

## General Description

The UV30N03 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge.

This device is suitable for use in PWM, load switching and general purpose applications.

## Features

Enhancement Mode

Enhanced Body diode dv/dt capability

100% Avalanche Tested

$V_{DS}$	30	V
$R_{DS(on)\ TYP}@V_{GS}=10V$	9	$m\Omega$
$R_{DS(on)\ TYP}@V_{GS}=4.5V$	12	$m\Omega$
$I_D$ (Silicon Limited)	30	A

## Applications

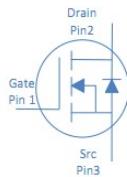
Power switching application

Hard Switched and High Frequency Circuits

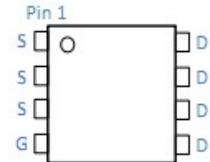
Uninterruptible Power Supply



DFN3\*3-8L Top view



Schematic diagram

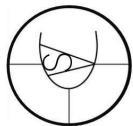


## Package Marking And Ordering Information

Part ID	Package Type	Marking	Tape and Reel information
UV30N03	DFN3*3-8L	UV30N03	3000pcs/Reel

## Maximum ratings, at $T_j=25^\circ C$ , unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain –Source breakdown voltage	30	V
$I_D$	Continuous drain current (Silicon Limited)	$T_c=25^\circ C$	30
		$T_c=100^\circ C$	19
	Continuous drain current (Package Limited)	$T_c=25^\circ C$	60
$I_{DM}$	Pulse drain current tested①	$T_c=25^\circ C$	A
$E_{AS}$	Avalanche energy, single pulsed②	80	mJ
$P_D$	Maximum power dissipation	$T_c=25^\circ C$	29
$V_{GS}$	Gate-Source voltage	$\pm 20$	V
$T_{STG}\ T_J$	Storage and operating temperature range	-55 to 175	°C



## Thermal Characteristic

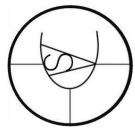
Symbol	Parameter	Typical	Unit
$R_{QJC}$	Thermal Resistance-Junction to Case	0.8	°C/W
$R_{QJA}$	Thermal Resistance-Junction to Ambient	40	°C/W

## Typical Characteristics

Symbol	Parameter	Condition	Min	Type	Max	Unit
Static Electrical Characteristics @ $T_j=25^\circ\text{C}$ ( unless otherwise stated)						
$V_{(\text{BR})DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
	Zero Gate Voltage Drain Current( $T_j=100^\circ\text{C}$ )	$V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$			50	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20\text{V}$ , $V_{DS}=0\text{V}$			$\pm 100$	nA
$V_{GS(\text{TH})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1.2		2.5	V
$R_{DS(\text{ON})}$	Drain-Source On-State Resistance <sup>③</sup>	$V_{GS}=10\text{V}$ , $I_D=20\text{A}$		9	11	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=20\text{A}$		12	15	$\text{m}\Omega$
Dynamic Electrical Characteristics @ $T_j=25^\circ\text{C}$ ( unless otherwise stated )						
$C_{iss}$	Input Capacitance	$V_{DS}=15\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$		680		PF
$C_{oss}$	Output Capacitance			190		PF
$C_{rss}$	Reverse Transfer Capacitance			75		PF
$Q_g$	Total Gate Charge	$V_{DS}=24\text{V}$ , $I_D=20\text{A}$ , $V_{GS}=10\text{V}$		15		nC
$Q_{gs}$	Gate-Source Charge			3		nC
$Q_{gd}$	Gate-Drain Charge			4		nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay time	$V_{DD}=15\text{V}$ , $I_D=20\text{A}$ , $R_G=3.3\ \Omega$ , $V_{GS}=10\text{V}$		5		nS
$t_r$	Turn-on Rise time			10		nS
$t_{d(off)}$	Turn-off Delay time			15		nS
$t_f$	Turn-off Fall time			4		nS
Source-Drain Diode Characteristics						
$V_{SD}$	Forward on voltage	$I_{SD}=20\text{A}$ , $V_{GS}=0\text{V}$		0.8	1.2	V
$t_{rr}$	Reverse Recovery Time	$T_j=25^\circ\text{C}$ , $I_{SD}=20\text{A}$ , $V_{GS}=0\text{V}$ , $dI/dt=300\text{A}/\mu\text{s}$		15		nS
$Q_{rr}$	Reverse Recovery Charge			8		nC

