

1984

HITACHI QUICK REFERENCE GUIDE TO INTEGRATED CIRCUITS AND DISCRETE SEMICONDUCTOR DEVICES

PREFERRED EUROPEAN TYPE-SELECTION

PROMILECT

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 **HITACHI**

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DISCRETE SEMICONDUCTOR DEVICES**

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NOTICE

The example of an applied circuit or combination with other equipment shown herein indicates characteristics and performance of a semiconductor-applied product. The Company shall assume no responsibility for a problem involving a patent caused when applying the descriptions in the example.

PRODUCT LIST

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------|
| <p>●</p> <p>This shows the product specifications at the present stage; A: Final specification B: Preliminary specification C: Under development</p> | <p>●</p> <p>Hitachi's products are listed in alphabetical order.</p> | <p>Outlines of functions of each product are described.</p> | <p>●</p> <p>Please refer to package illustrations at the end of a list.</p> | <p>●</p> <p>Please refer to the following material for details of each product. DB : Data Book DS : Data Sheet UM: User's Manual</p> | <p>●</p> | <p>●</p> <p>This shows the page of this manual on which outlines of each product are described.</p> |

LINEAR IC

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|-------|------------|----------------------------------------------|-----------|--------------|----------------------|------|
| A | HA1124 | TV Sound IF | Bipolar | DP-14 | DB | 43 |
| A | HA1125 | | | | | |
| A | HA1127 | 5 Transistor Arrays | | DG-14 | DB | |
| A | HA1137W | FM IF (Hi-Fi) | | DP-16 | DB | 44 |
| A | HA1156W | FM MPX (Hi-Fi) | | DP-14 | | 45 |
| A | HA1196 | | | | | |
| A | HA1197 | AM Tuner (Hi-Fi) | | DP-16 | | |
| A | HA1199 | AM Tuner (Car) | | | | 44 |
| A | HA11211 | FM/AM Tuner (Hi-Fi) | | DP-18 | | |
| A | HA11223W | FM MPX with Pilot Cancel | | | | 45 |
| A | HA11225 | FM IF (Hi-Fi) | | DP-16 | | 44 |
| A | HA11226 | Dolby-B N.R. System | | DP-18 | | |
| A | HA11226MP | | | MP-18 | | 45 |
| A | HA11423 | Color TV Deflection Signal Processor | | DP-16-2 | | |
| A | HA11423MP | | | MP-18 | 43 | |
| A | HA11431 | Color TV Luminance-chroma | | DP-28 | | |
| A | HA11431NT | | | DP-30S | 42 | |
| A | HA11436A | Color TV Lumi-chroma with Auto. Flesh | | DP-28 | | |
| A | HA11440A | Color TV Picture IF | | DP-16 | | |
| A | HA11441 | TV Synchronous Processor | | DP-16-2 | | |
| A | HA11441MP | | | MP-18 | 43 | |
| A | HA11442A | Color TV Picture IF | | DP-16 | | |
| A | HA11445A | TV Signal Processor | | | | |
| A | HA11458 | Color TV/VTR Picture IF & Sound IF | | DP-28 | | |
| A | HA11461NT | Color TV Picture IF, Sound IF & H/V | | DP-42S | | |
| A | HA11464 | Color TV Chroma Processor | | | | |
| A | HA11465A | TV Video Amp. | | DP-16-2 | | |
| A | HA11480 | Color TV Lumi-chroma with Auto. Flesh | | DP-28 | | |
| A | HA11485NT | VTR Picture IF & Sound IF | | DP-30S | DB | 42 |
| A | HA11720 | Video Camera Encoder | | DP-16-2 | | |
| A | HA11720MP | | | MP-18 | | |
| A | HA11731MP | Video Camera 3-ch Processing Amp. | | MP-28 | | |
| A | HA11734 | VTR Slow Motion Controller | | DP-22 | | |
| A | HA11741 | VTR Color Signal Processor | | DP-28 | | |
| A | HA11743AMP | Video Camera Integrator | | MP-28 | | |
| A | HA11744 | VTR Write & Read Amp. | | | | |
| A | HA11745 | VTR Video Amp. | | DP-28 | | |
| A | HA11747A | VTR Servo Controller | | | | |
| A | HA11749 | VTR Speed Controller | | DP-18 | | |
| A | HA11750 | VTR f_H Correction | | DP-16 | | |
| A | HA11751NT | VTR Phase Servo Controller | | DP-42S | | |
| A | HA11752 | VTR Playback Preamp. | | DP-16 | 43 | |
| A | HA11753NT | VTR Servo Controller | DP-42S | | | |
| A | HA11755 | VTR Video Reproducing Video Signal Processor | | | | |
| A | HA11756 | VTR Chroma Signal Processor | DP-28 | | | |
| A | HA11759PB | Video Camera Index Signal Processor | | | | |
| A | HA11760PB | Video Camera M-signal Processor | FP-36 | | | |
| A | HA11767AMP | Video Camera 4-ch Process | MP-44 | | | |
| A | HA11768 | VTR 2/4/6 Automatic Mode Change | | | | |
| A | HA11772 | VTR Preamp. | DP-16 | | | |
| A | HA11773MP | Video Camera AGC | | | | |
| A | HA11774MP | Video Camera Det. | | | | |
| A | HA11776AMP | Video Camera Encoder | MP-28 | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | |
|-------|------------|----------------------------------------------|-----------|--------------|----------------------|------|----|
| A | HA11777MP | Video Camera Auto White Balance | Bipolar | MP-28 | DB | 43 | |
| A | HA11781NT | VTR Chroma Signal Processor | | DP-30S | | | |
| A | HA11784NT | VTR Video & Playback | | MP-28 | | | |
| A | HA11789MP | Sound FM Mod. and Demod. for Hi-Fi VTR | | DP-30S | | | |
| A | HA11789NT | | | SP-8 | | 46 | |
| A | HA12002 | Protector of Speaker & Power Amp. | | DP-16 | | | |
| A | HA12005 | Audio Low Noise Amp. | | DP-16-2 | | | |
| A | HA12006 | Electronic Controller for Cassette Tape Deck | | DP-16 | | 45 | |
| A | HA12010 | Fluorescent Tube Bar Graph Display | | SP-7 | | | |
| A | HA12016 | FM MPX (Hi-Fi) | | DP-28 | | | |
| A | HA12017 | Audio Low Noise Amp. | | DP-16-2 | | 46 | |
| A | HA12020 | Audio Auto. Equalizer | | DP-16 | | | |
| A | HA12022 | Voltage Gain Controller | | DP-22 | | 45 | |
| A | HA12024 | Audio Tape Program Selector | | DP-28 | | | |
| A | HA12026 | FM MPX with VCO Stop (Car, Portable) | | DP-18 | | 45 | |
| A | HA12028 | Cassette Tape Deck REC/PLY System | | DP-16-2 | | | |
| A | HA12031 | FM MPX with Birdie Noise Cancel | | DP-16 | | 46 | |
| A | HA12032 | Quartz-lock Player Motor Controller | | DP-28 | | | |
| A | HA12033 | Microcomputer Output Extender for Tape Deck | | DP-16 | | 45 | |
| A | HA12034 | Audio Tape Program Selector | | DP-28 | | | |
| A | HA12035 | Audio 2-ch Auto. Equalizer | | DP-30S | | 45 | |
| A | HA12037NT | Cassette Tape Deck REC/PLY System | | DP-28 | | | |
| A | HA12038 | Dolby-B/C Noise Reduction | | DP-30S | | 46 | |
| A | HA12038NT | | | M-28 | | | |
| A | HA12038MP | | | DP-16-2 | | | |
| A | HA12039 | Auto. Volume Control (Car) | | DP-18 | | 45 | |
| A | HA12043 | CX Noise Reduction | | MP-18 | | | |
| A | HA12044 | | | DP-18 | | | |
| A | HA12045 | Dolby-B Noise Reduction | | MP-18 | | | 45 |
| A | HA12045MP | | | DP-18 | | | |
| A | HA12046 | | | MP-18 | | | |
| A | HA12046MP | | | DP-18 | | | |
| A | HA12047 | | | MP-18 | | | |
| A | HA12047MP | | | FP-18 | | | |
| A | HA12048FP | MP-18 | | 46 | | | |
| A | HA12048MP | DP-28 | | | | | |
| A | HA12049A | DAD Preamp. | | DP-30S | | 45 | |
| A | HA12051NT | Cassette Tape Deck REC/PLY System | | DP-18 | | | |
| A | HA12052C | Pre + Power Amp. (Headphone Stereo) | | FP-18 | | 45 | |
| A | HA12052CFP | | | MP-18 | | | |
| A | HA12052CMS | | DP-16 | | | | |
| A | HA12053 | DAD Sample & Hold | SP-21 | 45 | | | |
| A | HA12055V | Noise Cancel + FM MPX (Car) | DP-28 | | | | |
| A | HA12058 | Dolby-B/C Noise Reduction | MP-28 | 45 | | | |
| A | HA12058MP | | DP-30S | | | | |
| A | HA12058NT | | DP-16 | | | | |
| A | HA12063 | FM MPX | MP-18 | 45 | | | |
| B | HA12066MP | Noise Reduction for VHS Hi-Fi and 8 mm Video | DP-30S | | | | |
| A | HA12067NT | Fluorescent Tube Bar Graph Display | DP-16 | 44 | | | |
| A | HA12411 | FM IF System (Car) | DP-16 | | | | |
| A | HA12412 | FM IF System (Hi-Fi) | | | | | |
| A | HA12413 | FM/AM IF System (Modular, Portable) | | | | | |
| A | HA12417 | AM Tuner (Car) | SP-16 | | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | |
|-------|------------|----------------------------------------------|-----------|--------------|----------------------|------|--------|
| A | HA12418 | FM IF System (Car) | Bipolar | SP-16 | DB | 44 | |
| A | HA12427AV | AM Tuner (Car) | | SP-16 | | | |
| A | HA12428 | AM Tuner with Station Det. (Car) | | DP-16-2 | | | |
| A | HA12428V | AM Tuner with Station Det. (Car) | | SP-21 | | | |
| A | HA12429 | AM Radio Noise Canceller | | DP-18 | | | |
| A | HA12429MP | | | MP-18 | | | |
| A | HA12430 | FM/AM IF System (Modular, Portable) | | DP-20 | | | |
| A | HA12432 | AM Tuner with Station Det. (Hi-Fi) | | SP-21 | | | |
| A | HA12435V | FM IF System (Car) | | | | | |
| A | HA12436 | FM IF System (Portable) | | DP-16 | | | |
| B | HA12438 | FM Front-End for Car Radio | | FP-16 | | | |
| B | HA12439V | | | SP-16 | | | |
| A | HA1364 | TV Sound IF + Audio Out | | QP-12T | | | |
| A | HA1374 | Dual 2 ~ 3W Audio Power Amp. (8Ω) | | SP-10TA | | | |
| A | HA1374A | Dual 3 ~ 4W Audio Power Amp. (8Ω) | | | | | |
| A | HA1377 | Dual 5.8W Audio Power Amp. (4Ω) | | SP-12T | | | |
| A | HA1384 | 20W BTL Audio Power Amp. (4Ω) | | | | | |
| A | HA1388 | 18W BTL Audio Power Amp. (4Ω) | | | | | |
| A | HA1392 | Dual 4 ~ 7W Audio Power Amp. (4Ω) | | | | | |
| A | HA1393 | 19W BTL Audio Power Amp. (4Ω) | | | | | |
| A | HA1394 | Dual 6 ~ 8W Audio Power Amp. (8Ω) | | | | | |
| A | HA1396 | 20W BTL Audio Power Amp. (4Ω) | | | | | |
| A | HA1397 | 20W Audio Power Amp. (8Ω) | | | | | |
| A | HA13001 | Dual 5.5W (8Ω)/17.5W BTL (4Ω) | | | | | |
| A | HA13003 | PWM Amp. Modulator | | | | | DP-14T |
| A | HA13007 | Stepping Motor Driver | | | | | DP-16 |
| A | HA13102 | Dual 5.5W Audio Power Amp. (4Ω) | | | | | SP-12T |
| A | HA13108 | Dual 5.7W Audio Power Amp. (4Ω) | | SP-12T | | | |
| A | HA13405 | Motor Driver (3-phase) | | SP-23T | | | |
| A | HA13406W | | | | | | |
| A | HA13408 | 9-ch Printer Driver | | | | | |
| A | HA13412 | Motor Driver (3-phase) | | | | | |
| A | HA13421A | Stepping Motor Driver | | | | | |
| B | HA13425 | Fan Motor Driver | | | | | |
| B | HA13425MP | | | | | | |
| B | HA13426 | Winchester Spindle Motor Driver | | | | | |
| A | HA13429 | 8-channel Power Driver | | | | | |
| A | HA13431 | Spindle Motor Driver for 5.5 inches FDD | | | | | |
| A | HA13432 | Spindle Motor Driver for 3 to 3.5 inches FDD | | | | | |
| A | HA13432MP | | | | | | |
| A | HA16603P | Contactless Switch | | | | | |
| A | HA16605W | Burner Controller | | | | | |
| A | HA16613A | 8-bit Double Integral A/D Converter | | | | | |
| A | HA16617P | 8-ch Fluorescent Display Driver | | | | | |
| A | HA16617PJ | | | | | | |
| A | HA16619P | | | | | | |
| A | HA16619PJ | | | | | | |
| B | HA16628P | DC Motor Control (5-bit D/A Converter) | | | | | |
| B | HA16629P | DC Motor Control (F/V Converter) | | | | | |
| A | HA16631P | FDD Read Amp. | | | | | |
| A | HA16631MP | | | | | | |
| A | HA16632AP | FDD VFO | | | | | |
| A | HA16633P | 16-bit D/A Converter | | | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | | |
|-------|------------|----------------------------------|-----------------------|----------------------|----------------------|------|---------------------------------|-------|
| A | HA16636P | Ground Fault Interrupter | Bipolar Bi-CMOS | SP-8 | DB | | | |
| B | HA16640NT | FDD Write + Mechanizm Control | | DP-42S | | | | |
| B | HA16642MP | FDD Read/Write Circuit | | MP-44 | | | | |
| B | HA16642NT | | | DP-42S | | | | |
| A | HC16701 | Thermal Head Driver | Bipolar | Chip | DB | | | |
| A | HA17008RP | 8-bit D/A Converter | | DP-16 | | | | |
| A | HA17008RG | | | DG-16 | | | | |
| A | HA17012RP | | | 12-bit D/A Converter | | | DP-16 | |
| A | HA17012RG | DG-16 | | | | | | |
| A | HA17080PA | JFET-top Operational Amp. | | DP-8 | | | | |
| A | HA17080PS | | | DG-8 | | | | |
| A | HA17080GA | | | | | | | |
| A | HA17080GS | | | | | | | |
| A | HA17082PA | Dual JFET-top Operational Amp. | | DP-8 | | | | |
| A | HA17082PS | | | DG-8 | | | | |
| A | HA17082GA | | | | | | | |
| A | HA17082GS | | | | | | | |
| A | HA17083P | | | | | | | |
| A | HA17083PA | | | | | | | |
| A | HA17083G | | | | | | | |
| A | HA17083GA | | | | | | | |
| A | HA17084P | | | | | | Quad. JFET-top Operational Amp. | DP-14 |
| A | HA17084PA | | | | | | | |
| A | HA17301P | Quad. Operational Amp. | | DG-14 | | | | |
| A | HA17301G | | | DP-14 | | | | |
| A | HA17324 | | | | | | | |
| A | HA17324P | | | | | | | |
| A | HA17324G | | | | | | | |
| A | HA17339 | | | | | | Quad. Voltage Comparator | DP-14 |
| A | HA17358 | Dual Operation Amp. | | DP-8 | | | | |
| A | HA17393 | Dual Voltage Comparator | | | | | | |
| A | HA17408P | 8-bit D/A Converter | | DP-16 | | | | |
| A | HA17408G | | | DG-16 | | | | |
| A | HA17458 | Dual Operational Amp. | | DP-8 | | | | |
| A | HA17458PS | | | DG-8 | | | | |
| A | HA17458GS | | | | | | | |
| A | HA17524P | Switching Regulator Controller | | DP-16 | | | | |
| A | HA17524G | | | DG-16 | | | | |
| A | HA17555 | | Precision Timer | DP-8 | | | | |
| A | HA17555PS | DG-8 | | | | | | |
| A | HA17555GS | | | | | | | |
| A | HA17558 | | Dual Operational Amp. | DP-8 | | | | |
| A | HA17558PS | DG-8 | | | | | | |
| A | HA17558GS | | | | | | | |
| A | HA17715G | High Speed Operational Amp. | DG-14 | | | | | |
| A | HA17723 | Voltage Regulator | DP-14 | | | | | |
| A | HA17723G | | DG-14 | | | | | |
| A | HA17733 | Differential Video Amp. | DP-14 | | | | | |
| A | HA17733P | | DG-14 | | | | | |
| A | HA17733G | | | | | | | |
| A | HA17741 | General Purpose Operational Amp. | DP-8 | | | | | |
| A | HA17741PS | | DG-14 | | | | | |
| A | HA17741G | | | | | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | | |
|-------|------------|----------------------------------|-----------|--------------|----------------------|------|------|-----|
| A | HA17741GS | General Purpose Operational Amp. | Bipolar | DG-8 | DB | 46 | | |
| A | HA17747 | Dual Operational Amp. | | DP-14 | | | | |
| A | HA17747P | | | DG-14 | | | | |
| A | HA17747G | | | | | | | |
| A | HA17805 | Fixed Voltage Regulator | | 1A | | | 5V | |
| A | HA17805P | | | | | | 6V | |
| A | HA17806 | | | | | | 7V | |
| A | HA17806P | | | | | | 8V | |
| A | HA17807 | | | | | | 12V | |
| A | HA17807P | | | | | | 15V | |
| A | HA17808 | | | | | | 18V | |
| A | HA17808P | | | | | | 24V | |
| A | HA17812 | | | | | | 0.5A | 5V |
| A | HA17812P | | | | | | | 6V |
| A | HA17815 | | | | | | | 7V |
| A | HA17815P | | | | | | | 8V |
| A | HA17818 | | | | | | | 12V |
| A | HA17818P | | | | | | | 15V |
| A | HA17824 | | | | | | | 18V |
| A | HA17824P | | | | | | | 20V |
| A | HA178M05 | | | | | | | 24V |
| A | HA178M05P | | | | | | | |
| A | HA178M06 | | | | | | | |
| A | HA178M06P | | | | | | | |
| A | HA178M07 | | | | | | | |
| A | HA178M07P | | | | | | | |
| A | HA178M08 | | | | | | | |
| A | HA178M08P | | | | | | | |
| A | HA178M12 | | | | | | | |
| A | HA178M12P | | | | | | | |
| A | HA178M15 | | | | | | | |
| A | HA178M15P | | | | | | | |
| A | HA178M18 | | | | | | | |
| A | HA178M18P | | | | | | | |
| A | HA178M20 | | | | | | | |
| A | HA178M20P | | | | | | | |
| A | HA178M24 | | | | | | | |
| A | HA178M24P | | | | | | | |
| A | HA17901P | Quad. Voltage Comparator | DP-14 | | | | | |
| A | HA17901G | | DG-14 | | | | | |
| A | HA17902 | Quad. Operational Amp. | DP-14 | | | | | |
| A | HA17902P | | DG-14 | | | | | |
| A | HA17902G | | DP-8 | | | | | |
| A | HA17903PS | Dual Voltage Comparator | DG-8 | | | | | |
| A | HA17903GS | | DP-8 | | | | | |
| A | HA17904PS | Dual Operational Amp. | DG-8 | | | | | |
| A | HA17904GS | | DG-14 | | | | | |
| A | HA1807 | Dual Voltage Comparator | DP-8 | | | | | |
| A | HA1812PS | Universal Voltage Comparator | DG-8 | | | | | |
| A | HA1812GS | | DP-8 | | | | | |
| A | HA1813PS | Voltage Comparator | DP-8 | | | | | |
| A | HA1835P | 5V Regulator Controller | DP-14 | | | | | |
| A | HA19202 | 4-bit High Speed A/D Converter | DP-22 | | | | | |
| A | HA19203MP | | MP-18 | | | | | |
| C | HA19208G | 8-bit High Speed A/D Converter | DG-28A | | | | | |
| A | TBA800 | 5W Audio Power Amp. (16Ω) | QP-12TA | | | | | |
| A | TBA810AS | 7W Audio Power Amp. (4Ω) | | | | | | |
| A | TBA810SH | | | QP-12T | | | | |

DIGITAL IC

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|-----------------------|------------|-------------------------------------|----------------|--------------|----------------------|------|
| ■ HD10K Series | | | | | | |
| A | HD10101 | Quad. OR/NOR | Bipolar ECL | DG-16 | DB | 39 |
| A | HD10102 | Quad. 2-NOR | | | | |
| A | HD10104 | Quad. 2-AND | | | | |
| A | HD10105 | Triple 2-3-2-OR/NOR | | | | |
| A | HD10106 | Triple 4-3-3-NOR | | | | |
| A | HD10107 | Triple 2-Ex.-OR-NOR | | | | |
| A | HD10109 | Dual 4-5-OR/NOR | | | | |
| A | HD10110 | Dual 3-in, 3-out OR | | | | |
| A | HD10111 | Dual 3-in, 3-out NOR | | | | |
| A | HD10116 | Triple Line Receiver | | | | |
| A | HD10117 | Dual 2-wide, 2-3-OR-AND/OR-NAND | | | | |
| A | HD10118 | Dual 2-wide, 3-OR-AND | | | | |
| A | HD10119 | 4-wide, 4-3-3-OR/AND | | | | |
| A | HD10121 | 4-wide, OR-AND/OR-NAND | | | | |
| A | HD10124 | Quad. TTL-ECL Translator | | | | |
| A | HD10125 | Quad. ECL-TTL Translator | | | | |
| A | HD10130 | Dual Latch | | | | |
| A | HD10131 | Dual D Master-Slave F.F. | | | | |
| A | HD10132 | Dual Multiplexer | | | | |
| A | HD10133 | Quad. Latch | | | | |
| A | HD10134 | Multiplexer with Latch | | | | |
| A | HD10136 | Universal Hexadecimal Counter | | | | |
| A | HD10145 | 64-bit Register File (RAM) | | | | |
| A | HD10147 | 128-bit RAM | | | | |
| A | HD10148 | 64-bit RAM | | | | |
| A | HD10160 | 12-bit Parity Gen./Check | | | | |
| A | HD10161 | Binary-to-1-8 Decoder (Low) | | | | |
| A | HD10162 | Binary-to-1-8 Decoder (High) | | | | |
| A | HD10164 | 8-line Multiplexer | | | | |
| A | HD10174 | Dual 4-to-1 Multiplexer | | | | |
| A | HD10175 | Quint Latch | | | | |
| A | HD10179 | Look-ahead Carry Block | | | | |
| A | HD10180 | Dual Adder/Subtractor | | | | |
| A | HD10181 | 4-bit ALU/Function Gen. | DG-24 | | | |
| A | HD10209 | Dual High Speed 4-5-OR/NOR | DG-16 | | | |
| A | HD10210 | Dual High Speed 3-in, 3-out OR | | | | |
| A | HD10211 | Dual High Speed 3-in, 3-out NOR | | | | |
| A | HD10230 | Dual High Speed Latch | | | | |
| A | HD10231 | Dual High Speed D Master-Slave F.F. | | | | |

