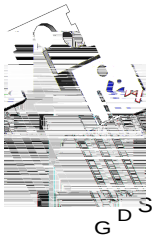
N-Channel Enhancement Mode MOSFET

Features

- 60V/230A
  $R_{DS(ON)}$ = 2.6 mΩ (typ.) @ V_{GS}=10V
- 100% avalanche tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description

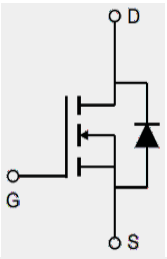


TO-220FB-3L

TO-263-2L

Applications

- Switching application
- Power Management for Inverter Systems.



N-Channel MOSFET

Ordering and Marking Information

P HY4306 YYXXXJWW G B HY4306 YYXXXJWW G	Package Code P : TO-220FB-3L B: TO-263-2L Date Code YYXXX WW Assembly Material 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 pr-oduct and/or to this document at any time without notice.

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	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	230	A
Mounted on Large Heat Sink				
I_{DM}		T_C=25°C	880**	A
I_D	Continuous Drain Current	T_C=25°C	230	A
		T_C=100°C	155	
P_D	Maximum Power Dissipation	T_C=25°C	258	W
		T_C=100°C	129	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.58	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	1.4***	J

Note：

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

Symbol	Parameter	Test Conditions	HY4306			Unit
			Min.	Typ.	Max.	
Static Characteristics						
	ge	V_{GS}=0V, I_{DS}=250μA	60	-	-	V
	nt	V_{DS}=60V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	10	
		V_{DS}=V_{GS}, I_{DS}=250μA	2.0	3.0	4.0	V
		V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
	nce	V_{GS}=10V, I_{DS}=115 A	-	2.6	3.0	mΩ
		I_{SD}=115A, V_{GS}=0V	-	0.8	1.2	V

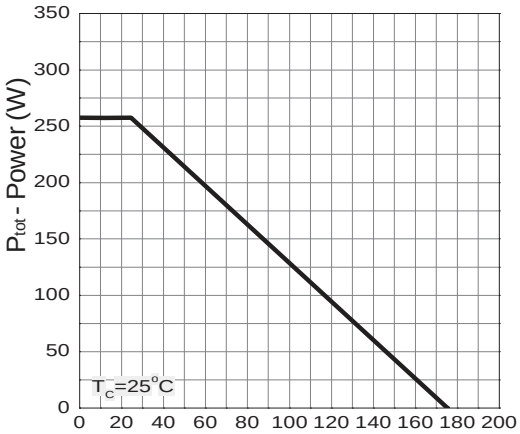
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY4306			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2.2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	7219	-	pF
C_{oss}	Output Capacitance		-	1093	-	
C_{rss}	Reverse Transfer Capacitance		-	558	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V, R_G=6 Ω, I_{DS} =115A, V_{GS}=10V,	-	26	-	ns
T_r	Turn-on Rise Time		-	18	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	40	-	
T_f	Turn-off Fall Time		-	54	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=48V, V_{GS}=10V, I_{DS}=115A	-	171	-	nC
Q_{gs}	Gate-Source Charge		-	30	-	
Q_{gd}	Gate-Drain Charge		-	63	-	

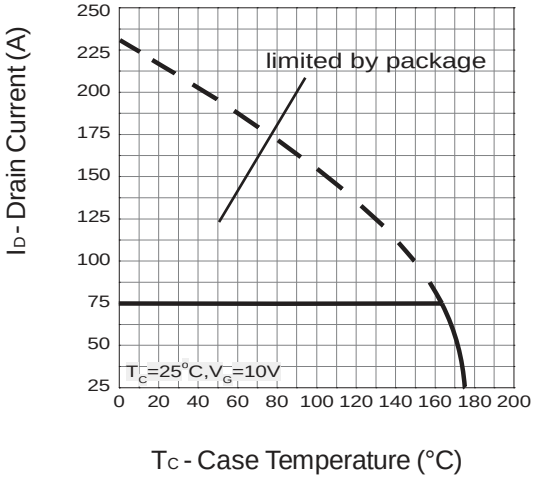
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

