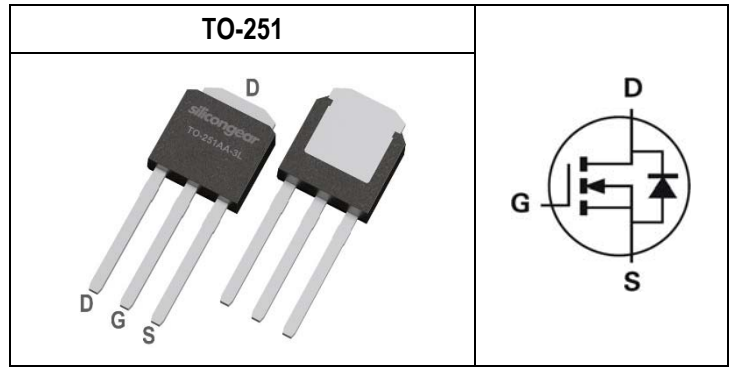


Key Performance Parameters		
Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(ON) \max.} V_{GS}=10V$	17.3	m Ω
$R_{DS(ON) \max.} V_{GS}=4.5V$	23	m Ω
I_D	54	A
Q_g	21.23	nC
Q_{gd}	5.65	nC



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
DG100N14I	Halogen-Free	TO-251AA	I	Tube	75

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	I_D	$T_C=25^\circ\text{C}$	54
		$T_C=100^\circ\text{C}$	34
Drain Current-Pulsed ^{Note 1}	I_{DM}	100	A
Avalanche Current	I_{AS}	15	A
Single Pulse Avalanche Energy ^{Note 3}	E_{AS}	11	mJ
Maximum Power Dissipation	P_{tot}	78.1	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
Junction-to-Ambient ^{Note 2}	$R_{\theta JA}$	Steady State	-	-	55	$^\circ\text{C/W}$
Thermal resistance, Junction-to-Case	$R_{\theta JC}$	Steady State	-	-	1.6	$^\circ\text{C/W}$

Notes:

- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, 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 $R_{\theta JA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.
- Limited by $T_{J\max}$, starting $T_J=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_g=50\Omega$, $I_D=15\text{A}$, $V_{GS}=10\text{V}$.

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	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=15A$	-	-	17.3	m Ω
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_{DS}=8A$	-	-	23	m Ω
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	0.5	-	Ω
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_{DS}=20A$	-	20	-	S

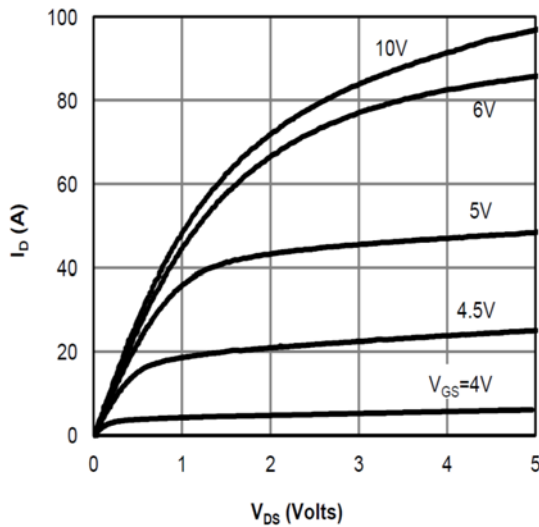
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	955	-	pF
Output Capacitance	C_{oss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	172	-	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	30	-	pF
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=20A, R_{GEN}=3\Omega$	-	7.2	-	ns
Rise Time	t_r	$V_{DS}=50V, V_{GS}=10V, I_{DS}=20A, R_{GEN}=3\Omega$	-	11.8	-	ns
Turn-Off Delay Time	$T_{d(off)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=20A, R_{GEN}=3\Omega$	-	18.4	-	ns
Fall Time	t_f	$V_{DS}=50V, V_{GS}=10V, I_{DS}=20A, R_{GEN}=3\Omega$	-	4.6	-	ns

GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q_{gs}	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	4.27	-	nC
Gate charge at threshold	$Q_{g(th)}$	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	1.93	-	nC
Gate to Drain Charge	Q_{gd}	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	5.65	-	nC
Switching charge	Q_{sw}	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	7.99	-	nC
Gate charge total	Q_g	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	21.23	-	nC
Gate charge total	Q_g	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 4.5V	-	11.39	-	nC
Gate plateau voltage	$V_{plateau}$	$V_{DD}=50V, I_D=20A, V_{GS}=0$ to 10V	-	3.81	-	V
Gate charge total, sync. FET ($Q_g - Q_{gd}$)	$Q_{g(sync)}$	$V_{DS}=0.1V, V_{GS}=0$ to 10V	-	15.58	-	nC