■ HD100K Series

| | | | | | | |
|---|-----------|------------------------------|----------------|--------|----|----|
| A | HD100101 | Triple 5-OR/NOR | Bipolar ECL | DG-24A | DB | 39 |
| A | HD100101F | | | FG-24 | | |
| A | HD100102 | Quint 2-OR/NOR | | DG-24A | | |
| A | HD100102F | | | FG-24 | | |
| A | HD100107 | Quint Exclusive-OR/NOR | | DG-24A | | |
| A | HD100107F | | | FG-24 | | |
| A | HD100112 | Quad. Driver | | DG-24A | | |
| A | HD100112F | | | FG-24 | | |
| A | HD100114 | Quint Diff. Line Receiver | | DG-24A | | |
| A | HD100114F | | | FG-24 | | |
| A | HD100117 | Triple 2-wide OR-AND/OR-NAND | | DG-24A | | |
| A | HD100117F | | | FG-24 | | |
| A | HD100118 | 5-wide OR-AND/OR-NAND | | DG-24A | | |
| A | HD100118F | | | FG-24 | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|-------|------------|--------------------------------|----------------|--------------|----------------------|------|
| A | HD100122 | 9-bit Buffer | Bipolar ECL | DG-24A | DB | 39 |
| A | HD100122F | | | FG-24 | | |
| A | HD100123 | Hex Bus Driver | | DG-24A | | |
| A | HD100123F | | | FG-24 | | |
| A | HD100124 | TTL to ECL Translator | | DG-24A | | |
| A | HD100124F | | | FG-24 | | |
| A | HD100125 | ECL to TTL Translator | | DG-24A | | |
| A | HD100125F | | | FG-24 | | |
| A | HD100126 | 9-bit Back Plane Driver | | DG-24A | | |
| A | HD100126F | | | FG-24 | | |
| A | HD100130 | Triple D-Latch | | DG-24A | | |
| A | HD100130F | | | FG-24 | | |
| A | HD100131 | Triple D-F.F. | | DG-24A | | |
| A | HD100131F | | | FG-24 | | |
| A | HD100136 | 4-stage Counter/S.R. | | DG-24A | | |
| A | HD100136F | | | FG-24 | | |
| A | HD100141 | 8-bit S.R. | | DG-24A | | |
| A | HD100141F | | | FG-24 | | |
| A | HD100142 | 4x4 Content Addressable Memory | | DG-24A | | |
| A | HD100142F | | | FG-24 | | |
| A | HD100145 | 16x4 R/W Register | | DG-24A | | |
| A | HD100145F | | | FG-24 | | |
| A | HD100150 | Hex D-Latch | | DG-24A | | |
| A | HD100150F | | | FG-24 | | |
| A | HD100151 | Hex D-F.F. | | DG-24A | | |
| A | HD100151F | | | FG-24 | | |
| A | HD100155 | Quad. Multiplexer/Latch | | DG-24A | | |
| A | HD100155F | | | FG-24 | | |
| A | HD100156 | Mask-Merge | | DG-24A | | |
| A | HD100156F | | | FG-24 | | |
| A | HD100158 | 8-bit Shift Matrix | | DG-24A | | |
| A | HD100158F | | | FG-24 | | |
| A | HD100160 | Dual Parity Gen./Checker | | DG-24A | | |
| A | HD100160F | | | FG-24 | | |
| A | HD100163 | Dual 8-input Multiplexer | | DG-24A | | |
| A | HD100163F | | | FG-24 | | |
| A | HD100164 | 16-input Multiplexer | | DG-24A | | |
| A | HD100164F | | | FG-24 | | |
| A | HD100165 | Universal Priority Encoder | | DG-24A | | |
| A | HD100165F | | | FG-24 | | |
| A | HD100166 | 9-bit Comparator | | DG-24A | | |
| A | HD100166F | | | FG-24 | | |
| A | HD100170 | Universal De-MPX/Decoder | | DG-24A | | |
| A | HD100170F | | | FG-24 | | |
| A | HD100171 | Triple 4-input MPX with Enable | DG-24A | | | |
| A | HD100171F | | FG-24 | | | |
| A | HD100179 | Carry Look-ahead | DG-24A | | | |
| A | HD100179F | | FG-24 | | | |
| A | HD100180 | Fast 6-bit Adder | DG-24A | | | |
| A | HD100180F | | FG-24 | | | |
| A | HD100181 | 4-bit Binary/BCD ALU | DG-24A | | | |
| A | HD100181F | | FG-24 | | | |
| A | HD100182 | 9-bit Wallace Tree Adder | DG-24A | | | |
| A | HD100182F | | FG-24 | | | |
| A | HD100183 | 2 x 8-bit Recode Multiplier | DG-24A | | | |
| A | HD100183F | | FG-24 | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|-------|------------|----------|-----------|--------------|----------------------|------|
|-------|------------|----------|-----------|--------------|----------------------|------|

■ Bipolar/Bi-CMOS Gate Array HD25/HD27 Series

| | | | | | | |
|---|-------|-----------------|------------|--------------------------------------------|-----|----|
| A | HD25L | 400 Gate Array | Bip. LSTTL | PGA-72 | D.S | 38 |
| A | HD27K | 200 Gate Array | Bip.-CMOS | DP-16, DP-20, DP-28, DP-42 | D.S | 39 |
| A | HD27L | 550 Gate Array | | DP-28, DP-42, DP-64S, FP-60, FP-80 | | |
| A | HD27P | 1000 Gate Array | | DP-28, DP-42, DP-64S, FP-60, FP-80, FP-100 | | |
| A | HD27Q | 1600 Gate Array | | | | |

■ CMOS LSI HD43000 Series

| | | | | | | |
|---|-----------|---------------------------------------|------|------------|-----|----|
| A | HD430196B | TV Remote Control Transmit | CMOS | DP-18 | DB | 43 |
| A | HD43160AH | LCD Controller | | FP-54 | DB | 40 |
| A | HD43360 | 4-bit Processor | CMOS | FP-60A | D.S | 40 |
| A | HD43365 | | | | | |
| A | HD43380 | | | | | |
| A | HD43381 | | | | | |
| A | HD43550 | Video Camera Sync. Gen. | CMOS | FP-60 | DB | 43 |
| A | HD44007A | | | | | |
| A | HD440072A | | | | | |
| A | HD440361 | | | | | |
| A | HD440362 | Playback for PCM Digital Audio | CMOS | FP-60 | DB | 46 |
| A | HD44037 | Error Correct. for PCM Digital Audio | | | | |
| A | HD440381 | Recorder for PCM Digital Audio | | DP-8 | | |
| A | HD440382 | | | DP-8 | | |
| A | HD44042 | Preamp. for TV Remote Control Receiv. | CMOS | FP-60 | DB | 40 |
| A | HD44100H | LCD Driver (with Bidirectional S.R.) | | | | |
| A | HD44101H | LCD Controller/Driver | | | | |
| A | HD44102CH | LCD Segment Driver | | | | |
| A | HD44103CH | LCD Common Driver | CMOS | FP-44 | DB | 41 |
| B | HD44105H | | | | | |
| A | HD44211A | 1-chip CODEC/Filter | CMOS | DC-24 | DB | 41 |
| A | HD44212A | | | | | |
| A | HD44222 | | | μ -law | | |
| A | HD44231B | | | A-law | | |
| C | HD44231C | | | μ -law | | |
| A | HD44232B | | | A-law | | |
| C | HD44232C | | | μ -law | | |
| A | HD44233B | | | A-law | | |
| C | HD44233C | | | μ -law | | |
| A | HD44234B | | | A-law | | |
| C | HD44234C | | | μ -law | | |
| A | HD44235 | | | A-law | | |
| C | HD44235C | μ -law | | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | |
|-------|------------|----------------------------------------|-----------|--------------------------------------|----------------------|------|------------|
| A | HD44236 | 1-chip CODEC/Filter | CMOS | DG-16 | DB | 41 | |
| C | HD44236C | | | | | | μ -law |
| A | HD44237 | | | | | | A-law |
| C | HD44237C | | | μ -law | | | |
| A | HD44238 | | | DG-20 | | | |
| C | HD44238C | | | | | | FP-80 |
| C | HD44240C | FP-100 | | | | | |
| A | HD44780 | LCD Controller/Driver (LCD-II) | CMOS | FC-80 | U.M | 42 | |
| A | HD44797E | LCD-IV Evaluation Chip | | | | | |
| A | HD44850E | 4-bit μ -com Evaluation Chip | | | | | |
| A | HD44857E | | | | | | |
| A | HD44881 | | | 128k Mask ROM (for Speech Synthesis) | | | |
| A | HD44883 | EPROM Interface (for Speech Synthesis) | | DP-28 | | | |
| | | | DP-40 | | | | |

■ CMOS Gate Array HD61 Series

| | | | | | | |
|---|---------------|---------------------------------------------|------|----------------------------------------------------|-----|----|
| A | HD61J Series | 500 Gates, I/O 50 | CMOS | DP-28, DP-42, FP-54, DC-28, DC-40 | D.S | 38 |
| A | HD61K Series | 1000 Gates, I/O 68 | | DP-28, DP-42, DP-64S, FP-80, DC-28, DC-40 | | |
| A | HD61L Series | 1600 Gates, I/O 68 | | DP-28, DP-42, DP-64S, FP-80, DC-28, DC-40, PGA-72A | | |
| B | HD61MM Series | 2500 Gates, I/O 104 (RAM on chip available) | | DP-64S, FP-100, DC-28, DC-40, PGA-120 | | |

■ CMOS LSI HD6100 Series

| | | | | | | |
|---|----------|-----------------------------------|------|--------|------|----|
| A | HD61100 | LCD Driver (Duty: Static ~ 1/64) | CMOS | FP-100 | D.S | 40 |
| B | HD61102 | LCD Segment Driver | | | | |
| A | HD61103 | LCD Common Driver | | | | |
| A | HD61602 | LCD Segment Driver (Static ~ 1/4) | | FP-80 | DB | 40 |
| A | HD61603 | LCD Segment Driver (Static) | | | | |
| A | HD61810B | High Performance Signal Processor | | DC-40 | U.M | 40 |
| A | HD61830 | LCD Controller | | FP-60 | DB | 40 |
| A | HD61885 | 1-chip Speech Synthesizer | | DP-28 | U.M. | 42 |
| A | HD61887 | | | FP-54 | | |
| A | HD61901H | DAD Signal Processor | | FP-60 | DB | 46 |
| A | HD61902H | | | | | |
| A | HD61927 | Video Camera Sync. Signal Gen. | | DP-22 | | — |

MICROCOMPUTER

■ 4-bit HMCS40 Series

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | | |
|-------|-----------------------|----------------------------|--------------------------------------|---------------|----------------------|------|---------------------------|---------------------------|
| A | HMCS44C (HD44800) | 4-bit 1-chip Microcomputer | CMOS | DP-42, DP-42S | U.M | 34 | | |
| A | HMCS44CL (HD44808) | | | | | | ROM 2KB, RAM 160B, I/O 32 | |
| A | HMCS45C (HD44820) | | CMOS | DP-64S, FP-54 | | | | |
| A | HMCS45CL (HD44828) | | | | | | ROM 4KB, RAM 160B, I/O 44 | |
| A | HMCS46C (HD44840) | | CMOS | DP-42, DP-42S | | | | |
| A | HMCS46CL (HD44848) | | | | | | ROM 4KB, RAM 256B, I/O 32 | |
| A | HMCS47C (HD44860) | | CMOS | DP-64S, FP-54 | | | | |
| A | HMCS47CL (HD44868) | | | | | | ROM 4KB, RAM 256B, I/O 44 | |
| B | HMCS402C (HD614020) | | 4-bit 1-chip Microm. with LCD Driver | CMOS | | | DP-64S, FP-54 | |
| C | HMCS402CL | | | | | | | ROM 2KB, RAM 160B, I/O 58 |
| C | HMCS402AC | | | | | | | ROM 4KB, RAM 256B, I/O 58 |
| B | HMCS404C (HD414040) | | | | | | | |
| C | HMCS404CL | | | | | | | |
| A | LCD-III (HD44790/795) | ROM 2KB, RAM 160B, I/O 32 | FP-80 | | | | | |
| B | LCD-IV (HD613900) | ROM 4KB, RAM 256B, I/O 32 | | | | | | |

■ 8-bit CMOS 1-chip MCU & Peripheral HD6300 Series

| | | | | | | | | |
|---|-------------|------------------|---------------------------|--------|------|-------|----|----|
| A | HD6301V1P | 8-bit 1-chip MCU | ROM 4KB, RAM 128B, I/O 29 | 1MHz | CMOS | DP-40 | DB | 34 |
| A | HD6301V1F | | | | | FP-54 | | |
| A | HD6301V1CG | | | | | CG-40 | | |
| A | HD63A01V1P | | | 1.5MHz | | DP-40 | | |
| A | HD63A01V1F | | | | | FP-54 | | |
| A | HD63A01V1CG | | | | | CG-40 | | |
| A | HD63B01V1P | | | 2MHz | | DP-40 | | |
| A | HD63B01V1F | | | | | FP-54 | | |
| A | HD63B01V1CG | | | | | CG-40 | | |

| Spec. | Device No. | Function | | | Structure | Package code | Material for details | Page | |
|-------|-------------|----------------------------------|----------------------------------|---------------------------------|-----------|--------------|----------------------|------|--------|
| A | HD6301XOP | 8-bit 1-chip MCU | ROM 4KB, RAM 192B, I/O 53 | 1MHz | CMOS | DP-64S | DB | 34 | |
| A | HD6301XOF | | | | | FP-80 | | | |
| A | HD63A01XOP | | | 1.5MHz | | DP-64S | | | |
| A | HD63A01XOF | | | | | FP-80 | | | |
| A | HD630B01XOP | | | 2MHz | | DP-64S | | | |
| A | HD63B01XOF | | | | | FP-80 | | | |
| B | HD6301YOP | | ROM 16KB, RAM 256B I/O 53 | 1MHz | | DP-64S | | | |
| B | HD6301YOF | | | | | FP-64 | | | |
| B | HD63A01YOP | | | 1.5MHz | | DP-64S | | | |
| B | HD63A01YOF | | | | | FP-64 | | | |
| B | HD63B01YOP | | | 2MHz | | DP-64S | | | |
| B | HD63B01YOF | | | | | FP-64 | | | |
| A | HD63P01M1 | | EPROM on package | 1MHz | | DC-40P | | | |
| B | HD63PA01M1 | | | 1.5MHz | | | | | |
| B | HD63PB01M1 | | | 2MHz | | | | | |
| A | HD6303RP | | ROM-less RAM 128B, I/O 13 | 1MHz | | DP-40 | | | |
| A | HD6303RF | | | | | | | | FP-54 |
| A | HD6303RCG | | | | | | | | CG-40 |
| A | HD63A03RP | | | 1.5MHz | | DP-40 | | | |
| A | HD63A03RF | | | | | | | | FP-54 |
| A | HD63A03RCG | | | | | | | | CG-40 |
| A | HD63B03RP | | | 2MHz | | DP-40 | | | |
| A | HD63B03RF | | | | | | | | FP-54 |
| A | HD63B03RCG | | | | | | | | CG-40 |
| A | HD6303XP | | | ROM-less RAM 192B, I/O 24 | | 1MHz | | | DP-64S |
| A | HD6303XF | | | | | | | | FP-80 |
| A | HD63A03XP | | | | | 1.5MHz | | | DP-64S |
| A | HD63A03XF | | | | | FP-80 | | | |
| A | HD63B03XP | | 2MHz | DP-64S | | | | | |
| A | HD63B03XF | | | | | FP-80 | | | |
| B | HD6303YOP | | ROM-less, RAM 256B, I/O 24 | 1MHz | | DP-64S | | | |
| B | HD6303YOF | | | | | FP-64 | | | |
| B | HD63A03YOP | | | 1.5MHz | | DP-64S | | | |
| B | HD63A03YOF | | | | | FP-64 | | | |
| B | HD63B03YOP | | | 2MHz | | DP-64S | | | |
| B | HD63B03YOF | | | | | FP-64 | | | |
| B | HD6305UOP | | ROM 2KB, RAM 128B, I/O 31 | 1MHz | | DP-40 | | | |
| B | HD63A05UOP | | | 1.5MHz | | | | | |
| B | HD63B05UOP | | | 2MHz | | | | | |
| C | HD6305VOP | | ROM 4KB, RAM 192B, I/O 31 | 1MHz | | | | | |
| C | HD63A05VOP | 1.5MHz | | | | | | | |
| C | HD63B05VOP | 2MHz | | | | | | | |
| A | HD6305XOP | ROM 4KB, RAM 128B, I/O 55 | 1MHz | DP-64S | | | | | |
| A | HD6305XOF | | | FP-64 | | | | | |
| A | HD63A05XOP | | 1.5MHz | DP-64S | | | | | |
| A | HD63A05XOF | | | FP-64 | | | | | |
| A | HD63B05XOP | | 2MHz | DP-64S | | | | | |
| A | HD63B05XOF | | | FP-64 | | | | | |
| B | HD6305X1P | ROM 4KB, RAM 128B, I/O 31 | 1MHz | DP-64S | | | | | |
| B | HD6305X1F | | | FP-64 | | | | | |
| B | HD63A05X1P | | 1.5MHz | DP-64S | | | | | |
| B | HD63A05X1F | | | FP-64 | | | | | |
| B | HD63B05X1P | | 2MHz | DP-64S | | | | | |
| B | HD63B05X1F | | | FP-64 | | | | | |
| B | HD6305X2P | ROM-less, RAM 128B, I/O 31 | 1MHz | DP-64S | | | | | |
| B | HD6305X2F | | | FP-64 | | | | | |
| B | HD63A05X2P | | 1.5MHz | DP-64S | | | | | |
| B | HD63A05X2F | | FP-64 | | | | | | |

| Spec. | Device No. | Function | | | Structure | Package code | Material for details | Page | | | |
|-------|------------|----------------------------------------|----------------------------|---------------------------------------------------|-----------|--------------|----------------------|------|-------|----|---|
| B | HD63B05X2P | 8-bit 1-chip MCU | ROM-less, RAM 128B, I/O 31 | 2MHz | CMOS | DP-64S | DB | 34 | | | |
| B | HD63B05X2F | | | ROM 4KB, RAM 96B, I/O 20 8-bit A/D, LCD Driver | | | | | FP-64 | | |
| A | HD63L05F1 | | | | | FP-80 | | | | | |
| B | HD63L05F2 | | | | | | | | | | |
| C | HD63B09P | 8-bit High-end MPU (external clock) | | 2MHz | | DP-40 | | DB | - | | |
| C | HD63C09P | | | 2.5MHz | | | | | | | |
| C | HD63D09P | | | 3MHz | | | | | | | |
| C | HD63B09EP | | | 2MHz | | | | | | | |
| C | HD63C09EP | | | 2.5MHz | | | | | | | |
| C | HD63D09EP | | | 3MHz | | | | | | | |
| C | HD6318P | Real Time Clock + RAM | | 1MHz | DP-24 | DB | - | | | | |
| C | HD63A18P | | | 1.5MHz | | | | | | | |
| A | HD6321P | Peripheral Interface Adapter | | 1MHz | DP-40 | | | | | DB | - |
| A | HD6321FP | | | | FP-54 | | | | | | |
| A | HD63A21P | | | 1.5MHz | DP-40 | | | | | | |
| A | HD63A21FP | | | | FP-54 | | | | | | |
| A | HD63B21P | | | 2MHz | DP-40 | | | | | | |
| A | HD63B21FP | | | | FP-54 | | | | | | |
| B | HD6340P | Program. Timer Module | | 1MHz | DP-28 | | | DB | - | | |
| B | HD63A40P | | | 1.5MHz | | | | | | | |
| B | HD63B40P | | | 2MHz | | | | | | | |
| B | HD6350P | Async. Communication Interface Adapter | | 1MHz | DP-24 | DB | - | | | | |
| B | HD6350FP | | | | FP-24 | | | | | | |
| B | HD63A50P | | | 1.5MHz | DP-24 | | | | | | |
| B | HD63A50FP | | | | FP-24 | | | | | | |
| B | HD63B50P | | | 2MHz | DP-24 | | | | | | |
| B | HD63B50FP | | | | FP-24 | | | | | | |
| A | HD146818P | Real Time Clock + RAM | | | DP-24 | | | | | DB | - |
| A | HD146818FP | | | | FP-24 | | | | | | |

