SP80N06HTQ

80V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
80V	6.0mΩ@10V	95A

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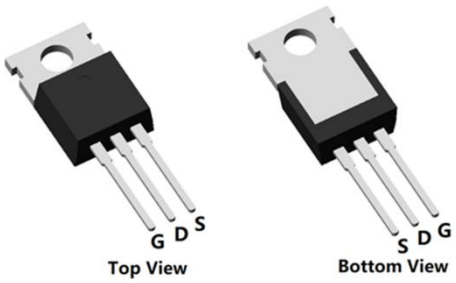
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

Applications

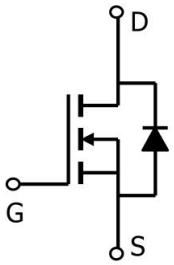
- Power switching application
- DC-DC Converter
- Power Management

Package

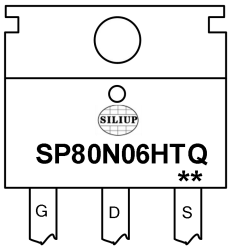


TO-220-3L(1:G 2:D 3:S)

Circuit diagram



Marking



SP80N06HTQ **:Product code**
****** **:Week code**

Order Information

Device	Package	Unit/Tube
SP80N06HTQ	TO-220-3L	50

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)	I_D	95	A
Continuous Drain Current (Tc=100℃)	I_D	64	A
Pulsed Drain Current	I_{DM}	380	A
Single Pulse Avalanche Energy[1]	E_{AS}	542	mJ
Power Dissipation (Tc=25℃)	P_D	165	W
Power Dissipation (Tc=100℃)	P_D	66	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.75	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

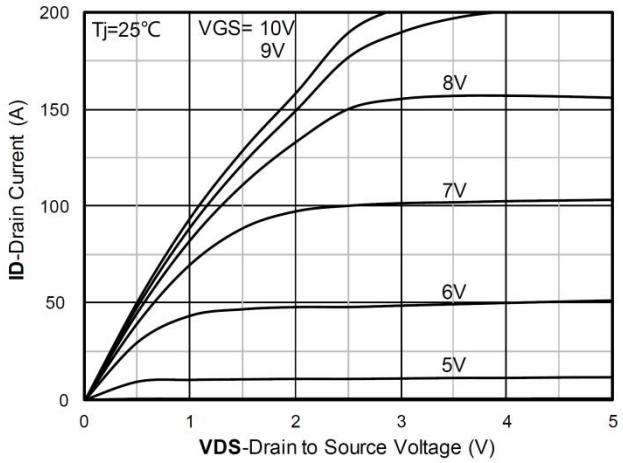
Electrical characteristics (Ta=25℃, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=250uA	80	-	-	V
Drain Cut-Off Current	I_{DSS}	VDS=64V , VGS=0V , TJ=25℃	-	-	1	μA
Gate Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	2.6	3.0	3.6	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=30A	-	6.0	9.3	mΩ
Gate Resistance	R_G	VDS=40V , VGS=0V , f=1MHz	-	1.6	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	VDS=40V , VGS=0V , f=1MHz	-	3610	-	pF
Output Capacitance	C_{oss}		-	285	-	
Reverse Transfer Capacitance	C_{rss}		-	210		
Total Gate Charge	Q_g	VDS=40V , VGS=10V , ID=30A	-	108	-	nC
Gate-Source Charge	Q_{gs}		-	32	-	
Gate-Drain Charge	Q_{gd}		-	24	-	
Gate Pleteau Vlotage	$V_{pleteau}$		-	5.2	-	V
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	VDD=40V , VGS=10V , RG=6Ω , ID=30A	-	18	-	nS
Rise Time	t_r		-	62	-	
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	
Fall Time	t_f		-	15	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	IS=1A , VGS=0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	95	A
Reverse Recovery Time	Trr	IS=20A , di/dt=100A/us , TJ=25℃	-	37	-	nS
Reverse Recovery Charge	Qrr		-	58	-	nC

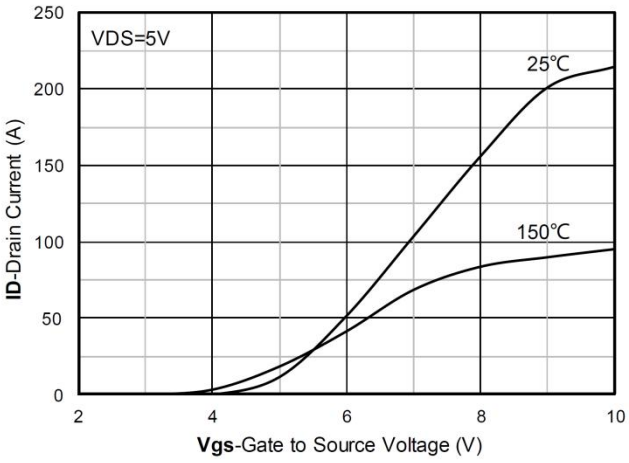
Note :

