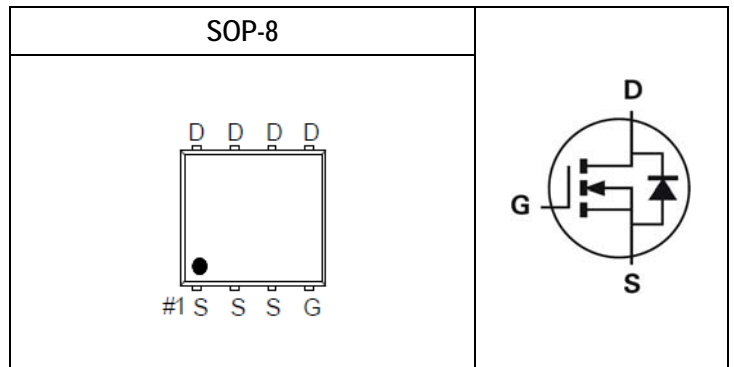


Key Performance Parameters		
Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(ON) \text{ max. } V_{GS}=10V}$	17.0	mΩ
$R_{DS(ON) \text{ max. } V_{GS}=4.5V}$	23.5	mΩ
I_D	18.7	A
Q_g	21.99	nC
Q_{gd}	6.11	nC



Features	Application
<ul style="list-style-type: none"> Optimized for synchronous rectification Low Input Capacitance Low Miller Capacitance Fully Characterized Capacitance and Avalanche Pb-free lead plating; RoHS compliant 	<ul style="list-style-type: none"> BLDC Motor drive applications Battery powered circuits Synchronous rectifier applications Resonant mode power supplies

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
DG100N14S	Halogen-Free	SOP-8	S	Tape & Reel	3,000

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous	$T_C=25^\circ\text{C}$	I_D	18.7	A
	$T_C=100^\circ\text{C}$		11.8	A
Drain Current-Pulsed ^{Note 1}	$T_C=25^\circ\text{C}$	I_{DM}	68	A
Avalanche Current ^{Note 3}		I_{AS}	8.5	A
Single Pulse Avalanche Energy ^{Note 3}		E_{AS}	3.6	mJ
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	P_{tot}	10.6	W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance, Junction-to-Ambient ^{Note 2}	$R_{\theta JA}$	Steady State	-	41.8	-	$^\circ\text{C/W}$
Thermal resistance, Junction-to-Case ^{Note 2}	$R_{\theta JC}$	Steady State	-	11.6	-	$^\circ\text{C/W}$

Notes:

- Pulse Test: Pulse Width $\leq 10\text{ms}$, Duty Cycle $\leq 1\%$.
- For surface-mounted devices, both $R_{\theta JA}$ and $R_{\theta JC}$ are measured with the device mounted on approximately 1"×1" FR-4 PCBs. In actual applications, many factors including the PCB material and layout, may affect the thermal resistance of the device-board assembly. For best results, characterize the thermal resistance directly in the application circuit.
- Starting $T_J=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_g=50\Omega$, $V_D=50\text{V}$, $V_{GS}=10\text{V}$.

Electrical Characteristics (T_J=25°C unless otherwise noted)

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_{DS}=10mA$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}C$	-	-	10	μA
		$V_{DS}=100V, V_{GS}=0V, T_J=125^{\circ}C$	-	-	100	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.2	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=13A$	-	-	17.0	m Ω
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_{DS}=3A$	-	-	23.5	m Ω
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	0.5	-	Ω
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_{DS}=20A$	-	12.8	-	S

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	884	-	pF
Output Capacitance	C_{oss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	213	-	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	28	-	pF
Turn-On Delay Time ^{Note 4}	$T_{d(on)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=8A, R_{GEN}=3\Omega$	-	6.1	-	ns
Rise Time ^{Note 4}	t_r	$V_{DS}=50V, V_{GS}=10V, I_{DS}=8A, R_{GEN}=3\Omega$	-	20	-	ns
Turn-Off Delay Time ^{Note 4}	$T_{d(off)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=8A, R_{GEN}=3\Omega$	-	14.9	-	ns
Fall Time ^{Note 4}	t_f	$V_{DS}=50V, V_{GS}=10V, I_{DS}=8A, R_{GEN}=3\Omega$	-	17.5	-	ns

