HY5208W/A

N-Channel Enhancement Mode MOSFET

Features

- 80V/320A
  $R_{DS(ON)}$=1.7 mΩ (typ.) @ V_{GS}=10V
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available
  (RoHS Compliant)

Pin Description

Applications

- Power Management for Inverter Systems.

N-Channel MOSFET

Ordering and Marking Information

W HY5208 YYXXXJWW G A HY5208 YYXXXJWW G	Package Code W : TO-247A-3L A : TO-3P-3L Date Code YYXXX WW Assembly Material G : Lead Free Device

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Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		80	V
V_{GSS}	Gate-Source Voltage		±25	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	320	A
Mounted on Large Heat Sink				
I_{DM}		T_C=25°C	1050**	A
I_D	Continuous Drain Current	T_C=25°C	320	A
		T_C=100°C	228	
P_D	Maximum Power Dissipation	T_C=25°C	416	W
		T_C=100°C	208	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.36	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		40	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	1500***	mJ

Electrical Characteristics (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY5208			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	80	-	-	V
		V_{DS}=80V, V_{GS}=0V	-	-	1	

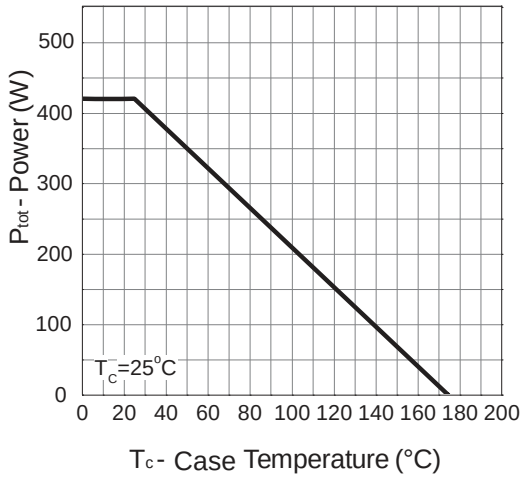
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY5208			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	12160	-	pF
C_{oss}	Output Capacitance		-	1500	-	
C_{rss}	Reverse Transfer Capacitance		-	920	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=40V, R_G=6 Ω, I_{DS}=160A, V_{GS}=10V,	-	58	120	ns
T_r	Turn-on Rise Time		-	35	64	
$t_{d(OFF)}$	Turn-off Delay Time		-	110	200	
T_f	Turn-off Fall Time		-	90	176	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=64V, V_{GS}=10V, I_{DS}=160A	-	298	-	nC
Q_{gs}	Gate-Source Charge		-	44	-	
Q_{gd}	Gate-Drain Charge		-	115	-	

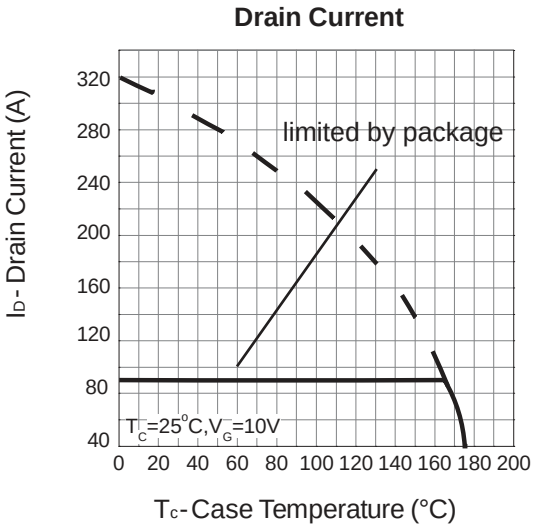
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