1. The EAS test condition is VDD=40V,VGS=10V,L=0.5mH,RG=25Ω

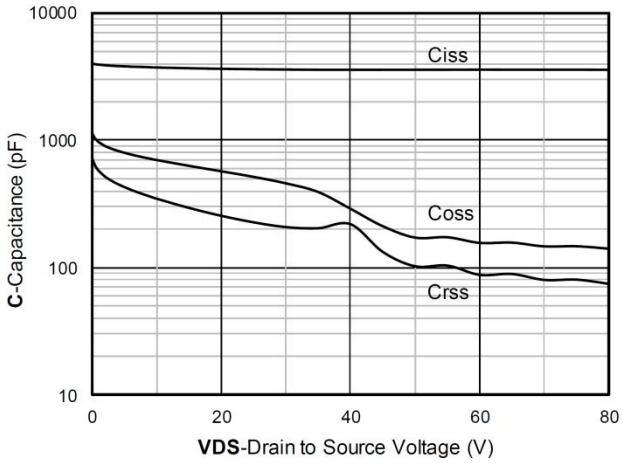
Typical Characteristics



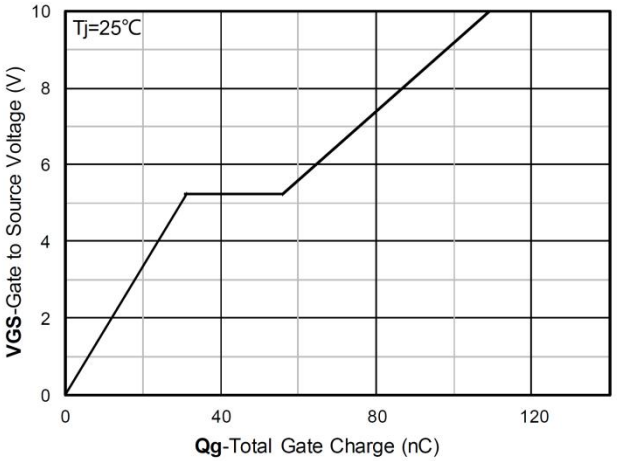
Output Characteristics



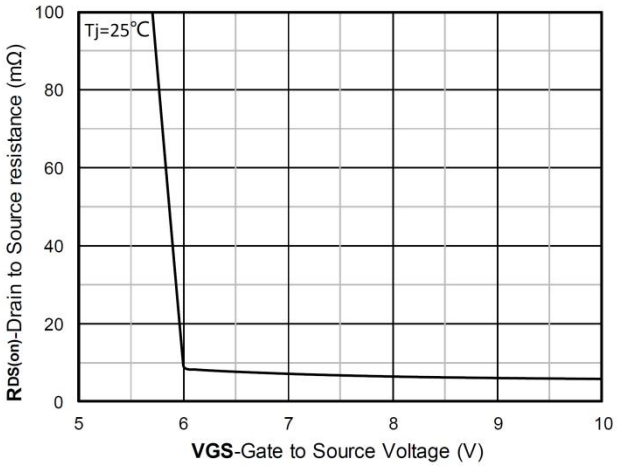
Transfer Characteristics



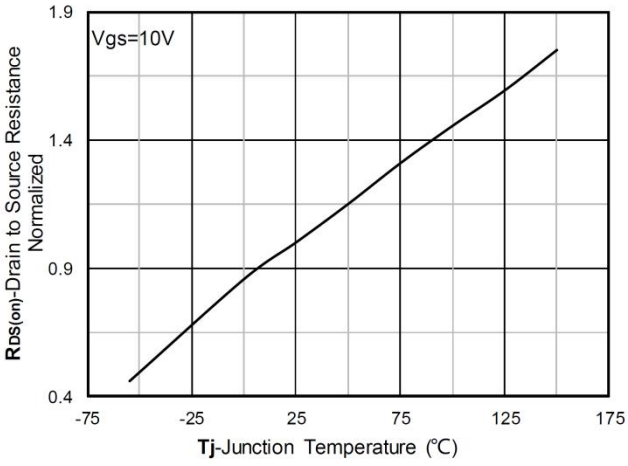
Capacitance Characteristics



