

$V_{DS}$ , 75V $R_{DS(ON)}$ , 9m $\Omega$ (max.) @ $V_{GS}=10V$ $I_D$ , 80A <sup>Note 3</sup>	<b>PDFN 5*6-8L</b>		

Description	Features
The SG75N07Q uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.	<ul style="list-style-type: none"> <li>• Low On-Resistance</li> <li>• Low Input Capacitance</li> <li>• Low Miller Charge</li> <li>• Low Input/Output Leakage</li> </ul>
	<b>Applications</b> <ul style="list-style-type: none"> <li>• Motor / Body Load Control</li> <li>• Load Switch</li> <li>• DC-DC converters and Off-line UPS</li> </ul>

### Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG75N07Q	Halogen-Free	PDFN 5*6-8L	Q	Tape & Reel	2,500

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	75	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Drain Current-Continuous <sup>Note 3</sup>	$I_D$	$T_C=25^\circ\text{C}$	80
		$T_C=70^\circ\text{C}$	64
Drain Current-Pulsed <sup>Note 1</sup>	$I_{DM}$	300	A
Drain Current-Continuous	$I_D$	$T_A=25^\circ\text{C}$	18
		$T_A=70^\circ\text{C}$	15
Avalanche Current, $L=0.5\text{mH}$	$I_{AS}$	28.3	A
Avalanche Energy, $L=0.5\text{mH}$	$E_{AS}$	200	mJ
Maximum Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	104
		$T_C=70^\circ\text{C}$	67
		$T_A=25^\circ\text{C}$	5.7
		$T_A=70^\circ\text{C}$	3.6
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ\text{C}$

### Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient <sup>Note 2</sup>	$R_{\theta JA}$	Steady State	-	-	62	$^\circ\text{C/W}$
Maximum Junction-to-Case <sup>Note 2</sup>	$R_{\theta JC}$	Steady State	-	-	1.2	$^\circ\text{C/W}$

### Electrical Characteristics ( $T_J=25^\circ\text{C}$ unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{DSS}$	$V_{GS}=0V, I_{DS}=250\mu A$	75	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage	$I_{GSS}$	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	$\pm 100$	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=30A$	-	7	9	m $\Omega$

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$	-	4800	-	pF
Output Capacitance	$C_{oss}$		-	650	-	
Reverse Transfer Capacitance	$C_{rss}$		-	340	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=30V, I_D=30A, V_{GS}=10V, R_g=3\Omega$	-	25	-	ns
Rise Time	$t_r$		-	21	-	
Turn-Off Delay Time	$T_{d(off)}$		-	85	-	
Fall Time	$t_f$		-	42	-	
Total Gate Charge at 10V	$Q_g$	$V_{DS}=30V, I_{DS}=30A, V_{GS}=10V$	-	125	-	nC
Gate to Source Gate Charge	$Q_{gs}$		-	35	-	
Gate to Drain "Miller" Charge	$Q_{gd}$		-	48	-	

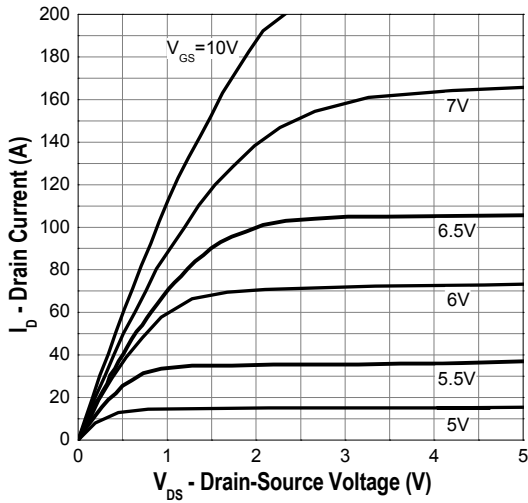
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=30A$	-	-	1.3	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=30A, di/dt=100A/\mu s$	-	32	-	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	47	-	nC

**Notes:**

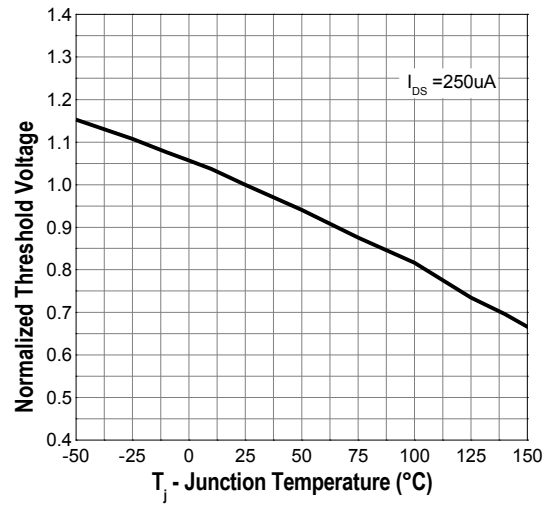
- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.  $R_{\theta JA}$  shown below for single device operation on FR-4 in still air.
- The maximum current rating is limited by package.