Note:

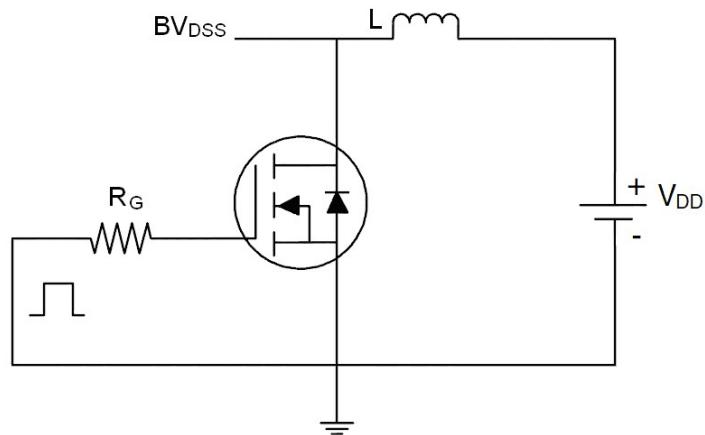
- ① Repetitive rating; pulse width limited by max, junction temperature.
- ② Limited by  $T_j$ max, starting  $T_j=25^\circ\text{C}$ ,  $L=0.1\text{mH}$ ,  $R_G=2\ \Omega$ ,  $I_{AS}=5\text{A}$ ,  $V_{GS}=10\text{V}$ , Part not recommended for use above this value
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$