■ 8-bit MPU/MCU & Peripheral HD6800 Series

| | | | | | | | | |
|---|--------------|------------------|----------------------------|----------------------------|-------|----|--------|--------|
| A | HD6800P | 8-bit MPU | | 1MHz | NMOS | DB | 35 | |
| A | HD68A00P | | | 1.5MHz | | | | |
| A | HD68B00P | | | 2MHz | | | | |
| A | HD6801S0P | 8-bit 1-chip MCU | ROM 2KB, RAM 128B, I/O 29 | | | | | DP-40 |
| A | HD6801S5P | | | | | | | |
| A | HD6801V0P | | ROM 4KB, RAM 128B, I/O 29 | | | | | |
| A | HD6801V5P | | | | | | | |
| A | HD68P01V07 | EPROM on Package | | | | | | DC-40P |
| B | HD68P01V07-1 | | | | | | | |
| A | HD68P01M0 | | | | | | | |
| B | HD68P01M0-1 | | | | | | | |
| A | HD6802P | 8-bit MPU | | Clock + RAM 128B | DP-40 | | | |
| A | HD6802WP | | | Clock + RAM 256B | | | | |
| A | HD6803P | 8-bit 1-chip MCU | ROM-less, RAM 128B, I/O 13 | | DB | 35 | | |
| A | HD6803P-1 | | | | | | | |
| A | HD6805S1P | | | ROM 1.1KB, RAM 64B, I/O 20 | | | | DP-28 |
| A | HD6805S6P | | | ROM 1.8KB, RAM 64B, I/O 20 | | | | |
| A | HD6805U1P | | | ROM 2KB, RAM 96B, I/O 32 | | | | DP-40 |
| A | HD6805V1P | | | ROM 4KB, RAM 96B, I/O 32 | | | | |
| C | HD6805T2P | | | ROM 2.5KB, RAM 64B, I/O 19 | | | | DP-28 |
| A | HD6805W1P | | | ROM 4KB, RAM 96B, I/O 29 | | | | DP-40 |
| C | HD6805X0P | | | ROM 4KB, RAM 96B, I/O 55 | | | | |
| C | HD6805X1P | | | ROM 4KB, RAM 96B, I/O 31 | | | | DP-64S |
| C | HD6805X2P | | | ROM-less, RAM 96B, I/O 31 | | | | |
| A | HD68P05M0 | | | EPROM on Package | | | DC-40P | |
| A | HD68P05V07 | | | | | | | |
| B | HD68P05W0 | | | | | | | |

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page | |
|-------|------------|-------------------------------------------|-----------|--------------|----------------------|------|--------|
| A | HD6809P | 8-bit High-end MPU | NMOS | DP-40 | DB | - | |
| A | HD68A09P | | | | | | 1MHz |
| A | HD68B09P | | | | | | 1.5MHz |
| A | HD6809EP | 8-bit High-end MPU (external Clock) | | | | | 2MHz |
| A | HD68A09EP | | | | | | 1MHz |
| A | HD68B09EP | | | | | | 1.5MHz |
| A | HD6821P | Peripheral Interface Adapter | | | | | 2MHz |
| A | HD68A21P | | | | | | 1MHz |
| A | HD68B21P | | | | | | 1.5MHz |
| A | HD6840P | Programmable Timer Module | | | | | 2MHz |
| A | HD68A40P | | | | | | 1MHz |
| A | HD68B40P | | | | | | 1.5MHz |
| A | HD6843P | Floppy Disk Controller | | | | | 2MHz |
| A | HD68A43P | | | | | | 1MHz |
| A | HD68B43P | | | | | | 1.5MHz |
| A | HD6844P | DMA Controller | | | | | 2MHz |
| A | HD68A44P | | | | | | 1MHz |
| A | HD68B44P | | | | | | 1.5MHz |
| A | HD6845P | 3MHz CRT Controller | | | | | 2MHz |
| A | HD68A45P | | | | | | 1MHz |
| A | HD68B45P | | | | | | 1.5MHz |
| A | HD6845SP | 3.7MHz CRT Controller | | | | | 2MHz |
| A | HD68A45SP | | | | | | 1MHz |
| A | HD68B45SP | | | | | | 1.5MHz |
| A | HD6846P | Combi. ROM-I/O-Timer | | 2MHz | | | |
| A | HD6850P | Async. Communication Interface Adapter | | 1MHz | | | |
| A | HD68A50P | | | 1.5MHz | | | |
| A | HD6852P | | | 1MHz | | | |
| A | HD68A52P | Sync. Serial Data Adapter | | 1.5MHz | | | |
| | | | | | | | DP-24 |

■ 8-bit Peripheral

| | | | | | | | |
|---|-------------|------------------------------|------|-------|----|---|--------|
| A | HD46508P | Analog Data Acquisition Unit | NMOS | DP-40 | DB | - | |
| A | HD46508P-1 | | | | | | 1MHz |
| A | HD46508AP | | | | | | 1.5MHz |
| A | HD46508AP-1 | | | | | | 1MHz |

■ 16-bit MPU & Peripheral HD68000 Series

| | | | | | | | | | | |
|---|------------|-----------------------|------|----------------|--------|---|-------|-------|----|---|
| A | HD68000-4 | 16-bit Microprocessor | NMOS | DC-64 | DB | - | | | | |
| A | HD68000-6 | | | | | | 4MHz | | | |
| A | HD68000-8 | | | | | | 6MHz | | | |
| A | HD68000-10 | | | | | | 8MHz | | | |
| A | HD68000-12 | | | | | | 10MHz | | | |
| A | HD68000Y4 | | | | | | 12MHz | | | |
| A | HD68000Y6 | | | | | | 4MHz | | | |
| A | HD68000Y8 | | | | | | 6MHz | | | |
| A | HD68000Y10 | | | 8MHz | | | | | | |
| A | HD68000Y12 | | | 10MHz | | | | | | |
| A | HD68000Z4 | | | 12MHz | | | | | | |
| A | HD68000Z6 | | | 4MHz | | | | | | |
| A | HD68000Z8 | | | 6MHz | | | | | | |
| A | HD68000Z10 | | | 8MHz | | | | | | |
| A | HD68000Z12 | | | 10MHz | | | | | | |
| A | HD68450-4 | | | DMA Controller | | | NMOS | DC-64 | DB | - |
| A | HD68450-6 | 4MHz | | | | | | | | |
| A | HD68450-8 | 6MHz | | | | | | | | |
| A | HD68450-10 | 8MHz | | | | | | | | |
| B | HD68450-12 | 10MHz | | | | | | | | |
| C | HD68450-12 | 12MHz | | | | | | | | |
| A | HD68450Y4 | 4MHz | | | | | | | | |
| A | HD68450Y6 | 6MHz | | | | | | | | |
| A | HD68450Y8 | 8MHz | | | | | | | | |
| B | HD68450Y10 | 10MHz | | | | | | | | |
| C | HD68450Y12 | 12MHz | | | | | | | | |
| | | | | | PGA-68 | | | | | |

■ 4-bit Evaluation

| | | | | | | | |
|---|-----------|------------------|----------------|---|---|-----|----|
| A | H40EVKIT | Evaluation Kit | HMCS42 ~ 45C | - | - | U.M | 34 |
| A | H40EVKIT2 | | HMCS40 Series | | | | |
| B | H40EVKIT4 | | LCD-III/IV | | | | |
| A | H40MIX1 | Emulator Set | HMCS40 Series | | | | |
| A | H40MIX2 | | LCD-III | | | | |
| A | H40MIX4 | | LCD-III/IV | | | | |
| B | H400CMIX1 | Evaluation Board | HMCS400 Series | | | | |
| A | H40LCEV00 | | LCD-III | | | | |
| B | H40LCEV04 | | LCD-III/IV | | | | |
| A | H43EV00 | | HMCS42/43 | | | | |
| A | H45CEV00 | | HMCS42 ~ 45C | | | | |
| B | H400CEV01 | | HMCS400 Series | | | | |

■ 8-bit Evaluation

| | | | | | | | |
|---|----------|-------------------------|------------------------|---|---|-----|----|
| A | H31EV00 | Evaluation Board | HD6301V | - | - | U.M | 34 |
| B | H31EV01 | | HD6301X | | | | |
| A | H31EVT1 | Evaluation Kit | HD6301V, 6303R | | | | |
| A | H31MIX1 | | HD6301V | | | | |
| A | H31MIX2 | Emulator Set | HD6301X | | | | |
| C | H31MIX3 | | HD6301Y | | | | |
| A | H35EV00 | Evaluation Board | HD6305X | | | | |
| A | H35EVT1 | Evaluation Kit | HD6305X | | | | |
| A | H35MIX1 | Emulator Set | HD6305X | | | | |
| A | H3L5EV00 | Evaluation Board | HD63L05 | | | | |
| A | H3L5EVT1 | Evaluation Kit | HD63L05 | | | | |
| A | H3L5MIX1 | Emulator Set | HD63L05 | | | | |
| A | H61EV01 | Evaluation Board | HD6801S/V | | | | |
| A | H61EVT2 | Evaluation Kit | HD6801S/V, 6803 | | | | |
| A | H61MIX1 | Emulator Set | HD6801S/V | | | | |
| A | H64EMB01 | Extendible Memory Board | HD6801S/V, 6803, 6301V | | | | |
| C | H65EV04 | Evaluation Board | HD6805X | | | | |
| A | H65MIX1 | Emulator Set | HD6805S/U/V | | | | |
| A | H65MIX2 | | HD6805W | | | | |
| C | H65MIX4 | | HD6805X | | | | |
| A | H65EVT2 | Evaluation Kit | HD6805S/U/V | | | | |
| A | H65EVT3 | | HD6805W | | | | |
| C | H65EVT4 | | HD6805X | | | | |

■ Development System

| | | | | | | |
|---|--------|-------------------------------------------|---|---|-----|----|
| A | H68SD5 | 4-bit and 8-bit Single-chip Microcom. Use | - | - | U.M | 35 |
|---|--------|-------------------------------------------|---|---|-----|----|

IC MEMORY

■ Bipolar RAM

| Spec. | Device No. | Function | Access Time (ns)max | Structure | Package code | Material for details | Page |
|-------|-------------|-------------------------|---------------------|-----------|--------------|----------------------|------|
| A | HM10414 | 256 × 1 RAM (ECL 10K) | 10 | Bipolar | DG-16 | DB | 37 |
| A | HM10414-1 | | 8 | | | | |
| A | HM2110 | 1024 × 1 RAM (ECL 10K) | 35 | | DG-16A | | |
| A | HM2110-1 | | 25 | | | | |
| A | HM2112 | | 10 | | | | |
| A | HM2112-1 | | 8 | | | | |
| A | HM10422 | 256 × 4 RAM (ECL 10K) | 10 | | DG-24A | | |
| A | HM10422-7 | | 7 | | | | |
| A | HM10470 | 4096 × 1 RAM (ECL 10K) | 25 | | DG-18 | | |
| A | HM10470-1 | | 15 | | | | |
| A | HM10470-20 | | 20 | | | | |
| A | HM2142 | | 10 | | | | |
| A | HM10474 | 1024 × 4 RAM (ECL 10K) | 25 | | DG-24A | | |
| B | HM10474-8 | | 8 | | | | |
| B | HM10474-10 | | 10 | | | | |
| A | HM10474-15 | | 15 | | | | |
| A | HM10480 | 16384 × 1 RAM (ECL 10K) | 25 | | DG-20 | | |
| A | HM10480F | | | | FG-20 | | |
| B | HM10484-15 | 4096 × 4 RAM (ECL 10K) | 15 | | DG-28A | | |
| B | HM10484-20 | | 20 | | | | |
| A | HM100415 | 1024 × 1 RAM (ECL 100K) | 10 | | DG-16 | | |
| A | HM100415CC | | | | CC-24 | | |
| A | HM100422 | 256 × 4 RAM (ECL 100K) | 10 | | DG-24A | | |
| A | HM100422F | | | | FG-24 | | |
| A | HM100422CC | | | | CC-24 | | |
| A | HM100470 | | | | 25 | | |
| A | HM100470-15 | 4096 × 1 RAM (ECL 100K) | 15 | | DG-18 | | |
| A | HM100474 | | 25 | | | | |
| A | HM100474-15 | 1024 × 4 RAM (ECL 100K) | 15 | DG-24A | | | |
| A | HM100474F | | 25 | | | | |

| Spec. | Device No. | Function | Access Time (ns)max | Structure | Package code | Material for details | Page |
|-------|--------------|-------------------------|---------------------|-----------|--------------|----------------------|------|
| A | HM100474F-15 | 1024 × 4 RAM (ECL 100K) | 15 | Bipolar | FG-24 | DB | 37 |
| A | HM100480 | | 25 | | DG-20 | | |
| B | HM100480-15 | | 15 | | | | |
| B | HM100480-20 | | 20 | | | | |
| A | HM100480F | | 25 | | | | |
| B | HM100480F-15 | | 15 | | | | |
| B | HM100480F-20 | 20 | FG-20 | | | | |
| C | HM100484-15 | 4096 × 4 RAM (ECL 100K) | 15 | | DG-28A | | |
| C | HM100484-20 | | 20 | | | | |
| A | HM2510 | 1024 × 1 RAM (TTL) | 70 | | DG-16A | | |
| A | HM2510-1 | | 45 | | | | |
| A | HM2510-2 | | 35 | | | | |
| A | HM2511 | | 70 | | | | |
| A | HM2511-1 | | 45 | | | | |
| A | HM25289 | | 35 | | | | |
| | | 16 × 4 RAM (TTL) | 35 | | DS | — | |

■ MOS RAM

| | | | | | | | |
|---|--------------|-----------------------|--------|-------|--------|----|----|
| A | HM48416AP-12 | 16384 × 4 Dynamic RAM | 120 | NMOS | DP-18 | DB | 36 |
| A | HM48416AP-15 | | 150 | | DG-16A | | |
| A | HM48416AP-20 | | 200 | | | | |
| A | HM4864-2 | 150 | DP-16 | | | | |
| A | HM4864-3 | 200 | | | | | |
| A | HM4864P-2 | 150 | | | | | |
| A | HM4864P-3 | 200 | DG-16A | | | | |
| A | HM4864A-12 | 120 | | | | | |
| A | HM4864A-15 | 150 | | | | | |
| A | HM4864A-20 | 200 | DP-16 | | | | |
| A | HM4864AP-12 | 120 | | | | | |
| A | HM4864AP-15 | 150 | | | | | |
| A | HM4864AP-20 | 200 | CG-18 | | | | |
| A | HM4864ACG-12 | 120 | | | | | |
| A | HM4864ACG-15 | 150 | | | | | |
| A | HM4864ACG-20 | 200 | DG-16A | | | | |
| A | HM50256-12 | 120 | | | | | |
| A | HM50256-15 | 150 | | | | | |
| A | HM50256-20 | 200 | DP-16A | | | | |
| A | HM50256P-12 | 120 | | | | | |
| A | HM50256P-15 | 150 | | | | | |
| A | HM50256P-20 | 200 | DG-16A | | | | |
| A | HM50257-12 | 120 | | | | | |
| A | HM50257-15 | 150 | | | | | |
| A | HM50257-20 | 200 | DP-16A | | | | |
| A | HM50257P-12 | 120 | | | | | |
| A | HM50257P-15 | 150 | | | | | |
| A | HM50257P-20 | 200 | CMOS | DG-24 | | | |
| A | HM6116-2 | 120 | | | | | |
| A | HM6116-3 | 150 | | | | | |
| A | HM6116-4 | 200 | | | | | |
| A | HM6116P-2 | 120 | | | | | |
| A | HM6116P-3 | 150 | | | | | |
| A | HM6116P-4 | 200 | | | | | |
| A | HM6116FP-2 | 120 | | | | | |
| A | HM6116FP-3 | 150 | | | | | |
| A | HM6116FP-4 | 200 | | | | | |
| A | HM6116CG-2 | 120 | | | | | |
| A | HM6116CG-3 | 150 | | | | | |
| A | HM6116CG-4 | 200 | | | | | |
| A | HM6116L-2 | 120 | | | | | |

| Spec. | Device No. | Function | Access Time (ns)max | Structure | Package code | Material for details | Page | |
|-------|---------------|----------------------|---------------------|-----------|--------------|----------------------|------|-------|
| A | HM6116L-3 | 2048 x 8 Static RAM | 150 | CMOS | DG-24 | DB | 36 | |
| A | HM6116L-4 | | 200 | | | | | |
| A | HM6116LP-2 | | 120 | | | | | |
| A | HM6116LP-3 | | 150 | | | | | |
| A | HM6116LP-4 | | 200 | | | | | |
| A | HM6116LFP-2 | | 120 | | | | | |
| A | HM6116LFP-3 | | 150 | | | | | |
| A | HM6116LFP-4 | | 200 | | | | | |
| A | HM6116AP-12 | | 120 | | | | | |
| A | HM6116AP-15 | | 150 | | | | | |
| A | HM6116AP-20 | | 200 | | | | | |
| A | HM6116ASP-12 | | 120 | | | | | |
| A | HM6116ASP-15 | | 150 | | | | | |
| A | HM6116ASP-20 | | 200 | | | | | |
| A | HM6116ALP-12 | | 120 | | | | | |
| A | HM6116ALP-15 | | 150 | | | | | |
| A | HM6116ALP-20 | | 200 | | | | | |
| A | HM6116ALSP-12 | | 120 | | | | | |
| A | HM6116ALSP-15 | | 150 | | | | | |
| A | HM6116ALSP-20 | | 200 | | | | | |
| A | HM6117P-3 | | 150 | | | | | |
| A | HM6117P-4 | | 200 | | | | | |
| A | HM6117FP-3 | | 150 | | | | | |
| A | HM6117FP-4 | | 200 | | | | | |
| A | HM6117LP-3 | | 150 | | | | | |
| A | HM6117LP-4 | | 200 | | | | | |
| A | HM6117LFP-3 | | 150 | | | | | |
| A | HM6117LFP-4 | | 200 | | | | | |
| A | HM6147H-35 | 4096 x 1 Static RAM | 35 | | | | | DG-18 |
| A | HM6147H-45 | | 45 | | | | | |
| A | HM6147H-55 | | 55 | | | | | |
| A | HM6147HP-35 | | 35 | | | | | |
| A | HM6147HP-45 | | 45 | | | | | |
| A | HM6147HP-55 | | 55 | | | | | |
| A | HM6147HLP-35 | | 35 | | | | | |
| A | HM6147HLP-45 | | 45 | | | | | |
| A | HM6147HLP-55 | 55 | | | | | | |
| A | HM6148H-35 | 1024 x 4 Static RAM | 35 | | | | | DG-18 |
| A | HM6148H-45 | | 45 | | | | | |
| A | HM6148H-55 | | 55 | | | | | |
| A | HM6148HP-35 | | 35 | | | | | |
| A | HM6148HP-45 | | 45 | | | | | |
| A | HM6148HP-55 | | 55 | | | | | |
| A | HM6148HLP-35 | | 35 | | | | | |
| A | HM6148HLP-45 | | 45 | | | | | |
| A | HM6148HLP-55 | 55 | | | | | | |
| A | HM6167 | 16384 x 1 Static RAM | 70 | | | | | DG-20 |
| A | HM6167-6 | | 85 | | | | | |
| A | HM6167-8 | | 100 | | | | | |
| A | HM6167P | | 70 | | | | | |
| A | HM6167P-6 | | 85 | | | | | |
| A | HM6167P-8 | | 100 | | | | | |
| A | HM6167LP | | 70 | | | | | |
| A | HM6167LP-6 | | 85 | | | | | |
| A | HM6167LP-8 | | 100 | | | | | |
| A | HM6167H-45 | | 45 | | | | | |
| A | HM6167H-55 | | 55 | | | | | |
| A | HM6167HP-45 | | 45 | | | | | |
| | | | | | | DP-20 | | |
| | | | | | | DG-20 | | |
| | | | | | | DP-20 | | |

| Spec. | Device No. | Function | Access Time (ns)max | Structure | Package code | Material for details | Page |
|-------|--------------|----------------------|---------------------|-----------|--------------|----------------------|------|
| A | HM6167HP-55 | 16384 × 1 Static RAM | 55 | CMOS | DP-20 | DB | 36 |
| A | HM6167HCG-45 | | 45 | | CG-20 | | |
| A | HM6167HCG-55 | | 55 | | DP-20 | | |
| A | HM6167HLP-45 | | 45 | | | | |
| A | HM6167HLP-55 | | 55 | | | | |
| A | HM6168H-45 | 4096 × 4 Static RAM | 45 | | DG-20 | | |
| A | HM6168H-55 | | 55 | | | | |
| A | HM6168H-70 | | 70 | | DP-20 | | |
| A | HM6168HP-45 | | 45 | | | | |
| A | HM6168HP-55 | | 55 | | | | |
| A | HM6168HP-70 | | 70 | | | | |
| A | HM6168HLP-45 | | 45 | | | | |
| A | HM6168HLP-55 | | 55 | | | | |
| A | HM6168HLP-70 | | 70 | | | | |
| A | HM6264P-10 | | 8192 × 8 Static RAM | | | | |
| A | HM6264P-12 | 120 | | | | | |
| A | HM6264P-15 | 150 | | | FP-28 | | |
| A | HM6264FP-12 | 120 | | | | | |
| A | HM6264FP-15 | 150 | | | DP-28 | | |
| A | HM6264LP-10 | 100 | | | | | |
| A | HM6264LP-12 | 120 | | | | | |
| A | HM6264LP-15 | 150 | | | | | |
| A | HM6264LFP-12 | 120 | | FP-28 | | | |
| A | HM6264LFP-15 | 150 | | | | | |
| B | HM6267P-35 | 16384 × 1 Static RAM | 35 | DP-20 | | | |
| B | HM6267P-45 | | 45 | | | | |
| A | HM6810P | 128 × 8 Static RAM | 450 | NMOS | DP-24 | - | |
| A | HM68A10P | | 360 | | | | |

