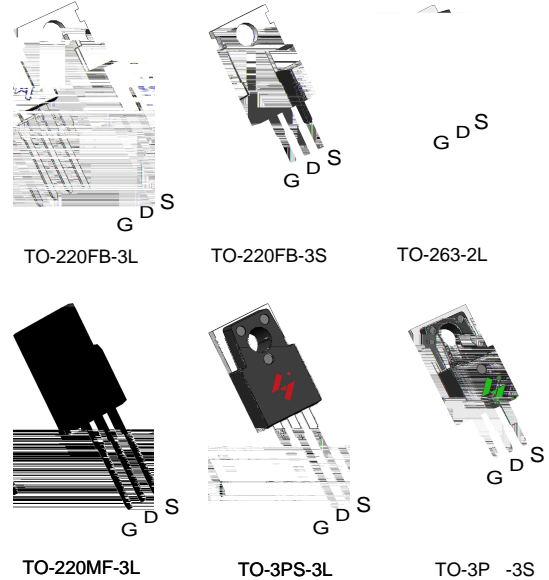


## N-Channel Enhancement Mode MOSFET

### Features

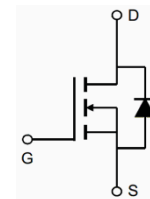
- 80V/200A  
 $R_{DS(ON)} = 2.9\text{ m}\Omega$  (typ.) @  $V_{GS}=10\text{V}$
- 100% avalanche tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

### Pin Description








### Applications

- Switching application
- Power Management for Inverter Systems.



N-Channel MOSFET

### Ordering and Marking Information

 P <b>HY4008</b> YYXXJWW G	 M <b>HY4008</b> YYXXJWW G	 B <b>HY4008</b> YYXXJWW G	Package Code P : TO-220FB-3L    M : TO-220FB-3S B: TO-263-2L      PS: TO-3PS-3L PM: TO-3PM-3S
 PS <b>HY4008</b> YYXXJWW G	 PM <b>HY4008</b> 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***	
		<b>HY4008</b>	
		80	
		2.9	

