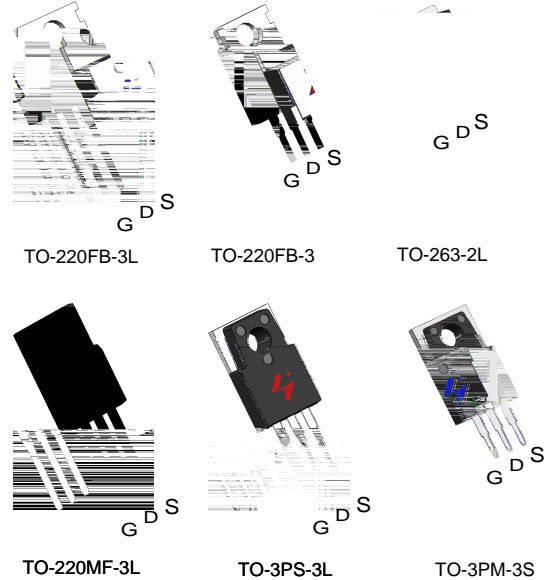


N-Channel Enhancement Mode MOSFET

Features

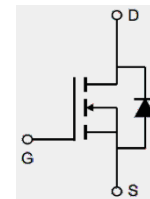
- 80V/200A
 $R_{DS(ON)} = 2.9\text{ m}\Omega$ (typ.) @ $V_{GS}=10V$
- 100% avalanche tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description








Applications

- Switching application
- Power Management for Inverter Systems.



N-Channel MOSFET

Ordering and Marking Information

| | | | |
|---|---|--|---|
|  P HY4008 YYXXJWW G |  M HY4008 YYXXJWW G |  B HY4008 YYXXJWW G | Package Code P : TO-220FB-3L M : TO-220FB-3 B: TO-263-2L PS: TO-3PS-3L PM: TO-3PM-3S |
|  PS HY4008 YYXXJWW G |  PM HY4008 YYXXJWW G | | Date Code Assembly Material YYXX WW G : Lead Free Device |

Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020 for MSL classification at lead-free peak reflow temperature. HUAYI defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|--------|-----------|---------------|------|
| | | 790** | |
| | | 1496*** | |
| | | HY4008 | |
| | | 80 | |
| | | 2.9 | |

Typical Operating Characteristics

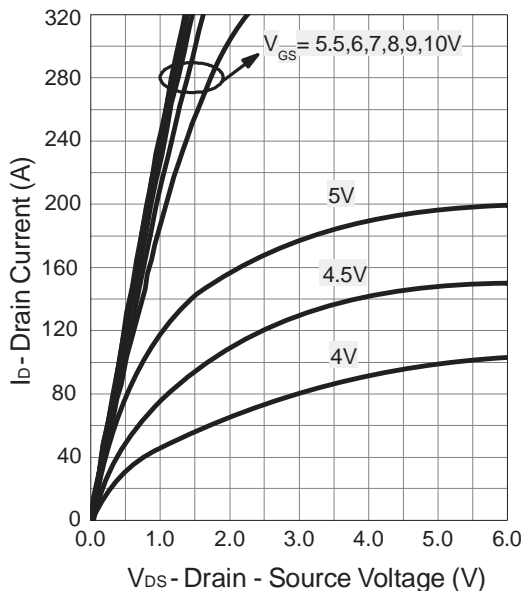
Safe Operation Area

—

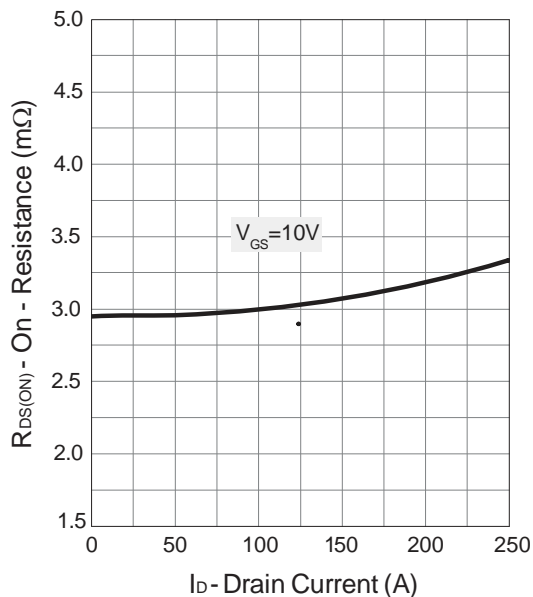
V_{DS} - Drain - Source Voltage (V)

Typical Operating Characteristics (Cont.)