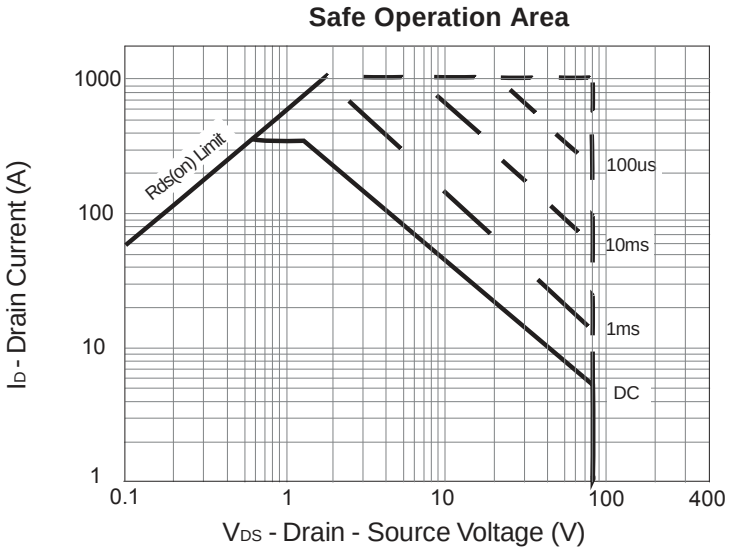
Power Dissipation



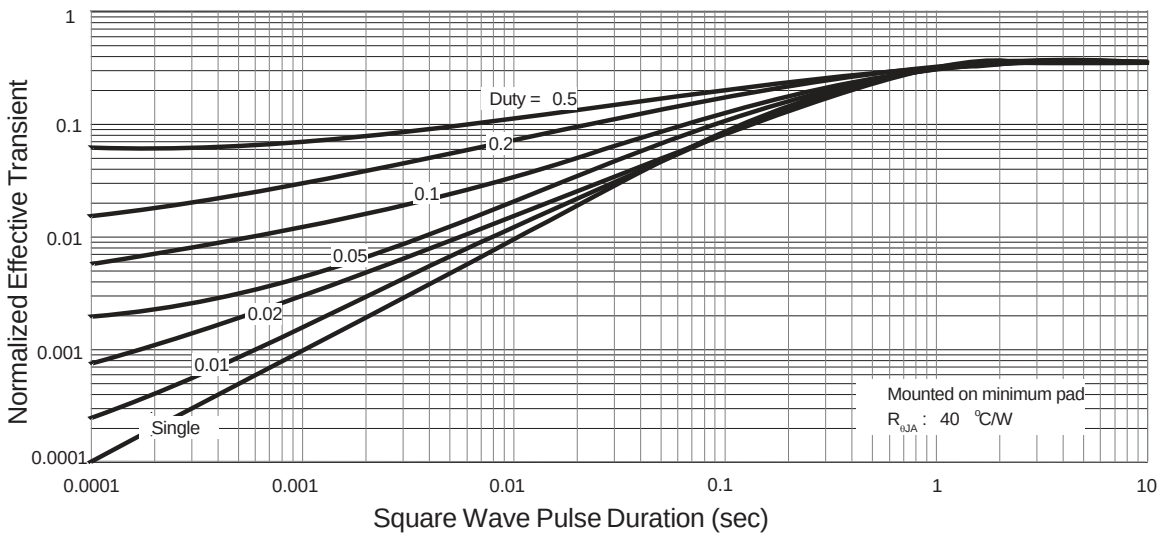
Drain Current



Safe Operation Area

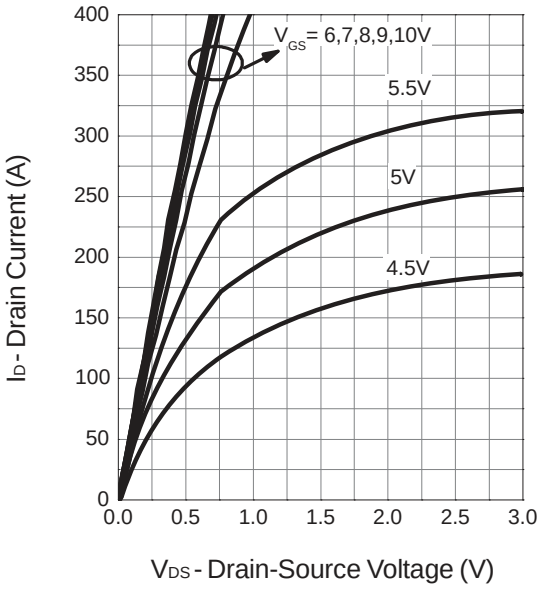


Thermal Transient Impedance

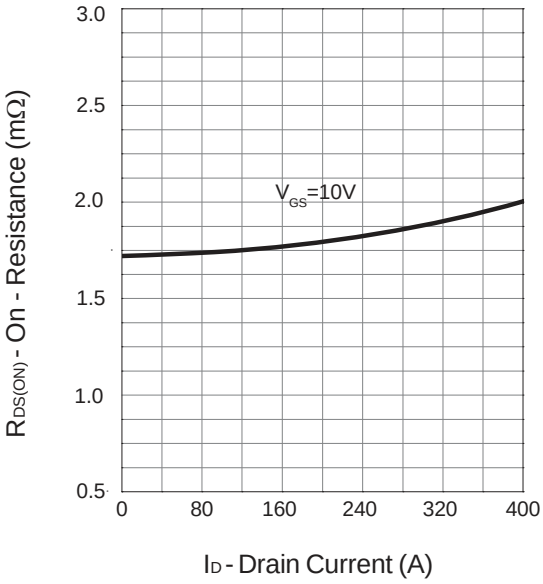


Typical Operating Characteristics (Cont.)