GATE CHARGE CHARACTERISTICS ^{Note 4}						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q_{gs}	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	4.49	-	nC
Gate charge at threshold	$Q_{g(th)}$	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	1.88	-	nC
Gate to Drain Charge	Q_{gd}	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	6.11	-	nC
Switching charge	Q_{SW}	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	8.71	-	nC
Gate charge total	Q_g	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	21.99	-	nC
Gate charge total	Q_g	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 4.5V$	-	11.82	-	nC
Gate plateau voltage	$V_{plateau}$	$V_{DD}=50V, I_D=8A, V_{GS}=0 \text{ to } 10V$	-	3.92	-	V
Gate charge total, sync. FET ($Q_g - Q_{gd}$)	$Q_{g(sync)}$	$V_{DS}=0.1V, V_{GS}=0 \text{ to } 10V$	-	15.89	-	nC

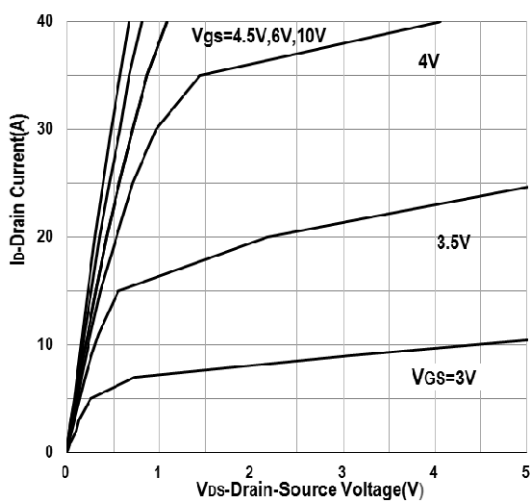
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=8A$	-	0.7	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$V_{DD}=50V, I_F=8A, di/dt=100A/\mu s$	-	35.33	-	ns
		$V_{DD}=50V, I_F=8A, di/dt=200A/\mu s$	-	27.73	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$V_{DD}=50V, I_F=8A, di/dt=100A/\mu s$	-	39.17	-	nC
		$V_{DD}=50V, I_F=8A, di/dt=200A/\mu s$	-	58.74	-	nC
Reverse Recovery Current	I_{RRM}	$V_{DD}=50V, I_F=8A, di/dt=100A/\mu s$		1.85		A
		$V_{DD}=50V, I_F=8A, di/dt=200A/\mu s$		3.64		A

Notes:

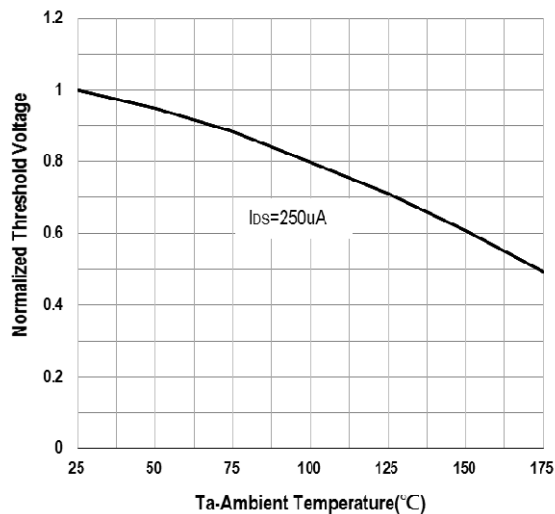
4. Gate charge data and figure are TO-252 values.