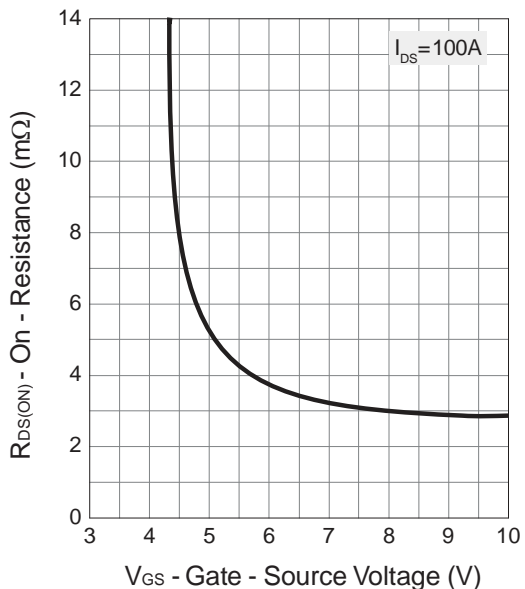
Output Characteristics



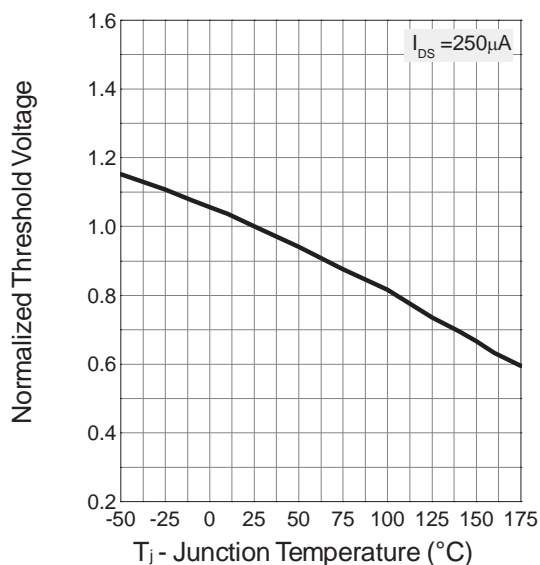
Drain-Source On Resistance



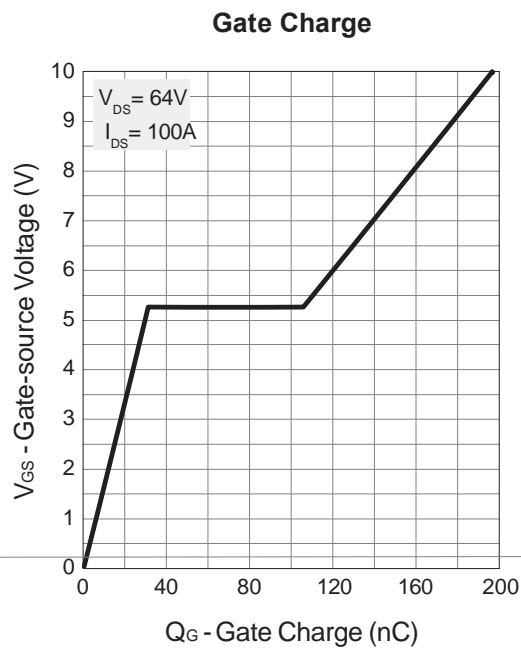
