

UV4015MS
40V 120A N-Channel Mosfet

General Description

The UV4015MS uses the SGT 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}	40	V
$R_{DS(on)\ TYP}@V_{GS}=10V$	1.5	$m\Omega$
$R_{DS(on)\ TYP}@V_{GS}=4.5V$	2.0	$m\Omega$
I_D (Silicon Limited)	120	A

Applications

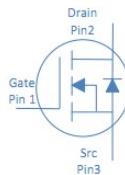
Power switching application

Hard Switched and High Frequency Circuits

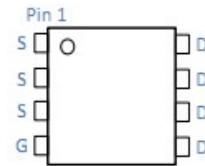
Uninterruptible Power Supply



DFN5*6-8L Top view



Schematic diagram

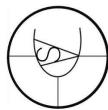


Package Marking And Ordering Information

Part ID	Package Type	Marking	Tape and Reel information
UV4015MS	DFN5*6-8L	4015MS	3000pcs/Reel

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

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain –Source breakdown voltage	40	V
I_D	Continuous drain current (Silicon Limited)	$T_c=25^\circ C$	120
		$T_c=100^\circ C$	92
I_{DM}	Pulse drain current tested ①	$T_c=25^\circ C$	A
E_{AS}	Avalanche energy, single pulsed ②	400	mJ
P_D	Maximum power dissipation	$T_c=25^\circ C$	125
V_{GS}	Gate-Source voltage	± 20	V
$T_{STG}\ T_J$	Storage and operating temperature range	-55 to 175	°C



UV4015MS
40V 120A N-Channel Mosfet

Thermal Characteristic

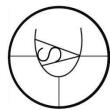
Symbol	Parameter	Typical	Unit
R_{QJC}	Thermal Resistance-Junction to Case	0.8	°C/W
R_{QJA}	Thermal Resistance-Junction to Ambient	40	°C/W

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	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	40			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32\text{V}, V_{GS}=0\text{V}$			1	μA
	Zero Gate Voltage Drain Current($T_j=55^\circ\text{C}$)	$V_{DS}=32\text{V}, V_{GS}=0\text{V}$			5	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			± 100	nA
$V_{GS(\text{TH})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2		2.2	V
$R_{DS(\text{ON})}$	Drain-Source On-State Resistance③	$V_{GS}=10\text{V}, I_D=20\text{A}$		1.5	1.8	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$		2.0	2.6	$\text{m}\Omega$
Dynamic Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise stated)						
C_{iss}	Input Capacitance	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		3972		PF
C_{oss}	Output Capacitance			1119		PF
C_{rss}	Reverse Transfer Capacitance			82		PF
Q_g	Total Gate Charge(4.5V)	$V_{DS}=15\text{V}, I_D=20\text{A}, V_{GS}=10\text{V}$		45		nC
Q_{gs}	Gate-Source Charge			12		nC
Q_{gd}	Gate-Drain Charge			18.5		nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay time	$V_{DD}=15\text{V}, I_D=20\text{A}, R_G=3.3\Omega$		18.5		nS
t_r	Turn-on Rise time			9		nS
$t_{d(off)}$	Turn-off Delay time			58.5		nS
t_f	Turn-off Fall time			32		nS
Source-Drain Diode Characteristics						
V_{SD}	Forward on voltage	$I_{SD}=20\text{A}, V_{GS}=0\text{V}$			1.2	V
t_{rr}	Reverse Recovery Time	$T_j=25^\circ\text{C}, I_S=I_F, V_{GS}=0\text{V}, dI/dt=100\text{A}/\mu\text{s}$			23	nS
Q_{rr}	Reverse Recovery Charge				67	nC

Note:

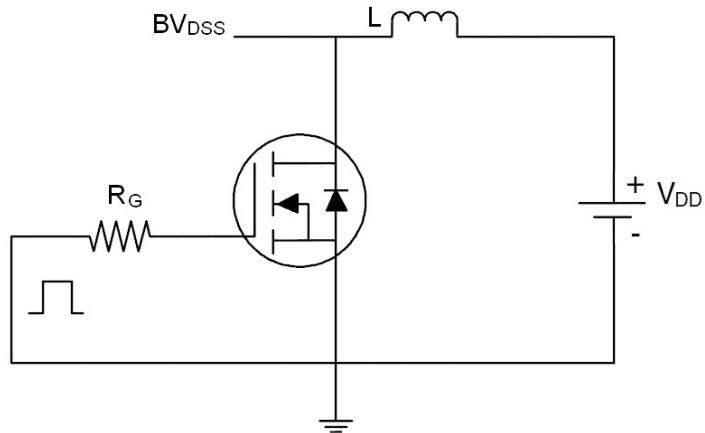
- ① Repetitive rating; pulse width limited by max, junction temperature.
- ② Limited by $T_{j\max}$, starting $T_j=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_G=2\ \Omega$, $I_{AS}=20\text{A}$, $V_{GS}=10\text{V}$, Part not recommended for use above this value
- ③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
- ④ Package limitation current is 100A