■ MOS ROM

| | | | | | | | |
|---|---------------|---------------------------------|-------|------|--------|----|----|
| B | HN27256-20 | 32768 × 8 EPROM | 200 | NMOS | DG-28 | DB | 36 |
| A | HN27256-25 | | 250 | | | | |
| A | HN27256-30 | | 300 | | | | |
| A | HN27C64-15 | 8192 × 8 EPROM | 150 | CMOS | DG-28 | DB | 36 |
| A | HN27C64-20 | | 200 | | | | |
| A | HN27C64-25 | | 250 | | | | |
| A | HN27C64-30 | | 300 | | | | |
| A | HN482732AG-20 | 4096 × 8 EPROM | 200 | NMOS | DG-24B | DB | 36 |
| A | HN482732AG-25 | | 250 | | | | |
| A | HN482732AG-30 | | 300 | | | | |
| A | HN482764G | 8192 × 8 EPROM | 250 | NMOS | DG-28 | DB | 36 |
| A | HN482764G-2 | | 200 | | | | |
| A | HN482764G-3 | | 300 | | | | |
| A | HN482764G-4 | | 450 | | | | |
| A | HN482764P-3 | 8192 × 8 One Time PROM | 300 | NMOS | DP-28 | DB | 36 |
| A | HN4827128G-25 | 250 | DG-28 | | | | |
| A | HN4827128G-30 | 300 | | | | | |
| A | HN4827128G-45 | 450 | | | | | |
| B | HN4827128P-30 | 16384 × 8 One Time PROM | 300 | | DP-28 | | |
| B | HN58064P-25 | 8192 × 8 EEPROM | 250 | NMOS | DP-28 | DB | 36 |
| B | HN58064P-30 | | 300 | | | | |
| B | HN58064P-45 | | 450 | | | | |
| A | HN61256P | 32768 × 8 or 65536 × 4 Mask ROM | 3500 | CMOS | DP-28 | DB | 36 |
| A | HN61256FP | | | | FP-54 | | |
| A | HN61364P | 8192 × 8 Mask ROM | 250 | CMOS | DP-28 | DB | 36 |
| A | HN61364FP | | | | FP-54 | | |

| Spec. | Device No. | Function | Access Time (ns)max | Structure | Package code | Material for details | Page |
|-------|------------|---------------------|---------------------|-----------|--------------|----------------------|------|
| A | HN61365P | 8192 × 8 Mask ROM | 250 | CMOS | DP-28 | DB | 36 |
| A | HN61366P | | | | | | |
| A | HN613128P | 16384 × 8 Mask ROM | 250 | | FP-54 | | |
| A | HN613128FP | | | | DP-28 | | |
| A | HN613256P | 32768 × 8 Mask ROM | 250 | | FP-54 | | |
| A | HN613256FP | | | | DP-28 | | |
| B | HN62301P | 131072 × 8 Mask ROM | 350 | | | | |

HYBRID IC

| Spec. | Device No. | Function | Structure | Package code | Material for details | Page |
|-------|-------------|------------------------------------------------------|------------|--------------|----------------------|------|
| A | User Custom | Passive elements and Hitachi designs active elements | Thick Film | DIP, SIP | U.M | — |

TRANSISTOR

■ FET / POWER FET

| Spec. | Device No. | Function | V _{DSX} (V _{GSS}) (V) | I _D (A) | Structure | Package code | Material for details | Page | | | |
|-------|------------|-------------------|------------------------------------------------|-----------------------|----------------------------------|--------------|----------------------|------|----|---------|----|
| A | 2SJ48 | Large Signal Amp. | 120 | 7 | Silicon P-channel MOS | T-3 | DB | 47 | | | |
| A | 2SJ49 | | 140 | 7 | | | | | | | |
| A | 2SJ50 | | 160 | 7 | | | | | | | |
| A | 2SJ55 | | 180 | 8 | | | | | | | |
| A | 2SJ56 | | 200 | 8 | | | | | | | |
| A | 2SJ56 ⊕ | | 200 | 8 | | | | | | | |
| A | 2SJ68 | Low Noise Amp. | 40 | 30m | Silicon P-channel Junction | T-92 | DB | — | | | |
| A | 2SJ69 | | 40 | 30m | | T-92M | | | | | |
| A | 2SJ70 | | 40 | 0.2 | | | | | | | |
| A | 2SJ76 | Large Signal Amp. | 140 | 0.5 | Silicon P-channel MOS | T-220AB | DB | 47 | | | |
| A | 2SJ77 | | 160 | 0.5 | | | | | | | |
| A | 2SJ77 ⊗ | | 160 | 0.5 | | | | | | | |
| A | 2SJ78 | | 180 | 0.5 | | | | | | | |
| A | 2SJ79 | | 200 | 0.5 | | | | | | | |
| A | 2SJ79 ⊗ | | 200 | 0.5 | | | | | | | |
| A | 2SJ81 | | 120 | 7 | | HPAK | | DB | 47 | | |
| A | 2SJ82 | | 140 | 7 | | | | | | | |
| A | 2SJ83 | | 160 | 7 | | | | | | | |
| A | 2SJ96 | | 60 | 8 | | | | | | | |
| A | 2SJ99 | | 140 | 8 | | | | | | | |
| A | 2SJ100 | | 160 | 8 | | | | | | | |
| A | 2SJ101 | | 40 | 5 | | | | | | T-220AB | |
| A | 2SJ102 | | 60 | 5 | | | | | | T-3 | 47 |
| A | 2SJ112 | | 100 | 10 | | | | | | T-3P | 47 |
| A | 2SJ113 | | 100 | 10 | | | | | | T-3 | 47 |
| A | 2SJ114 | | 200 | 8 | | | | | | T-220AB | 47 |
| A | 2SJ116 | | 400 | 8 | | | | | | T-3P | 47 |
| A | 2SJ117 | | 400 | 2 | | | | | | T-3P | 47 |
| A | 2SJ118 | | 140 | 8 | | | | | | DPAK | 49 |
| A | 2SJ119 | 160 | 8 | T-220AB | — | | | | | | |
| A | 2SJ120 | 40 | 2 | T-72 | — | | | | | | |
| A | 2SJ122 | 60 | 10 | T-92 | — | | | | | | |
| A | 2SK16 ⊕ | Small Signal Amp. | (20) | 10m | Silicon N-channel Junction | T-92 | DB | — | | | |
| A | 2SK40 | | (50) | 10m | | | | | | | |
| A | 2SK54 | | (1) | 10m | | | | | | | |
| A | 2SK55 | | (1) | 10m | | | | | | | |
| A | 2SK133 | Large Signal Amp. | 120 | 7 | Silicon N-channel MOS | T-3 | DB | 47 | | | |
| A | 2SK134 | | 140 | 7 | | | | | | | |
| A | 2SK135 | | 160 | 7 | | | | | | | |

| Spec. | Device No. | Function | V _{DSX} (V _{GSS}) (V) | I _D (A) | Structure | Package code | Material for details | Page | |
|-------|------------|-----------------------------------|------------------------------------------------|-----------------------|-----------------------------|-----------------|-------------------------|--------|---------|
| A | 2SK168 | Small Signal Amp. | (1) | 20m | Si.N-ch.J | T-92 | DB | — | |
| A | 2SK175 | Large Signal Amp. | 180 | 8 | Silicon N-channel MOS | T-3 | | 47 | |
| A | 2SK176 | | 200 | 8 | | | | 47 | |
| A | 2SK176 ⊕ | | 200 | 8 | | 47 | | | |
| A | 2SK186 | Low Noise Amp. | (40) | 30m | | T-92 | | — | |
| A | 2SK187 | | (40) | 30m | | 47 | | | |
| A | 2SK190 | | (40) | 0.2 | | T-92M | | — | |
| A | 2SK191 | | (15) | 0.5 | | T-39 | | — | |
| A | 2SK196 ⊕ | | Large Signal Amp. | 160 | 0.5 | Si.N-ch.J | | MPAK | 48 |
| A | 2SK197 | Small Signal Amp. | (1) | 20m | Silicon N-channel MOS | T-220AB | | 47 | |
| A | 2SK213 | Large Signal Amp. | 140 | 0.5 | | | | 47 | |
| A | 2SK214 | | 160 | 0.5 | | | | 47 | |
| A | 2SK214 ⊕ | | 160 | 0.5 | | | | 47 | |
| A | 2SK215 | | 180 | 0.5 | | | | 47 | |
| A | 2SK216 | | 200 | 0.5 | | | | 47 | |
| A | 2SK216 ⊕ | 200 | 0.5 | 48 | | | | | |
| A | 2SK217 | Small Signal Amp. | (1) | 20m | Si.N-ch.J | MPAK | | 47 | |
| A | 2SK220 ⊕ | Large Signal Amp. | 160 | 8 | Silicon N-channel MOS | T-3 | | 47 | |
| A | 2SK221 ⊕ | | 200 | 8 | | | | HPAK | 47 |
| A | 2SK225 | | 120 | 7 | | T-3 | | | 47 |
| A | 2SK226 | | 140 | 7 | | | | | 47 |
| A | 2SK227 | | 160 | 7 | | 47 | | | |
| A | 2SK258 ⊕ | High Voltage Large Signal Amp. | 250 | 8 | T-3 | 47 | | | |
| A | 2SK259 ⊕ | 350 | 5 | | | | | | |
| A | 2SK260 ⊕ | 400 | 5 | | | | | | |
| A | 2SK286 | Large Signal Amp. | 60 | 8 | Si.N-ch.J | T-92 | | — | |
| A | 2SK291 | | 15 | 50m | | | | | |
| A | 2SK294 | | 80 | 5 | | | | | |
| A | 2SK295 | | 100 | 5 | | | | | |
| A | 2SK296 | | 300 | 1 | | | | | |
| A | 2SK298 | High Voltage Large Signal Amp. | 400 | 8 | Silicon N-channel MOS | T-220AB | | 47 | |
| A | 2SK299 | 450 | 8 | | | | | | |
| A | 2SK308 | Large Signal Amp. | 120 | 10 | | T-3 | | | |
| A | 2SK310 | High Voltage Large Signal Amp. | 400 | 3 | | | | | T-220AB |
| A | 2SK311 | 450 | 3 | | | | | | |
| A | 2SK312 | 400 | 12 | T-3 | | 47 | | | |
| A | 2SK313 | 450 | 12 | | | | | | |
| A | 2SK317 | Large Signal Amp. | 180 | 8 | RF-PAK | | | | |
| A | 2SK318 | 180 | 4 | | | | | | |
| A | 2SK319 | High Voltage Large Signal Amp. | 400 | 5 | T-220AB | | | | |
| A | 2SK320 | 450 | 5 | | | | | | |
| A | 2SK322 | Small Signal Amp. | (10) | 50m | Si.N-ch Junction | MPAK | | 48 | |
| A | 2SK323 | (40) | 30m | 48 | | | | | |
| A | 2SK343 | Large Signal Amp. | 140 | 8 | Silicon N-channel MOS | HPAK | | 47 | |
| A | 2SK344 | | 160 | 8 | | | | | |
| A | 2SK345 | | 40 | 5 | | T-220AB | | | |
| A | 2SK346 | | 60 | 5 | | | | | |
| A | 2SK347 | | 400 | 1 | | | | | |
| A | 2SK347 ⊕ | H.V. Large Signal Amp. | 400 | 1 | DPAK | 47, 49 | | | |
| A | 2SK349 | 400 | 10 | DPAK-L | | | | | |
| A | 2SK350 | High Voltage Large Signal Amp. | 400 | 10 | T-3P | 47 | | | |
| A | 2SK351 | 450 | 10 | | | | | | |
| A | 2SK359 | Small Signal Amp. | 800 | 5 | T-3 | — | | | |
| A | 2SK360 | Small Signal Amp. | 20 | 30m | Si.N-ch Junction | T-92 | — | | |
| A | 2SK375 | High Voltage Large Signal Amp. | 20 | 30m | Silicon N-channel MOS | MPAK | 48 | | |
| A | 2SK375 ⊕ | | 300 | 1 | | | DPAK | | |
| A | 2SK382 | | 300 | 1 | | | | DPAK-L | 47, 49 |
| A | 2SK382 | Signal Amp. | 500 | 2 | T-220AB | 47 | | | |

| Spec. | Device No. | Function | V _{DSX} (V _{GS}) (V) | I _D (A) | Structure | Package code | Material for details | Page |
|-------|------------|-----------------------------------|-----------------------------------------------|-----------------------|------------------------------------------|-----------------------------|-------------------------|--------|
| A | 2SK383 | Large Signal Amp. | 100 | 10 | Silicon N-channel MOS | T-220AB | DB | 47 |
| A | 2SK384 | H.V. Large Signal Amp. | 500 | 0.3 | | DPAK | | 47, 49 |
| A | 2SK384 ① | | 500 | 0.3 | | DPAK-L | | 47 |
| A | 2SK398 | Large Signal Amp. | 100 | 10 | | T-3 | | 47 |
| A | 2SK399 | | 100 | 10 | | T-3P | | 47 |
| A | 2SK400 | | 200 | 8 | | T-3 | | |
| A | 2SK401 | | 250 | 10 | | T-3P | | |
| A | 2SK402 | High Voltage Large Signal Amp. | 400 | 8 | | T-220AB | | 47 |
| A | 2SK403 | | 450 | 8 | | RF-PAK | | |
| A | 2SK408 | Large Signal Amp. | 180 | 2 | | T-3P | | |
| A | 2SK409 | | 180 | 8 | | T-3P | | |
| A | 2SK410 | High Voltage Large Signal Amp. | 250 | 10 | | T-220AB | | |
| A | 2SK412 | | 140 | 8 | | RF-PAK | | |
| A | 2SK413 | Large Signal Amp. | 160 | 8 | | T-3P | | 47 |
| A | 2SK414 | | 800 | 3 | | T-3P | | 47 |
| A | 2SK415 | H.V. Large Signal Amp. | 40 | 2 | | DPAK | | 47, 49 |
| A | 2SK416 | | 40 | 2 | | DPAK-L | | 47 |
| A | 2SK416 ① | Large Signal Amp. | 60 | 10 | | T-220AB | | 47 |
| A | 2SK428 | | 100 | 3 | | DPAK | | 47, 49 |
| A | 2SK429 | | 100 | 3 | | DPAK-L | | 47, 49 |
| A | 2SK429 ① | | 150 | 3 | | DPAK | | 47, 49 |
| A | 2SK430 | | 150 | 3 | | DPAK-L | | 47, 49 |
| A | 2SK430 ① | | 40 | 30m | | Si.N-ch.J | | MPAK |
| A | 2SK431 | Low Noise Amp. | 22 | 0.1 | | Silicon N-channel MOS | | T-92 |
| A | 2SK435 | Small Signal Amp. | 20 | 0.1 | SPAK | | 49 | |
| A | 2SK439 | | 200 | 6 | T-3 | | 47 | |
| A | 2SK440 | Large Signal Amp. | 500 | 0.3 | T-126 | 47 | | |
| B | 2SK441 | H.V. Large Signal Amp. | 6 | 0.1 | GaAs Schottky | FPAK | — | |
| A | 2SK457 | Low Noise Amp. | 22 | 0.1 | Si.N-ch.J | SPAK | 49 | |
| A | 2SK494 | Small Signal Amp. | 500 | 12 | Silicon N-channel MOS | T-3 | 47 | |
| A | 2SK512 | Large Signal Amp. | 800 | 3 | | T-220 | 47 | |
| A | 2SK513 | | 800 | 5 | | T-3P | 47 | |
| A | 2SK534 | | 400 | 1.5 | | DPAK | 47, 49 | |
| A | 2SK535 | | 400 | 1.5 | DPAK-L | 47, 49 | | |
| A | 2SK535 ① | Small Signal Amp. | 20 | 10m | Silicon N-channel Dual Gate MOS | TO-72 | — | |
| A | 3SK20 ④ | | 20 | 10m | | | — | |
| A | 3SK21 ④ | | 22 | 35m | | | — | |
| A | 3SK45 | | 20 | 35m | | | — | |
| A | 3SK51 | | 15 | 33m | | | — | |
| A | 3SK53 | | 15 | 33m | | | — | |
| A | 3SK60 | | 20 | 50m | | | — | |
| A | 3SK70 | | 20 | 50m | | | — | |
| A | 3SK80 | | 20 | 50m | | | — | |
| A | 3SK81 | | 20 | 50m | | | — | |
| A | 3SK82 | | 15 | 33m | | | — | |
| A | 3SK83 | | 15 | 33m | | | — | |
| A | 3SK85 | | 22 | 35m | — | | | |
| A | 3SK88 | | 15 | 35m | — | | | |
| A | 3SK95 | | 15 | 35m | — | | | |
| A | 3SK96 | | 15 | 35m | — | | | |
| A | 3SK103 | | 15 | 35m | — | | | |
| A | 3SK104 | | 15 | 35m | — | | | |
| A | 3SK104V | | 15 | 35m | — | | | |
| A | 3SK113 | | 12 | 80m | — | | | |
| A | 3SK136 | | 20 | 50m | — | | | |
| A | 3SK137 | | 15 | 35m | — | | | |
| A | 3SK138 | | 15 | 35m | MPAK4 | — | | |

DIODE

■ Laser Diode

| Spec. | Device No. | Function | P _O (mW) | λ _p (nm) | Structure | Package code | Material for details | Page | |
|-------|------------|----------|------------------------|------------------------|-----------|--------------|----------------------|------|--------|
| B | HL1221A | | 5 | 1200 | InGaAsP | Type A | DB | 50 | |
| B | HL1221B | | 1.2* | | | Type B | | | |
| B | HL1221C | | 5 | | | Type C | | | |
| B | HL1321P | | 1.2 | 1300 | | Type P | | | |
| B | HL1321SP | | 1.0 | 1300 | | | | | |
| A | HL7801E | | 5 | 780 | GaAlAs | Type E | | | |
| A | HL7801G | | | | | Type G | | | |
| B | HL7802E | | 2 | 780 | | Type E | | | |
| B | HL7802G | | | | | Type G | | | |
| A | HL8311E | | 2 | 830 | | Type E | | | |
| A | HL8311G | | | | | Type G | | | |
| A | HL8312E | | 20 | 830 | | Type E | | | |
| A | HL8312G | | | | | Type G | | | |
| B | HL8314E | | 30 | 830 | | Type E | | | |
| A | HLP1400 | | 15 | 830 | | Type A | | | |
| A | HLP1500 | | 6* | | | Type B | | | |
| A | HLP1600 | | 15 | | | Type C | | | |
| A | HLP5400 | | 5 | 1300 | | InGaAsP | | | Type A |
| A | HLP5500 | | 1.2* | | | | | | Type B |
| A | HLP5600 | | 5 | | | | | | Type C |

■ Infra-red Emitting Diode

| Spec. | Device No. | Function | P _O (W) | λ _p (nm) | Structure | Package code | Material for details | Page |
|-------|------------|----------|-----------------------|------------------------|-----------|--------------|----------------------|------|
| A | HE8402F | | 60μ | 840 | GaAlAs | Type F | DB | 50 |
| A | HE8403R | | 80μ* | 840 | | Type R | | |
| A | HE8801 | | 6m | 850 | | Type SG | | |
| A | HE8811 | | 20m | 840 | | | | |
| A | HLP20R | | 15m | 760 | | | | |
| A | HLP20RG | | 7m | 820 | | Type RG | | |
| A | HLP30R | | 25m | | | Type R | | |
| A | HLP30RG | | 12m | 840 | | Type RG | | |
| A | HLP40R | | 35m | | | Type R | | |
| A | HLP40RG | | 17m | 840 | | GaAlAs | | |
| A | HLP50R | | 45m | | Type R | | | |
| A | HLP50RG | | 22m | | Type RG | | | |
| A | HLP60R | | 55m | 840 | Type R | | | |
| A | HLP60RG | | 17m | | | Type RG | | |
| C | HS9807 | | 25μ(min) | 1300 | InGaAsP | — | DB | 50 |

*Expected output power from a 50μm dia. GI fiber.