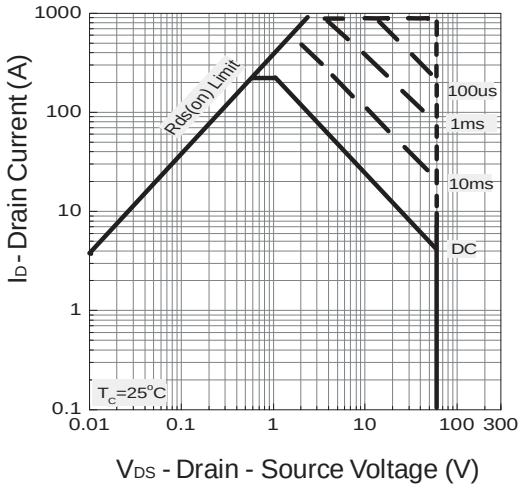
Power Dissipation



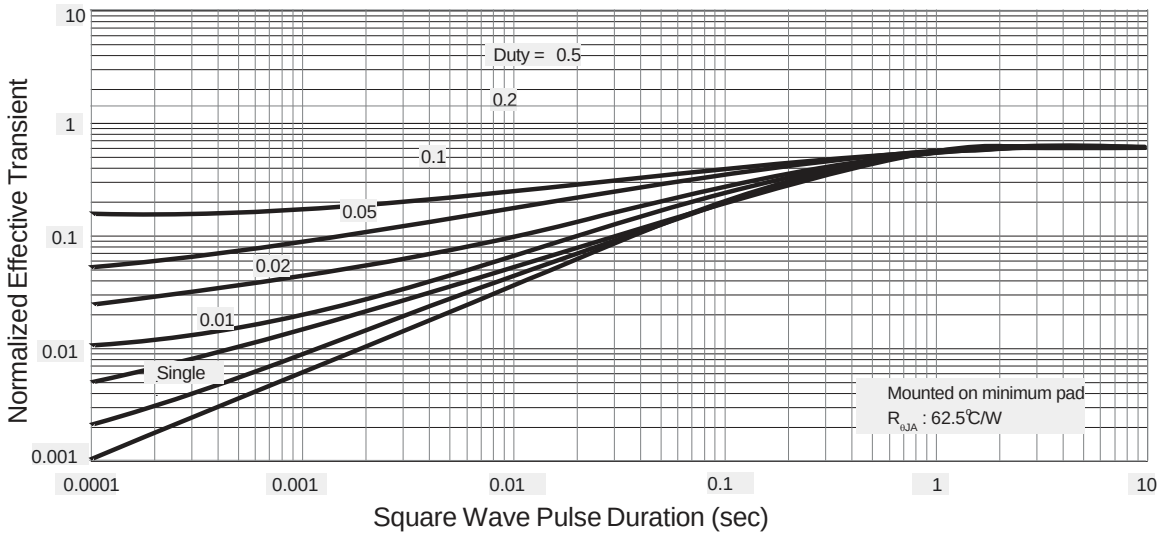
Drain Current



Safe Operation Area

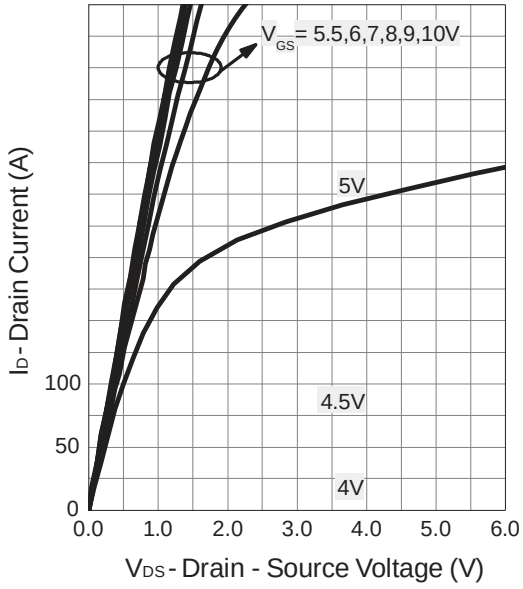


Thermal Transient Impedance

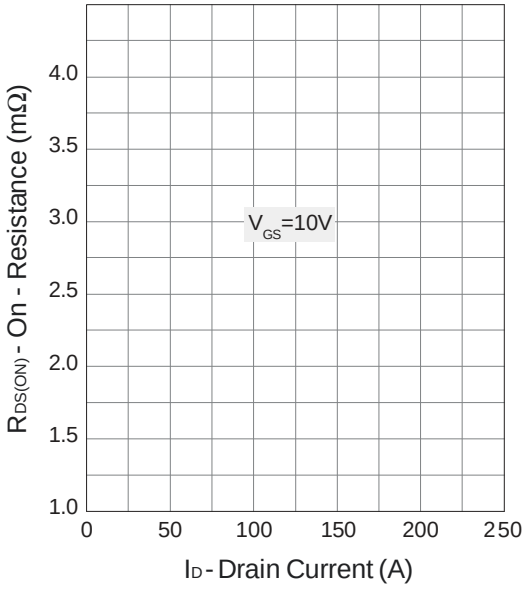


Typical Operating Characteristics (Cont.)