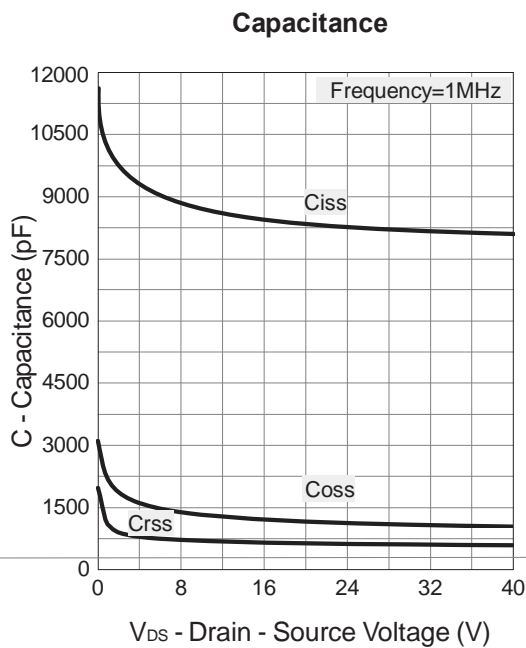
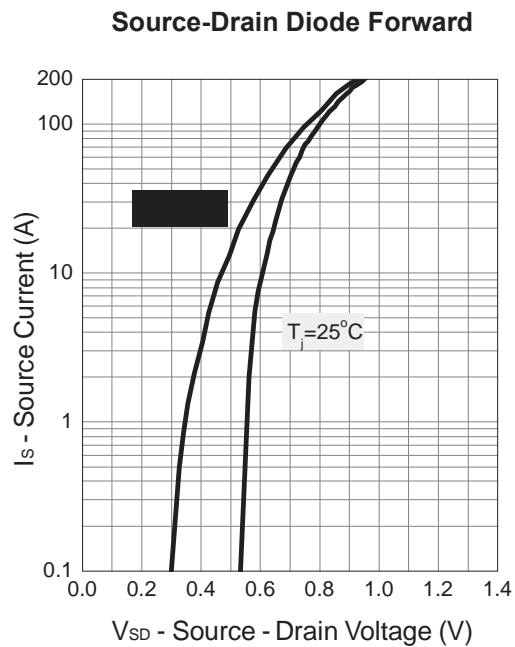
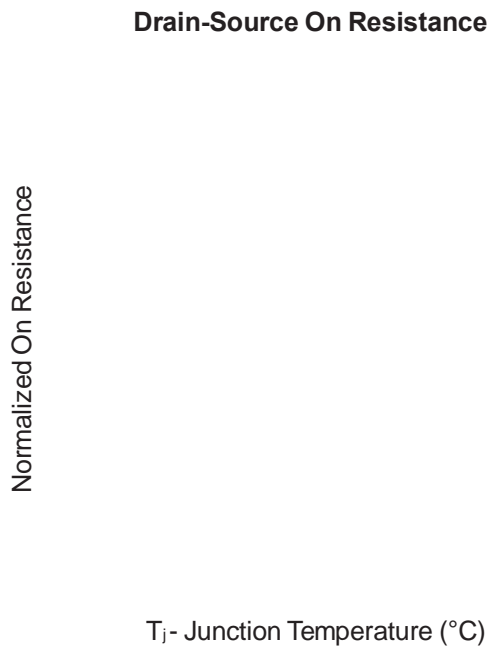
Gate-Source On Resistance