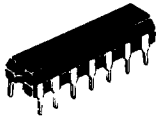
PACKAGE OUTLINE

● Plastic DIP

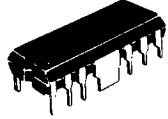
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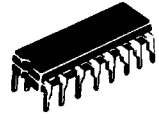
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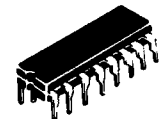
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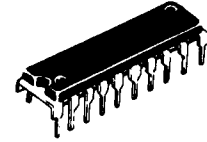
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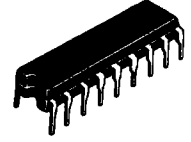
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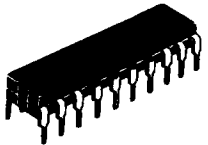
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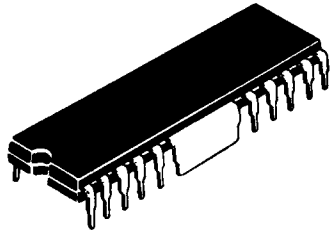
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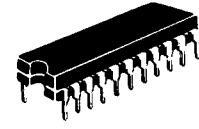
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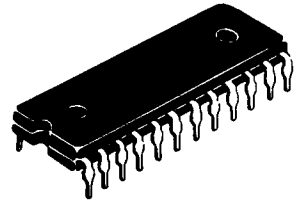
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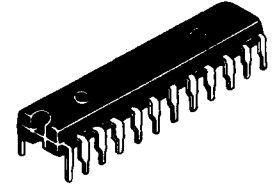
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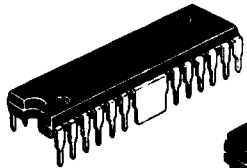
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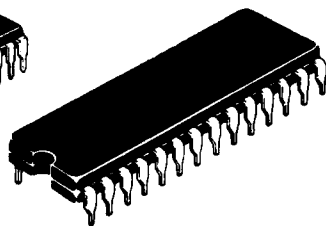
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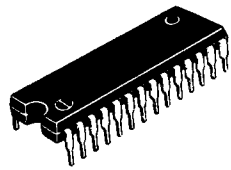
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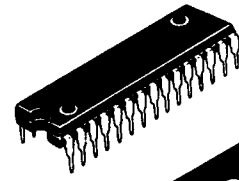
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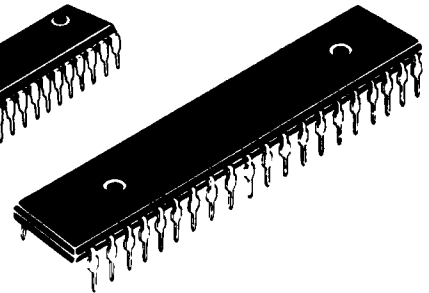
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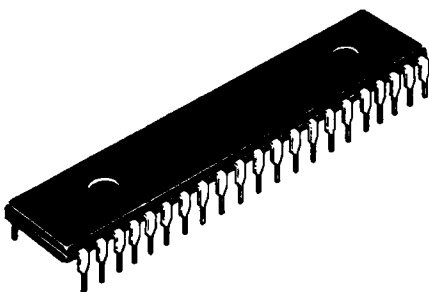
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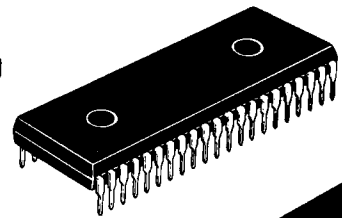
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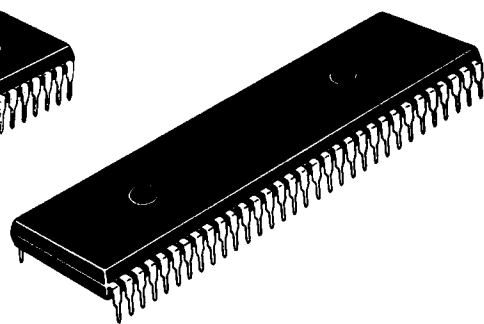
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DP-42S



DP-64S

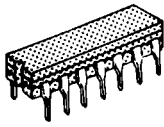


● Cerdip

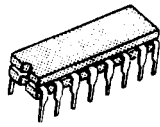
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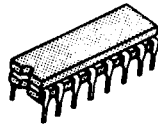
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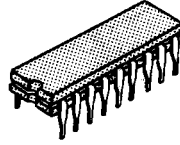
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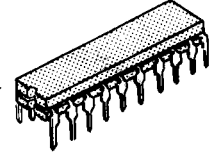
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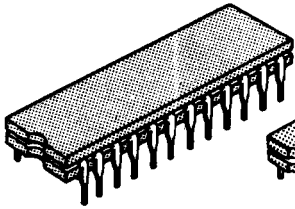
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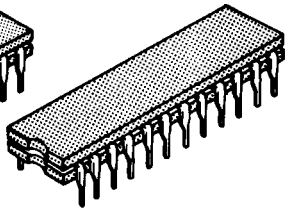
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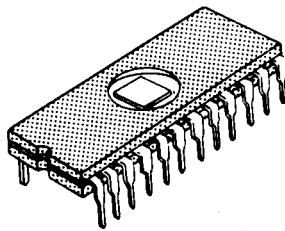
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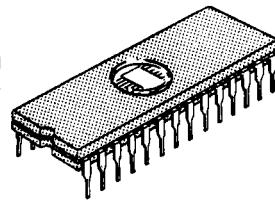
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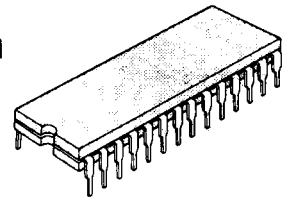
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DG-28

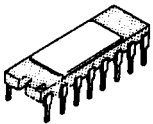


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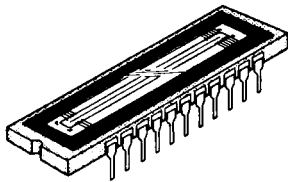


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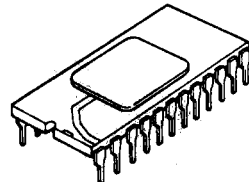
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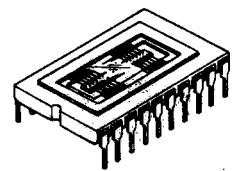
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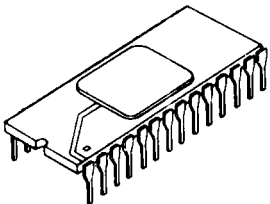
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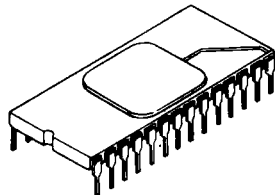
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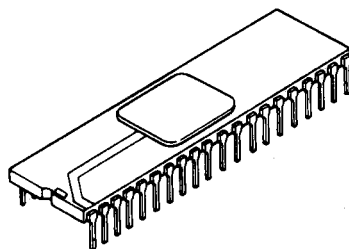
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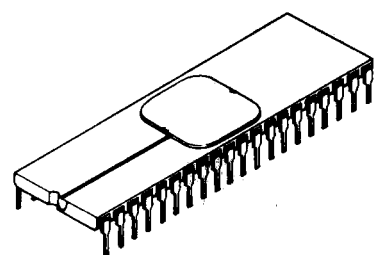
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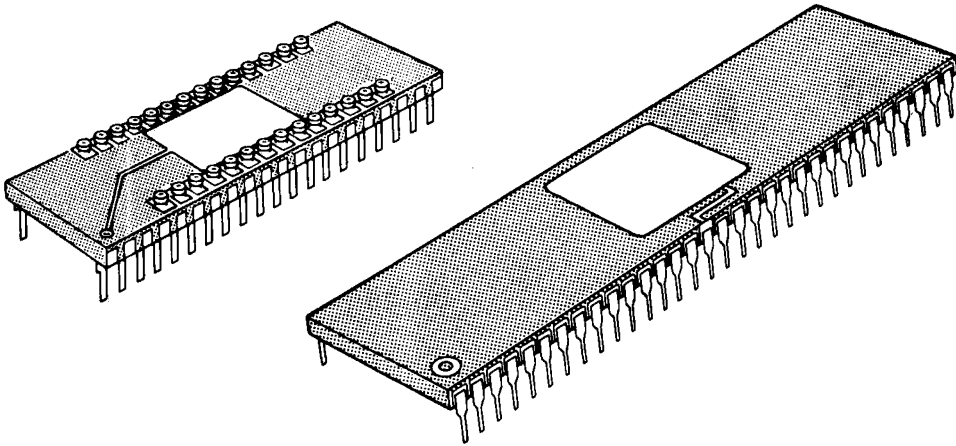


DC-40A



DC-40P

DC-64



● Plastic SIP

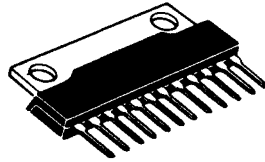
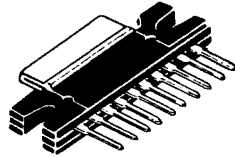
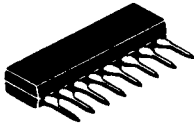
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SP-8

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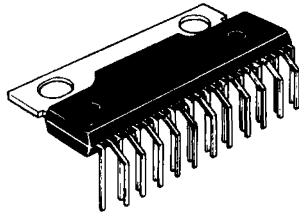
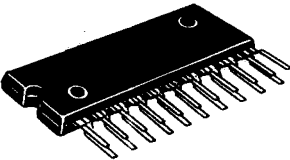
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SP-16



SP-21

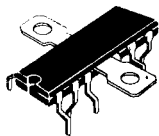
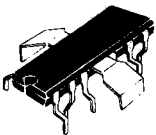
SP-23T



● Plastic QIP

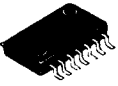
QP-12T

QP-12TA

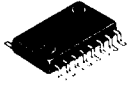


● Plastic Flat

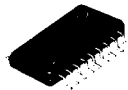
FP-14



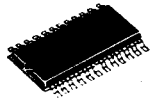
FP-16



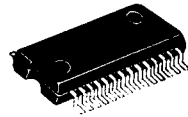
FP-18



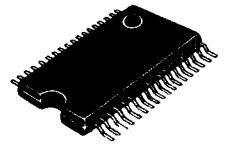
FP-24



FP-28



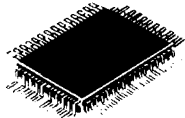
FP-36



FP-44



FP-54



FP-60



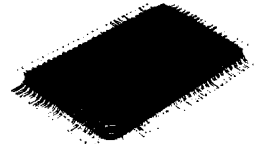
FP-60A



FP-80



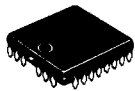
FP-100



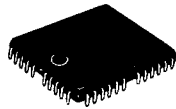
MP-18



MP-28

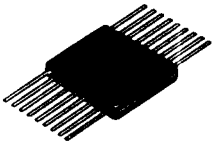


MP-44

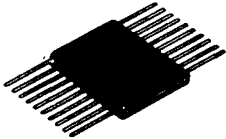


● Ceramic Flat

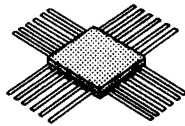
FG-18



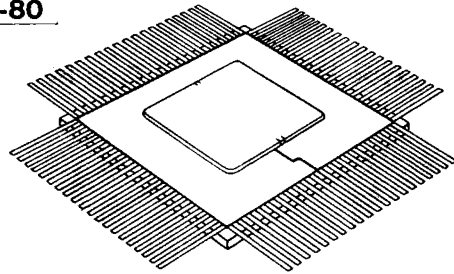
FG-20



FG-24



FC-80



● Chip Carrier

CG-18



CG-20



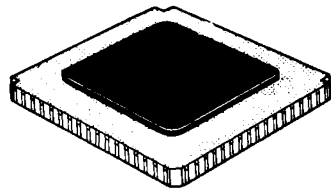
CG-32



CG-40

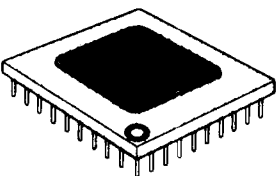


CG-68

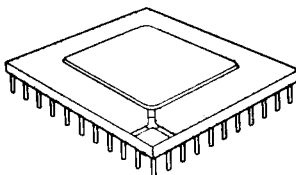


● Pin Grid Array

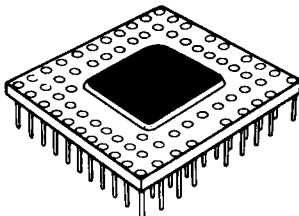
PGA-68



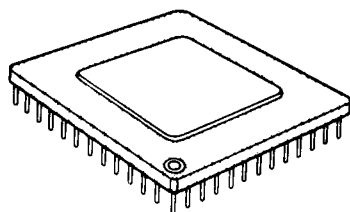
PGA-72



PGA-72A

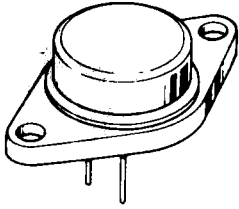


PGA-120

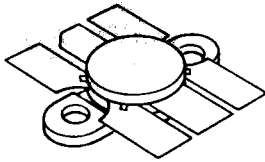


● Hermetic Seal

T-3



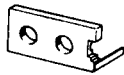
RF-PAK



T-18



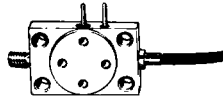
Type-A



T-39



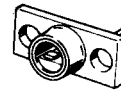
Type-B



T-39A



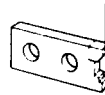
Type-C



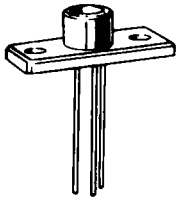
T-72



Type-D



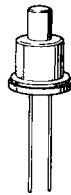
Type-E



Type-RG



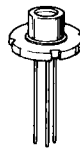
Type-F



Type-RL



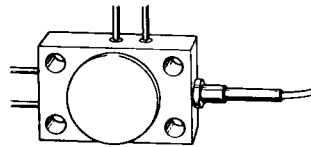
Type-G



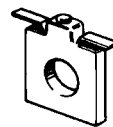
Type-SG



Type-P



Type-T



Type-R



PD-1



PD-2



● Plastic Mold

DDPAK



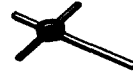
DDPAK-L



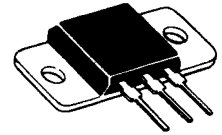
EDPAK



FDPAK



HPAK



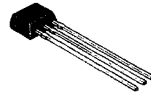
MDPAK



MDPAK4



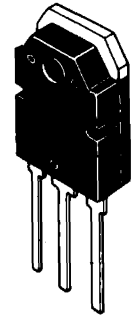
SDPAK



UPAK



T-3P



T-92



T-92A



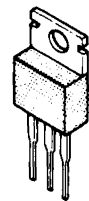
T-126



T-202



T-22AB



NOTES

OUTLINE OF DEVICE FAMILY

MICROCOMPUTER

4-bit System HMCS40/HMCS400 Series

| Device | Series Name | PMOS HMCS40 Series | | | | | CMOS HMCS40C/400C Series | | | | | | | | LCD Series | | | | | | | | | | | |
|-------------------------|-------------|---------------------------------|----|-----|-----|-----|--------------------------|--------|--------|--------|--------|--------|------------|---------|------------|--------|--|--|--|--|--|--|--|--|--|--|
| | | 42 | 43 | 44A | 45A | 47A | 42C/CL | 43C/CL | 44C/CL | 45C/CL | 46C/CL | 47C/CL | 402C/CL/AC | 404C/CL | LCD-III | LCD-IV | | | | | | | | | | |
| Eva-luation | ROM(KB) | 0.5 | 1 | 2 | 4 | 4 | 0.5 | 1 | 2 | 4 | 4 | 4 | 2 | 4 | 2 | 4 | | | | | | | | | | |
| | RAM(Byte) | 32 | 80 | 160 | 160 | 256 | 32 | 80 | 160 | 160 | 256 | 256 | 160 | 256 | 160 | 256 | | | | | | | | | | |
| | I/O Port | 22 | 32 | 32 | 44 | 44 | 22 | 32 | 32 | 44 | 32 | 44 | 58 | 58 | 32 | 32 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Emulator Set for H68SD5 | H40MIX1 | NOT FOR NEW DEVELOPMENTS | | | | | | | | | | | | | | | | | | | | | | | | |
| | H40MIX2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H40MIX4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H400CMIX1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluation Kit | H40EVKIT | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H40EVKIT2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H40EVKIT4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluation Board | H40LCEV00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H40LCEV04 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H43EV00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H45CEV00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | H47CEV00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluation Board | H400CEV01 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | HD38750E | | | | | | | | | | | | | | | | | | | | | | | | | |
| | HD44850E | | | | | | | | | | | | | | | | | | | | | | | | | |
| | HD44857E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluation Chip | HD44797E | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |

Built-in
→
LCD Driver

8-bit System HMCS6800 Series

• Single-chip CMOS HD6300 Series

| Device | Series Name | HD6301V | | HD6301X | | HD6301Y | | HD6305 | | HD6305X | | | HD6305Y | | | † HD63L05 |
|-------------------------|-------------|---------|-------|---------|-------|---------|-------|--------|-------|---------|--------|--------|---------|--------|--------|--------------|
| | | 6301V | 6303R | 6301X | 6303X | 6301Y | 6303Y | 6305U | 6305V | 6305X0 | 6305X1 | 6305X2 | 6305Y0 | 6305Y1 | 6305Y2 | |
| Eva-luation | ROM(KB) | 4 | — | 4 | — | 16 | — | 2 | 4 | 4 | 4 | — | 8 | 8 | — | 4 |
| | RAM(Byte) | 128 | 128 | 192 | 192 | 256 | 256 | 128 | 192 | 128 | 128 | 128 | 256 | 256 | 256 | 96 |
| | I/O Port | 29 | 13 | 53 | 24 | 53 | 24 | 31 | 31 | 55 | 31 | 31 | 55 | 31 | 31 | 20 |
| | | | | | | | | | | | | | | | | |
| EPROM on Package MCU | 32K | | | | | | | | | | | | | | | |
| | 64K | | | | | | | | | | | | | | | |
| Emulator Set for H68SD5 | H31MIX1 | | | | | | | | | | | | | | | |
| | H31MIX2 | | | | | | | | | | | | | | | |
| | H31MIX3 | | | | | | | | | | | | | | | |
| | H35MIX1 | | | | | | | | | | | | | | | |
| | H3L5MIX1 | | | | | | | | | | | | | | | |
| Evaluation Kit | H31EVT1 | | | | | | | | | | | | | | | |
| | H35EVT1 | | | | | | | | | | | | | | | |
| | H3L5EVT1 | | | | | | | | | | | | | | | |
| Evaluation Board | H31EV00 | | | | | | | | | | | | | | | |
| | H31EV01 | | | | | | | | | | | | | | | |
| | H35EV00 | | | | | | | | | | | | | | | |
| | H3L5EV00 | | | | | | | | | | | | | | | |

Built-in
→
LCD Driver

† Built-in A/D Converter

● Single-chip NMOS HD6800 Series

| Device | Series Name | HD6801 | | | | | HD6805 | | | | | HD6805X | | |
|-------------------------|-------------|--------|-------|------|--------|--------|--------|-------|-------|--------|--------|---------|--------|--|
| | | 6801S | 6801V | 6803 | 6805S1 | 6805S6 | 6805U | 6805V | 6805T | 6805W† | 6805X0 | 6805X1 | 6805X2 | |
| | ROM(KB) | 2 | 4 | — | 1.1 | 1.8 | 2 | 4 | 2.5 | 4 | 4 | 4 | — | |
| | RAM(Byte) | 128 | 128 | 128 | 64 | 64 | 96 | 96 | 64 | 96 | 96 | 96 | 96 | |
| Evaluation | I/O Port | 29 | 29 | 13 | 20 | 20 | 32 | 32 | 19 | 29 | 55 | 31 | 31 | |
| EPROM on Package MCU | 32K | | | | | | | | | | | | | |
| | 64K | | | | | | | | | | | | | |
| Emulator Set for H68SD5 | H61MIX1 | | | | | | | | | | | | | |
| | H65MIX1 | | | | | | | | | | | | | |
| | H65MIX2 | | | | | | | | | | | | | |
| | H65MIX4 | | | | | | | | | | | | | |
| Evaluation Kit | H61EVT2 | | | | | | | | | | | | | |
| | H65EVT2 | | | | | | | | | | | | | |
| | H65EVT3 | | | | | | | | | | | | | |
| | H65EVT4 | | | | | | | | | | | | | |
| Evaluation Board | H61EV01 | | | | | | | | | | | | | |
| | H65EV04 | | | | | | | | | | | | | |

† Built-in A/D Converter

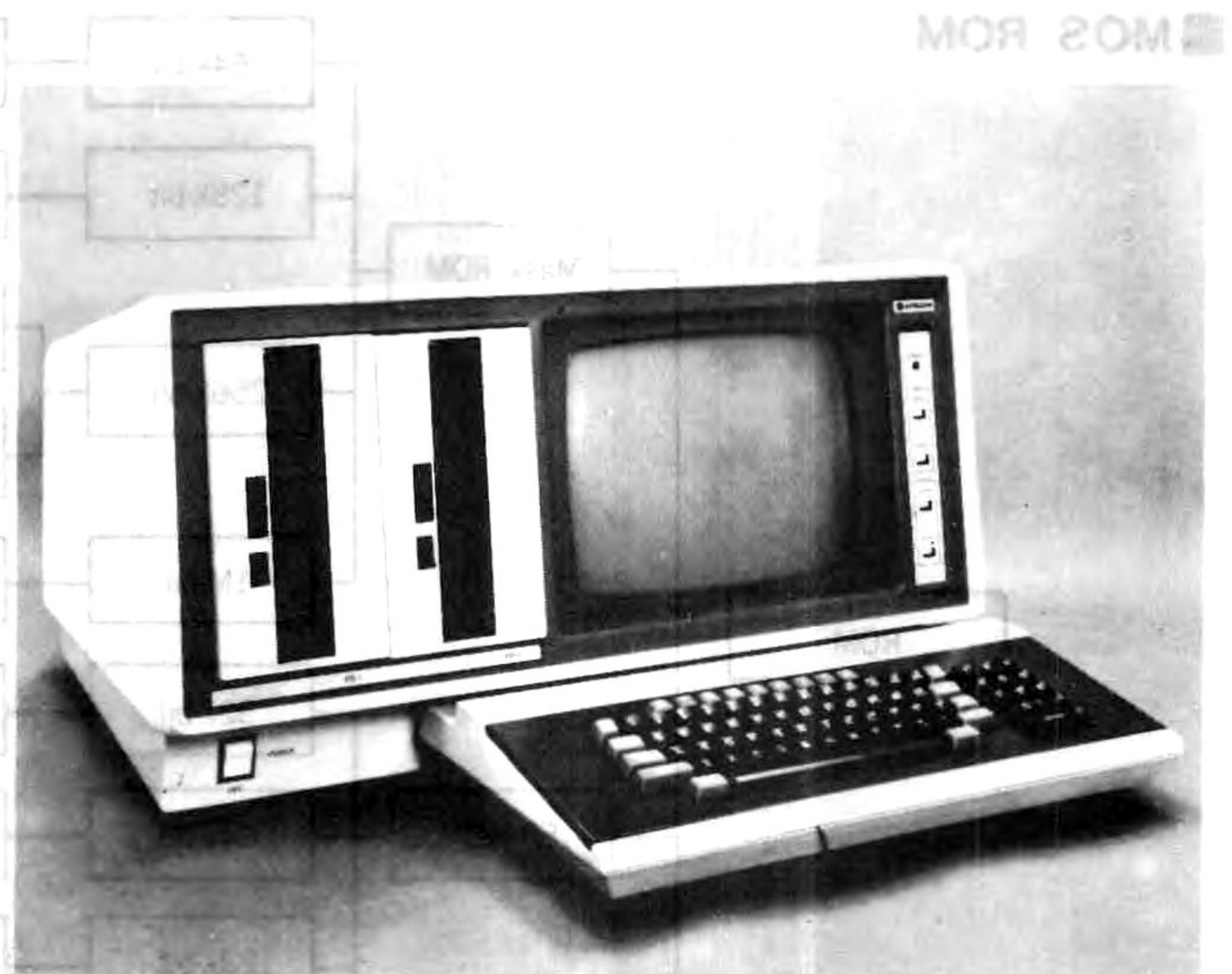
Development Tool

■ H68SD5 (for 4-bit and 8-bit Single-chip Microcomputer)

H68SD5 is an all-in-one type compact HD6800 based CRT/Key board microcomputer terminal with one Floppy disk driver and has standard interface for the TTY (RS-232C or TTL level) and printer (centronics parallel interface). The EPROM Programmer and the second Floppy disk driver are optionally available.