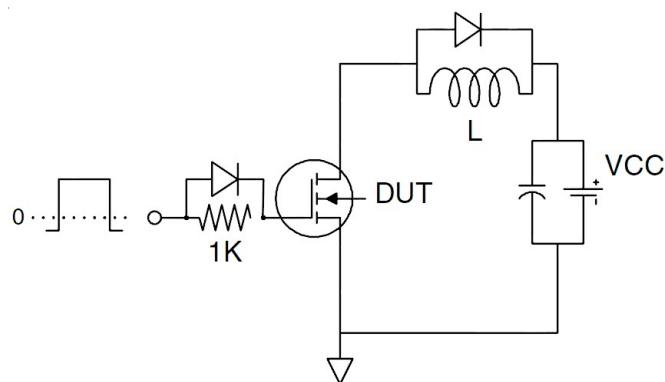
UV30N03  
30V 30A N-Channel Mosfet

## Test circuit

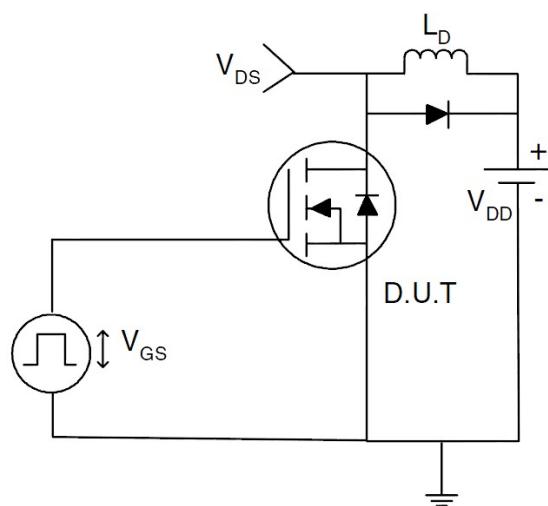
### (1) $E_{AS}$ test circuits

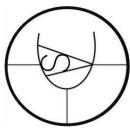


### (2) Gate charge test circuit



### (3) Switch time test circuit





## Typical Operating Characteristics

Figure 1: Power Dissipation

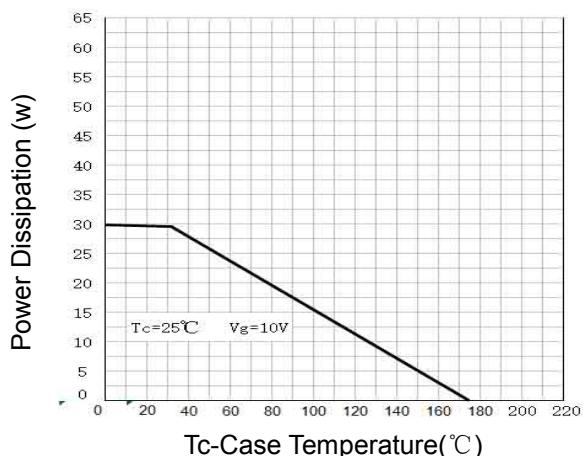