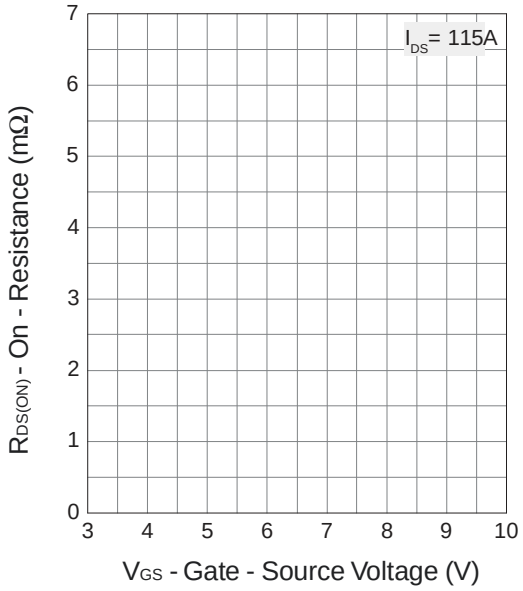
Output Characteristics



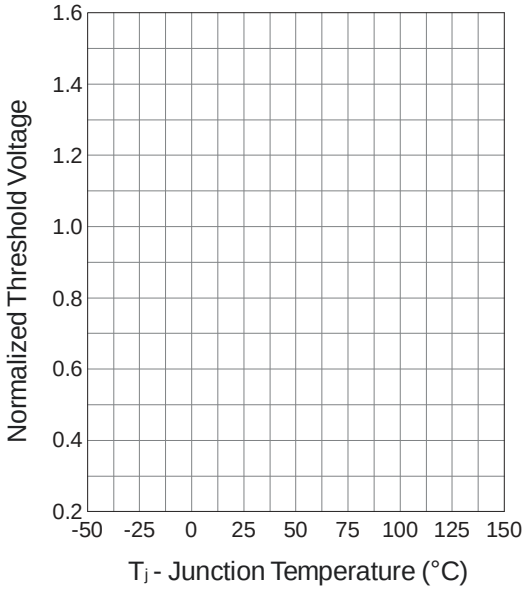
Drain-Source On Resistance



Gate-Source On Resistance

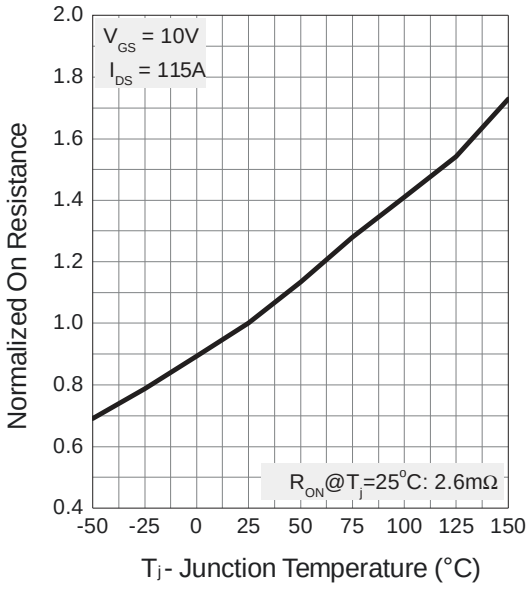


Gate Threshold Voltage

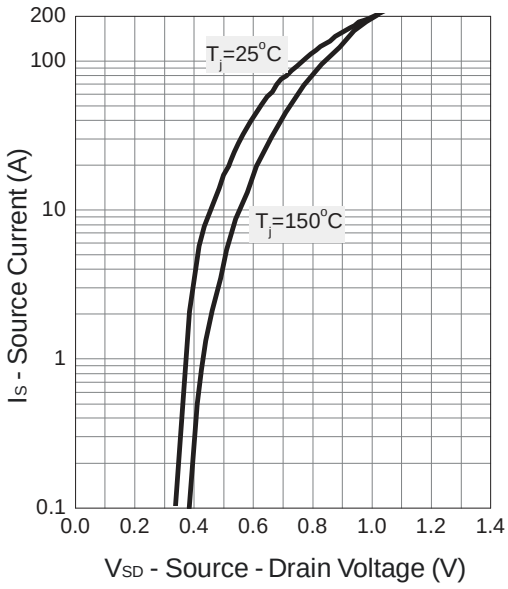


Typical Operating Characteristics (Cont.)

