Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
120V	6.3mΩ@10V	130A

合肥矽普半导体
Siliup Semiconductor Technology Co.Ltd
技术 品质 服务
www.siliup.com

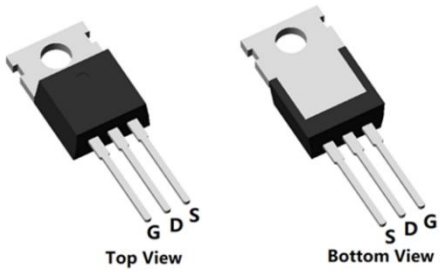
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- ***100% UIS TESTED***

Applications

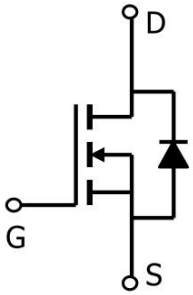
- High Speed Power switching
- DC-DC Converter
- Power Management

Package

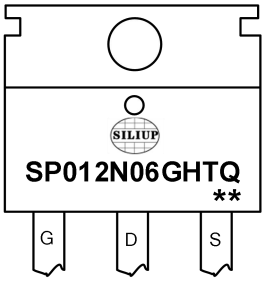


TO-220-3L(1:G 2:D 3:S)

Circuit diagram



Marking



SP012N06GHTQ :Product code
** :Week code

Order Information

Device	Package	Unit/Tube
SP012N06GHTQ	TO-220-3L	50

Absolute maximum ratings (Ta=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)	I_D	130	A
Continuous Drain Current (Tc=100℃)	I_D	87	A
Pulsed Drain Current	I_{DM}	520	A
Single Pulse Avalanche Energy[1]	E_{AS}	552	mJ
Power Dissipation (Tc=25℃)	P_D	160	W
Power Dissipation (Tc=100℃)	P_D	64	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.78	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

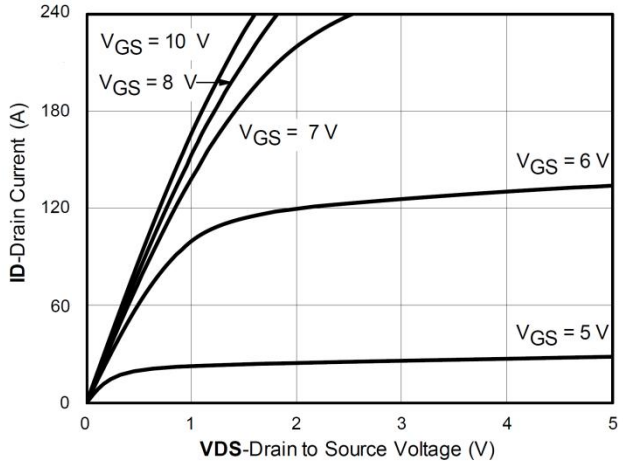
Electrical characteristics (Ta=25℃, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	ID=250μA , VGS=0V	120	-	-	V
Drain Cut-Off Current	I_{DSS}	VDS=96V , VGS=0V	-	-	1	μA
Gate Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VDS=VGS , ID=250μA	2.6	3.0	3.4	V
Drain-Source ON Resistance	$R_{DS(ON)}$	VGS=10V , ID=50A	-	6.3	7.4	mΩ
Gate Resistance	R_G	f=1MHz	-	2.1	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	VDS=60V , VGS=0V , f=1.0MHz	-	3020	-	pF
Output Capacitance	C_{oss}		-	357	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Total Gate Charge	Q_g	VDS=60V , VGS=10V , ID=75A	-	52	-	nC
Gate-Source Charge	Q_{gs}		-	16	-	
Gate-Drain Charge	Q_{gd}		-	8	-	
Gate Plateau Voltage	$V_{plateau}$		-	5	-	V
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	VGS=10V , VDS=50V , ID=75A , RG=1.6Ω	-	18.5	-	nS
Rise Time	t_r		-	30	-	
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	
Fall Time	t_f		-	25.5	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	IS=1A , VGS=0V , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	130	A
Reverse Recovery Time	T_{rr}	IS=50A , di/dt=100A/us , TJ=25℃	-	85	-	nS
Reverse Recovery Charge	Q_{rr}		-	215	-	nC