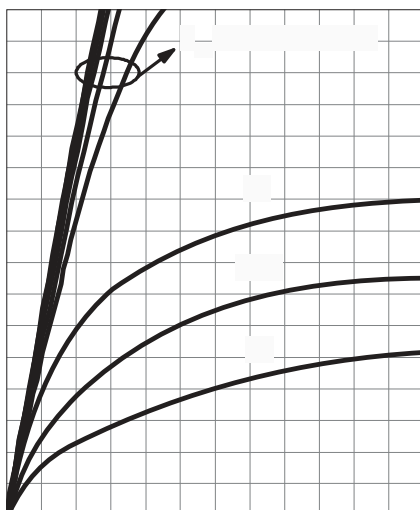


## Typical Operating Characteristics

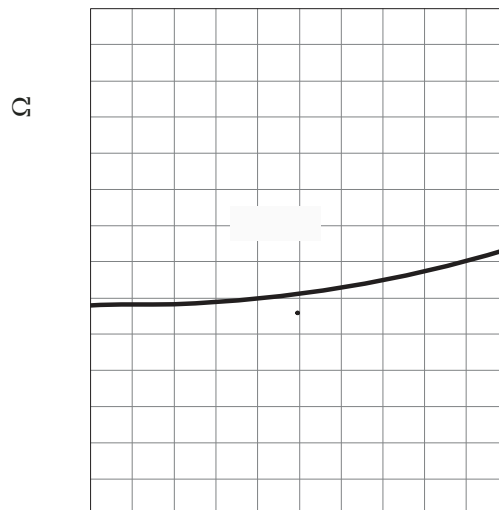
Safe Operation Area

## Typical Operating Characteristics (Cont.)

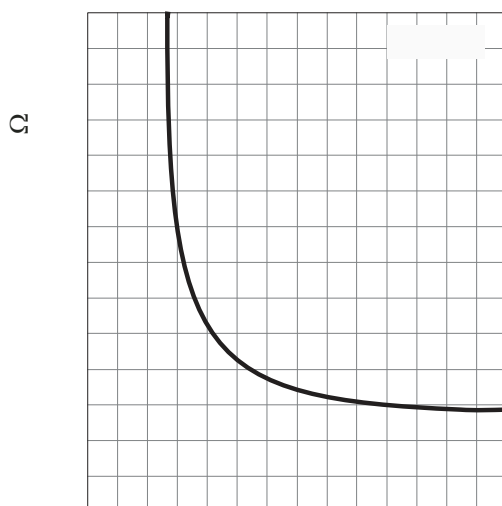
Output Characteristics



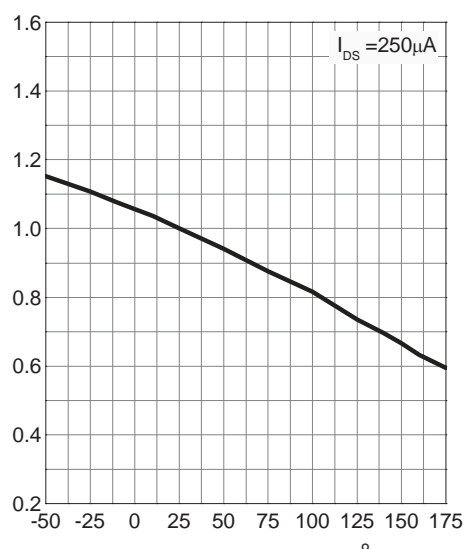
Drain-Source On Resistance



Gate-Source On Resistance



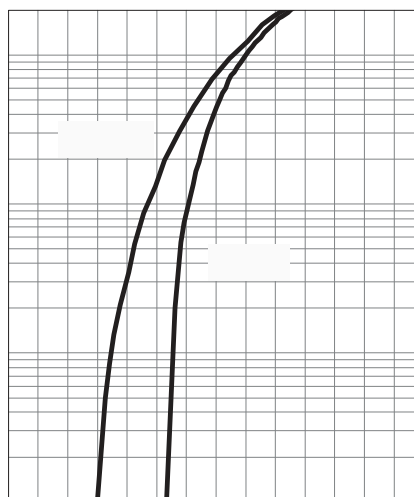
Gate Threshold Voltage



## Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

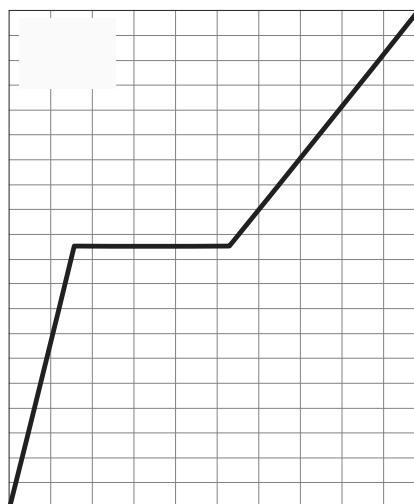
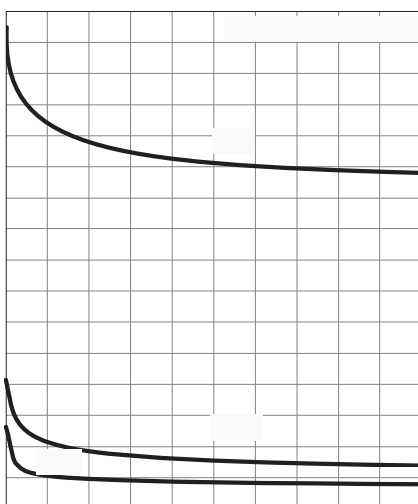
Source-Drain Diode Forward