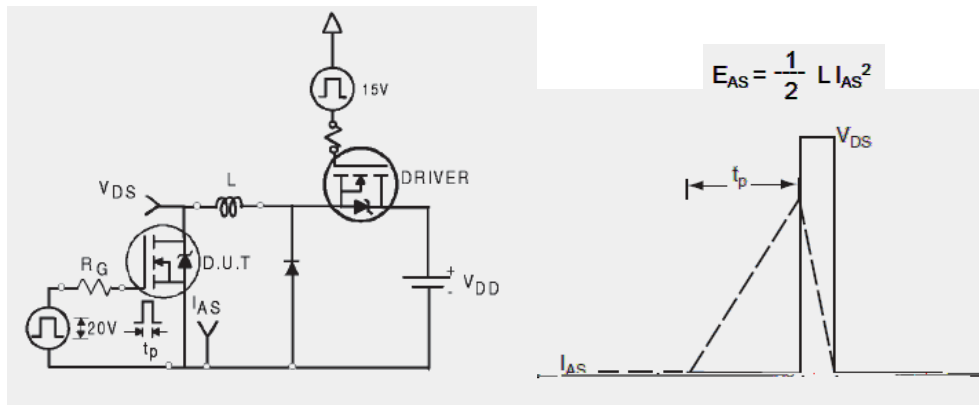
Gate Threshold Voltage



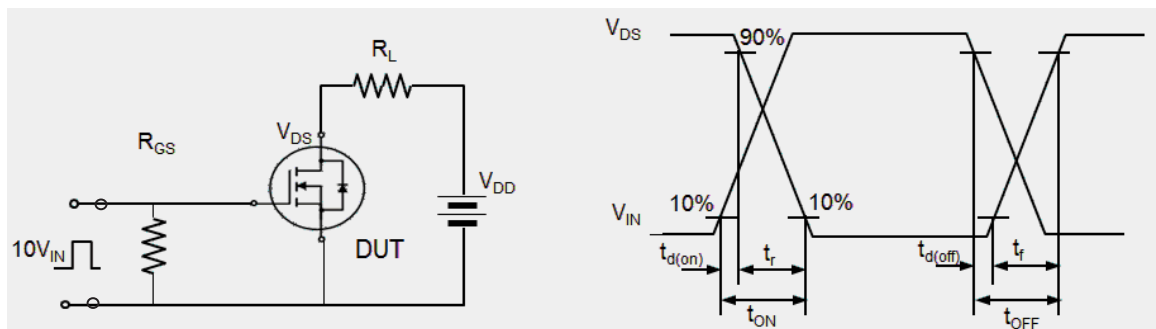
Typical Operating Characteristics (Cont.)