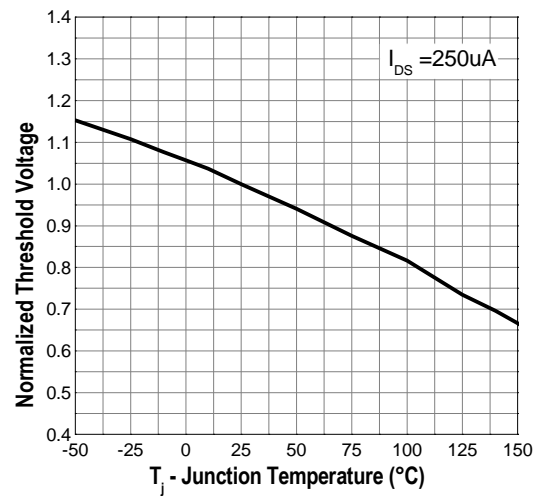
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode continuous forward current (Body Diode)	I_S	$T_C=25^\circ C$	-	-	54	A
Diode pulse current (Body Diode)	I_{SM}	$T_C=25^\circ C$	-	-	100	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=20A$	-	0.7	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$V_{DD}=50V, I_F=20A, di/dt=100A/\mu s$	-	49	-	ns
		$V_{DD}=50V, I_F=20A, di/dt=200A/\mu s$	-	29	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$V_{DD}=50V, I_F=20A, di/dt=100A/\mu s$	-	89	-	nC
		$V_{DD}=50V, I_F=20A, di/dt=200A/\mu s$	-	69	-	nC