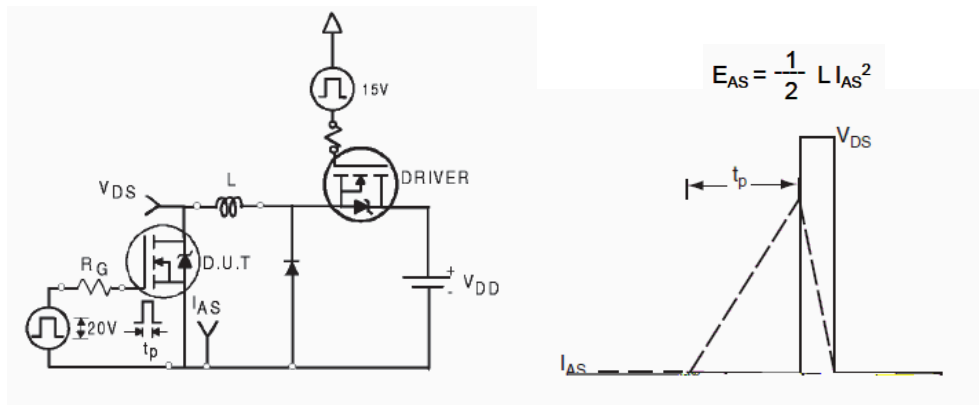
o

Capacitance

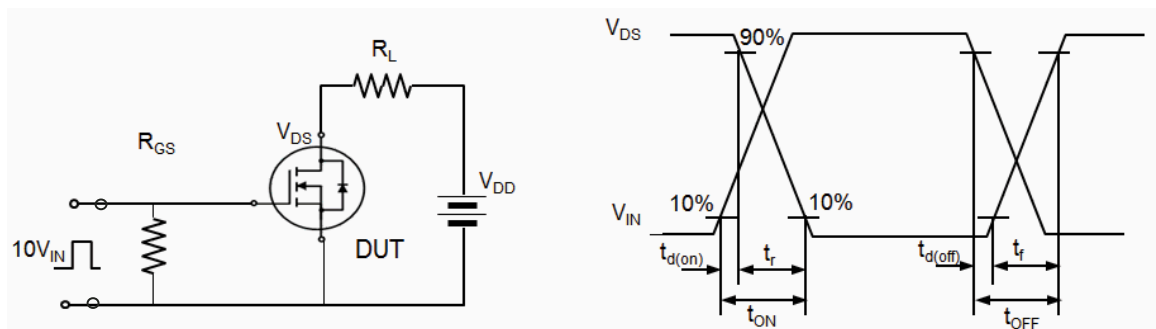
Gate Charge



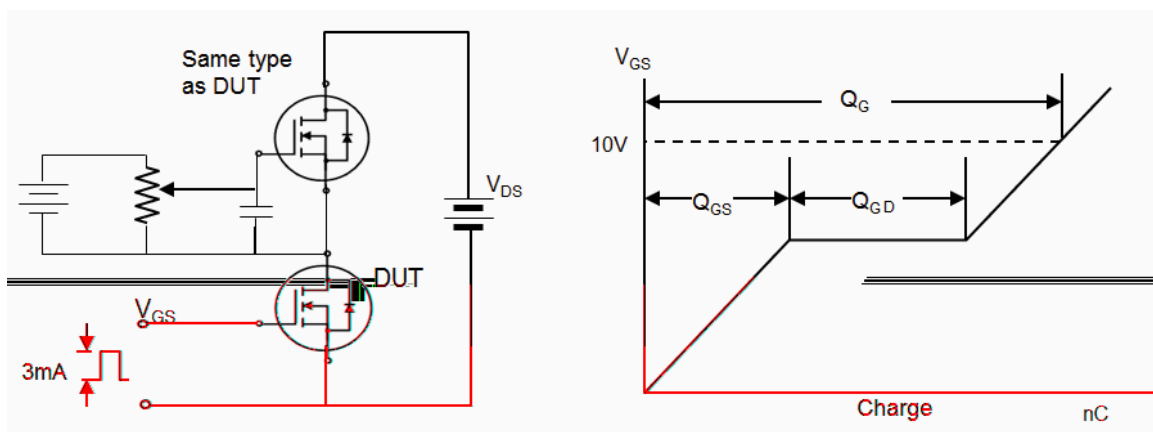
### Avalanche Test Circuit



### Switching Time Test Circuit



### Gate Charge Test Circuit

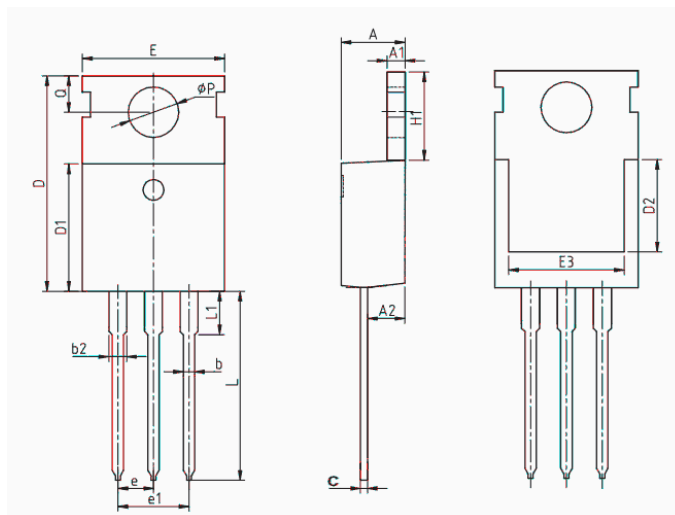