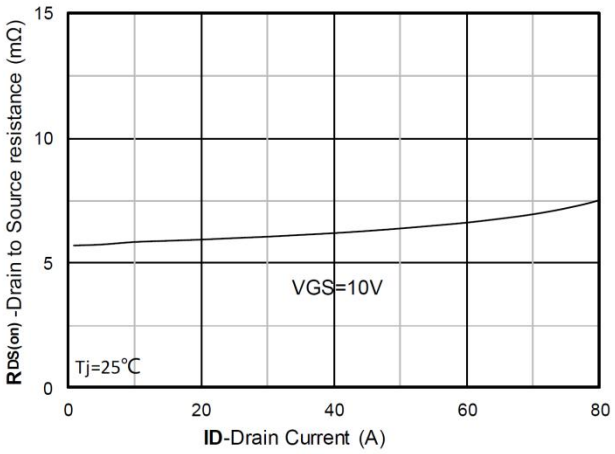
Gate Charge



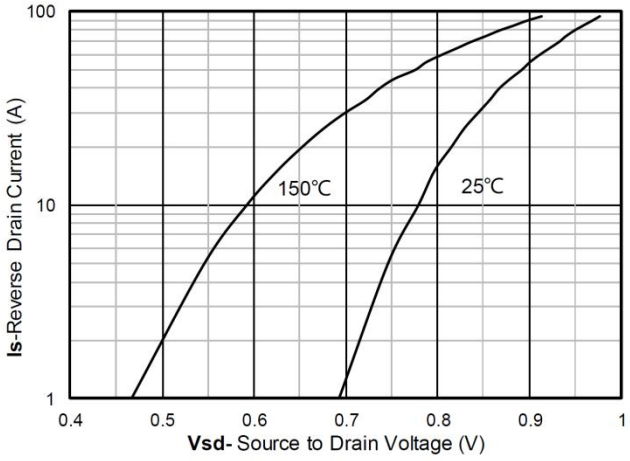
On-Resistance vs Gate to Source Voltage



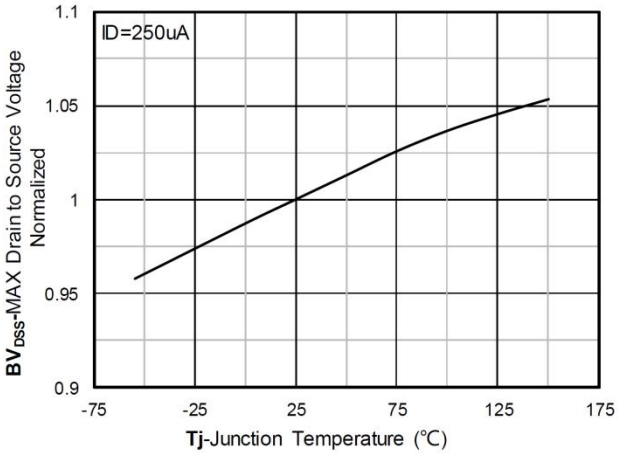
Normalized On-Resistance



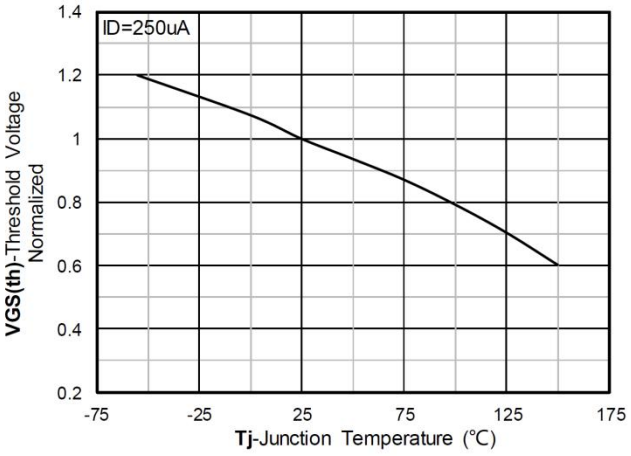
$R_{DS(on)}$ VS Drain Current



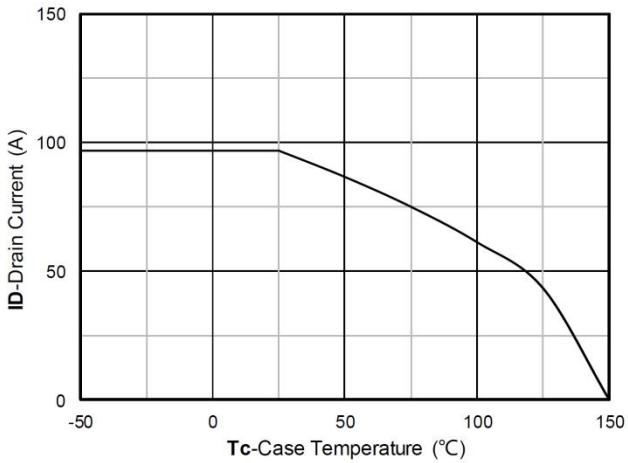
Forward characteristics of reverse diode