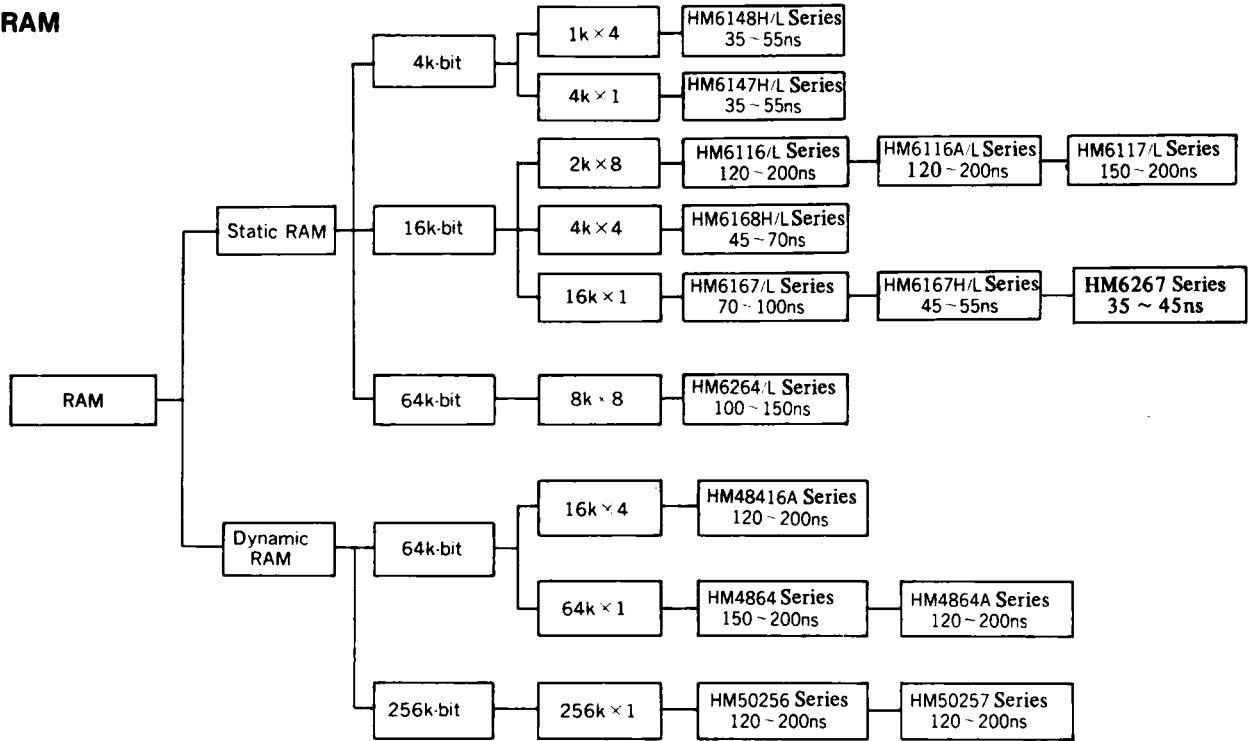
■ FEATURES

- ★ Supports the system development for 8-Bit and 4-Bit single-chip microcomputers
- ★ Disk based low cost system
- ★ Provides the CRT Editor, Assembler, Emulator and EPROM Programmer controlled by FDOS-III
- ★ 56k-byte RAMs
- ★ Allows linking between the H68SD5 and the I/O devices (TTY and Printer)
- ★ Easy to debug user's prototype system using the Emulator Module

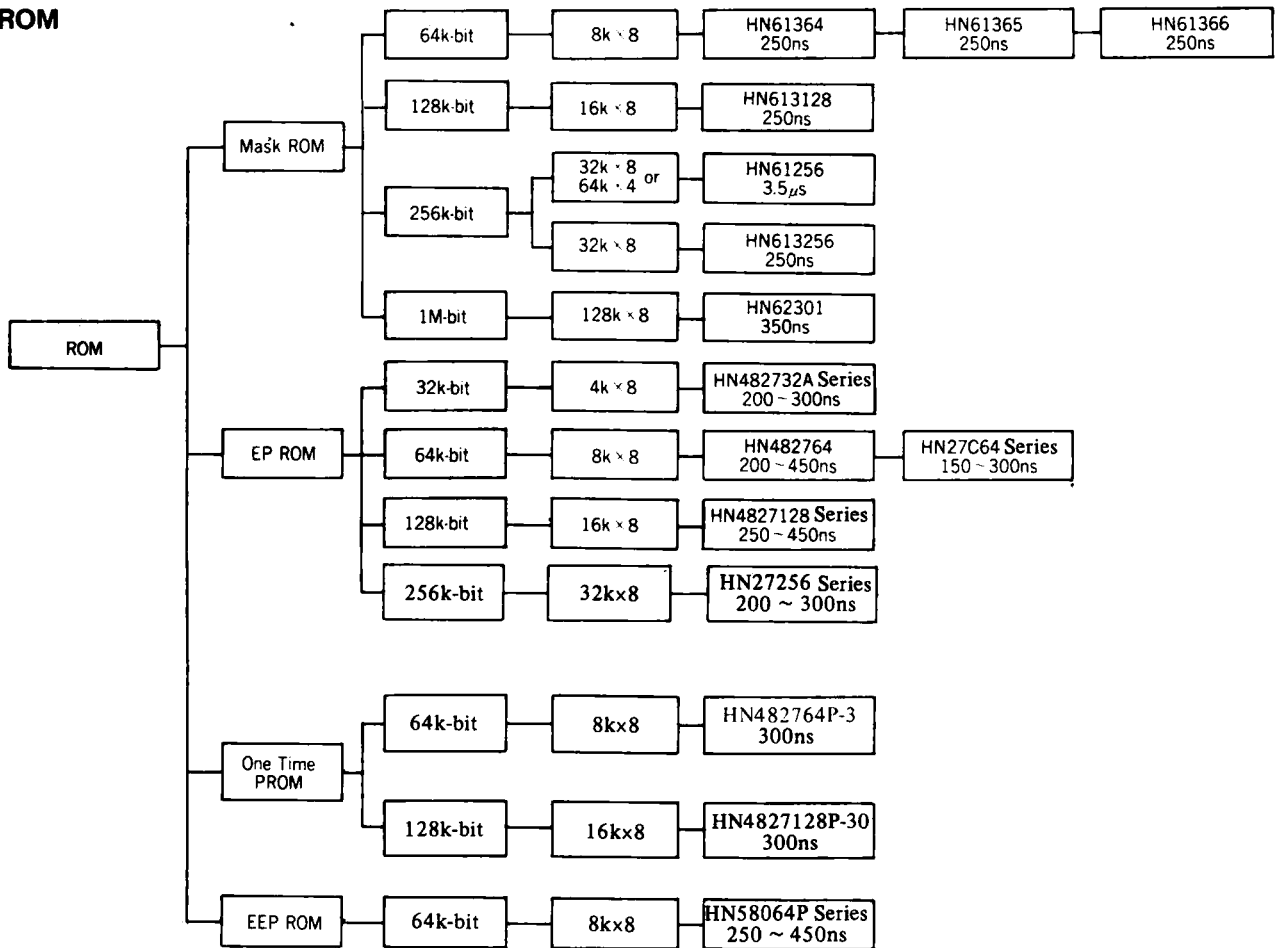


IC MEMORY

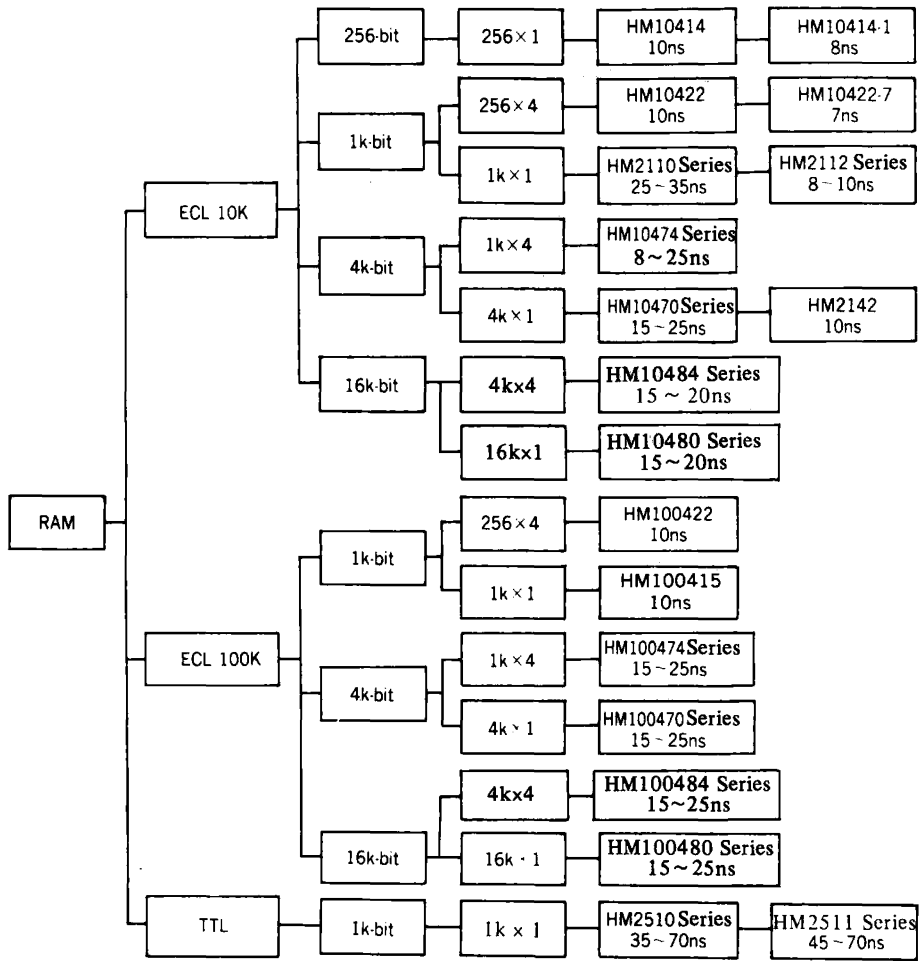
■ MOS RAM



■ MOS ROM



■ Bipolar RAM



GATE ARRAY

CMOS Gate Array HD61J/HD61K/HD61L/HD61MM Series

■ FEATURES

- **Fast operation**
 Internal gate (2-input NAND, FO=3, AL=3mm) . 3.5ns typ
 Input buffer (FO=3, AL=3mm) 9ns typ
 Output buffer (C_L=50pF) 20ns typ
 Memory access time (HD61MM) 60ns typ
- **Low Power dissipation**
 At 10MHz operation (Internal gate) 130μW/gate typ
- **Abundant input and output configuration**
 Allocation of all pins except power supply pins to input/
 output/input-output
 Output can be CMOS/open drain/3-state
- **Memory on-chip (HD61MM)**
 Flexibility of memory capacity and word organization
 Selection of single port/dual port memory
- **Wide operation temperature range**
 -20 to +75°C
- **Wide package selection**
 Especially plastic packages with high pin count
 DILP64/FPP100
- **Powerful design support**
 User-Defined-Macro
 Test pattern evaluation with fault simulator
 Design support at local Design Center
- **Quick turn around time and reasonable development cost**

■ LINE UP

| | | HD61J | HD61K | HD61L | HD61MM |
|------------------|-------|-------|-------|-------|-----------|
| Gate count | | 504 | 1080 | 1584 | 2496 |
| I/O pin count | | 50 | 68 | 68 | 104 |
| RAM on chip | | — | — | — | available |
| Package | DP28 | ○ | ○ | ○ | — |
| | DP42 | ○ | ○ | ○ | — |
| | DP64 | — | ○ | ○ | ○ |
| | DP54 | ○ | — | — | — |
| | FP80 | — | ○ | ○ | — |
| | FP100 | — | — | — | ○* |
| | DC28 | ○ | ○ | ○ | ○ |
| | DC40 | ○ | ○ | ○ | ○ |
| | PGA72 | — | — | ○ | — |
| PGA120 | — | — | — | ○* | |
| Power supply pin | | 4 | | | 4 *8 |

Bi-CMOS Gate Array HD27K/HD27L/HD27P/HD27Q Series

■ FEATURES

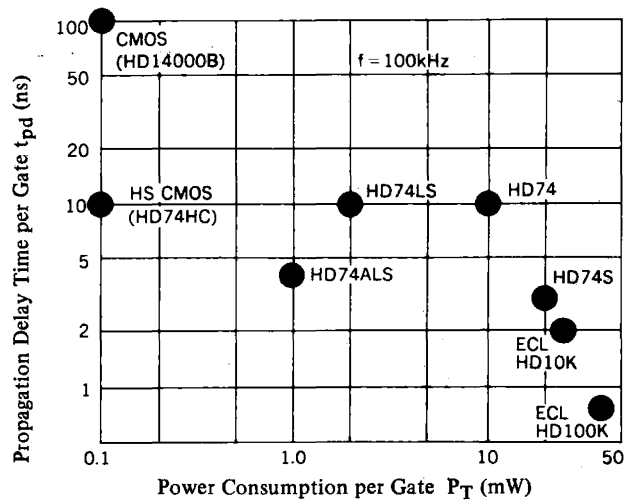
- High speed with super low power dissipation
 - Internal gate: 4.0ns (Fan out=3) @0.05mW
 - Input buffer: 5.0ns (Fan out=3) @2.6mW
 - Output buffer: 8.0ns ($C_L=15pF$) @2.6mW
- LS TTL compatible input/output
 - Selectable totem-pole/3-state/open collector output
 - $I_{OL}=8mA$: Capable of driving 20 LS TTL's
- Output buffer can construct logic functions.
 - Saves gate stages.
- A variety of macrocell library
 - Internal gate: 44
 - Output buffer: 9
- A variety of reliable package
 - Plastic DIP 16 to 64 pins
 - Plastic FP 60 to 100 pins (under development)
- A variety of DA system support
 - Only logic diagrams and test patterns needed as an interface with the user.
- Short development time

■ LINE UP

| | Number of gates | | | Number of V_{CC} and GND pins | Package | |
|-------|------------------------------|--------------|---------------|---------------------------------|---------------------|------------------|
| | Internal gate (2-input NAND) | Input buffer | Output buffer | | DIP (Plastic) | FP* (Plastic) |
| HD27K | 200 | 18 | 18 | 2 | 16, 20, 28, 42 pins | — |
| HD27L | 528 | 30 | 30 | 4 | 28, 42, 64 pins | 60, 80 pins |
| HD27P | 966 | 40 | 40 | 4 | 28, 42, 64 pins | 60, 80, 100 pins |
| HD27Q | 1530 | 50 | 50 | 4 | 28, 42, 64 pins | 60, 80, 100 pins |

LOGIC FAMILIES

Hitachi logic IC's include general TTL to ultrahigh-speed and easy-to-handle ECL 100K, and low power and wide voltage range CMOS logic. High-speed CMOS logic devices are equivalent to the standard 74HC devices, and the development of the new devices is continuously being promoted.



| | ECL | | TTL | | | | CMOS | |
|------------------------------------|----------|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------------|--------------------|
| | HD10K | HD100K | HD74 | HD74S | HD74LS | HD74ALS | HD14000B | HD74HC |
| Operating Supply Voltage Range (V) | -5.2±10% | -4.2~-5.7 | +5±5% | +5±5% | +5±5% | +5±10% | +3~+18 | +2~+6 |
| Propagation Delay Time (ns/Gate) | 2 | 0.75 | 10 | 3 | 10 | 4 | 105 | 10 |
| Power Consumption (mW/Gate) | 25 | 40 | 10 | 20 | 2 | 1 | 0.1 | 0.1 |
| Operating Temperature Range (°C) | -30~+85 | 0~+85 | -20~+75 | -20~+75 | -20~+75 | -20~+75 | -40~+85 | -40~+85 |
| Package | Cerdip | Cerdip Cera.Flat | Plastic DIP Cerdip | Plastic DIP Cerdip | Plastic DIP Cerdip | Plastic DIP Cerdip | Plastic DIP Cerdip SOP | Plastic DIP SOP |
| Number of Device | 39 | 35 | 101 | 38 | 126 | 16 | 110 | 99 |

LSI FOR SPECIAL FUNCTIONS

LCD Controller/Drivers

| Type | | General | | Segment Display | | | |
|---------------------|----------------------------|-------------------------------|--------------------------|------------------------|--------------------|-----------------------|--------|
| LSI Characteristics | Type Number | HD44100H | HD61100 | HD61602 | HD61603 | | |
| | Process | CMOS | CMOS | CMOS | CMOS | | |
| | Supply Voltage (V) | 5*1 | 5*1 | 3 ~ 5*1 | 3 ~ 5*1 | | |
| | Operating Temperature (°C) | -20 ~ +75*2 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 | | |
| | Package | FP-60 | FP-100 | FP-80 | FP-80 | | |
| | Power Dissipation (mW) | 5.0 | 5.0 | 0.5 (5V) | 0.5 (5V) | | |
| Function | Memory | ROM (bits) | - | - | - | - | |
| | | RAM (bits) | - | - | 51 × 4 | 64 × 1 | |
| | I/O | Interface (CPU) | 8 | 4 | 14 | 10 | |
| | | Interface (Driver IC) | 2 | 2 | - | - | |
| | | Interface (External ROM, RAM) | - | - | - | - | |
| | Number of Instruction | | - | - | 4 | 4 | |
| | LCD Driver | Common | | - | - | 4 | 1 |
| | | Segment | | 40 | 80 | 51 | 64 |
| | | Duty | | Free (N) | Free (N) | Static, 1/2, 1/3, 1/4 | Static |
| | | Bias | | 1/2, 1/3, 1/4, 1/5 | 1/2, 1/3, 1/4, 1/5 | 1/2, 1/3 | - |
| Display Capability | | N × 40 Matrix (1/N Duty) | N × 80 Matrix (1/N Duty) | 204 Segment (1/4 Duty) | 64 Segment | | |
| Comment | | SR type | SR type | | | | |

*1: Except Power Supply for LCD.

*2: -40 ~ +85°C (Special Request). Please contact Hitachi Agents.

*3: CG; Character Generator.

4-bit Processor for Special Functions

| Type No. | Features | Functions | Supply Voltage | Cycle Time | Power Consumption |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|-------------------|
| HD43380 | <ul style="list-style-type: none"> 4-bit Processor Low Power Consumption Built-in LCD Driver Built-in Time-piece | <ul style="list-style-type: none"> ROM 480 × 26 bit RAM 48 × 6 bit LCD Driver Segment 3 × 27 | 3V | 183μs | 30μW |
| HD43381 | <ul style="list-style-type: none"> 4-bit Processor Low Power Consumption Built-in LCD Driver | <ul style="list-style-type: none"> ROM 480 × 26 bit RAM 48 × 6 bit LCD Drive Segment 3 × 27 | 3V | 183μs | 30μW |
| HD43360 | <ul style="list-style-type: none"> 4-bit Processor Low Power Consumption Built-in LCD Driver Built-in Time-piece | <ul style="list-style-type: none"> ROM 480 × 26 bit RAM 48 × 6 bit LCD Drive Segment 3 × 27 4-bit Data Output | 3V | 183μs | 30μW |
| HD43365 | <ul style="list-style-type: none"> 4-bit Processor Low Power Consumption Built-in LCD Driver Built-in Time-piece | <ul style="list-style-type: none"> ROM 960 × 27 bit RAM 64 × 8 bit LCD Drive Segment 4 × 26 8-bit Data I/O | 3V | 183μs | 30μW |
| HD43550 | <ul style="list-style-type: none"> 4-bit Processor Wide I/O Port (51 bit) Compatible Instruction with HMCS40 | <ul style="list-style-type: none"> ROM 3008 × 10 bit RAM 64 × 10 bit | 5V | 20μs | 1mW |
| HD61810B (HSP) | <ul style="list-style-type: none"> Digital Signal Processor Floating Point Operation High Speed Operation | <ul style="list-style-type: none"> Instruction ROM 512 × 22 bit Data ROM 128 × 16 bit RAM 200 × 16 bit 16-bit Floating Point Operation | 5V | 250μs | 250mW |

| Character Display | | | Graphic Display | | | | |
|-------------------------------------------------|-------------------------------------------------|----------------------------------------------|-------------------------------|-------------------------------|------------------------------------------------|-------------------------------|-------------------------------|
| HD44780 (LCD-II) | HD44101H | HD43160AH | HD44102CH | HD44103CH | HD61830 | HD61102 | HD61103 |
| CMOS | CMOS | CMOS | CMOS | CMOS | CMOS | CMOS | CMOS |
| 5*1 | 5*1 | 5*1 | 5*1 | 5*1 | 5*1 | 5*1 | 5*1 |
| -20 ~ +75*2 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 | -20 ~ +75 |
| FP-80 | FP-80 | FP-54 | FP-80 | FP-60 | FP-60 | FP-100 | FP-100 |
| 1.75 | 1.75 | 10.0 | 2.5 | 4.0 | 30.0 | 2.5 | 5.0 |
| 7200 (CG)*3 | 6720 (CG)*3 | 6240 (CG)*3 | - | - | 7360 (CG)*3 | - | - |
| 80×8/64×8 (CG)*3 | 32×8 | 80×8 | 200×8 | - | (External 65536×8) | 512×8 | - |
| 11 | 12 | 21 | 21 | 6 | 13 | 21 | 2 |
| 4 | 4 | 5 | - | 5 | 9 | - | 2 |
| - | - | 18 | - | - | 33 | - | - |
| 11 | 8 | 6 | 6 | - | 12 | 8 | - |
| 16 | 15 | - | - | 20 | - | - | 64 |
| 40 | 40 | - | 50 | - | - | 64 | - |
| 1/8, 1/11, 1/16 | 1/7, 1/14 | 1/8, 1/12, 1/16 | 1/8, 1/12, 1/16 1/24, 1/32 | 1/8, 1/12, 1/16 1/24, 1/32 | 1/1 ~ 1/128 | ~ 1/64 | 1/48, 1/64 1/96, 1/128 |
| 1/4, 1/5 | 1/4, 1/5 | - | 1/5 | 1/5 | - | 1/5 | - |
| 16 Digits (5×7 Dots 1/16 Duty) | 16 Digits (5×7 Dots 1/14 Duty) | - | 32×50 Dots (1/32 Duty) | - | - | N×64 Matrix (1/64 duty) | N×64 Matrix (1/64 duty) |
| Expandable to 80 Digits using HD44100H | Expandable to 32 Digits using HD44100H | Display to 80 Digits using HD44100H | | | Display to 524288 Dots using HD44100H | | |

CODEC/Filter Combo-LSI

| Series | Type No. | Comp. Law | Power Dissipation (mW) | CR Filter | Voltage Reference | Clock | | | Signaling |
|----------|----------|-----------|------------------------|-----------|-------------------|-------------------------|-------------|------------------------|---------------|
| | | | | | | Internal Clock | Sync/ Async | PCM Bit Clock Required | |
| HD44210 | HD44211A | A | 150 | - | - | External 128kHz req. | Both | 64 ~ 2048kHz | |
| | HD44212A | μ | | | | | | | |
| HD44220 | HD44222 | μ | 40 | - | External | PLL | Both | 64 ~ 2048kHz | Decoder Shift |
| HD44230 | HD44231B | A | 60 | ○ | ○ | Divider | Sync | 1536/1544/ 2048kHz | |
| | HD44232B | μ | | | | | | | |
| | HD44233B | A | | | | | | | |
| | HD44234B | μ | | | | | | | |
| | HD44235 | A | 50 | ○ | ○ | PLL | Sync | 64 ~ 2048kHz | Decoder Shift |
| | HD44236 | μ | | | | | | | |
| | HD44237 | A | | | | | | | |
| HD44238 | μ | | | | | Both | | Decoder Shift | |
| HD44230C | HD44231C | A | 60 | ○ | ○ | Divider | Sync | 1536/1544/ 2048kHz | |
| | HD44232C | μ | | | | | | | |
| | HD44233C | A | | | | | | | |
| | HD44234C | μ | | | | | | | |
| | HD44235C | A | PLL | Sync | 64 ~ 2048kHz | | | | |
| | HD44236C | μ | | | | | | | |
| | HD44237C | A | | | | | | | |
| HD44238C | μ | | | | | Both | | Decoder Shift | |
| HD44240 | HD44240C | μ | 60 | ○ | ○ | PLL | Both | 64 ~ 2048kHz | A/B Data I/O |

*A-law: Europe and International Telephone.