8Y j]WY'DYf' I b]h'

DUW_U[Y'HmdY'	I b]h'	E i Ub]hm'

DUW\_U[Y'=bzcf a Uh]cb'

HC!&&\$ : 6!'@'



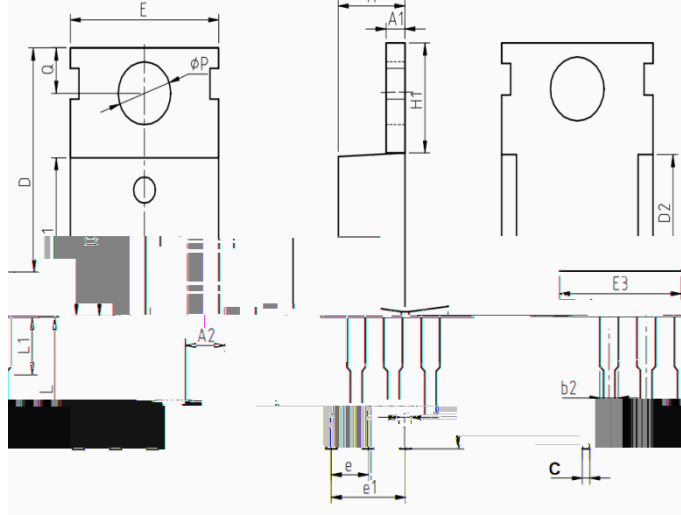



8Y j]WY'DYf' I b]h'

DUW_U[Y'HmdY'	I b]h'	E i Ubh]hm'

DUW\_U[Y'=bZcf a Uh]cb'

HC!&&\$: 6!'G'

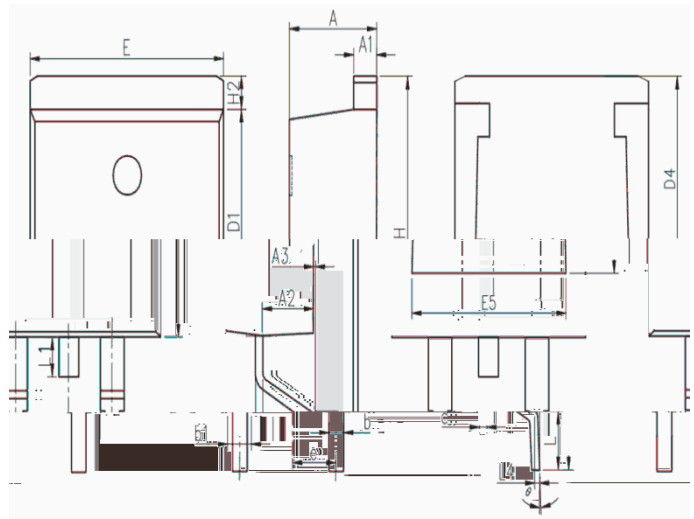



8Yj]WY'DYf' I b]h'