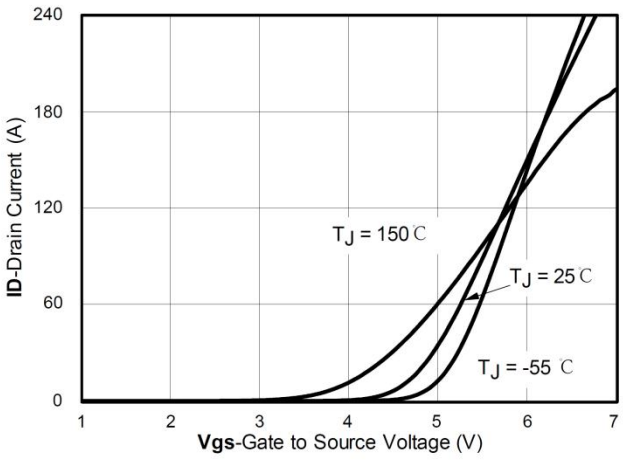
Note :

1. The test condition is VDD=50V, VGS=10V, L=0.5mH, RG=25Ω;

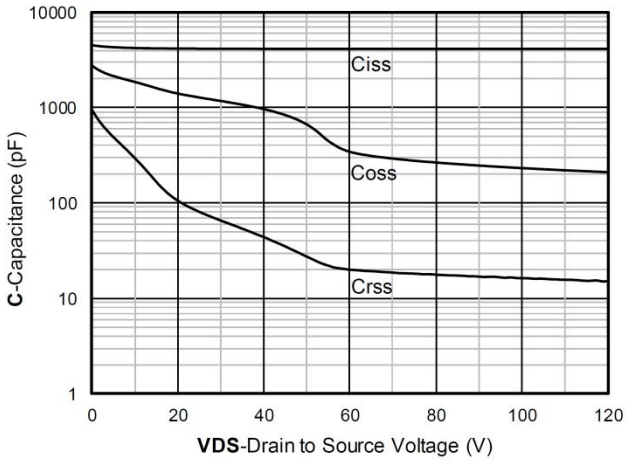
Typical Characteristics



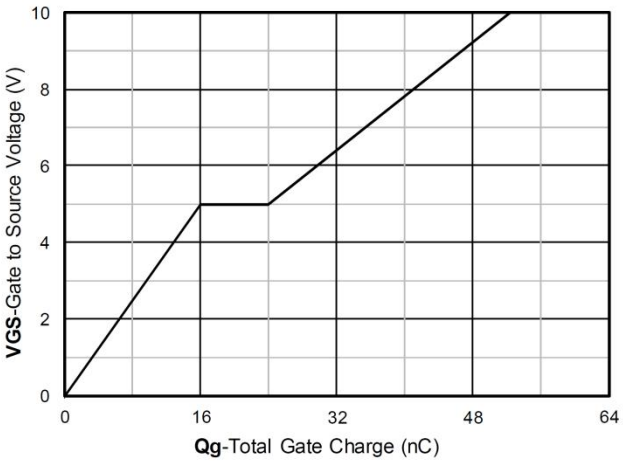
Output Characteristics



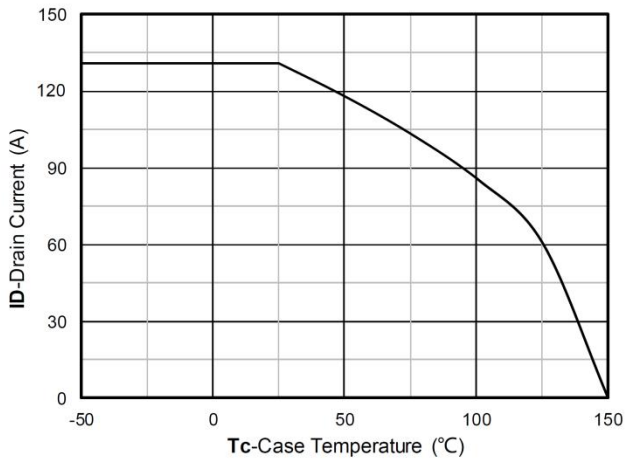
Transfer Characteristics