Figure 3: Safe Operation Area

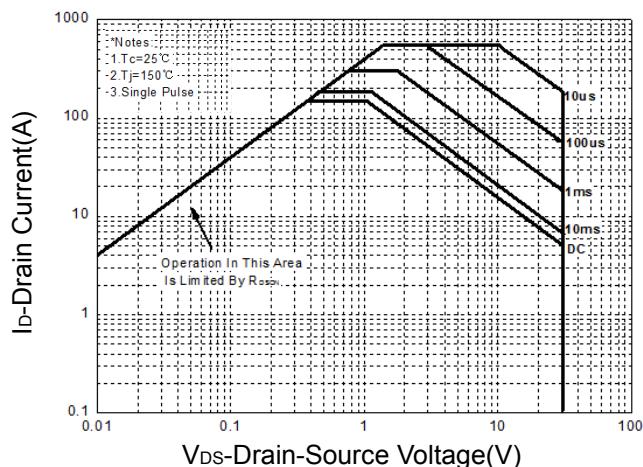


Figure 5: Output Characteristics

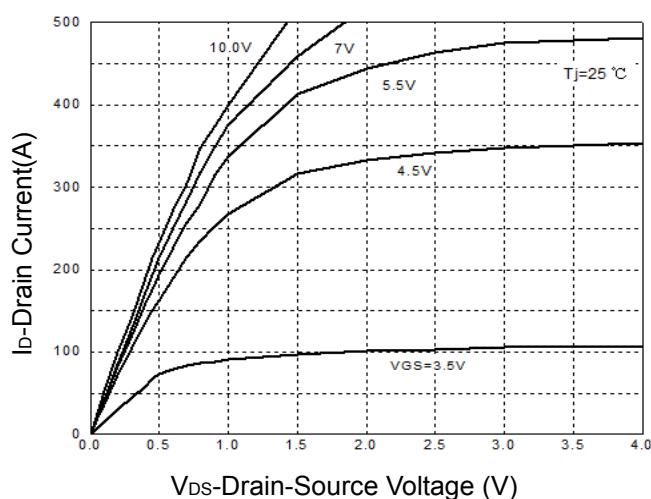


Figure 2: Drain Current

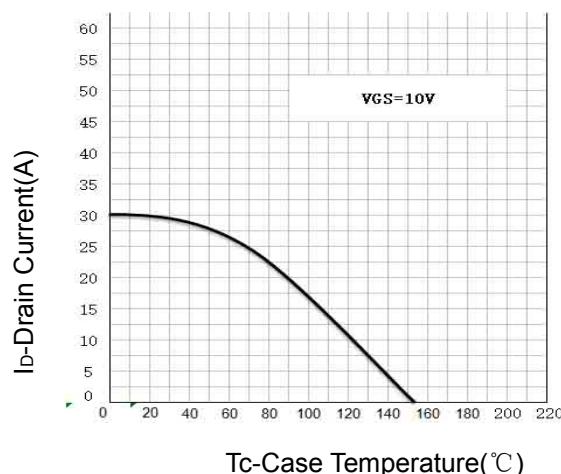


Figure 4: Thermal Transient Impedance

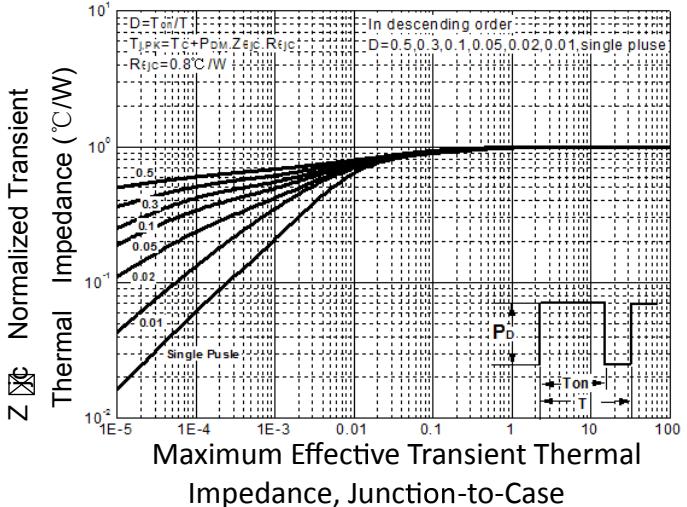
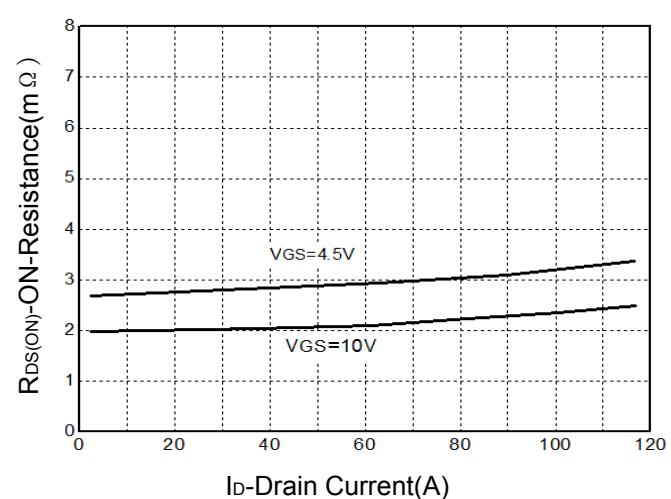
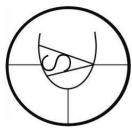