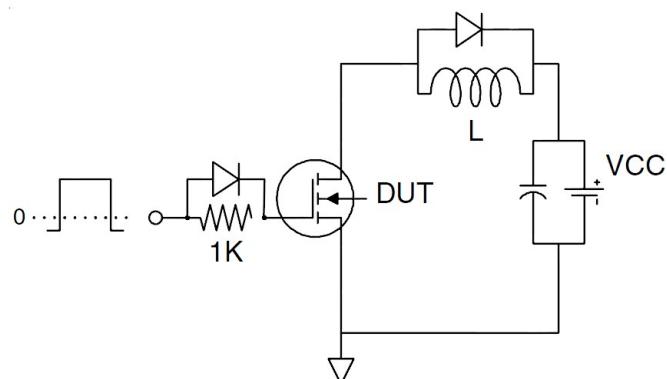
UV4015MS
40V 120A N-Channel Mosfet

Test circuit

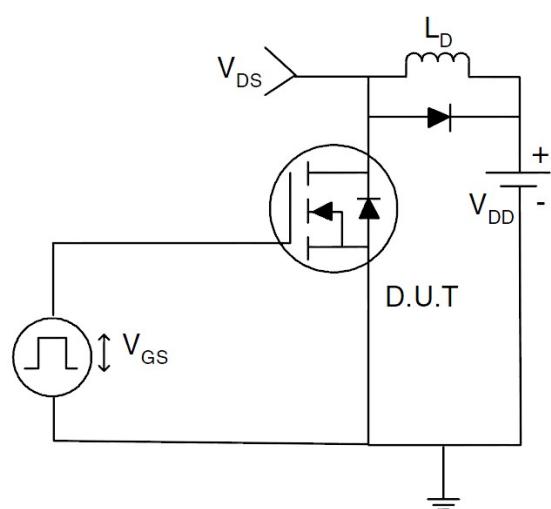
(1) E_{AS} test circuits

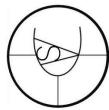


(2) Gate charge test circuit



(3) Switch time test circuit





Typical Characteristics

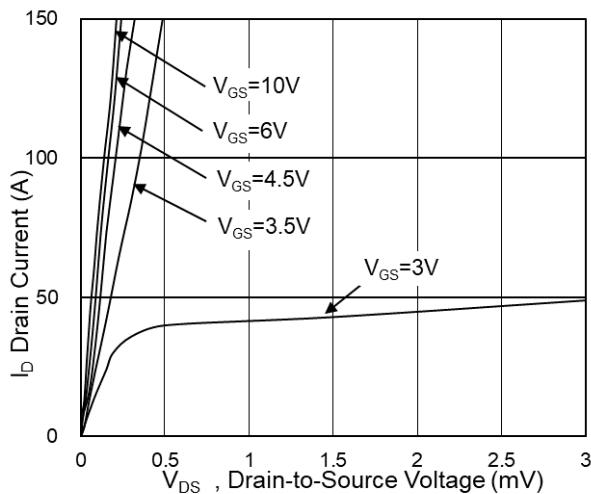


Fig.1 Typical Output Characteristics