**Typical Operating Characteristics**

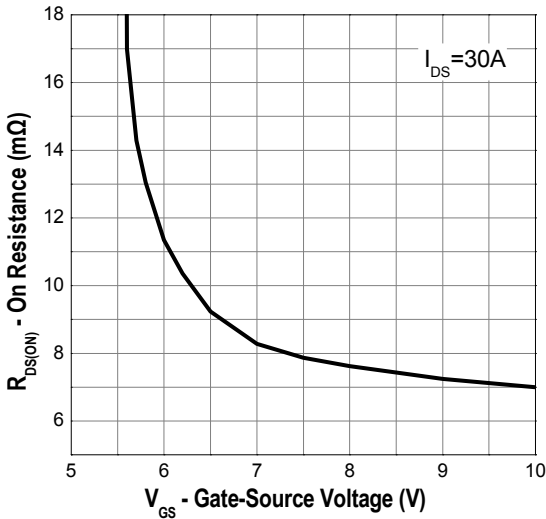
**Output Characteristics**



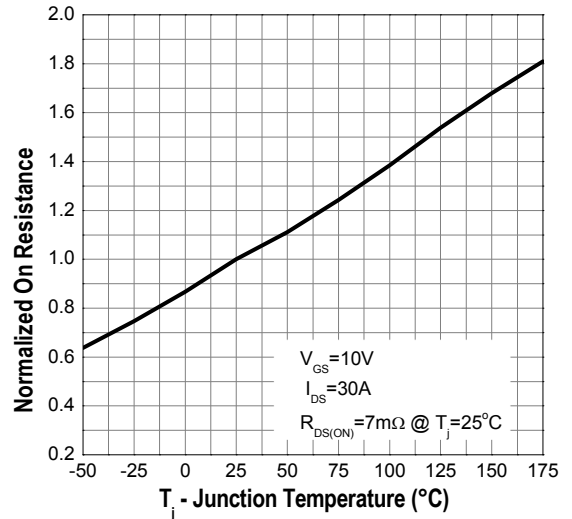
**Gate Threshold Voltage**



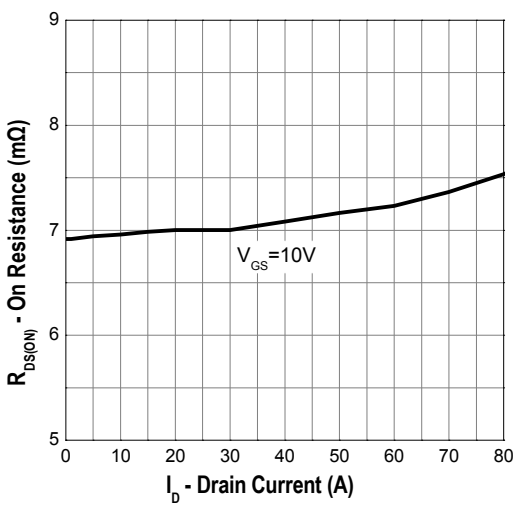
**Gate-Source On Resistance**



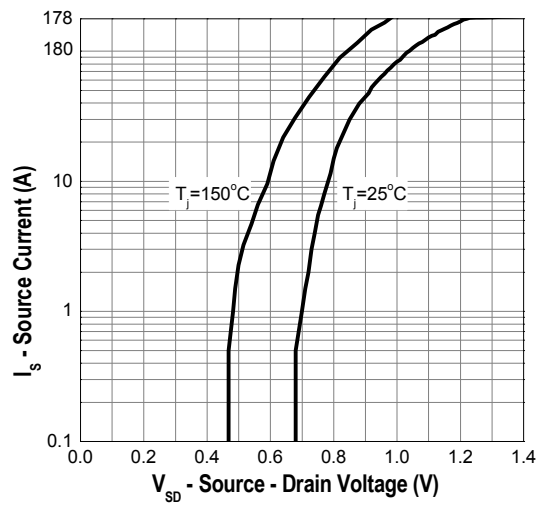