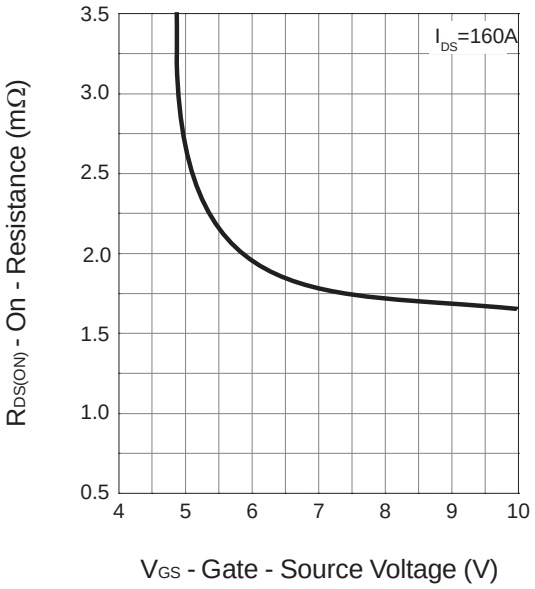
Output Characteristics



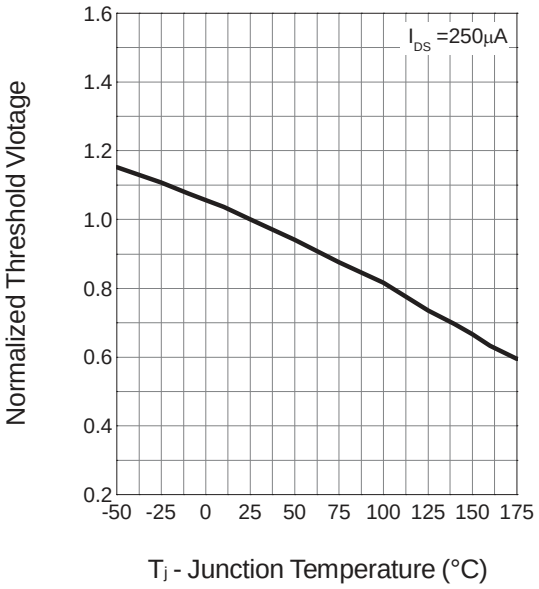
Drain-Source On Resistance



Drain-Source On Resistance



Gate Threshold Voltage



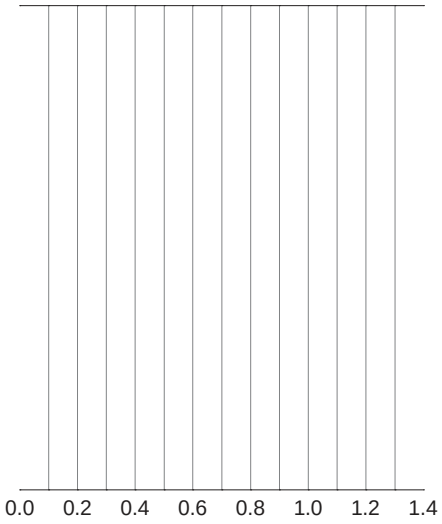
Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Normalized On Resistance

T_j - Junction Temperature (°C)

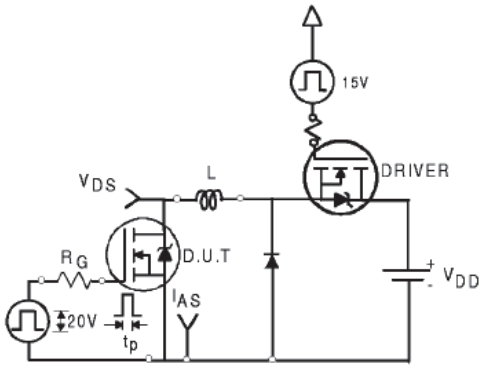
Source-Drain Diode Forward



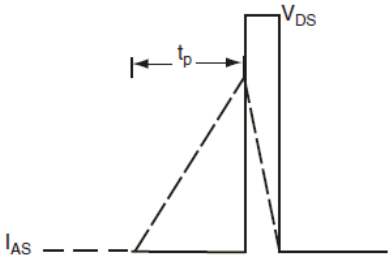
I_S - Source Current (A)