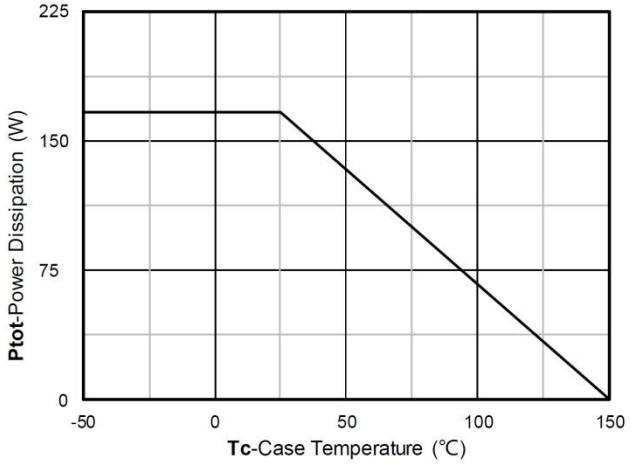
Normalized breakdown voltage



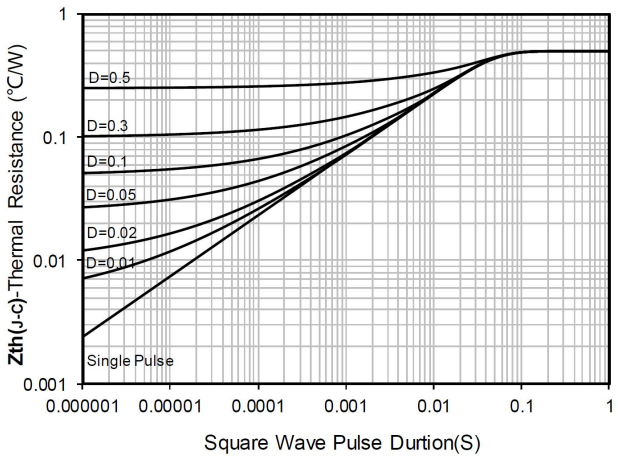
Normalized Threshold voltage



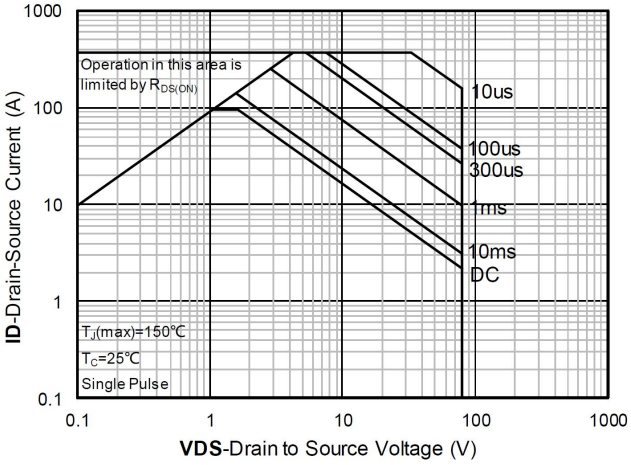
Current dissipation



Power dissipation



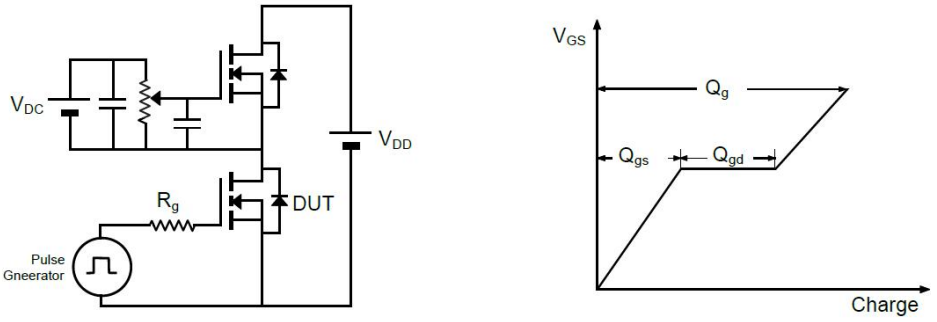