Typical Operating Characteristics

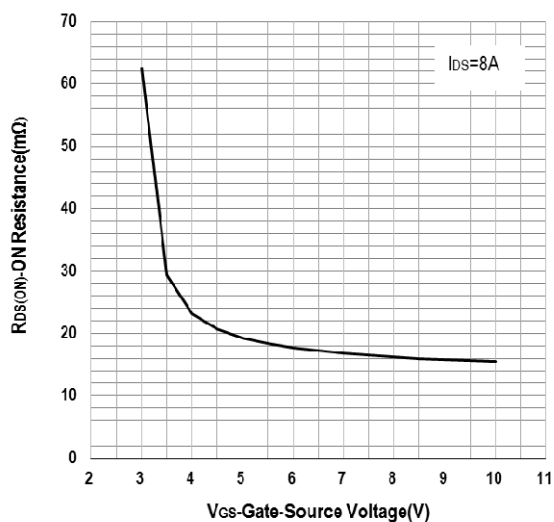
Output Characteristics



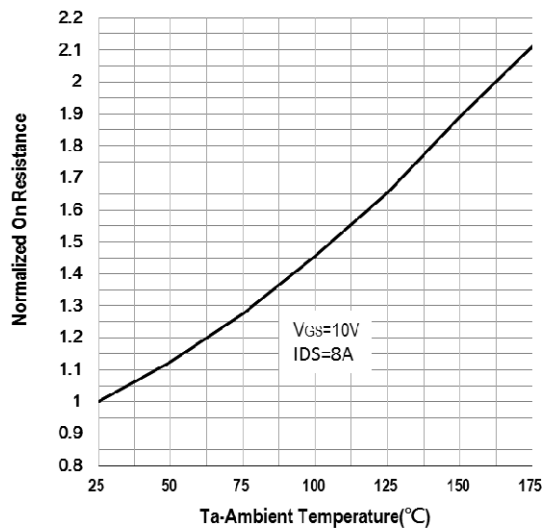
Gate Threshold Voltage



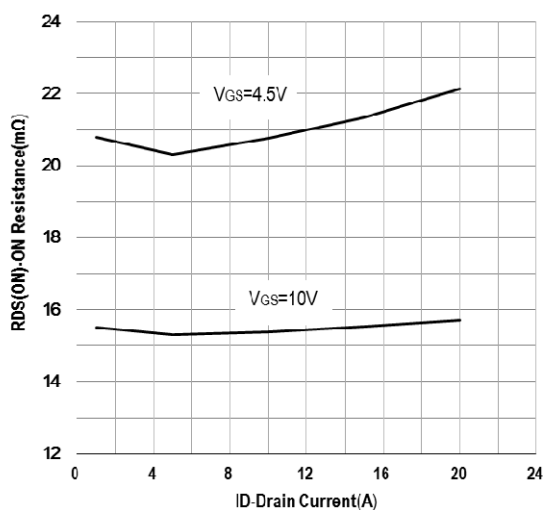
Gate-Source On Resistance



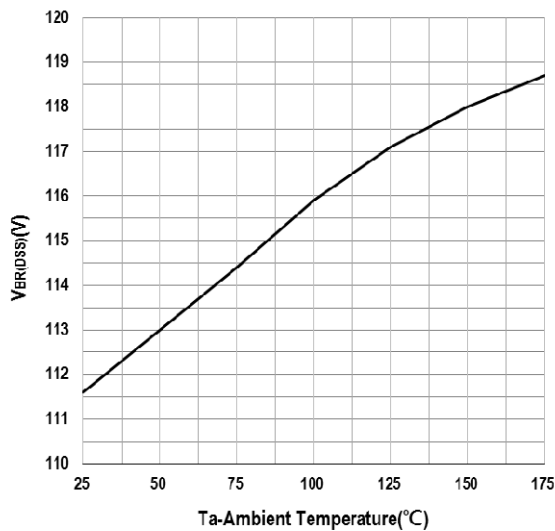
Drain-Source On Resistance



Drain-Source On Resistance

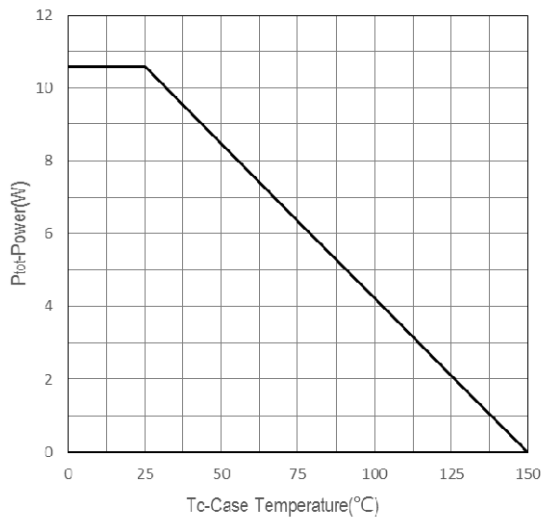


Drain-source Breakdown Voltage

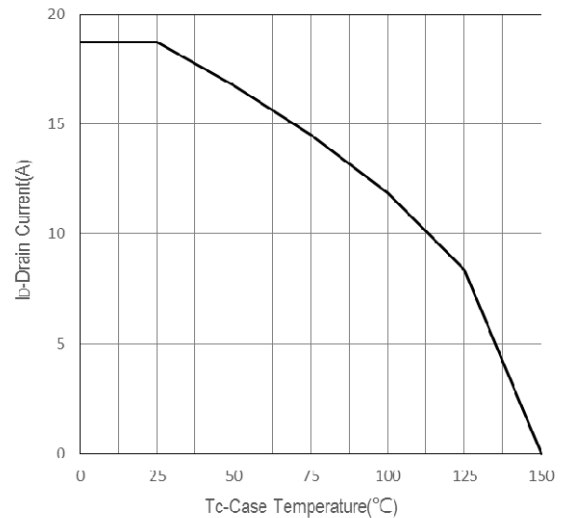


Typical Operating Characteristics (Cont.)