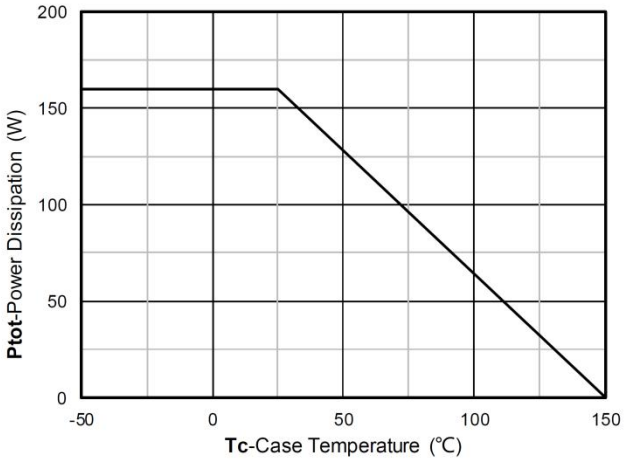
Capacitance Characteristics



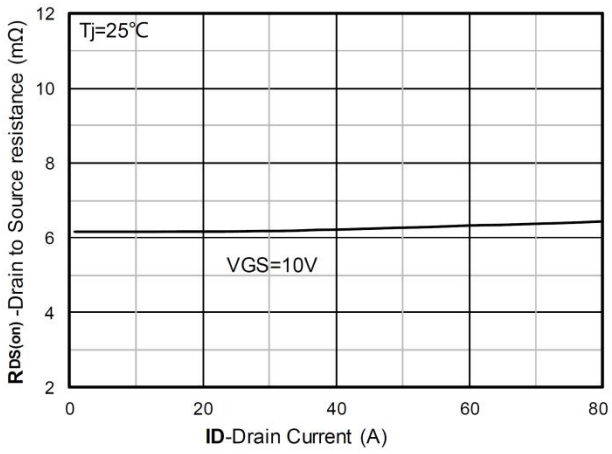
Gate Charge



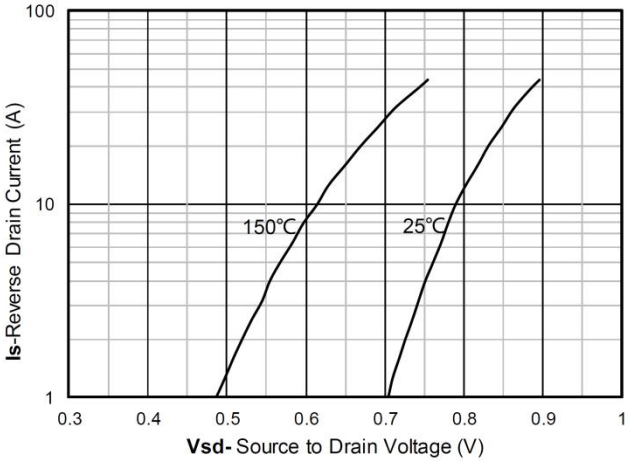
Current dissipation



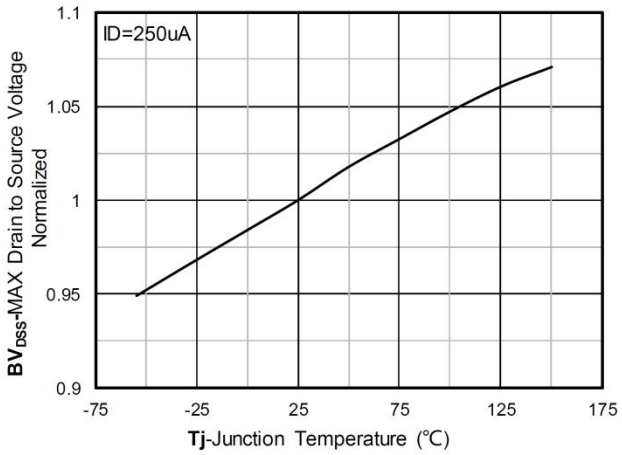
Power dissipation



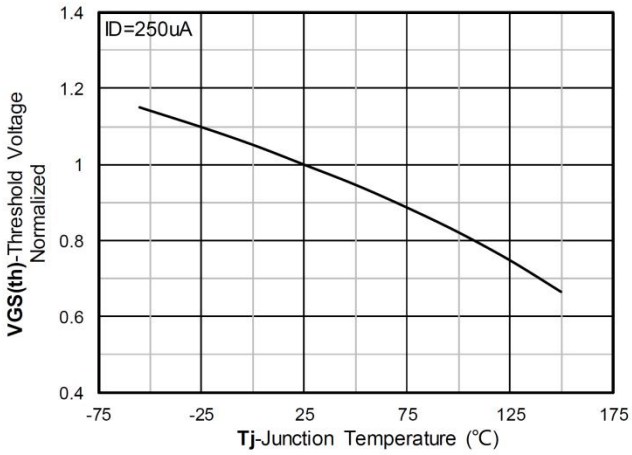
RDS(on) VS Drain Current