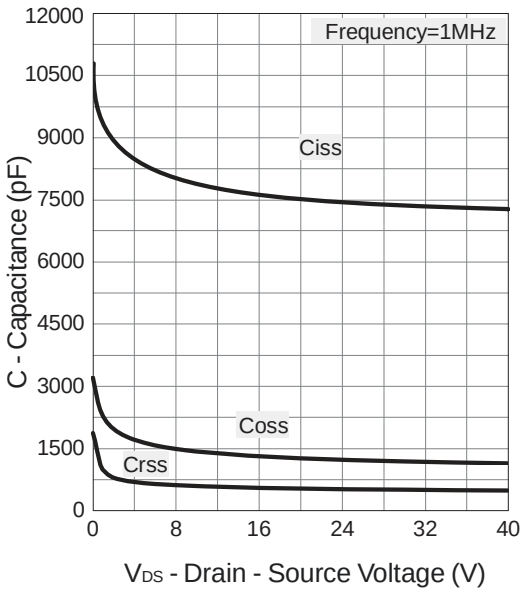
Drain-Source On Resistance



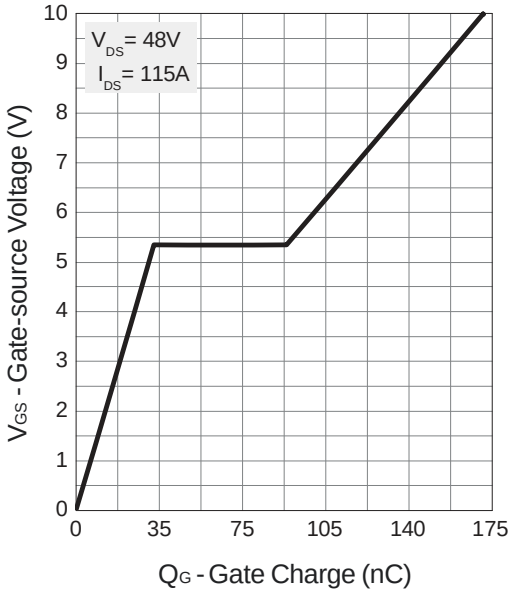
Source-Drain Diode Forward



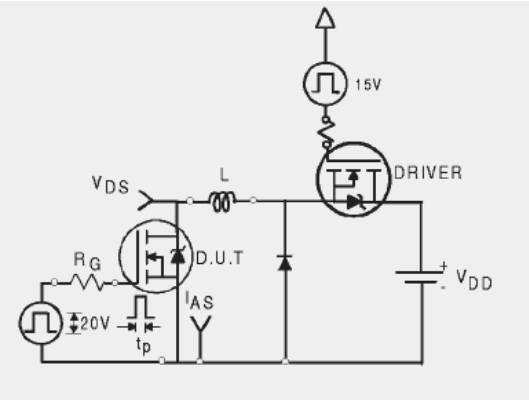
Capacitance