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

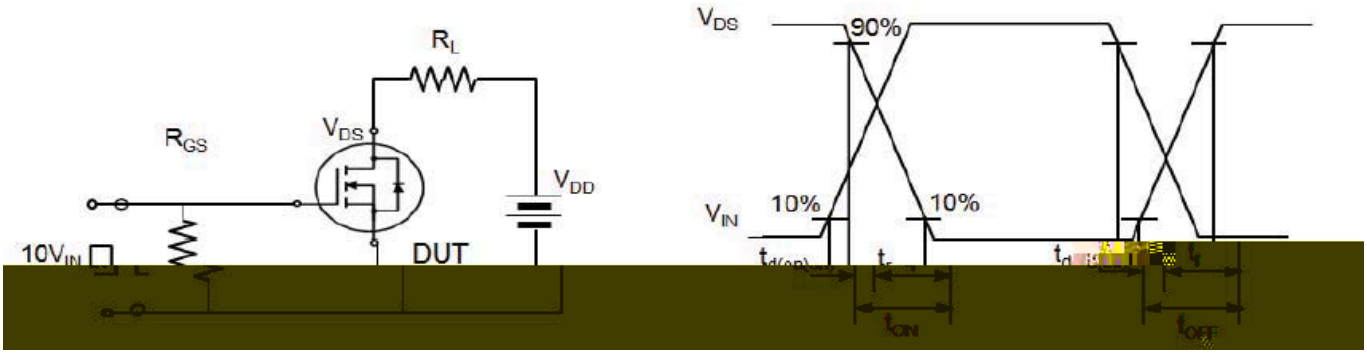
Avalanche Test Circuit



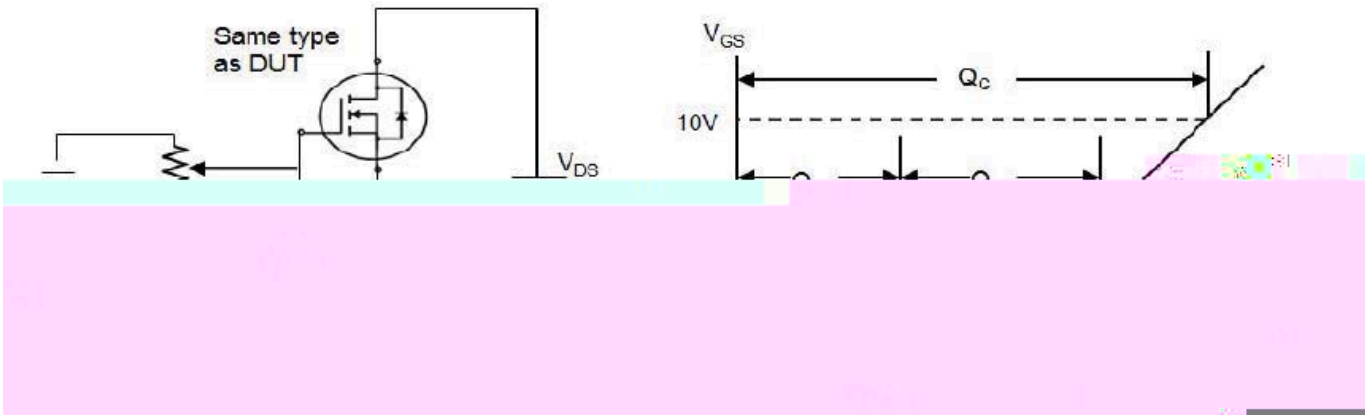
$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