Maximum Transient Thermal Impedance



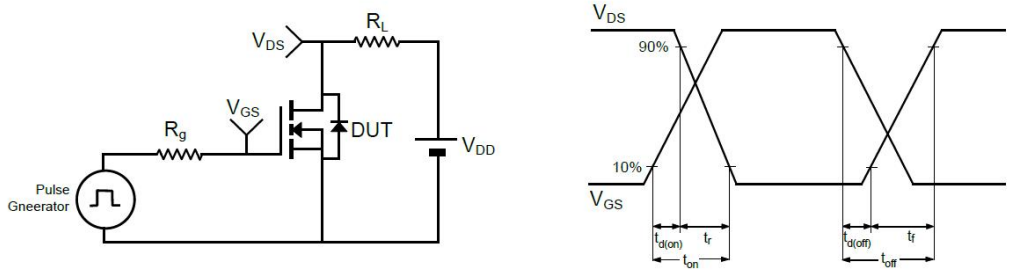
Safe Operation Area

Test Circuit

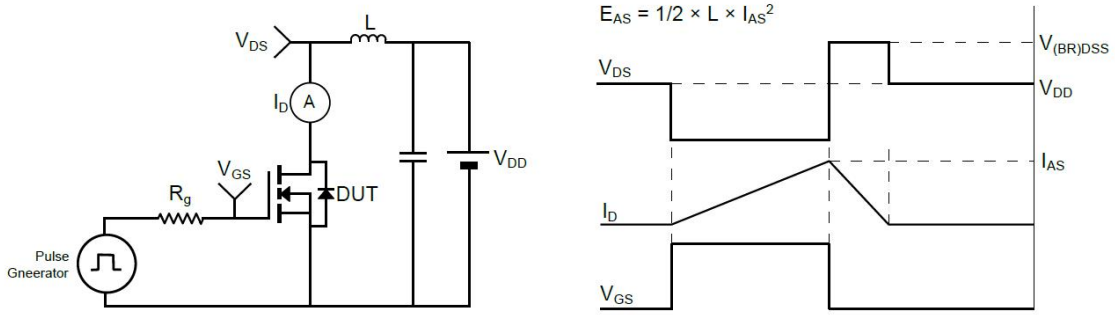
Gate Charge



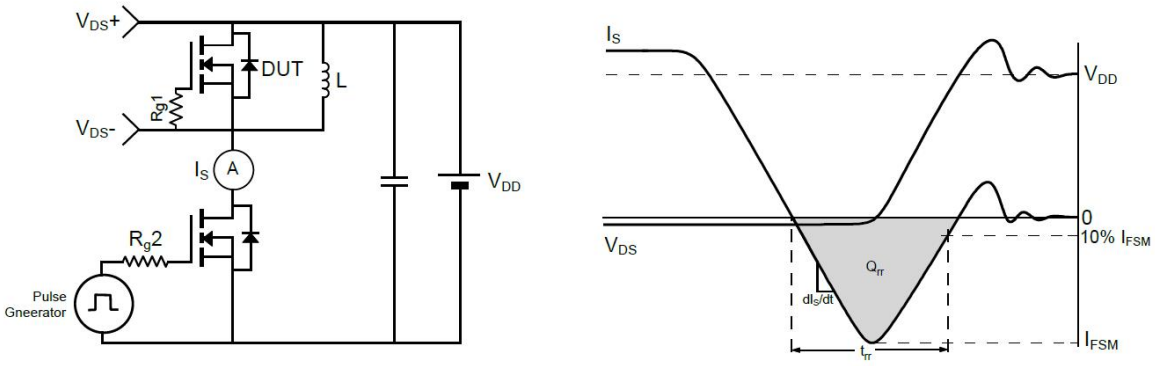
Resistive Load Switching Time