**Drain-Source On Resistance**



**Drain-Source On Resistance**



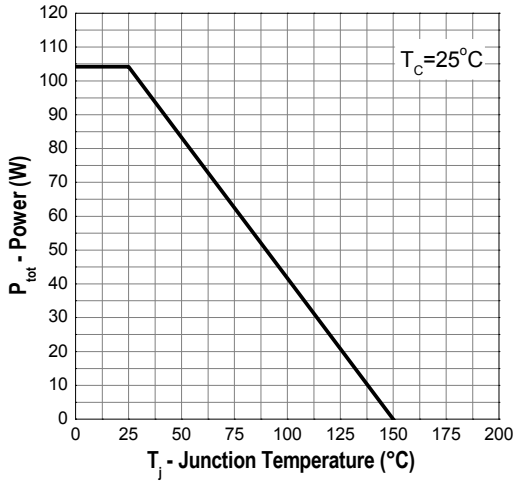
**Source-Drain Diode Forward**



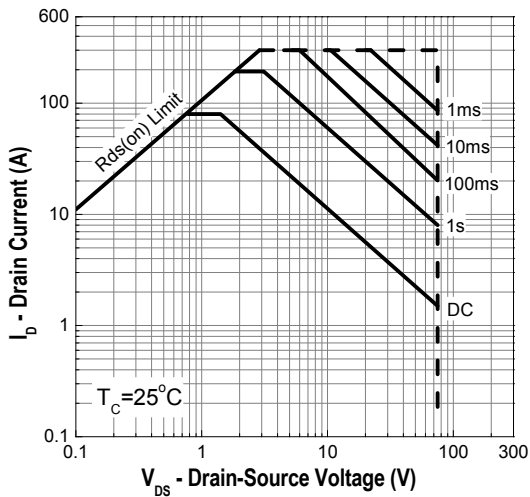
**Typical Operating Characteristics (Cont.)**

**Power Dissipation**

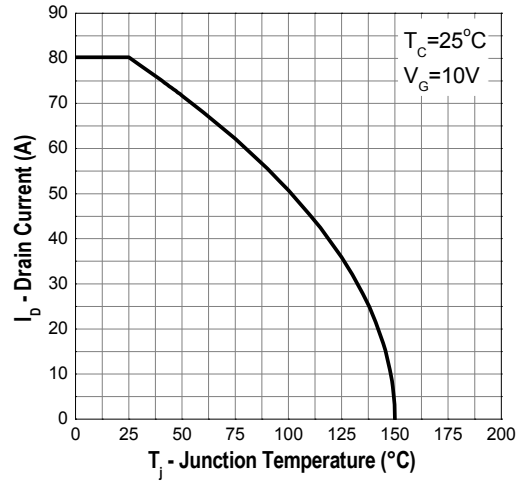
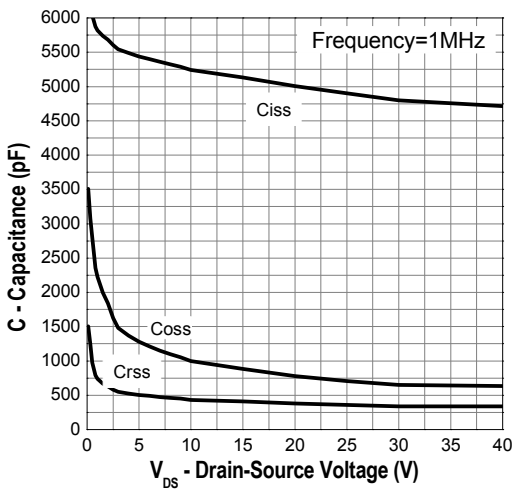
**Drain Current**