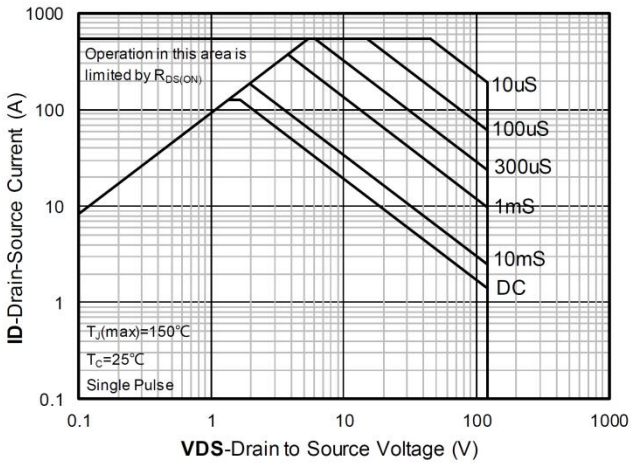
Forward characteristics of reverse diode



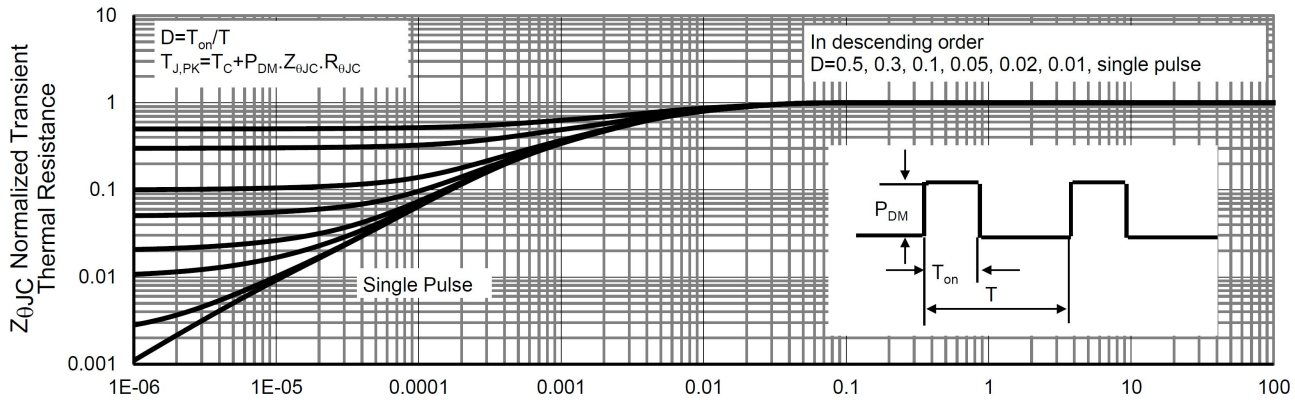
Normalized breakdown voltage



Normalized Threshold voltage



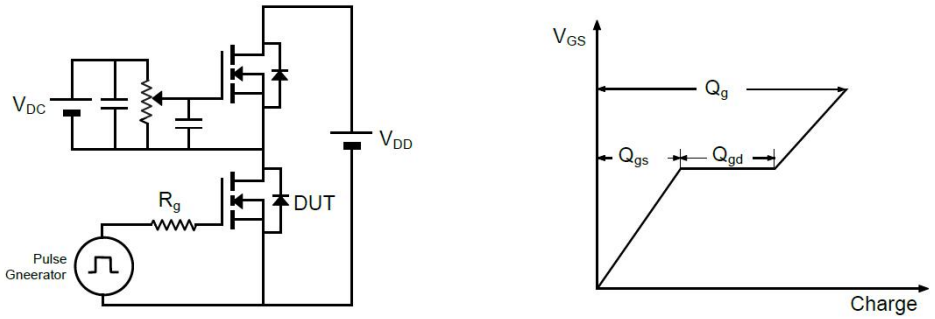
Safe Operation Area



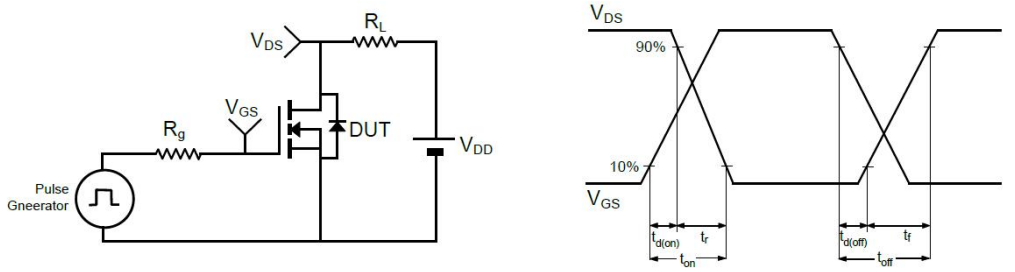
Normalized Maximum Transient Thermal Impedance