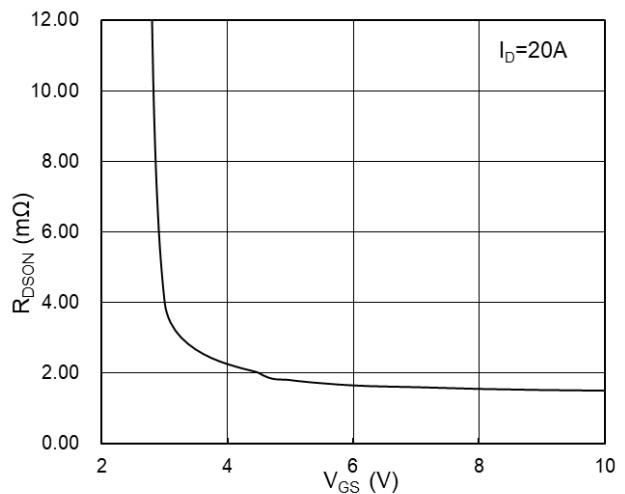


Fig.2 On-Resistance vs G-S Voltage

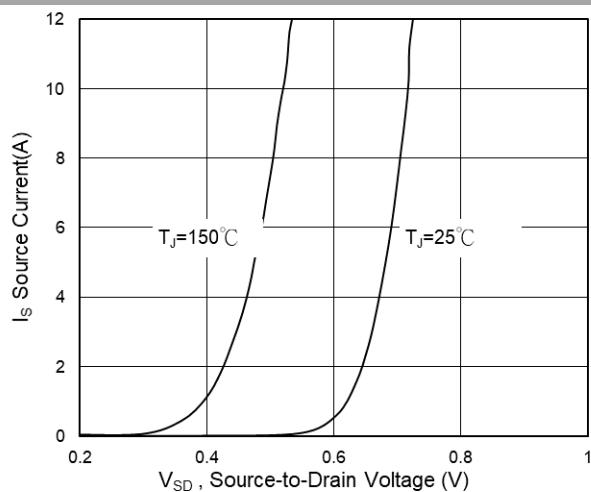


Fig.3 Source Drain Forward Characteristics

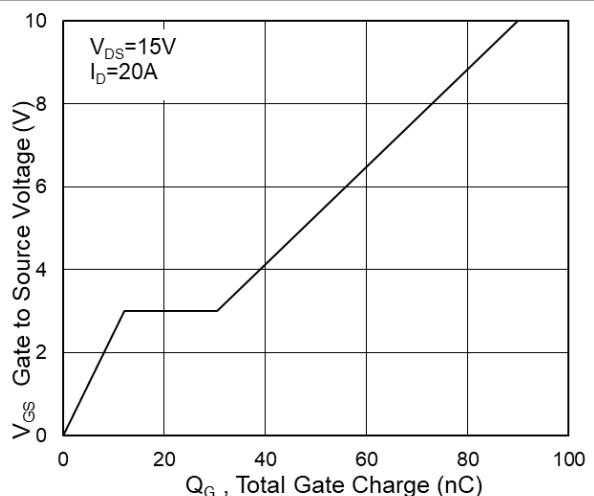


Fig.4 Gate-Charge Characteristics

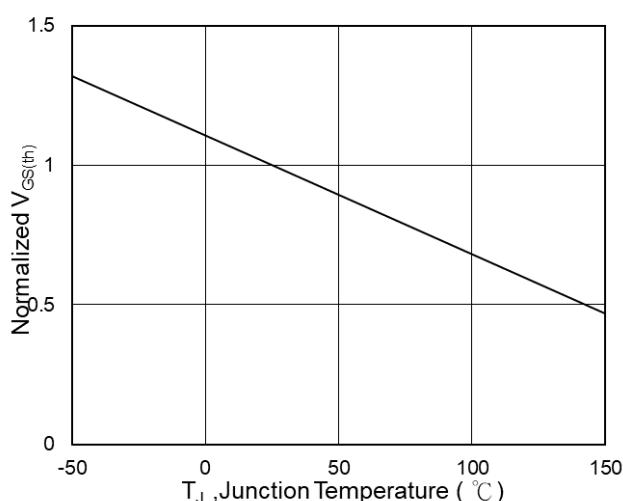


Fig.5 Normalized $V_{GS(th)}$ vs T_J

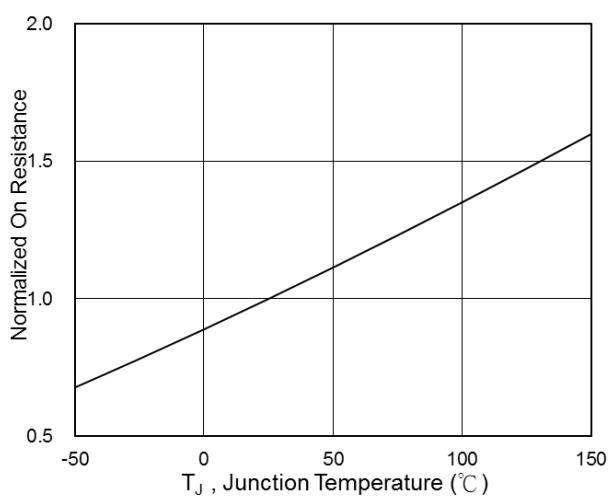
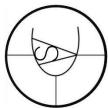