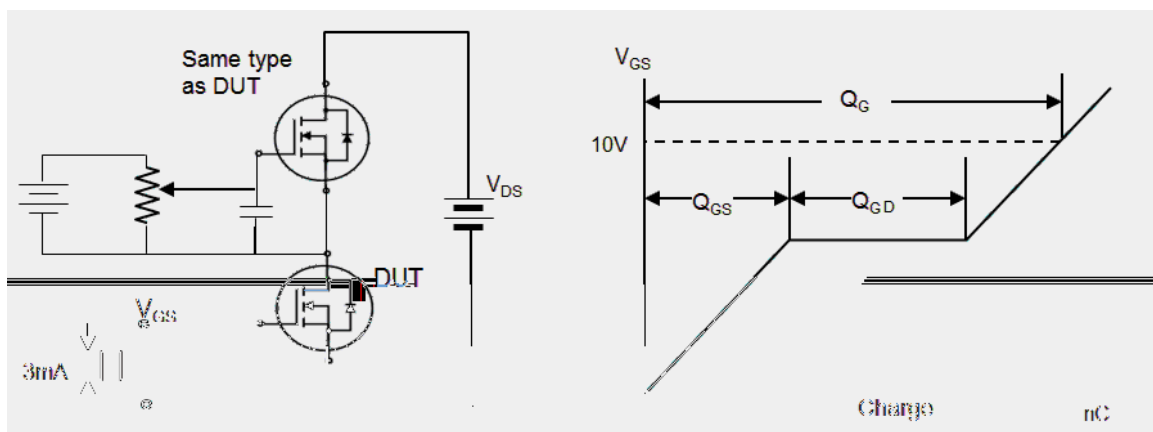
Avalanche Test Circuit



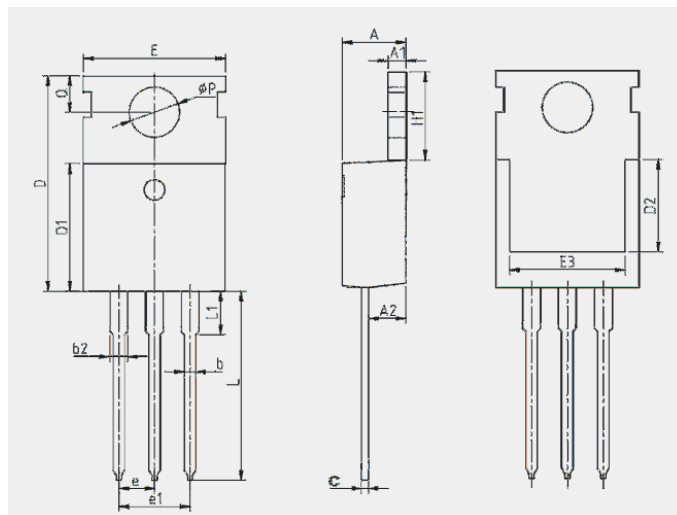
Switching Time Test Circuit



Gate Charge Test Circuit



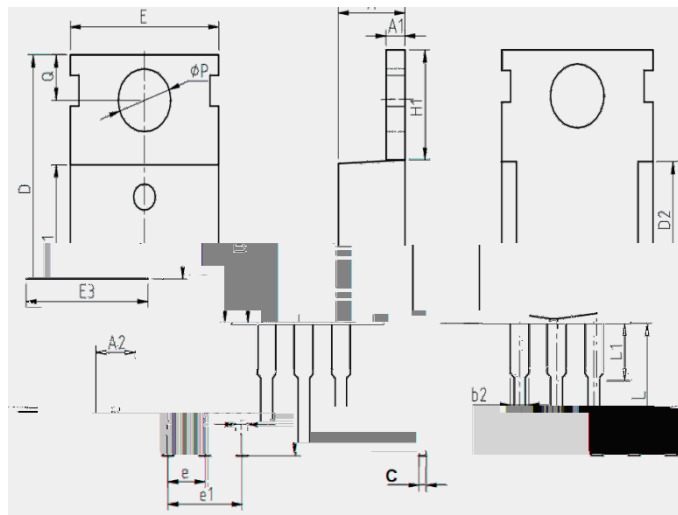
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| VUĒGGĒØŌĒHŠÁ | V˘ā^Á | íĒÁ |
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ŌUTTURÁŌTŌRŪQURŪÁ

| ŪYTŌUSÁ | { {Á | | |
|---------|-----------|--------|--------|
| | TŌPÁ | PŪTÁ | TŌEYÁ |
| ŒÁ | íĒĪÁ | íĒĪÁ | íĒĪÁ |
| ŒFÁ | FĒĠÁ | FĒĤÁ | FĒĪÁ |
| ŒĠÁ | GĒĠĒÁ | GĒĪĒÁ | GĒĪĒÁ |
| àÁ | ĒĒĪĒÁ | ĒĒĪĒÁ | ĒĒĪÁ |
| àĠÁ | FĒFĪÁ | FĒĠĪÁ | FĒĪĪÁ |
| &Á | ĒĒĪĒÁ | ĒĒĪĒÁ | ĒĒĪÁ |
| ŌÁ | FĪĒFĒÁ | FĪĒĒÁ | FĪĒFĒÁ |
| ŌFÁ | ĪĒĪĒÁ | JĒFĒÁ | JĒĪĒÁ |
| ŌĠÁ | ĪĒĪĒÁ | ĒÁ | ĒÁ |
| ŌÁ | JĒĪĒÁ | FĒĒĒÁ | FĒĒĤÁ |
| ŌĤÁ | ĪĒĒĒÁ | ĒÁ | ĒÁ |
| ^Á | GĒĪĪÁŌŪŌÁ | | |
| ^FÁ | ĪĒĒĪÁŌŪŌÁ | | |
| PFÁ | ĪĒĠÁ | ĪĒĪĒÁ | ĪĒĪĪÁ |
| ŠÁ | FGĒĪĪÁ | FĤĒĪĒÁ | FĤĒĪĒÁ |
| ŠFÁ | ĒÁ | HĒFĒÁ | HĒĪĒÁ |
| ŪÁ | HĒĪĒÁ | HĒĪĒÁ | HĒĪĒÁ |
| ŪÁ | GĒĪĒÁ | GĒĪĒÁ | HĒĒĒÁ |