Test Circuit

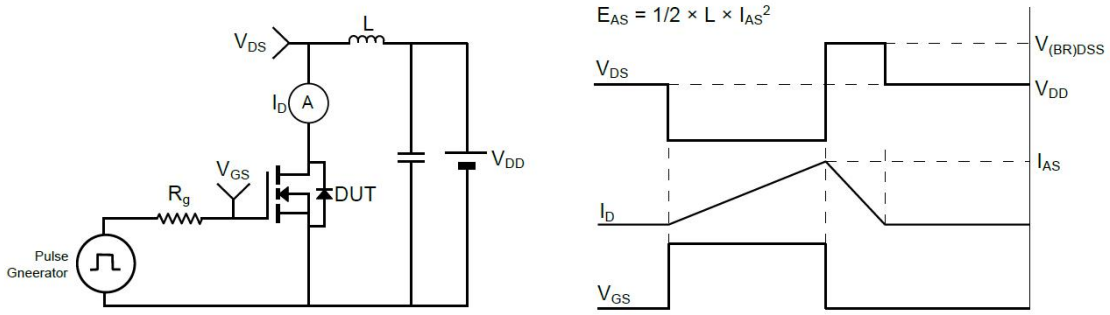
Gate Charge



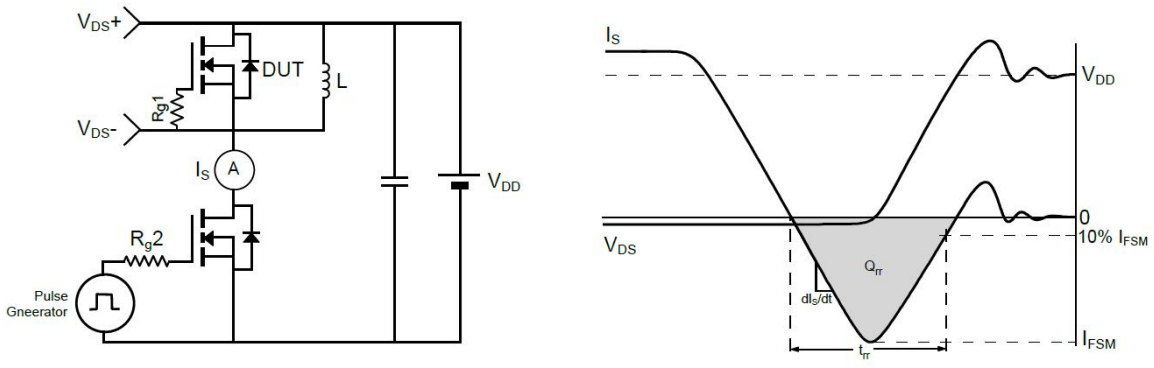
Resistive Load Switching Time



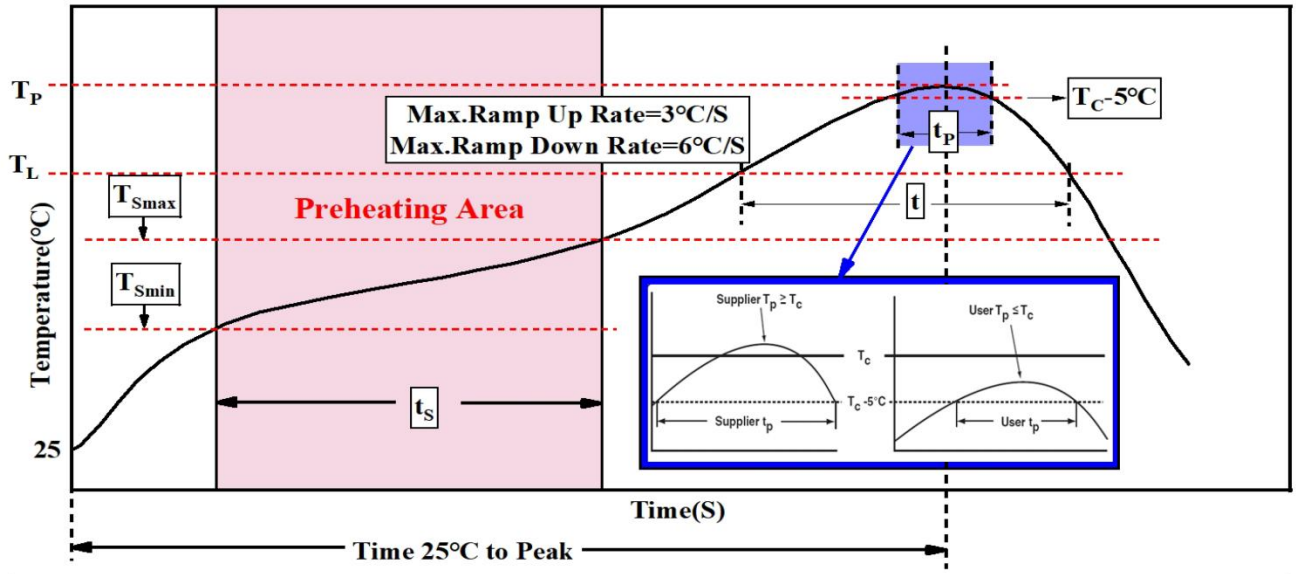
Un-clamped Inductive Load Switching



Drain-Source Body Diode Reverse Recovery



Temperature Profile for IR Reflow Soldering



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.	3°C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	183 °C 60-150 seconds	217°C 60-150 seconds
Peak package body Temperature e (Tp)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (tp)** within 5°C of the specified classification temperature (Tc)	20** seconds	30** seconds