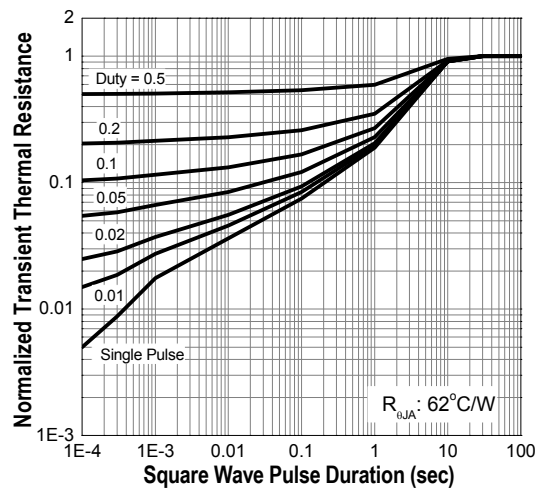
Safe Operation Area



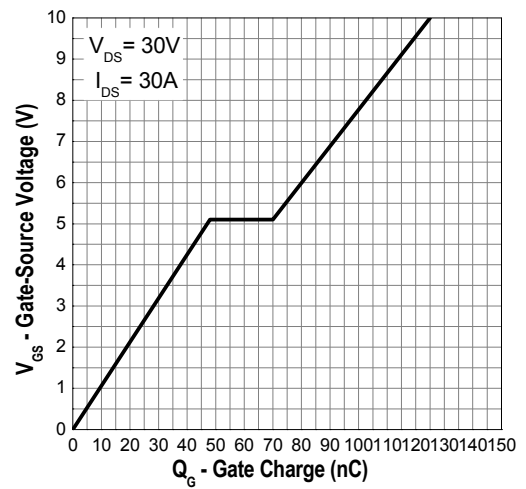
Capacitance



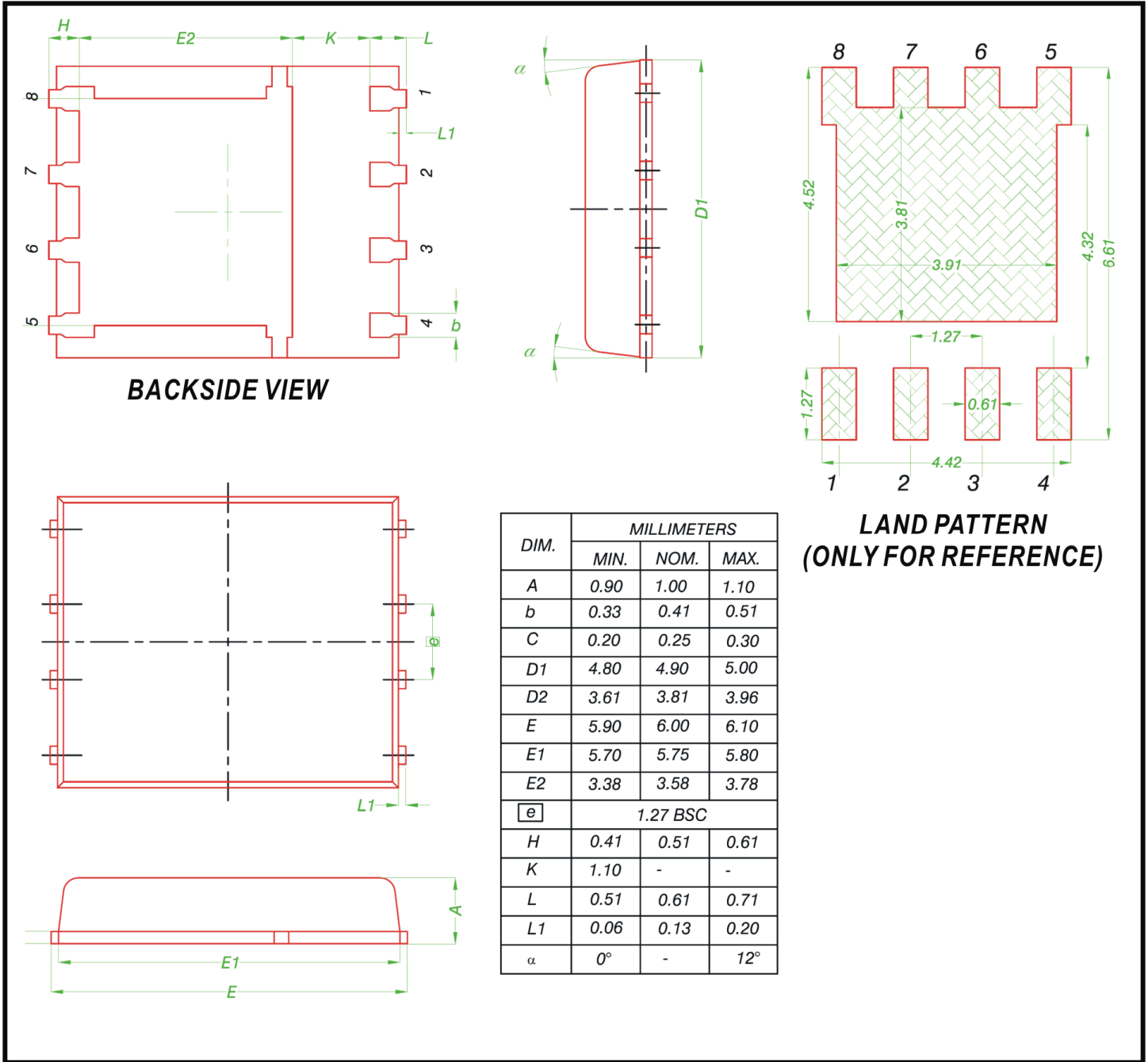
Transient Thermal Impedance



Gate Charge



**Outline Dimension**



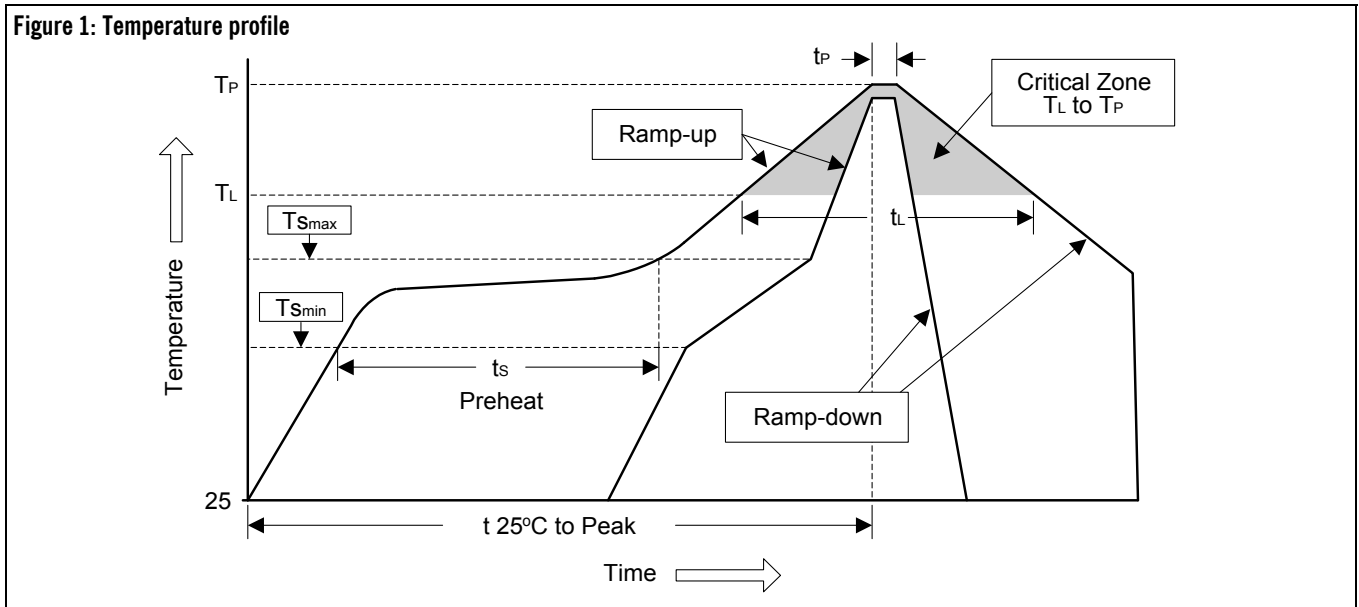
**Note:**

1. All Dimensions are in mm.
2. Package body sizes exclude Mold Flash, Protrusion or Gate Burrs. Mold Flash, Protrusion or Gate Burrs Shall not exceed 0.10mm per side.
3. Package body sizes determined at the outermost extremes of the plastic body exclusive of Mold Flash, Tie Bar, Tie Bar Burrs, Gate Burrs and Interlead Flash, But Including any mismatch between the top and bottom of the plastic body.
4. The package top may be smaller than the package bottom.

**Soldering Methods for SiliconGear's Products**

1. Storage environment: Temperature = 10°C to 35°C Humidity = 65% ± 15%

2. Reflow soldering of surface-mount devices



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min ( $T_{smin}$ )	100°C	150°C
- Temperature Max ( $T_{smax}$ )	150°C	200°C
- Time (min to max) ( $t_s$ )	60 to 120 sec	60 to 180 sec
$T_{smax}$ to $T_L$		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature ( $T_L$ )	183°C	217°C
- Time ( $t_L$ )	60 to 150 sec	60 to 150 sec
Peak Temperature ( $T_P$ )	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec

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