Figure 6: Drain-Source On Resistance





## Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

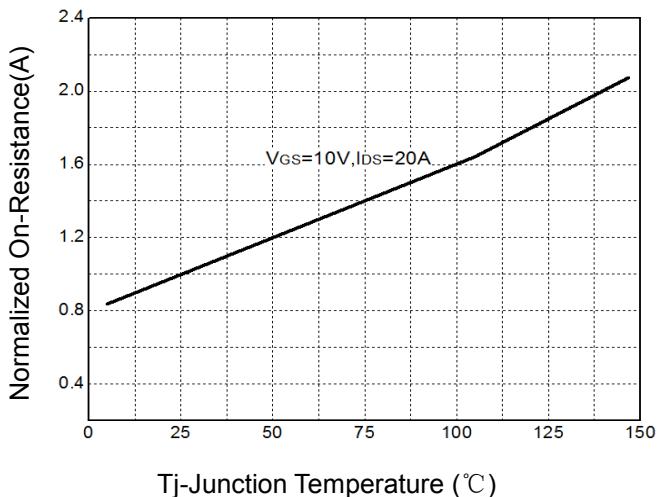


Figure 8: Source-Drain Diode Forward

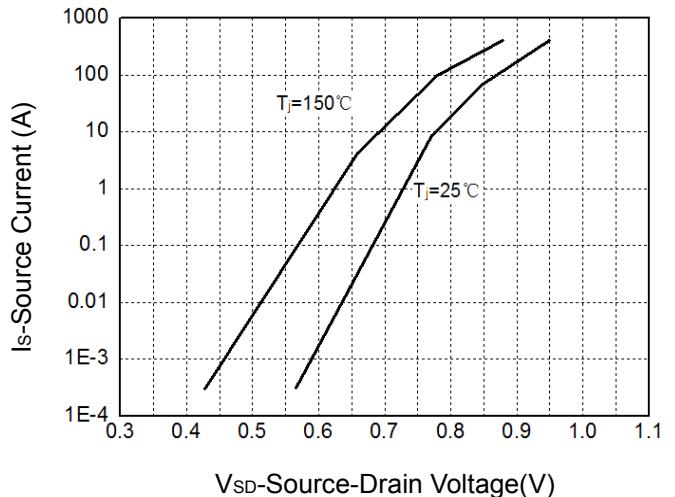


Figure 9: Capacitance Characteristics

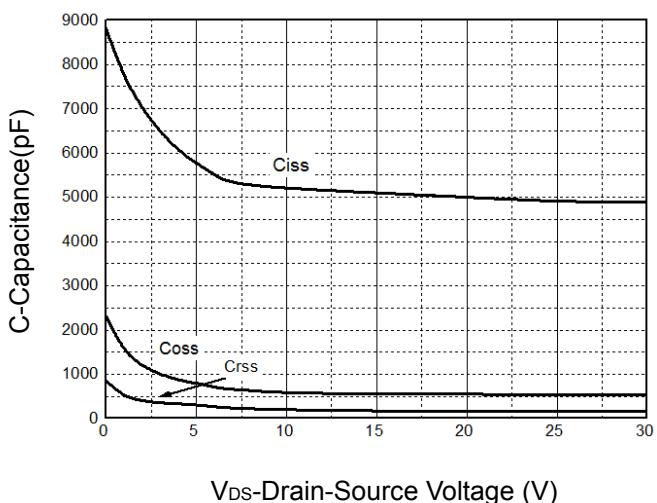
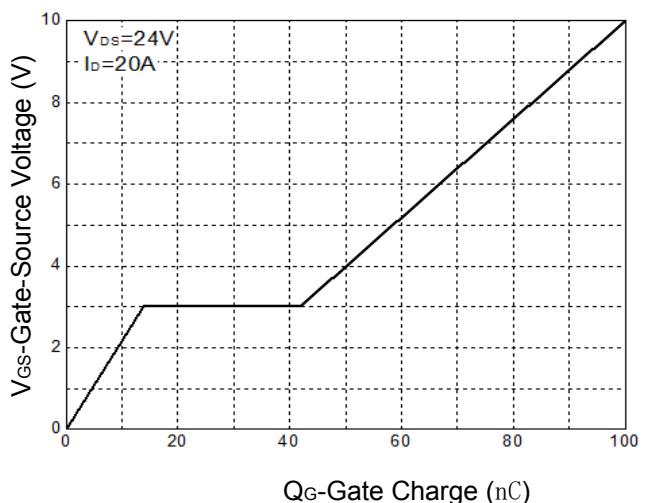
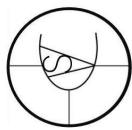


Figure 10: Gate Charge Characteristics



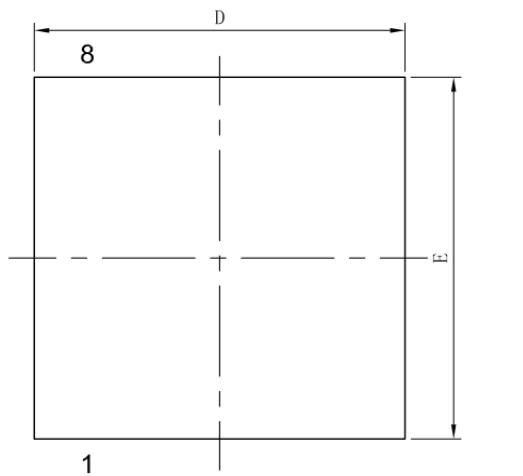


## Device Per Unit

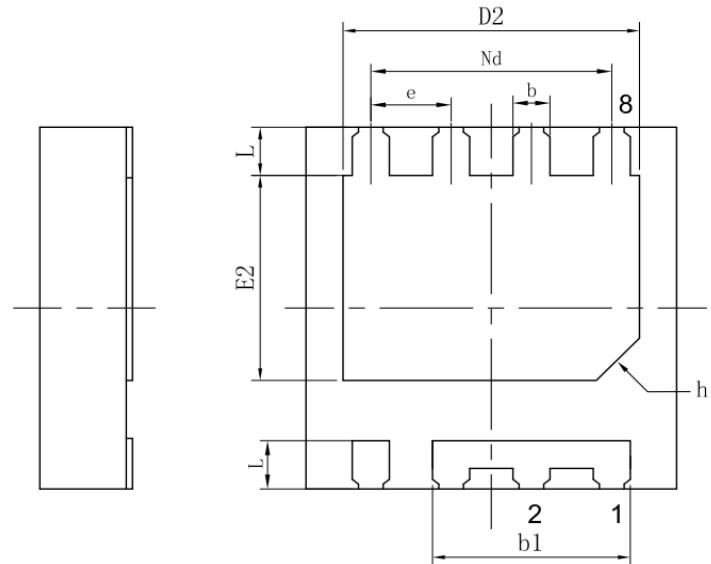
Package Type	Unit	Quantity
DFN3*3-8L	Reel	3000