Average ramp-down rate (Tp to Tsmax)	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 (Tp) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum		

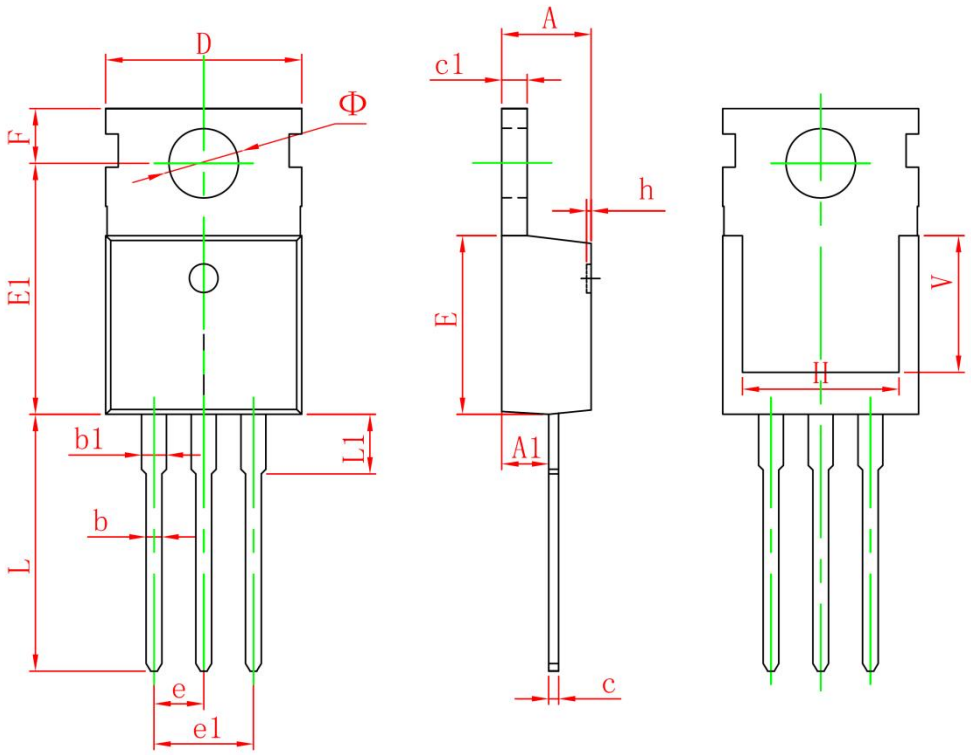
Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

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

TO-220-3L Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.300	4.700
A1	2.200	2.500
b	0.700	0.900
b1	1.100	1.400
c	0.300	0.700
c1	1.200	1.400
D	9.800	10.200
E	9.000	9.400
E1	12.700	13.500
e	2.490	2.590
e1	4.980	5.180
F	2.650	2.950
H	7.600	8.400
h	0.000	0.300
L	12.700	13.500
L1	2.850	3.250
V	6.900 REF.	
Φ	3.400	3.800