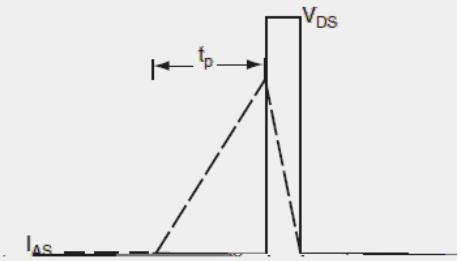
Gate Charge



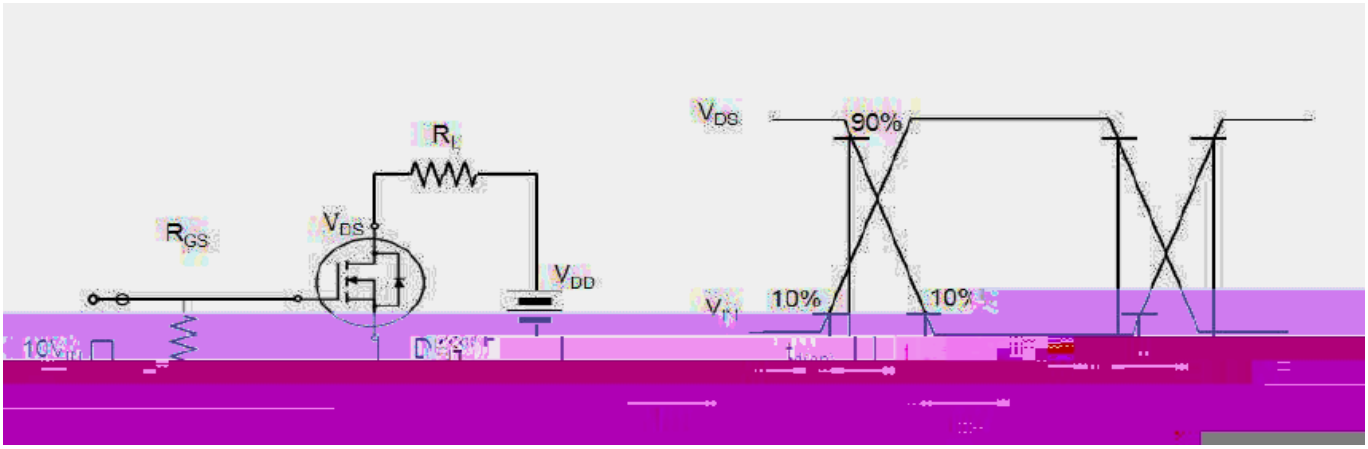
Avalanche Test Circuit



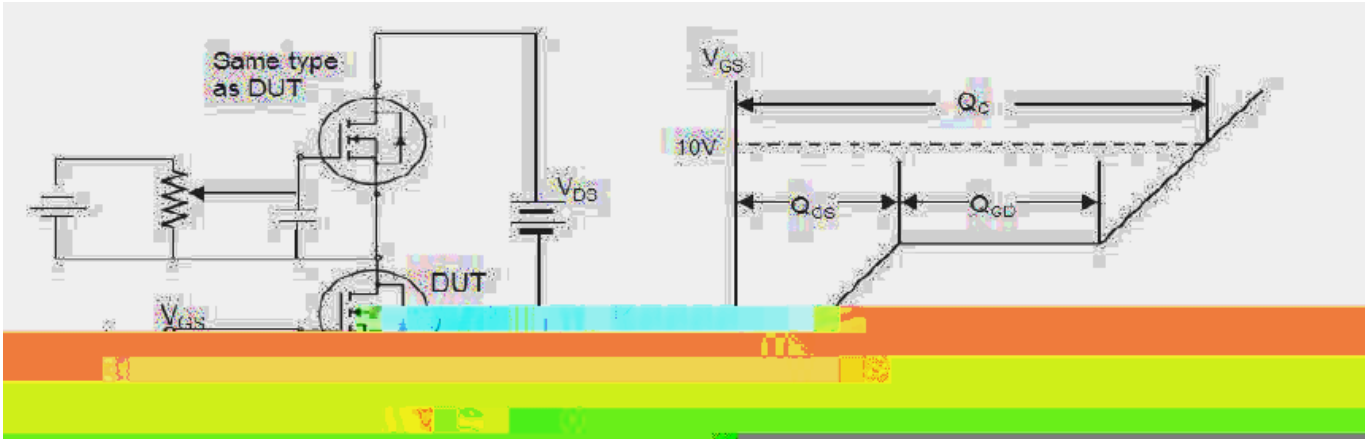
$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