Fig.6 Normalized $R_{DS(on)}$ vs T_J



UV4015MS
40V 120A N-Channel Mosfet

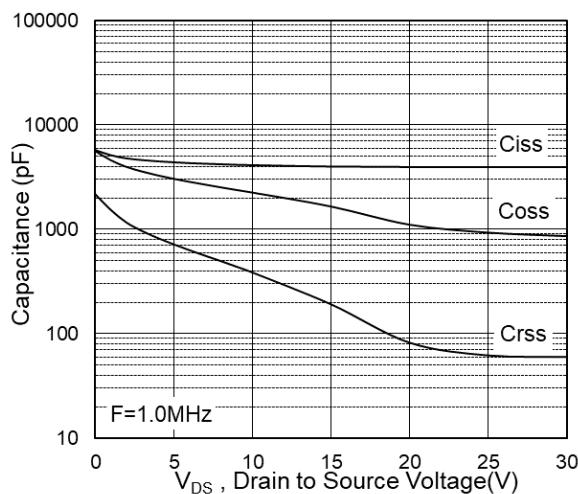


Fig.7 Capacitance

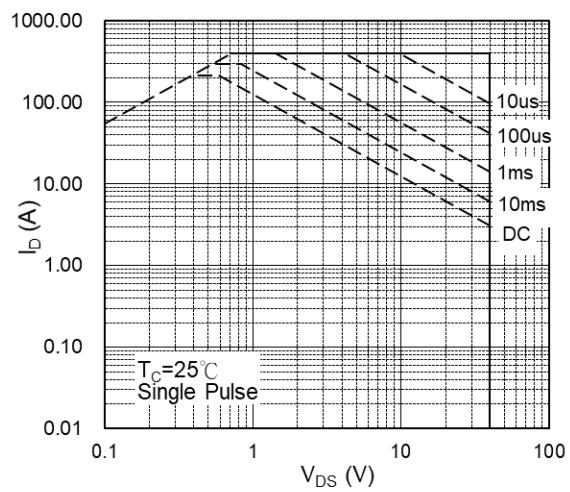


Fig.8 Safe Operating Area

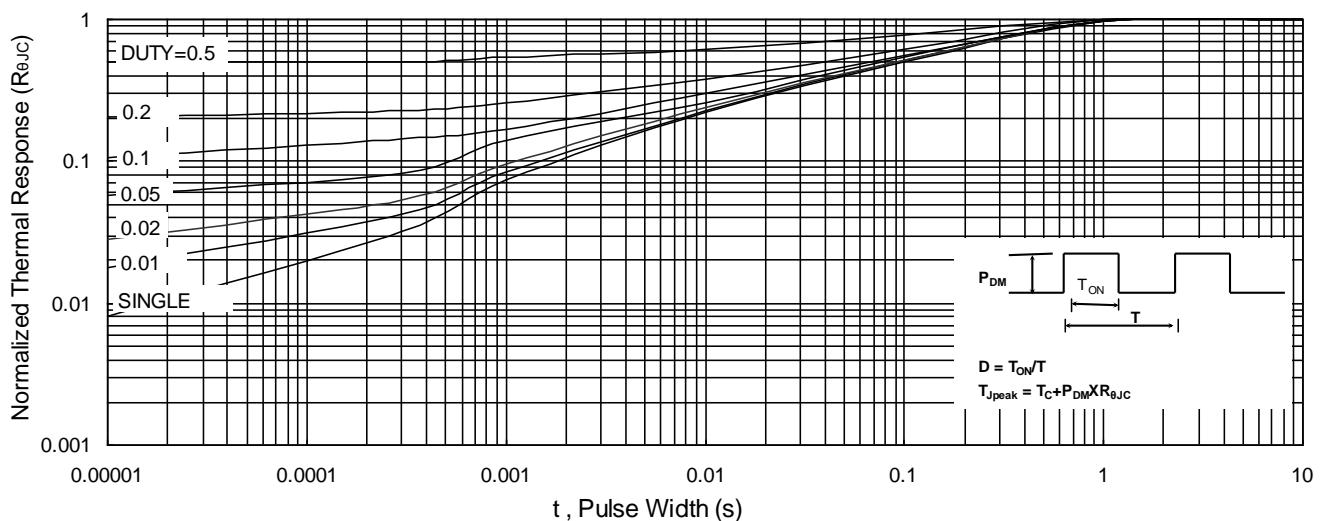
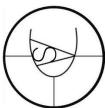


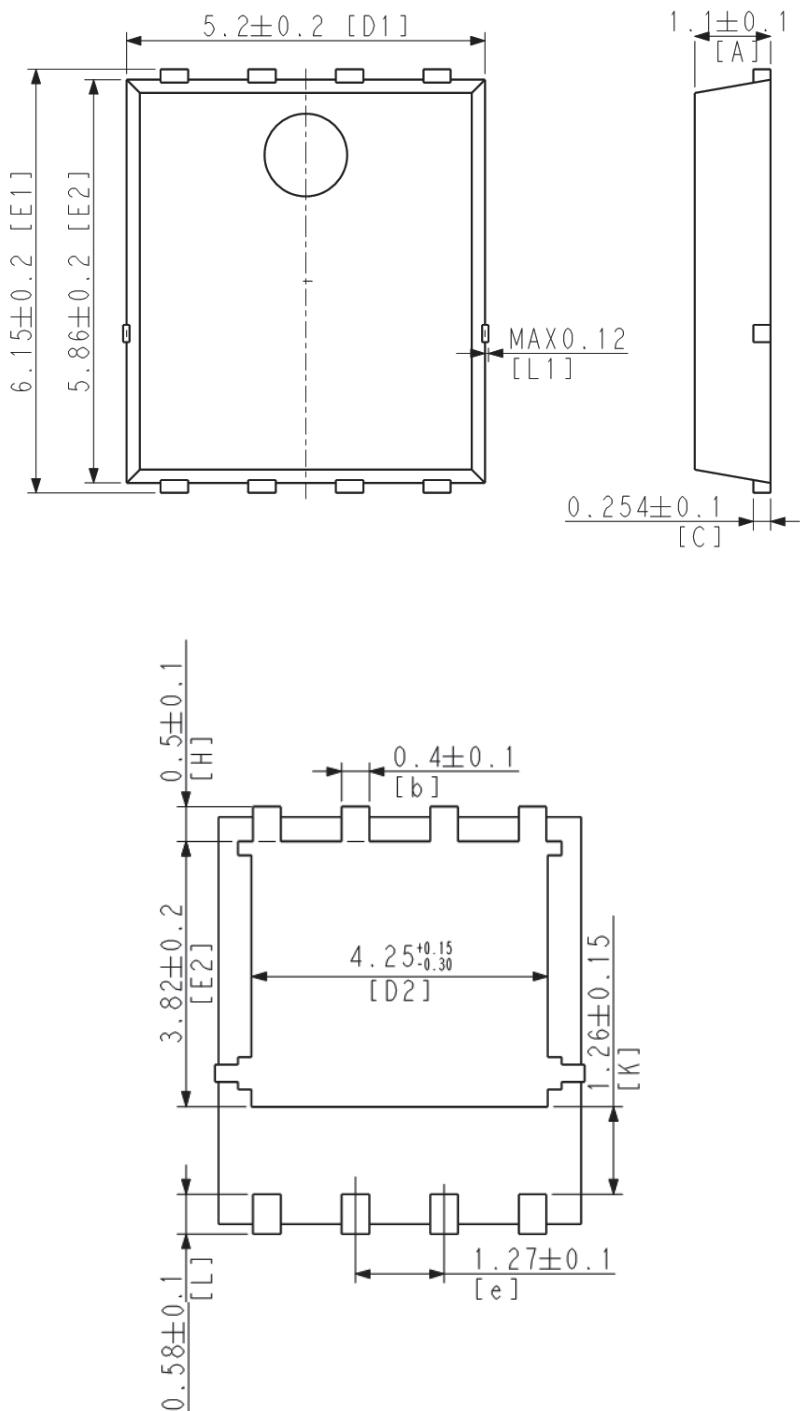
Fig.9 Normalized Maximum Transient Thermal Impedance