*μ-law: U.S.A., Canada and Japan.

Speech Synthesis LSI

| Type | PMOS 3-chip System | CMOS 1-chip System |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Device | HD38880B (Speech Synthesizer) HD38881 (128k-bit ROM) HD38882 (EPROM Interface) HMCS40 Series (Controller) | HD61885/7 (Speech Synthesizer) HD44881 (128k-bit Expanding ROM) |
| System | PARCOR | PARCOR |
| Voice channel model | <ul style="list-style-type: none"> 8 steps/10 steps digital filter; selectable Voice canal loss effect (existencel non-existence); selectable | 10 steps digital filter |
| Voice source model | <ul style="list-style-type: none"> Voice sound Rectangular wave/triangle wave; selectable Voiceless sound; White noise | - |
| Sampling frequency | 8kHz | 10kHz |
| Bit rate (b/s) | 2400 4800 9600 | 1250 ~ 9900 |
| Frame period (ms) | 20 20 10 | 10/20 |
| Variable speaking speed | Variation of frame period is possible from -30% to 60% by 10% steps. | -25%, 0, +25% |
| Speaking time | 50 ~ 100 sec/ROM (2400 b/s) | 10 ~ 20 sec (internal ROM) |

IC FOR CONSUMER APPLICATIONS

TV Applications

■ AFT and PIF

| Type No. | Outline | Electrical Performance | | | | | | Recommended Application | | Remarks |
|-----------|---------|------------------------|----------|--------------|------------|--------------------|--------------------------------|-------------------------|-----|-----------------------------------------------|
| | | AFT | PIF Amp. | RF AGC | Video Det. | Supply Voltage (V) | Other | Color | B/W | |
| HA11440A | DP-28 | • | • | • Reverse | • | 12 | with Video Amp. | • | - | Direct coupled SAW filter |
| HA11442A | DP-16 | • | • | • Forward | • | 12 | with Video Amp. | • | - | Direct coupled SAW filter |
| HA11458 | DP-28 | • | • | • Reverse | • | 12 | with SIF | • | - | Correspond to composite SAW filter, PIF + SIF |
| HA11461NT | DP-42S | • | • | • Reverse | • | 12 | with SIF, Audio-DC-ATT and H/V | • | - | Direct coupled SAW filter |
| HA11485NT | DP-30S | • | • | • Reverse | • | 12 | with SIF | • | - | |

■ Color and Video Signal Processing

| Type No. | Outline | Electrical Performance | | | | | Recommended Application | | Remarks |
|----------|---------|------------------------|-------------|--------------|-------------------------|--------------------|-------------------------|-----|-------------------------------------|
| | | Color Amp. | Color Sync. | Color Demod. | Video Amp. | Supply Voltage (V) | Color | B/W | |
| HA11431 | DP-28 | • | • | • | • Brightness Control | 12 | • | - | Tint DC Control Blinking |
| HA11436A | DP-28 | • | • | • | • Brightness Control | 12 | • | - | With Automatic Flesh Control |
| HA11464 | DP-16-2 | • | • | • | - | 12 | • | - | Tint DC Control, Color Saturation |
| HA11465A | DP-16-2 | - | - | - | • Brightness Control | 12 | • | - | Sync. Sept. Pedestal Clamp Blanking |

■ B/W TV 1-chip

| Type No. | Outline | Function | Function | Features |
|----------|---------|-----------------------------------------|----------------|--------------------------------------------------------------------------------------------|
| HA11445A | DP-28 | PIF, Synchronous Signal Processing, SIF | Reverse RF AGC | A set comprises the tuner and the sound, picture, horizontal and vertical output circuits. |

■ Synchronous Signal Processing and Deflection

| Type No. | Outline | Electrical Performance | | | | | | | Recommended Application | | Remarks |
|----------|------------------|------------------------|-------------|--------------|------------|-------------|------------|--------------------|-------------------------|-----|--------------------------------------|
| | | Sync. Sept. | Horiz. Osc. | Horiz. Drive | Vert. Osc. | Vert. Drive | Vert. Out. | Supply Voltage (V) | Color | B/W | |
| HA11423 | DP-16-2 MP-18 | • | • | — | • | — | — | 12 | • | — | with X-ray protection and Blanking |
| HA11441 | DP-16-2 | • | • | • | • | • | — | 5 | • | • | Low Voltage Operation, with Blanking |

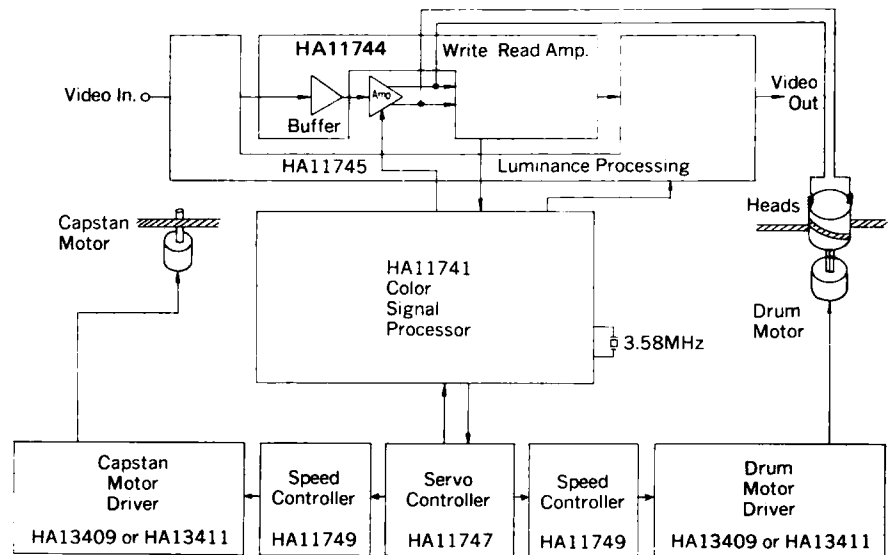
■ Sound Signal Processing

| Type No. | Outline | Electrical Performance | | | | | Recommended Application | | Remarks |
|------------------|---------|------------------------|-----------------------------|---------|------------|--------------------|-------------------------|-----|-----------------------------------------------------|
| | | SIF Amp. | Discrim. | AF Amp. | Power Amp. | Supply Voltage (V) | Color | B/W | |
| HA1124 HA1125 | DP-14 | • | • Differential Peak Det. | • | — | 9 | • | • | HA1125 is included zener diode for regulated supply |
| HA1364 | QP-12T | • | • Differential Peak Det. | • | • | 24 | • | — | — |

■ Other Functions

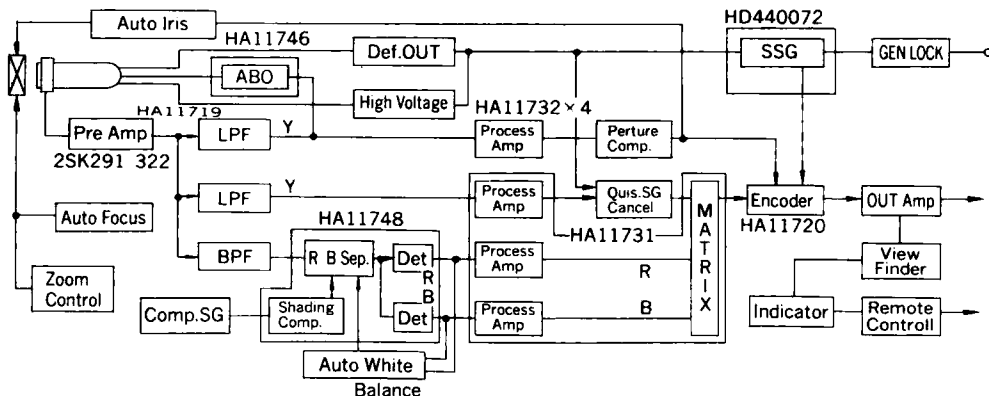
| Type No. | Outline | Functions | Recommended Applications |
|-----------|---------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| HD38986/E | DP-42 | PLL Channel Selection of Voltage-controlled System | |
| HD430196B | DP-18 | with PPM code, address 3-bit + data 6-bit transmission, prevention of double pushing and 455kHz ceramic filter used are possible. | Transmitter of Remote Control |
| HD44042 | DP-8 | Preamplifier for Infra-red Remote Control System | Receiver for Infra-red Remote Control System |

VTR Applications

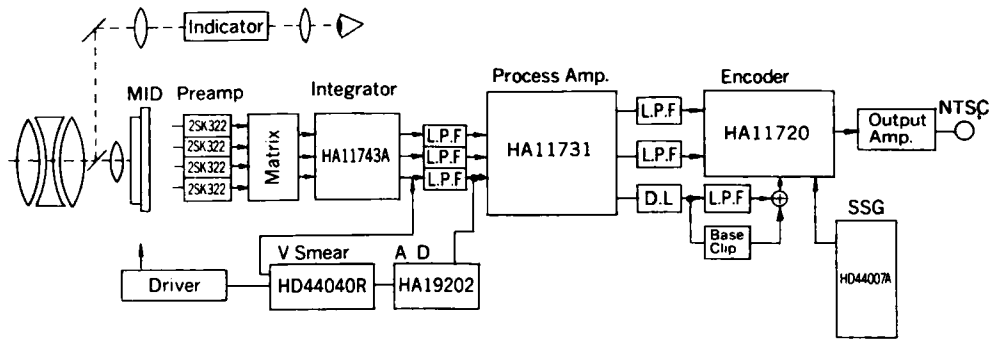


Video Camera Applications

● One Carrier Frequency System Camera



● Solid State (MID) Camera



Audio Applications

■ FM/AM Receivers

| Type No. | Outline | Electrical Performance | | | | | | Recommended Application | | | Remarks |
|-----------|------------------|------------------------|------------|---------|------------|-----------|-------------------------------------------------|-------------------------|----------------------------|---------|----------------------------------------------------------------------------------------|
| | | AM-RF Conv. | AM-IF Amp. | AM Det. | FM-IF Amp. | FM Demod. | Other Function | Tuner Receiver | Radio, Cassette with Radio | Car Use | |
| HA1137W | DP-16 | | | | • | • | • Muting • Center Meter & Signal Meter Drive | • | | ○ | S/N: 72dB typ |
| HA1197 | DP-16 | • | • | • | | | • Signal Meter Drive | • | | | |
| HA1199 | DP-16 | • | • | • | | | | | | • | Good Strong Field |
| HA11211 | DP-16-2 | | • | | • | • | • Muting • Center Meter & Signal Meter Drive | • | | | S/N: 79dB typ |
| HA11225 | DP-16 | | | | • | • | • Muting • Center Meter & Signal Meter Drive | • | | | • Variable Muting Level • S/N: 84dB typ |
| HA12411 | DP-16 | | | | • | • | • Muting • Center Meter & Signal Meter Drive | ○ | | • | |
| HA12412 | DP-16 | | | | • | • | • Muting • Center Meter & Signal Meter Drive | • | | | Tuning Meter short-circuit for AM band. |
| HA12413 | DP-16 | | • | • | • | • | • Signal Meter Drive | ○ | • | | $V_{CC} = 3 \sim 16V$ $I_Q = 15mA$ typ |
| HA12417 | SP-16 | • | • | • | | | | | | • | Good Strong Field |
| HA12418 | SP-16 | | | | • | • | • Muting • Center Meter & Signal Meter Drive | ○ | | • | |
| HA12427AV | SP-16 | • | • | • | | | | | | • | Coupled Ceramic Filter |
| HA12428/V | DP-16-2 SP-21 | • | • | • | | | • Osc. Buffer • SD Circuit | | | • | • Good 2-Signal Interruption Characteristic • Good Strong Field at High Sensitivity |
| HA12430 | DP-20 | • | • | • | • | • | • Signal Meter Drive | ○ | • | | |
| HA12432 | DP-20 | • | • | • | | | • Signal Meter Drive • Antenna AGC | • | | | • High Usable Sensitivity • Wide AGC FOM |
| HA12435V | SP-21 | | | | • | • | | | | • | |
| HA12436 | DP-16 | • | • | • | • | • | | | | • | Low External Components |
| HA12439V | SP-16 | | | | | | • FM Front-end | | | • | Good Strong Field |

■ FM Stereo Demodulators

| Type No. | Outline | Electrical Performance | | | | Recommended Applications | | | Remarks |
|----------|---------|------------------------|-----------------|-----------|-------------|--------------------------|----------------------------|---------|------------------------------------------------|
| | | Demodulation System | Pilot Canceller | Post Amp. | Lamp Driver | Tuner Receiver | Radio, Cassette with Radio | Car Use | |
| HA1156W | DP-14 | PLL | | | • | • | | ○ | $G_V = -6\text{dB}$ |
| HA1196 | DP-16 | PLL | | • | • | • | | | $G_V = 15\text{dB}$ |
| HA11223W | DP-16 | PLL | • | | • | • | | | $G_V = -2\text{dB}$ $S/N = 86\text{dB typ}$ |
| HA12016 | DP-16 | PLL | | • | • | • | | | $G_V = 12\text{dB}$ $S/N = 88\text{dB typ}$ |
| HA12026 | DP-16 | PLL | | | • | | • | • | with VCO stop |
| HA12031 | DP-28 | PLL | • | • | • | • | | | with Mute, VCO stop and Beat Canceller |
| HA12055V | SP-21 | PLL | | | • | | | • | with FM Noise suppressor |
| HA12063 | DP-16 | PLL | | | • | | • | | Non-adjust |

■ Cassette Tape Deck Applications

| Type No. | Outline | Electrical Performance | | | | | Remarks |
|---------------|--------------------------|------------------------|----------------|-------------------|-------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| | | PLY/REC Amp. | Headphone Amp. | Mechanism Control | Electronic Switch | Other | |
| HA11226/MP | DP-16-2 MP-18 | | | | | Dolby-B Type 2-channel | |
| HA12005 | DP-16 | • | | | • | | PLY/REC Switch |
| HA12006 | DP-16-2 | | • | | • | | includes Head Switch and Mute Switch |
| HA12010 | DP-16 | | | | | 12 point linear-scale bargraph display (0.25V step) | |
| HA12020 | DP-28 | | | | | Automatic Equalizer | with 5-bit DA and EQ |
| HA12024 | DP-16-2 | | | | | Automatic Program Selection | |
| HA12028 | DP-22 | • | • | | • | | with REC Switch and Mute Switch |
| HA12035 | DP-28 | | | | | 2-channel Automatic Equalizer | with 4-bit DA and EQ |
| HA12037NT | DP-30S | | | | • | For Cassette Tape Deck with Radio | All electronics of function switch |
| HA12038/MP/NT | DP-28 DP-30S MP-28 | | | | | Dolby-C Type | |
| HA12045/MP | DP-18 MP-18 | | | | | Dolby-B Type 2-channel | Low external parts count |
| HA12046/MP | | | | | | | |
| HA12047/MP | | | | | | | |
| HA12048/FP/MP | DP-18 FP-18 MP-18 | | | | | | |
| HA12051NT | DP-30S | • | • | | | Signal Circuit of Dolby-C Type Deck | 1-chip IC for PLY/REC Signal with Mute Switch |
| HA12052C | DP-18 FP-18 MP-18 | | • | | | <ul style="list-style-type: none"> • 2-channel Headphone Stereo • with Automatic Stop Detect | <ul style="list-style-type: none"> • Low External Components • with Mute Switch |
| HA12058 | DP-28 DP-30S MP-28 | | | | | Dolby-B/C Type | |
| HA12067NT | DP-30S | | | | | 12 point log-scale bargraph display (2dB step) | <ul style="list-style-type: none"> • Low External Components • Wide Operating Voltage (11 ~ 24V) |

■ Preamplifiers

| Type No. | Outline | Max. Ratings | | Electrical Characteristics | | | | Recommended Application | | | | Remarks |
|----------|---------|--------------|--------------|----------------------------|---------|----------------|---------------|-------------------------|---------|------------------------|-------------|-------------------|
| | | P_T (mW) | V_{CC} (V) | Noise | THD (%) | $G_V(OL)$ (dB) | V_{out} (V) | HiFi Amp. | Car Use | Cassette Tape Recorder | Home Stereo | |
| HA12017 | SP-7 | 500 | ±26.5 | $V_{n(out)}$ 1.15mV | 0.002 | 105 | 14.7 | • | | | ○ | 2 supplies system |

■ Power ICs

| Type No. | Outline | Max. Ratings | | Electrical Characteristics | | | Recommended Application | | | | Remarks |
|----------|---------|--------------|-----------------|----------------------------|-----------------------|-----------------|-------------------------|------------|------------------------------|----------------|-------------------------------------------|
| | | P_T (W) | V_{CC} (V) | P_{out} (W) | R_L (Ω) | V_{CC} (V) | Hi-Fi Amp. | Car Use | Cassette Tape Recorder | Home Stereo | |
| HA1377 | SP-12T | 15 | 18 | 5.8x2 | 4 | 13.2 | | ● | ○ | | 2-channel built-in |
| HA1384 | SP-12T | 15 | 26 | 20 | 4 | 13.2 | | ● | | ○ | BTL |
| HA1388 | SP-12T | 15 | 18 | 18 | 4 | 13.2 | | ● | | ○ | BTL |
| HA1392 | SP-12T | 15 | 20 | 6.8 | 4 | 15 | | | ● | | 2-channel built-in, with Mute Terminal |
| | | | | 4.3 | 4 | 12 | | | | | |
| HA1393 | SP-12T | 15 | 26 | 20 | 4 | 13.2 | | ● | | ○ | BTL |
| HA1394 | SP-12T | 15 | 35 | 8.2x2 | 8 | 25 | | | ○ | ● | 2-channel built-in |
| HA1396 | SP-12T | 15 | 26 | 20 | 4 | 13.2 | | ● | | ○ | BTL with Mute |
| HA1397 | SP-12T | 30 | ±30 | 20 | 8 | ±22 | ● | | | ○ | 2 supplies system |
| HA13001 | SP-12T | 15 | 26 | 5.5x2 | 4 | 13.2 | | ● | | | 2 channel built-in BTL connection |
| | | | | 17.5 | | | | | | | |
| HA13102 | SP-12T | 15 | 18 | 5.5x2 | 4 | 13.2 | | ● | ○ | | 2 channel built-in |
| TBA800 | QP-12TA | 5 | 30 | 5.0 | 16 | 24 | | | ○ | ● | |
| | | | | 3.4 | 8 | 16 | | | | | |
| TBA810AS | QP-12TA | 5 | 20 | 7 | 4 | 16 | | | ○ | ● | |
| TBA810SH | QP-12T | | | | | | | | | | |

■ PCM and DAD Applications

| Use | Type | Function | Contents | Outline |
|-------------|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| P C M | HD440361 | Playback | <ul style="list-style-type: none"> ● Conversion of sample data from in-series to in-alternating ● Detection of error data ● Detection and protection of control block ● RAM control and data processing ● Mute function | FP-60 |
| | | | <ul style="list-style-type: none"> ● Detection and protection of synchronizing signal ● RAM address control ● Deinterleave | |
| | HD440362 | | <ul style="list-style-type: none"> ● RAM I/O ● Error correction ● Check and latch of control block ● D/A output latch and buffer | |
| | HD440381 | Recording | <ul style="list-style-type: none"> ● Parity word generation (P, Q) ● RAM address control | |
| | HD440382 | | <ul style="list-style-type: none"> ● Conversion of output data from in-alternating to inseries ● Synchronizing signal generation ● CRCC generation ● RAM address control ● Interleave | |

| Use | Type | Function | Contents | Outline |
|-------------|----------|------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------|
| D A D | HA12049A | Interface | ● Input Signal Processing | DP-28 |
| | HA12053 | Interface | ● Sample & Hold | DP-16 |
| | HA16633 | D/A Converter | <ul style="list-style-type: none"> ● 16-bit D/A Converter ● High-speed settling (1.5μs) | DP-42 |
| | HD61901H | Error Correction | <ul style="list-style-type: none"> ● EFM Signal Demod. ● Error Correction | FP-60 |
| | HD61902H | Output Control | <ul style="list-style-type: none"> ● External RAM Address Control ● Output Control ● Digital Servo | FP-80 |