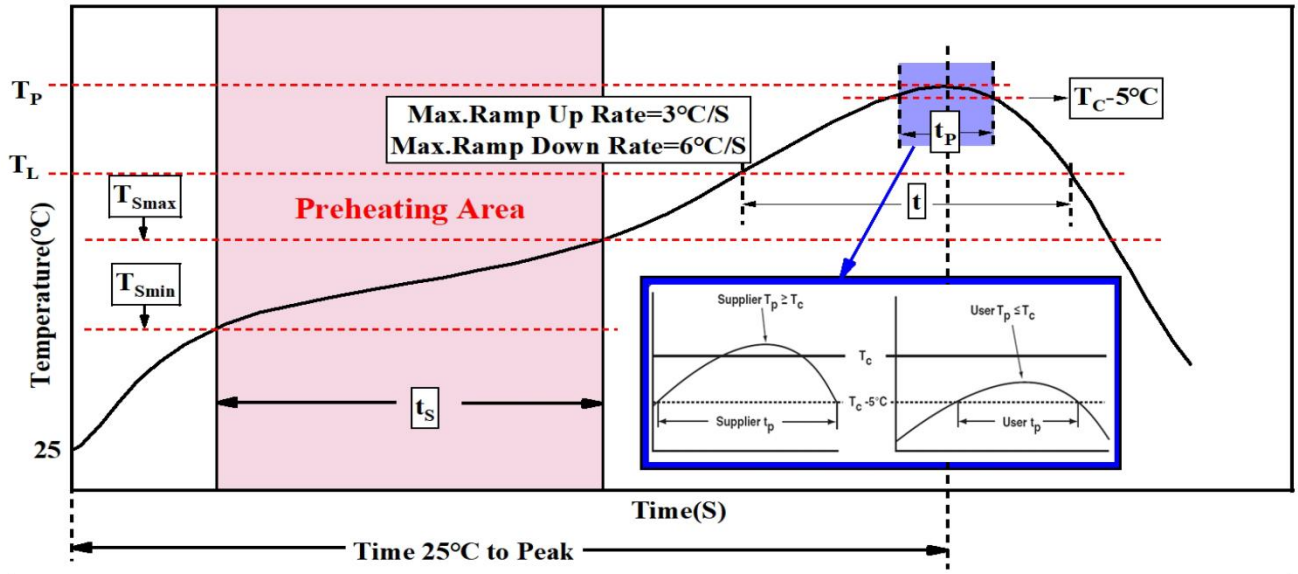
Un-clamped Inductive Load Switching



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		

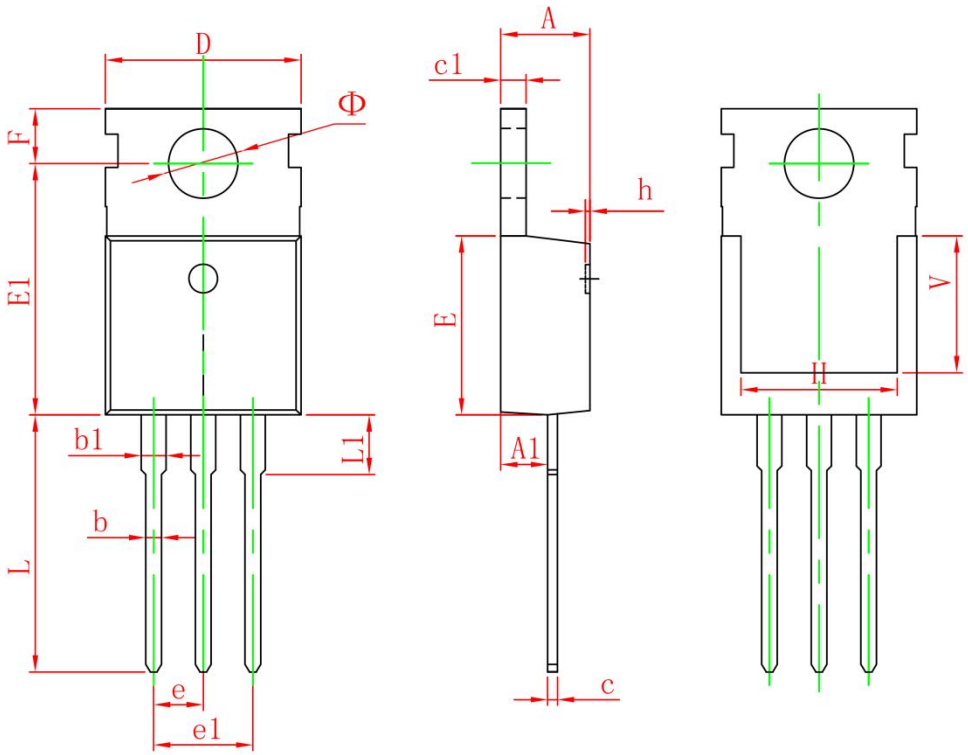
Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

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