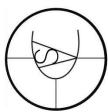


UV4015MS
40V 120A N-Channel Mosfet

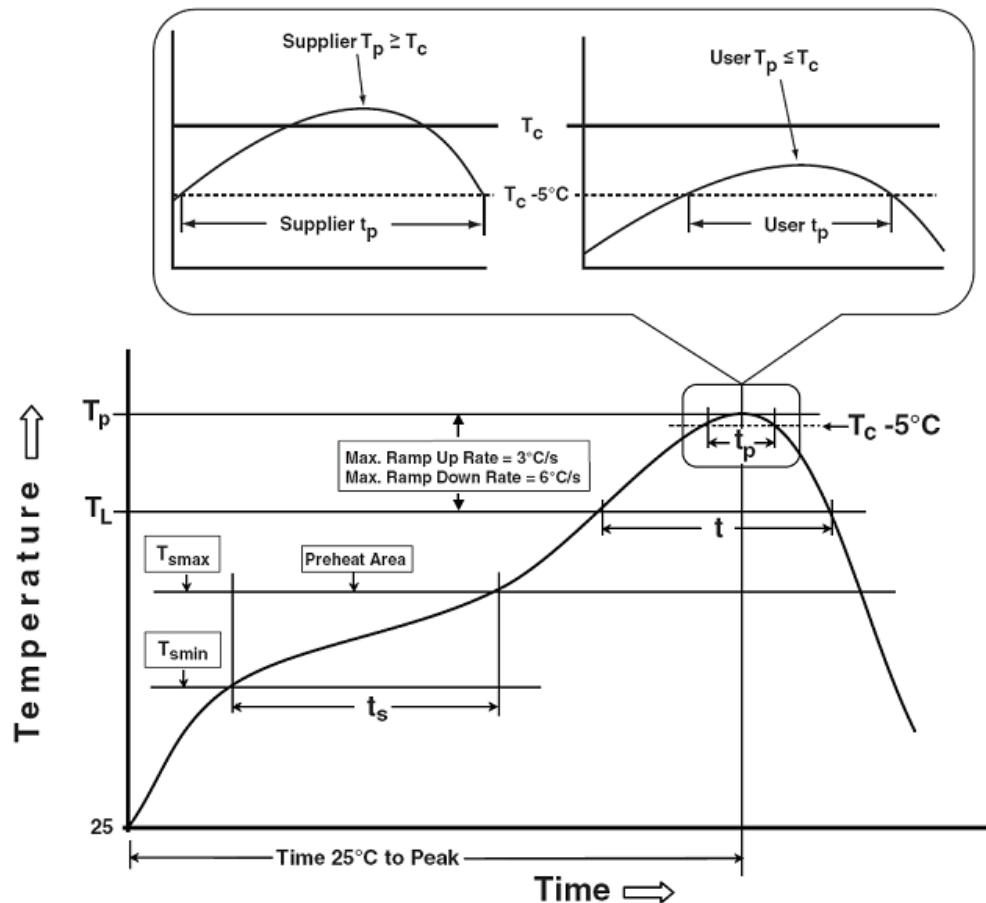
Package Information

PPAK5*6-8L





Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
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.