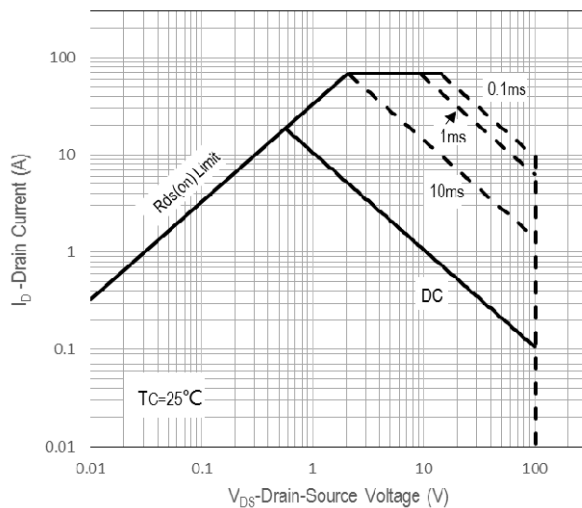
Power Dissipation



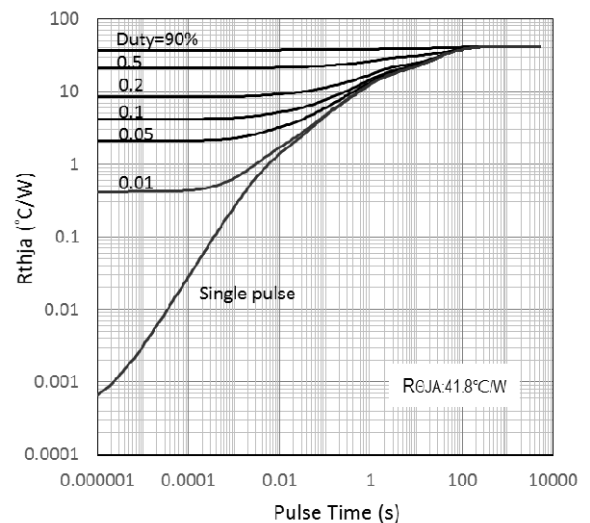
Drain Current



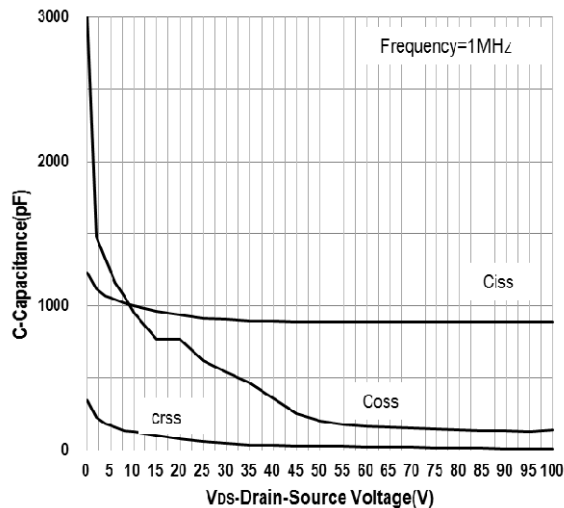
Safe Operation Area



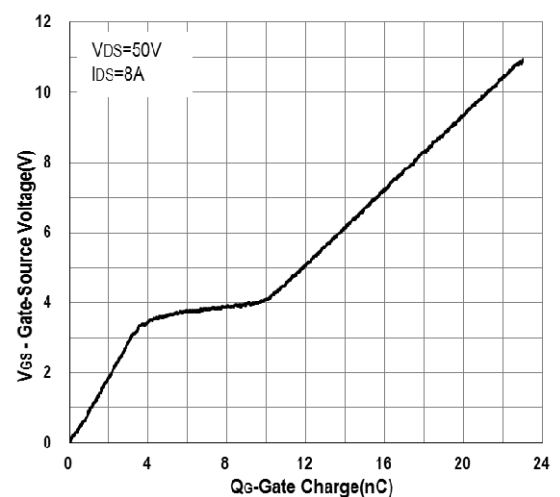
Transient Thermal Impedance



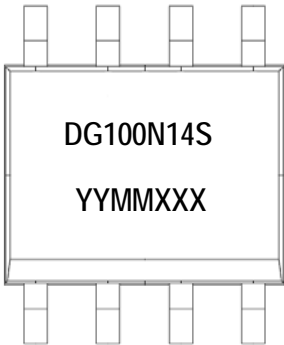
Capacitance



Gate Charge ^{Note 4}

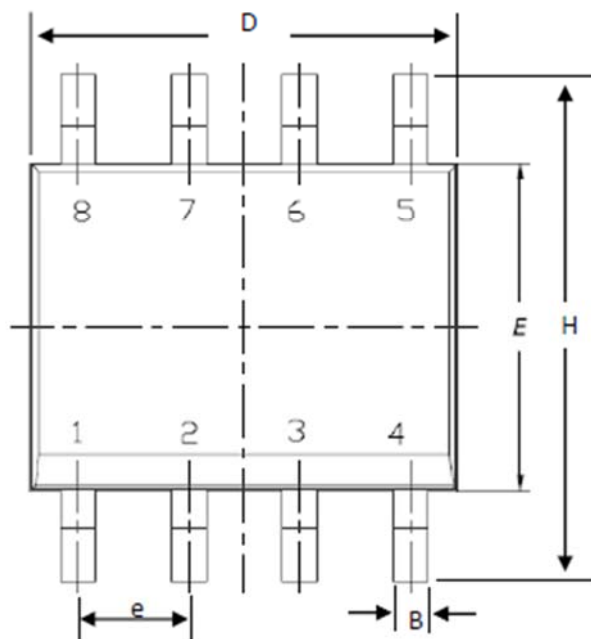


Marking Information

SOP-8 (S)	Marking Rule
<p>Laser Marking</p>  <p>The diagram shows a top-down view of the MOSFET package. The top surface is marked with 'DG100N14S' and 'YYMMXXX'. The package has eight pins: four on the top and four on the bottom.</p>	<p><u>Line 1</u> : Device DG100N14S</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