Switching Time Test Circuit



Gate Charge Test Circuit

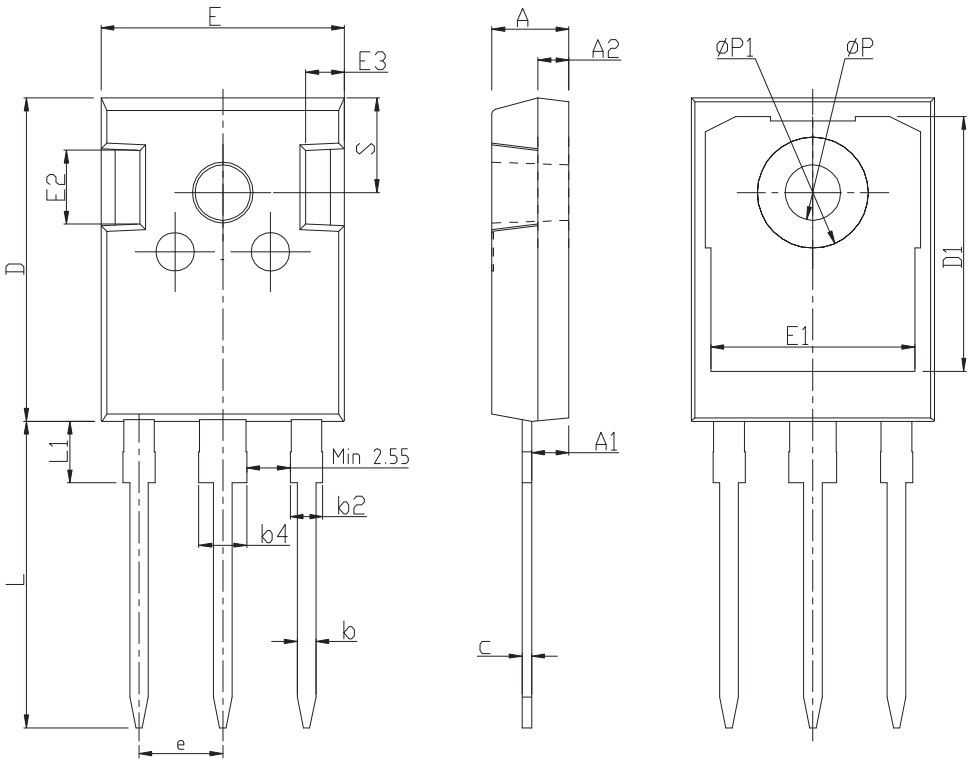


Device Per Unit

Package Type	Unit	Quantity
TO-247A-3L	Tube	30

Package Information

TO-247A-3L



COMMON DIMENSIONS

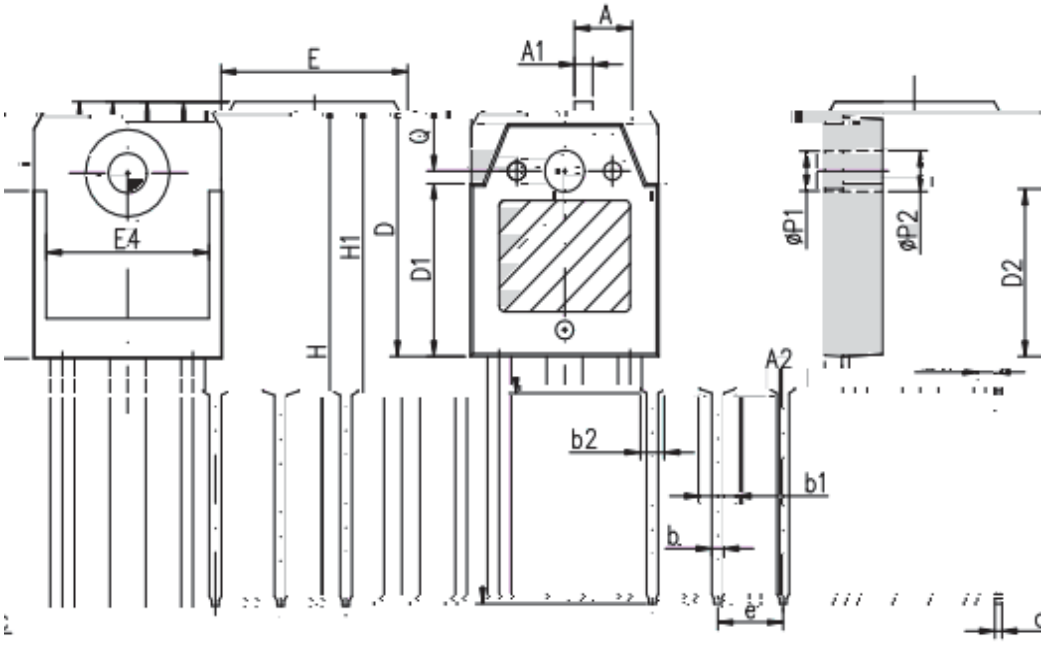
SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
P	3.40	3.60	3.80
P1	-	-	7.30
S	6.15BSC		