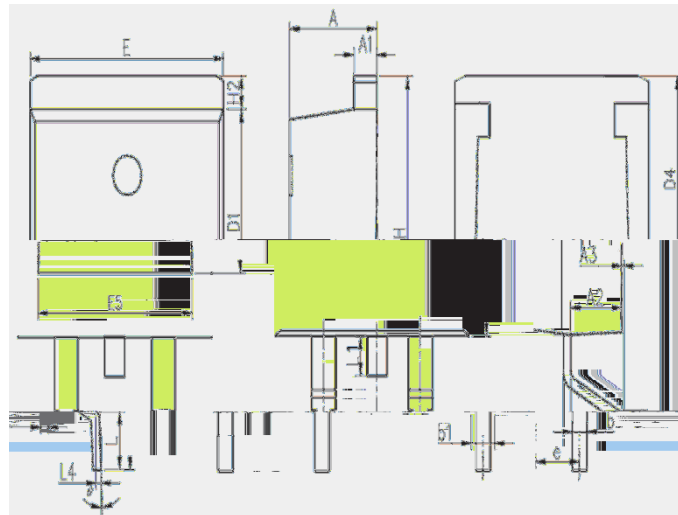
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| ŪYTÓUSÁ | { { Á | | |
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| CEÁ | IĒHTÁ | IĒITÁ | IĒITÁ |
| CEFÁ | FĒGÍÁ | FĒHEÁ | FĒIÍÁ |
| CEGÁ | GĒGEÁ | GĒIEÁ | GĒIEÁ |
| àÁ | ĒĒIEÁ | ĒĒIEÁ | ĒĒJÍÁ |
| àGÁ | FĒFĒÁ | FĒGTÁ | FĒIĒÁ |
| &Á | ĒĒIEÁ | ĒĒIEÁ | ĒĒIĒÁ |
| ÖÁ | FĒFEÁ | FĒIEÁ | FĒIEÁ |
| ÖFÁ | IĒFEÁ | JĒFEÁ | JĒIEÁ |
| ÖGÁ | IĒIEÁ | ĒÁ | ĒÁ |
| ÒÁ | JĒIEÁ | FĒĒĒÁ | FĒĒHEÁ |
| ÒHÁ | IĒĒĒÁ | ĒÁ | ĒÁ |
| ^Á | GĒIÍÁØŪÖÁ | | |
| ^FÁ | IĒĒIÁØŪÖÁ | | |
| PFÁ | IĒGÍÁ | IĒIEÁ | IĒIÍÁ |
| ŠÁ | IĒIEÁ | IĒĒĒÁ | IĒGEÁ |
| ŠFÁ | ĒÁ | HĒFEÁ | HĒIEÁ |
| ŪÁ | HĒIEÁ | HĒIEÁ | HĒIEÁ |
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| VUEĠĠĤĠĠSĀ | Ü^Λ Ā | ÍĒĀ |
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ÖUT TUPĀÖQTÖPÜQUPÜĀ