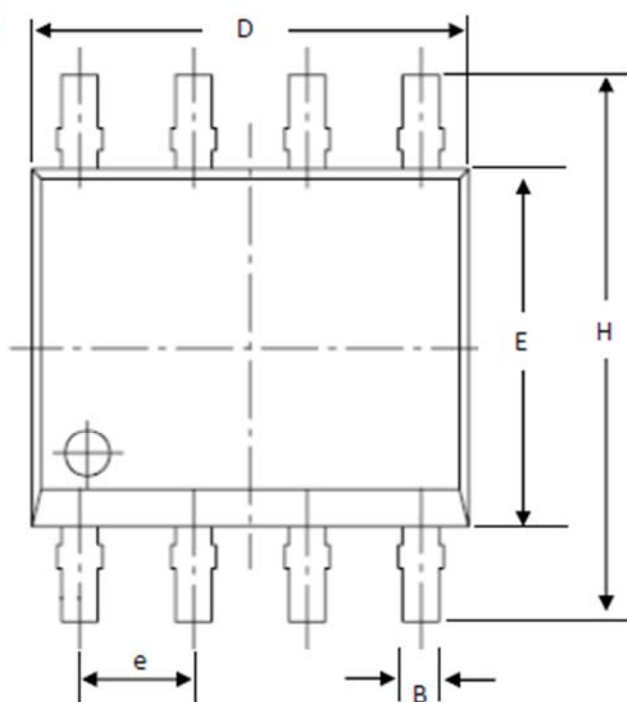
Package of Dimension

G-TYPE



Symbol	Min	Nor	Max
A	1.35	1.55	1.75
A1	0.10	0.18	0.25
B	0.31	0.41	0.51
c	0.17	0.21	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27	1.27	1.27
H	5.80	6.00	6.20
L	0.40	0.84	1.27
α	0.00	4.00	8.00

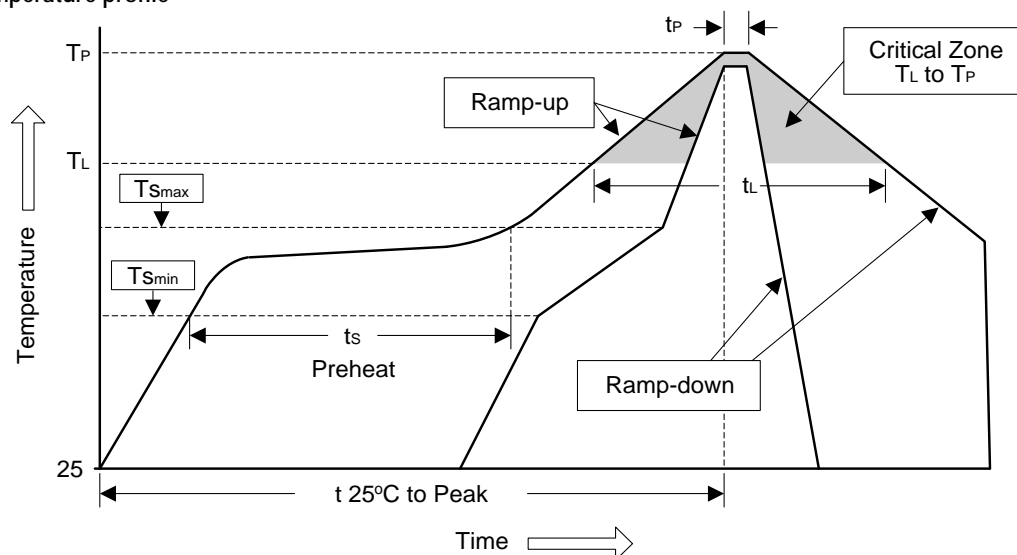
B-TYPE



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

Figure 1: Temperature profile



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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