Switching Time Test Circuit



Gate Charge Test Circuit

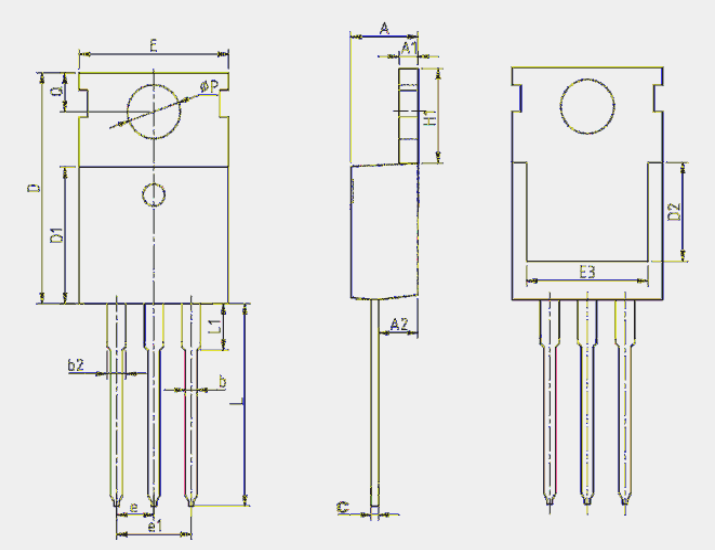


Device Per Unit

Package Type	Unit	Quantity
TO-220FB-3L	Tube	50

Package Information

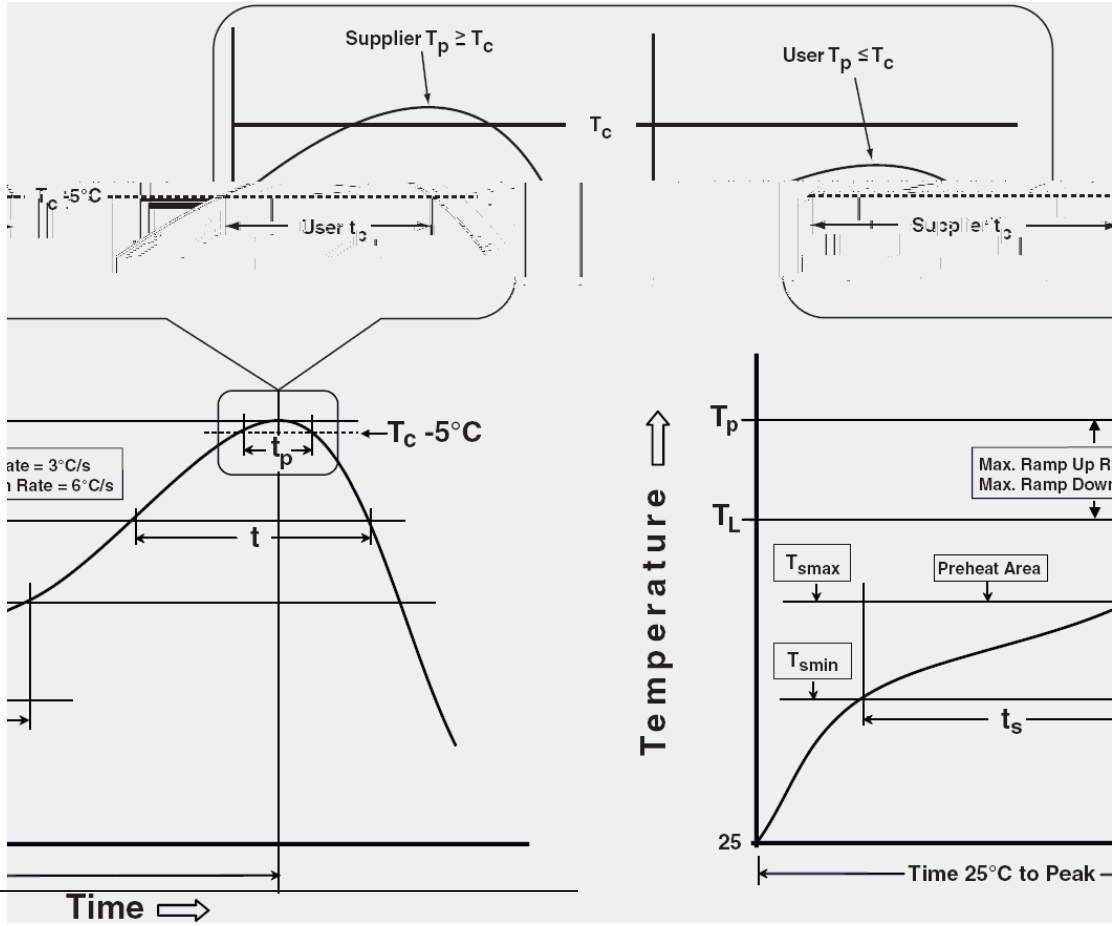
TO-220FB-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

Classification Profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly

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