## Package Information

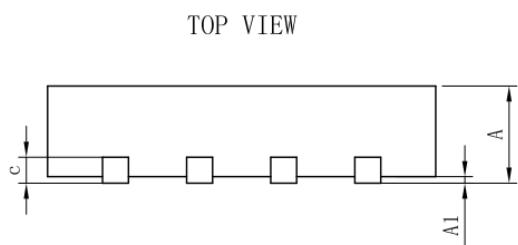
DFN3\*3-8L



TOP VIEW

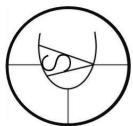


BOTTOM VIEW

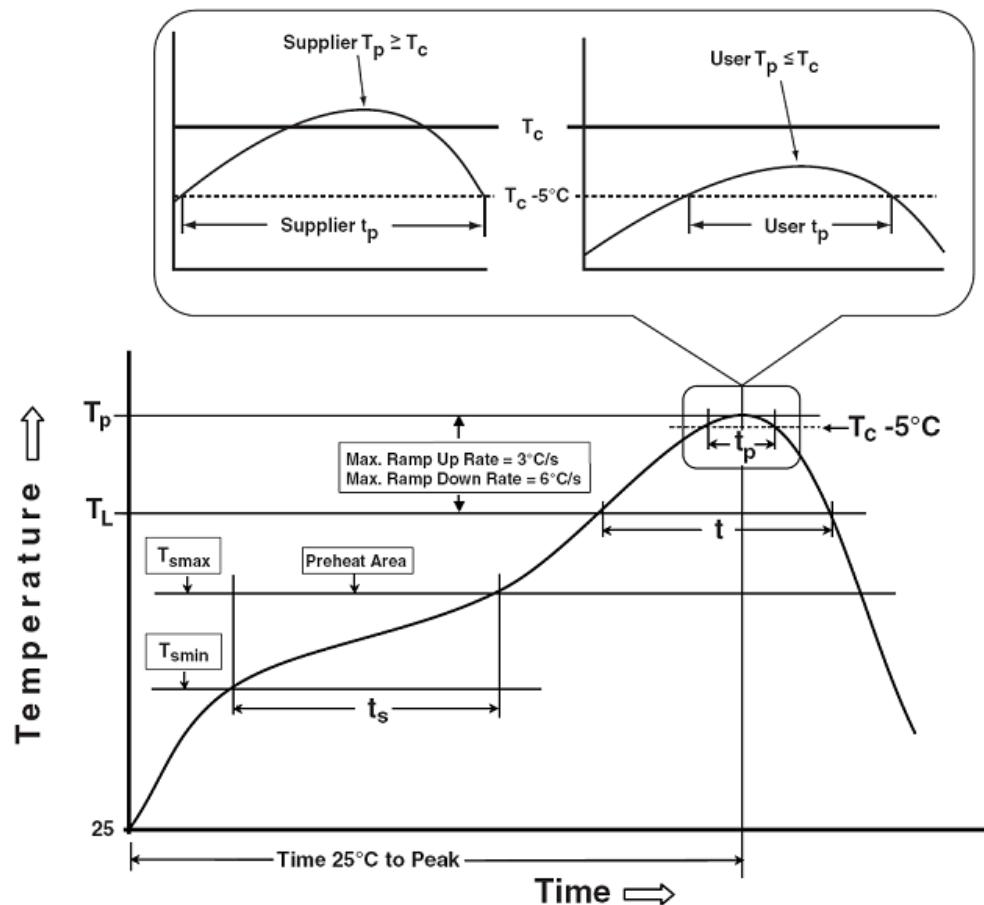


TOP VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
b1	1.55	1.60	165.00
c	0.19	0.20	0.21
D	2.90	3.00	3.10
D2	2.30	2.40	2.50
Nd	1.90	1.95	2.00
E	2.90	3.00	3.10
E2	1.60	1.70	1.80
e	0.65bsc		
L	0.35	0.40	0.45
h	0.30	0.35	0.40



## 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.

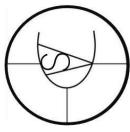


Table 1.SnPb Eutectic Process – Classification Temperatures (Tc)

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	168/500/1000Hrs, Bias @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -55°C~150°C

### Customer Service

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