DUW_U[Y'HmdY'	I b]h'	E i Ub]hm'

DUW\_U[Y'=bzcf a Uh]cb'

HC!&\* ' !&@'




# HY4008P/M/B/PS/PM

---

8YjjWY'DYf' I b]h'

DUW_U[Y'HmdY'	I b]h'	E i Ubh]hm'

DUW\_U[Y'=bZcf a Uh]cb'

HC!'DG!'@'

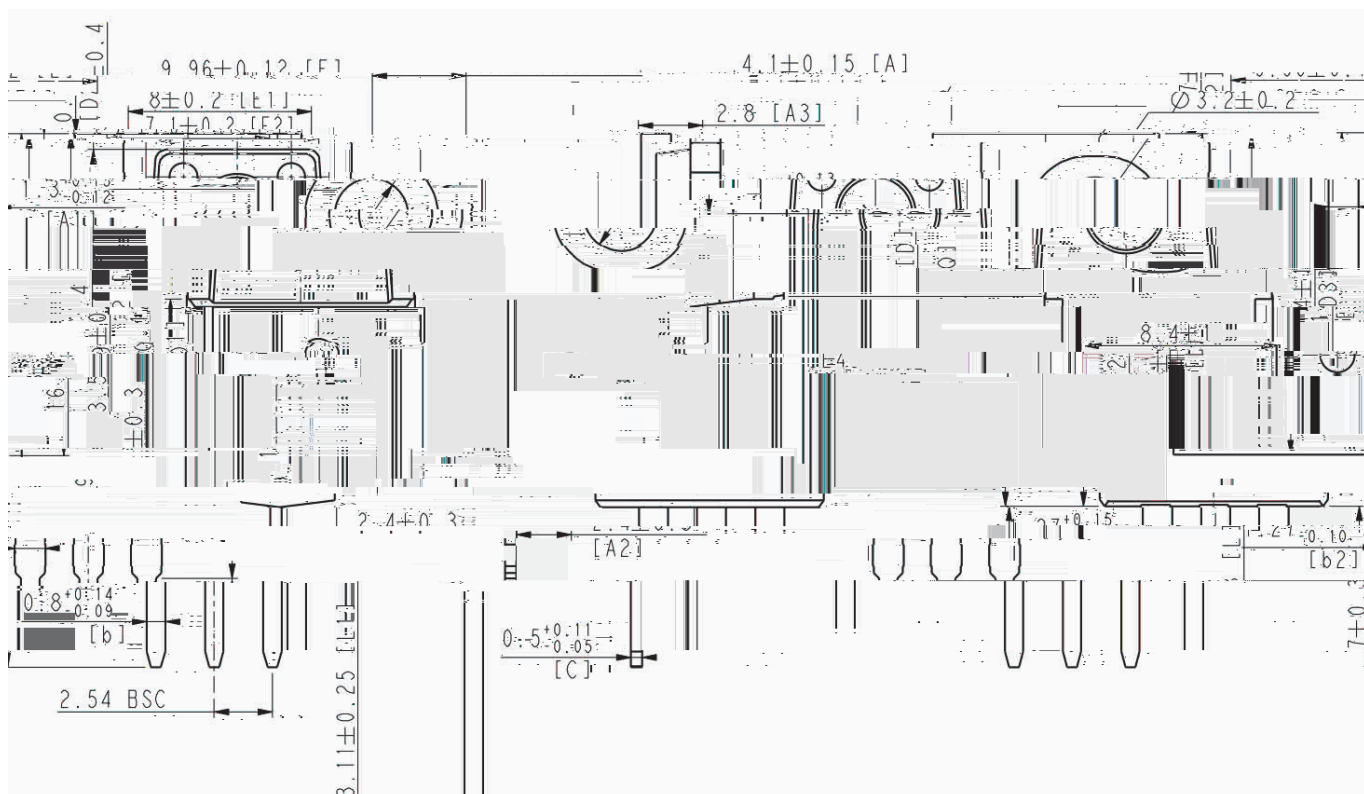
--	--	--	--

8Y j]WY'DYf' I b]h'