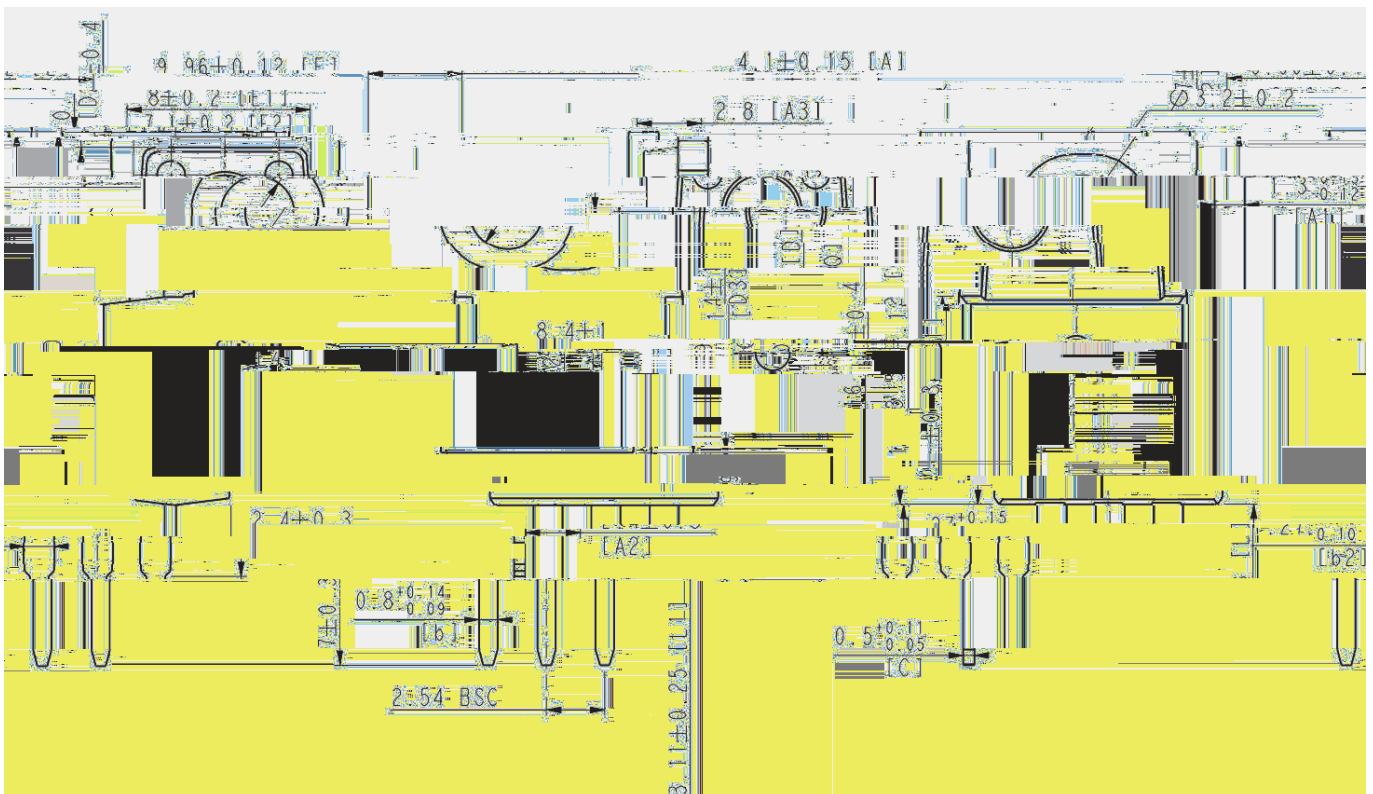
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| CEFA | FĒGGĀ | FĒĠĪĀ | FĒĠĠĀ |
| CEGĀ | GĒIJĀ | GĒĪJĀ | GĒĪJĀ |
| CEHĀ | ĒĀ | ĒĒFHĀ | ĒĒĠĪĀ |
| ĀĀ | ĒĒĪĪĀ | ĒĒĪĪFA | ĒĒĠĪĪĀ |
| ĀFA | FĒĒFĪĀ | FĒĠĠĪĀ | FĒĪĪĪĀ |
| ĀĀ | ĒĒHĀ | ĒĒHĪĀ | ĒĒĪĪHĀ |
| ÖFA | ĪĒĪĪĀ | ĪĒĪĪĀ | ĪĒĠĠĀ |
| ÖĪĀ | ĪĒĪĪĀ | ĒĀ | ĒĀ |
| ÖĀ | JĒĪĪĪĀ | FĒĒĒFĪĀ | FĒĒĒHĪĀ |
| ÖĪĪĀ | ĪĒĒĒĪĪĀ | ĒĀ | ĒĀ |
| ĀĀ | GĒĪĪĪĀÖÜÖĀ | | |
| PA | FĪĒĪĪĀ | FĪĒĒFA | FĪĒĪĪĀ |
| PGA | FĒĒĒĪĪĀ | FĒĠĠĪĪĀ | FĒĪĪĪĪĀ |
| ŠĀ | GĀ | GĒHĀ | GĒĪĪĀ |
| ŠFA | FĒĪĪĀ | FĒĪĪĪĪĀ | FĒĪĪĪĀ |
| ŠĪĪĀ | ĒĒĒĒĪĪĪĀÖÜÖĀ | | |
| ĀĀ | ĒĒĀĀ | ĪĪĀĀ | JĪĪĀ |

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| VUEHUUËHŠÁ | V~à^À | í€À |