■ Other Applications

| Type No. | Outline | Functions | Remarks |
|------------|----------------|-----------------------------------------|-----------------------------------------------------------------|
| HA12002 | SP-8 | Protection of Speaker and Power Amp. | with Relay Driver |
| HA12022 | DP-16-2 | Voltage Controlled Amp. | |
| HA12032 | DP-18 | Motor Controller for Quartz-lock Player | except Motor Driver |
| HA12039 | DP-16-2 | Automatic Volume Control (AVC) | Adjustment of the volume by detecting the indoor noise of a car |
| HA12043 | DP-18 | CX NR System for MCA System | NR Effects 14dB |
| HA12044 | DP-18 | CX NR System | NR Effects 20dB |
| HA12429/MP | DP-18 MP-18 | AM Noise Canceller | |
| HA13003 | DP-14T | Modulator for PWM Amplifier | Small Channel Crosstalk |

TRANSISTOR

Power MOS FET Line Up

| $I_D(A)$ $V_{DS}(V)$ | 0.3 | 0.5 | 1 | 1.5 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 |
|-------------------------|--------------------------|---------------------------------------------------------------|----------------------------|--------------|----------------------------|------------------------|-------------|----------------------------|--------------|--------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------|
| 35 | | | | *HS8709(1.8) | | | | *HS8711(0.6) | | | | | |
| 40 | | | | | 2SK416(0.5) 2SJ120(1.2) | | | 2SK345(0.3) 2SJ101(0.3) | | | | | |
| 60 | | | | | | | | 2SK346(0.3) 2SJ102(0.3) | | | 2SK286(0.5) 2SJ96(0.5) | 2SK428(0.1) 2SJ122(0.15) | |
| 80 | | | | | | | | 2SK294(0.4) | | | | | |
| 100 | | | | | | 2SK429(0.5) | | 2SK295(0.4) | | | | 2SK383(0.15) 2SK398(0.2) 2SJ112(0.25) 2SK399(0.2) 2SJ113(0.25) | |
| 120 | | | | | | | | | | 2SK133(1.0) 2SJ48(1.0) 2SK225(1.0) 2SJ81(1.0) | | 2SK308(0.2) | |
| 140 | | 2SK213(8) 2SJ76(10) | | | | | | | | 2SK134(1.0) 2SJ49(1.0) 2SK226(1.0) 2SJ82(1.0) | 2SK343(0.4) 2SJ99(0.4) 2SK413(0.4) 2SJ118(0.4) | | |
| 150 | | | | | | 2SK430(0.8) | | | | | | | |
| 160 | | 2SK214(8) 2SK214(8) 2SJ77(10) 2SJ77(10) 2SK196(8) | | | | | | | | 2SK135(1.0) 2SJ50(1.0) 2SK227(1.0) 2SJ83(1.0) | 2SK344(0.4) 2SJ100(0.4) 2SK414(0.4) 2SJ119(0.4) 2SK220(1.0) | | |
| 180 | | 2SK215(8) 2SJ78(10) | | | 2SK408(7.0) 2SK409(7.0) | | 2SK318(1.9) | | | | 2SK175(1.0) 2SJ55(1.0) 2SK317(0.95) 2SK410(1.2) *HS8707(1.3) | | |
| 200 | | 2SK216(8) 2SK216(8) 2SJ79(10) 2SJ79(10) | | | | | | | *2SK440(0.4) | | 2SK176(1.0) 2SJ56(1.0) 2SK221(1.0) 2SK400(0.5) 2SJ114(0.6) | | |
| 250 | 2SK511(30) | | | | | | | | | | 2SK258(0.8) | 2SK401(0.3) 2SK412(0.3) | |
| 300 | | | 2SK296(2.5) 2SK375(2.5) | | | | | | | | | | |
| 350 | | | | | | | | 2SK259(2.5) | | | | | |
| 400 | | | 2SK347(9) | 2SK535(4) | 2SJ117(5) | 2SK310(2.5) | | 2SK260(2.5) 2SK319(1.1) | | | 2SK298(1.1) 2SK402(1.1) 2SJ116(1.75) | 2SK349(0.67) | 2SK312(0.67) |
| 450 | | | | | | 2SK311(2.5) | | 2SK320(1.1) | | | 2SK299(1.1) 2SK403(1.1) | 2SK350(0.67) | 2SK313(0.67) |
| 500 | 2SK384(25) 2SK441(25) | | | | 2SK382(2.5) | | | | | | | | 2SK512(0.5) |
| 800 | | | | | | 2SK415(5) 2SK515(5) | | 2SK351(1.7) 2SK534(3) | | | | | |

Power MOS FET for Audio Applications

| Output (W) | | Input Stage | | Driver Stage | | | | Output Stage | | | | | | |
|------------------|--------------------|------------------|---------------------|--------------------|-------------------|---------------|-----------------------|-----------------|-------------------|---------------|---------------|----------------|---------------|---------------|
| Single Push-pull | Parallel Push-pull | FET | Bipolar | | FET (V_{DSX}) | | Bipolar (V_{CEO}) | | FET (V_{DSX}) | | | | | |
| | | | NPN | PNP | N-ch | P-ch | NPN | PNP | Can Type | | Resin Type | | | |
| | | | | | | | | | N-ch | P-ch | N-ch | P-ch | | |
| 50~60 | - | 2SK186 2SK190 | | | 2SK213 (140V) | 2SJ76 (-140V) | 2SD756 (120V) | 2SB716 (-120V) | 2SK133 (120V) | 2SJ48 (-120V) | 2SK225 (120V) | 2SJ81 (-120V) | | |
| 50~80 | 100~120 | | | | 2SK214 (160V) | 2SJ77 (-160V) | 2SD756A (140V) | 2SB716A (-140V) | 2SK134 (140V) | 2SJ49 (-140V) | 2SK226 (140V) | 2SJ82 (-140V) | 2SK343 (140V) | 2SJ99 (-140V) |
| - | 120~140 | | | | 2SK215 (180V) | 2SJ78 (-180V) | 2SD668A (160V) | 2SB648A (-160V) | 2SK135 (160V) | 2SJ50 (-160V) | 2SK413 (140V) | 2SJ118 (-140V) | 2SK227 (160V) | 2SJ83 (-160V) |
| 80~100 | - | | | | 2SK216 (200V) | 2SJ79 (-200V) | 2SD758 (200V) | 2SB718 (-200V) | 2SK175 (180V) | 2SJ55 (-180V) | | | | |
| - | 140~200 | | 2SC1775A 2SC2856 | 2SA872A 2SA1191 | - | - | | | 2SK176 (200V) | 2SJ56 (-200V) | 2SK400 (200V) | 2SJ114 (-200V) | | |

Note) 1. Under line is D series (Drain Case)

□ : D Series
 • : Under Development
 () : $R_{DS(on)}$ [Ω]

MPAK Series

| Transistor Type | Type Number | | Maximum Ratings | | | Reference Type Number | | |
|---------------------------------------|-------------|------------|----------------------------------------------|------------------------------------------|------------------------|-----------------------|------------|---------|
| | NPN (N-ch) | PNP (P-ch) | V _{CEO} V _{D SX} (V) | I _C I _D (mA) | P _C (mW) | Type Number | | Outline |
| | | | | | | NPN (N-ch) | PNP (P-ch) | |
| Bipolar Transistor For Low Frequency | — | 2SA1052 | 30 | 100 | 150 | — | 2SA1029 | TO-92 |
| | 2SC2618 | 2SA1121 | 35 | 500 | 150 | 2SC1213 | 2SA673 | TO-92 |
| | — | 2SA1122 | 55 | 100 | 150 | — | 2SA844 | TO-92 |
| | — | 2SA1171 | 90 | 50 | 150 | — | 2SA893 | TO-92 |
| | 2SD1101 | 2SB831 | 20 | 700 | 150 | 2SD467 | 2SB561 | TO-92 |
| | — | 2SB973 | 10 | 700 | 150 | — | — | — |
| | 2SC2462 | — | 40 | 100 | 150 | 2SC458 | — | TO-92 |
| | 2SC2463 | — | 50 | 100 | 150 | 2SC1345 | — | TO-92 |
| | 2SC2821 | — | 10 | 50 | 150 | — | — | — |
| Bipolar Transistor For High Frequency | 2SD1306 | — | 15 | 700 | 150 | 2SD655 | — | TO-92 |
| | 2SC2619 | — | 30 | 100 | 150 | 2SC461 | — | TO-92 |
| | 2SC2620 | — | 20 | 20 | 100 | 2SC535 | — | TO-92 |
| | 2SC2732 | — | 25 | 20 | 150 | 2SC2464 | — | FPAK |
| | 2SC2733 | — | 20 | 50 | 150 | 2SC2512 | — | TO-92 |
| | 2SC2735 | — | 20 | 50 | 150 | 2SC1906 | — | TO-92 |
| | 2SC2736 | — | 20 | 50 | 150 | 2SC2471 | — | TO-92 |
| | 2SC2776 | — | 20 | 30 | 150 | 2SC1342 | — | TO-92 |
| | 2SC3015 | — | 10 | 50 | 150 | 2SC2729 | — | FPAK |
| | 2SC3016 | — | 10 | 50 | 150 | 2SC2730 | — | FPAK |
| Single Gate MOS FET | 2SC3127 | — | 12 | 50 | 150 | 2SC3128 | — | TO-92 |
| | 2SC3493 | — | 12 | 20 | 150 | 2SC2727 | — | FPAK |
| | 2SK197 | — | 18 | 20 | 150 | 2SK55 | — | TO-92 |
| | 2SK217 | — | 30 | 20 | 150 | 2SK168 | — | TO-92 |
| | 2SK322 | — | 15 | 50 | 150 | 2SK291 | — | TO-92 |
| | 2SK323 | — | 40 | 30 | 150 | 2SK186 | — | TO-92 |
| | 2SK360 | — | 20 | 30 | 150 | 2SK359 | — | TO-92 |
| Dual Gate MOS FET | 2SK431 | — | 40 | 30 | 150 | 2SK187 | — | TO-92 |
| | 3SK136 | — | 20 | 35 | 150 | 3SK81 | — | FPAK |
| | 3SK137 | — | 15 | 35 | 150 | 3SK104 | — | FPAK |
| | 3SK138 | — | 15 | 35 | 150 | 3SK103 | — | FPAK |

UPAK Series

| Type Number | | Maximum Rating | | | Reference Type Number | | |
|-------------|----------|-------------------------|-----------------------|-----------------------|-----------------------|---------|---------|
| NPN | PNP | V _{CEO} (V) | I _C (A) | P _C (W) | Type Number | | Outline |
| | | | | | NPN | PNP | |
| 2SD1366 | 2SB1000 | 20 | 1 | 1 | 2SD468 | 2SB562 | TO-92M |
| 2SD1366A | 2SB1000A | 25 | 1 | 1 | 2SD468A | 2SB562A | TO-92M |
| 2SD1367 | 2SB1001 | 16 | 2 | 1 | 2SD787 | 2SB738 | TO-92M |
| 2SD1368 | 2SB1002 | 50 | 1 | 1 | 2SD789 | 2SB740 | TO-92M |
| 2SD1418 | 2SB1025 | 80 | 1 | 1 | 2SD667 | 2SB647 | TO-92M |
| 2SD1419 | 2SB1026 | 100 | 1 | 1 | 2SD667A | 2SB647A | TO-92M |
| 2SD1463 | 2SB1045 | 100 | 50m | 1 | 2SD666A | 2SB646A | TO-92M |
| 2SD1464 | 2SB1046 | 160 | 50m | 1 | 2SD668A | 2SB648A | TO-126 |

EPAK Series

| Transistor Type | Type Number | | Absolute Maximum Ratings | | | Reference Type Number | | |
|--------------------|-------------|---------|--------------------------|-----------------------|-----------------------|-----------------------|---------|---------|
| | NPN | PNP | V _{CEO} (V) | I _C (A) | P _C (W) | Type Number | | Outline |
| | | | | | | NPN | PNP | |
| Bipolar Transistor | — | 2SA1340 | 50 | 0.1 | 0.4 | — | 2SA1031 | TO-92 |
| | — | 2SA1351 | 30 | 0.1 | 0.4 | — | 2SA1031 | TO-92 |
| | 2SC3394 | — | 50 | 0.1 | 0.4 | 2SC458 (L) | — | TO-92 |
| | 2SC3414 | — | 30 | 0.1 | 0.4 | 2SC458 (L) | — | TO-92 |

DPAK Series

| Transistor Type | Type Number | | Absolute Maximum Ratings | | | Reference Type Number | | | |
|--------------------|---------------|---------|---------------------------------------------|-----------------------------------------|-------------------------------------------------|-----------------------|-------------|---------|---|
| | NPN | PNP | V _{CEO} V _{DSS} (V) | I _C I _D (A) | P _C (T _C =25°C) (W) | Type Number | | Outline | |
| | | | | | | NPN | PNP | | |
| Bipolar Transistor | 2SC2870 | — | 300 | 0.1 | 10 | 2SC1514 | — | TO-202 | |
| | 2SC3129 | — | 400 | 0.5 | 10 | 2SC2899 | — | TO-126 | |
| | 2SC3132 | — | 30 | 3 | 10 | 2SC3004 | — | TO-126 | |
| | 2SD1077 | 2SB837 | 35 | 2.5 | 20 | 2SC1162 | 2SA715 | TO-126 | |
| | 2SD1078 | 2SB838 | 50 | 2.0 | 20 | 2SC1212 | 2SA743 | TO-126 | |
| | 2SD1079 | 2SB839 | 80 | 2.0 | 20 | 2SC1212A | 2SA743A | TO-126 | |
| | 2SD1080 | 2SB840 | 120 | 1.5 | 20 | 2SD669 | 2SB649 | TO-126 | |
| | 2SD1081 | 2SB841 | 160 | 1.5 | 20 | 2SD669A | 2SB649A | TO-126 | |
| | 2SD1083 | — | 60 | 2 | 20 | 2SD975 | — | TO-126 | |
| | 2SD1281 | 2SB957 | 60 | 2 | 20 | 2SD1177 | 2SB874 | TO-126 | |
| | 2SC2871 | 2SA1197 | 60 | 1 | 20 | 2SC2324 (K) | 2SA1194 (R) | TO-126 | |
| | 2SD1465 | 2SB1047 | 120 | 1.5 | 20 | — | — | — | |
| | — | 2SA1233 | 360 | 100m | 10 | — | 2SA1024 (H) | TO-18 | |
| | 2SC3362 | — | 400 | 1.5 | 10 | — | — | — | |
| | 2SC3363 | — | 450 | 1.0 | 10 | — | — | — | |
| | 2SD1520 | 2SB1072 | 80 | 4 | 20 | — | — | — | |
| | — | 2SA1379 | 600 | 0.8 | 10 | — | — | — | |
| | 2SC3386 | — | 50 | 3 | 10 | — | — | — | |
| | Power MOS FET | 2SK416 | 2SJ120 | 40 | 2 | 10 | — | — | — |
| | | 2SK429 | — | 100 | 3 | 20 | — | — | — |
| 2SK430 | | — | 150 | 3 | 20 | — | — | — | |
| 2SK375 | | — | 300 | 1 | 10 | 2SK296 | — | TO-220 | |
| 2SK347 | | — | 400 | 1 | 10 | — | — | — | |
| (HS7281) | | — | 400 | 1.5 | 10 | — | — | — | |
| 2SK384 | | — | 500 | 0.3 | 10 | 2SK441 | — | TO-39 | |
| 2SK535 | — | 400 | 1.5 | 20 | — | — | — | | |

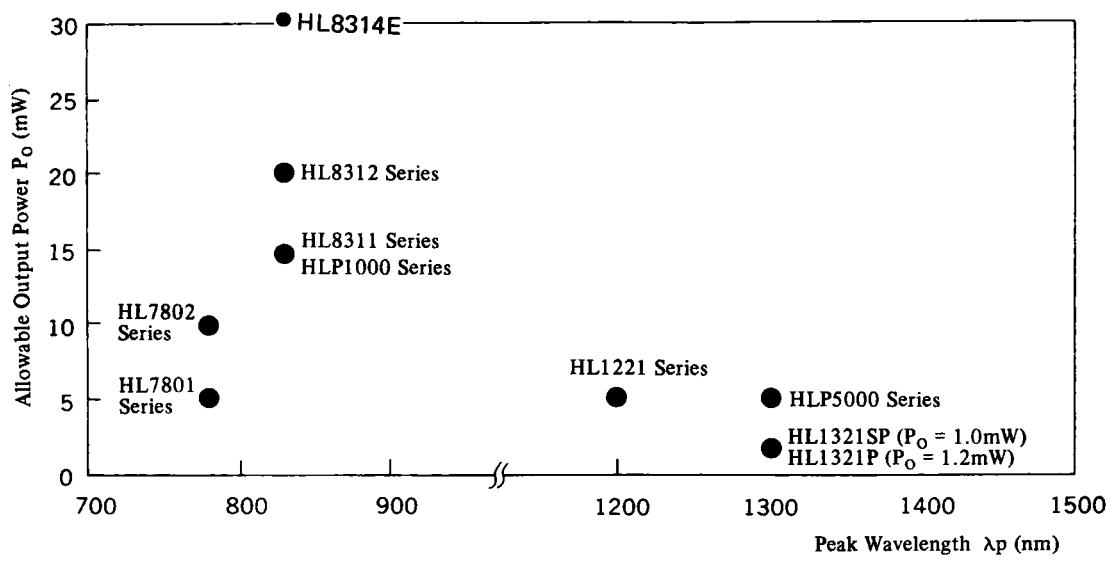
() Under Development

SPAK Series

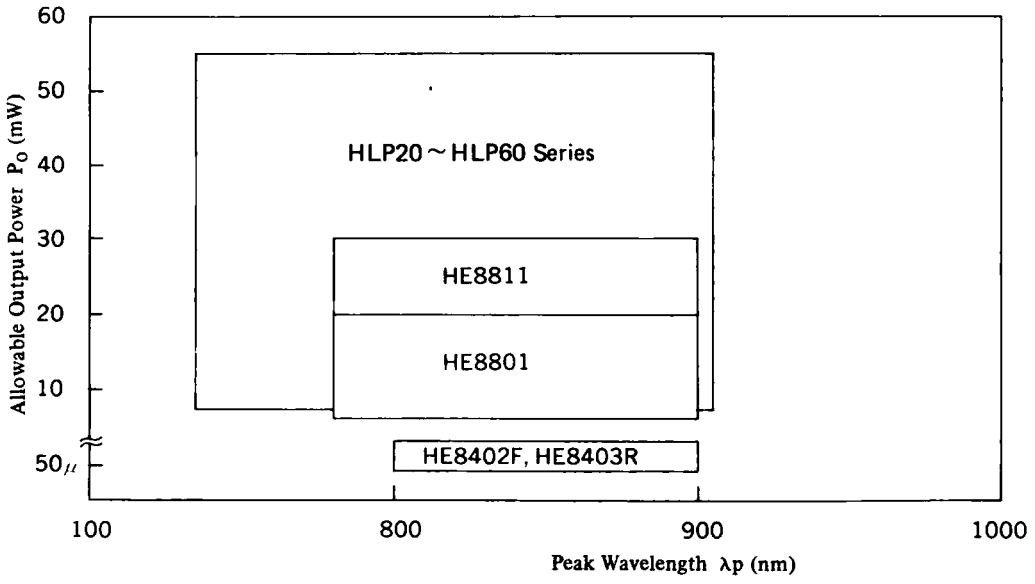
| Transistor Type | Type Number | | Absolute Maximum Ratings | | | Reference Type Number | | |
|--------------------|-------------|------------|---------------------------------------------|-----------------------------------------|-----------------------|-----------------------|------------|---------|
| | NPN (N-ch) | PNP (P-ch) | V _{CEO} V _{DSS} (V) | I _C I _D (A) | P _C (W) | Type Number | | Outline |
| | | | | | | NPN (N-ch) | PNP (P-ch) | |
| Bipolar Transistor | | 2SA1337 | 50 | 0.1 | 0.3 | | 2SA1031 | TO-92 |
| | | 2SA1350 | 30 | 0.1 | 0.3 | | 2SA1031 | TO-92 |
| | | 2SA1374 | 55 | 0.1 | 0.3 | | 2SA836 | TO-92 |
| | | 2SA1390 | 35 | 0.5 | 0.3 | | 2SA673 | TO-92 |
| | 2SC3390 | | 50 | 0.1 | 0.3 | 2SC458 (LG) | | TO-92 |
| | 2SC3391 | | 20 | 20m | 0.2 | 2SC535 | | TO-92 |
| | 2SC3413 | | 30 | 0.1 | 0.3 | 2SC458 (LG) | | TO-92 |
| | 2SC3470 | | 50 | 0.1 | 0.3 | 2SC1345 | | TO-92 |
| | 2SC3494 | | 30 | 0.1 | 0.3 | 2SC460 | | TO-92 |
| | 2SC3553 | | 35 | 0.5 | 0.3 | 2SC1213 | | TO-92 |
| MOS FET | 2SD1504 | | 15 | 0.5 | 0.3 | | | |
| | 2SK439 | | 20 | 30m | 0.3 | 2SK359 | | TO-92 |
| | 2SK494 | | 22 | 0.1 | 0.3 | 2SK435 | | TO-92 |

OPTOELECTRONIC DEVICES

■ Laser Diodes



■ Infra-red Emitting Diodes



■ Photo Detectors