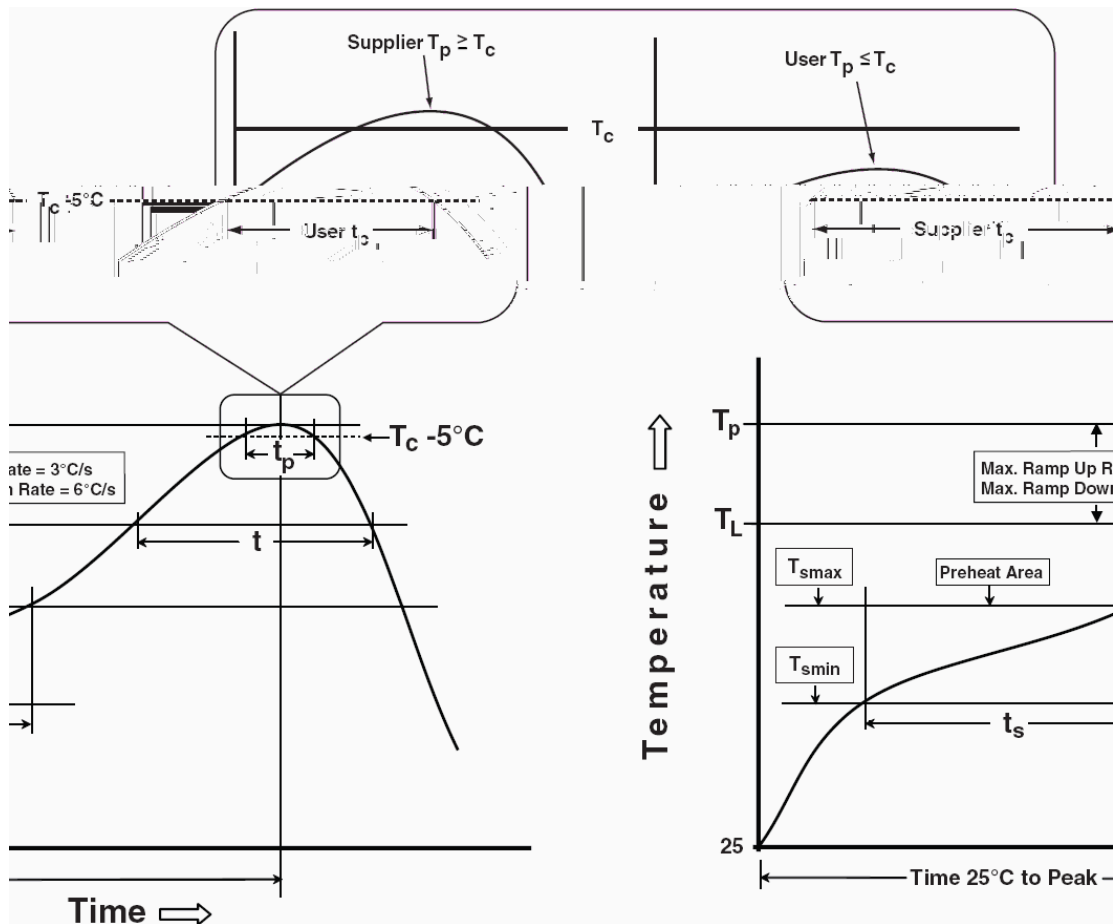
DUW_U[Y'HmdY'	I b]h'	E i Ubh]hm'

DUW\_U[Y'=bZcf a Uh]cb'

HC!'DA!'G'



### Classification Profile



### Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
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 <sup>3</sup> <350	Volume mm <sup>3</sup> ≥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 <sup>3</sup> <350	Volume mm <sup>3</sup> 350-2000	Volume mm <sup>3</sup> >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

7 i g h c a Y f ' G Y f j j W Y ' ( , ( ( ( ( (