Device Per Unit

Package Type	Unit	Quantity
TO-3P-3L	Tube	30

Package Information

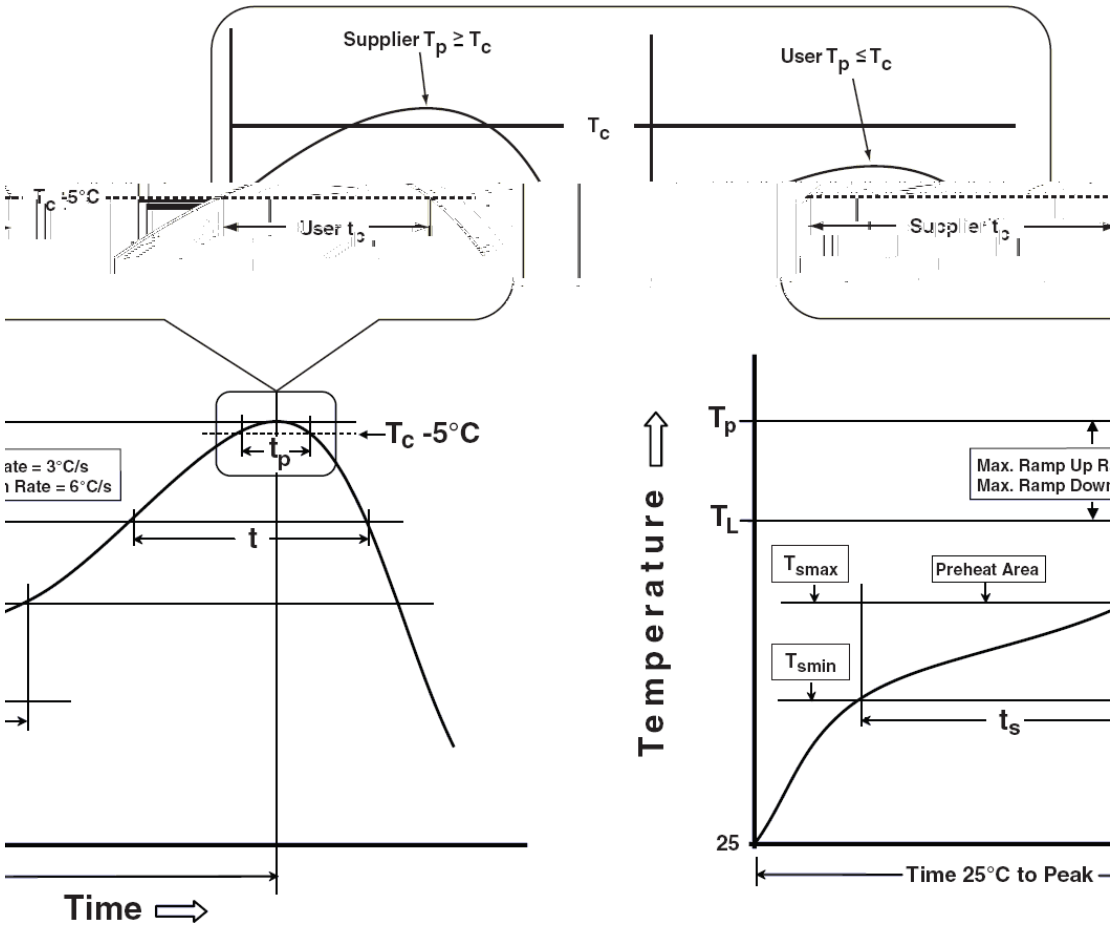
TO-3P-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.60	4.80	5.00
A1	1.40	1.50	1.65
A2	1.18	1.38	1.58
b	0.80	1.00	1.20
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
e	0.50	0.60	0.75
D	19.60	19.80	19.90
D1	13.55	13.70	13.90
D2		12.90 REF	
E	15.35	15.60	15.85
E4		12.60	
H	40.10	40.50	40.90
H1	23.15	23.40	23.65
øP1		3.20 REF	
øP2		3.50 REF	

Classification Profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})		
Temperature max (T_{smax})		
Time (T_{smin} to T_{smax}) (t_{s} 479J0 Tc 5.0 0 8.9985 0 0 Tm 17.9667 2720266 TD[]()279.008 Tc 0.380377 0 33029 .0734		

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 @ 150°C
PCT	JESD-22, A102	96Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -55°C~150°C

Customer Service
Worldwide Sales and Service: sales@hymexa.com
Technical Support: Technology@hymexa.com
Xi'an Huayi Microelectronics Co., Ltd.
No.8928,Shangji Road,Economic and Technological Development Zone,Xi'an,China
TEL: (86-029) 86685706
FAX: (86-029) 86685705
E-mail: sales@hymexa.com
Web net: www.hymexa.com