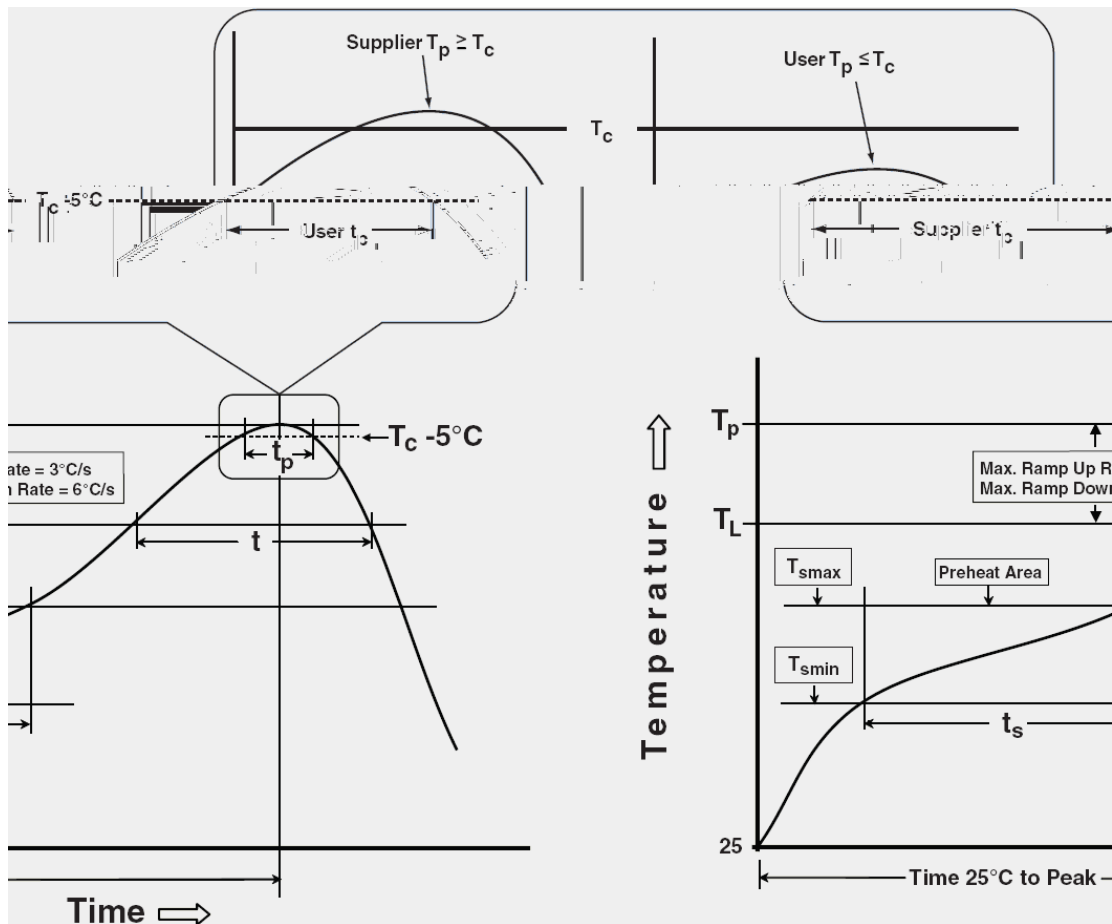
ÔUTTURÁÖQTÒRÙQUËÙÁ

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| ÛŸTÓUŠÁ | | | |
| CEÁ | HÈHÎÁ | HÈÍÎÁ | H " |

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Classification Profile



Classification Reflow Profiles

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|------------------------------------|------------------------------------|
| Preheat & Soak | | |
| Temperature min (T_{smin}) | 100 °C | 150 °C |
| Temperature max (T_{smax}) | 150 °C | 200 °C |
| Time (T_{smin} to T_{smax}) (t_s) | 60-120 seconds | 60-120 seconds |
| Average ramp-up rate (T_{smax} to T_p) | 3 °C/second max. | 3°C/second max. |
| Liquidous temperature (T_L) | 183 °C | 217 °C |
| Time at liquidous (t_L) | 60-150 seconds | 60-150 seconds |
| Peak package body Temperature (T_p)* | See Classification Temp in table 1 | See Classification Temp in table 2 |
| Time (t_p)** within 5°C of the specified classification temperature (T_c) | 20** seconds | 30** seconds |
| Average ramp-down rate (T_p to T_{smax}) | 6 °C/second max. | 6 °C/second max. |
| Time 25°C to peak temperature | 6 minutes max. | 8 minutes max. |
| * Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. | | |
| ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum. | | |

HY4008P/M/B/PS/PM

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm | 235 °C | 220 °C |
| ≥2.5 mm | 220 °C | 220 °C |

Table 2. Pb-free Process – Classification Temperatures (Tc)

| Package Thickness | Volume mm ³ <350 | Volume mm ³ 350-2000 | Volume mm ³ >2000 |
|-------------------|-----------------------------|---------------------------------|------------------------------|
| <1.6 mm | 260 °C | 260 °C | 260 °C |
| 1.6 mm – 2.5 mm | 260 °C | 250 °C | 245 °C |
| ≥2.5 mm | 250 °C | 245 °C | 245 °C |

Reliability Test Program

| Test item | Method | Description |
|---------------|---------------|--|
| SOLDERABILITY | JESD-22, B102 | 5 Sec, 245°C |
| HTRB | JESD-22, A108 | 168 Hrs/500 Hrs/1000 Hrs, Bias @ 125°C |
| PCT | JESD-22, A102 | 96 Hrs, 100 %RH, 2atm, 121°C |
| TCT | JESD-22, A104 | 500 Cycles, -55°C~150°C |

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