Typical Operating Characteristics

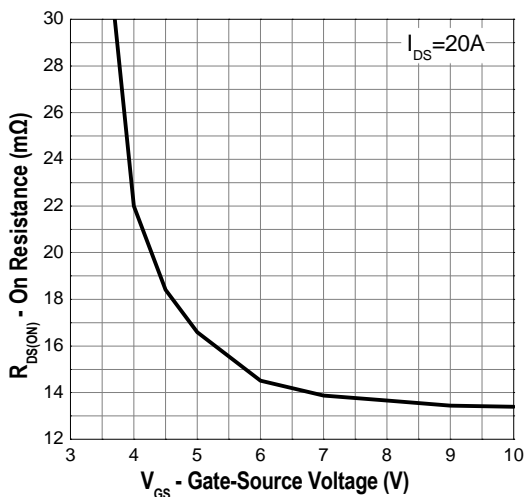
Output Characteristics



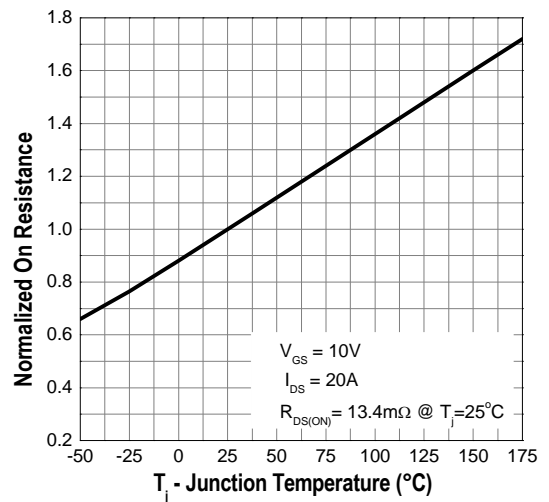
Gate Threshold Voltage



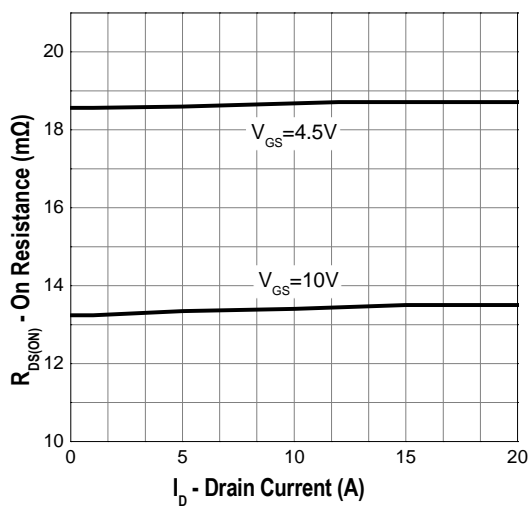
Gate-Source On Resistance



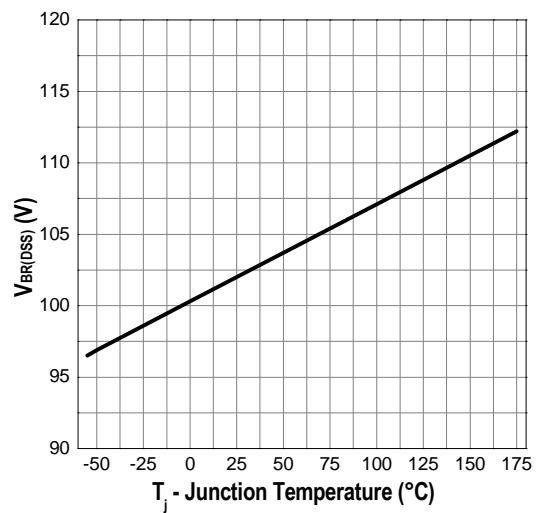
Drain-Source On Resistance



Drain-Source On Resistance

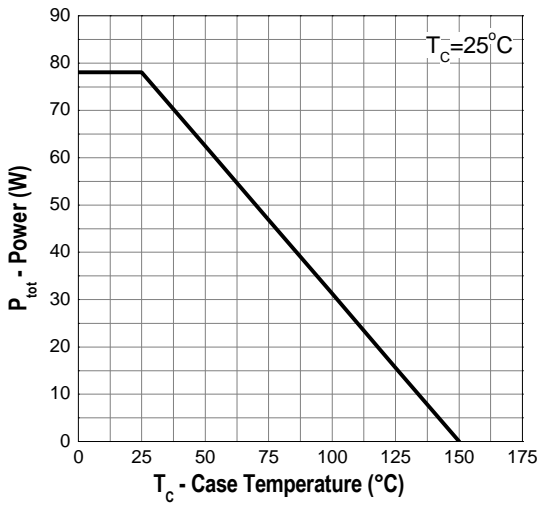


Drain-source Breakdown Voltage

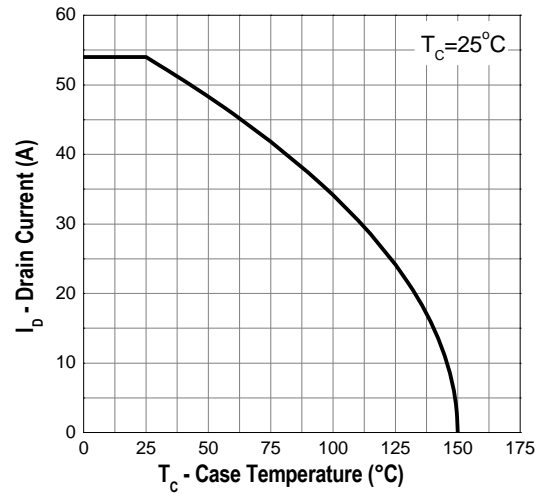


Typical Operating Characteristics (Cont.)

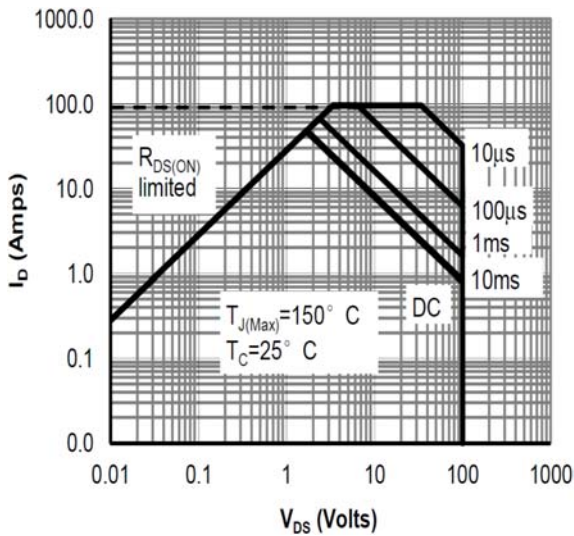
Power Dissipation



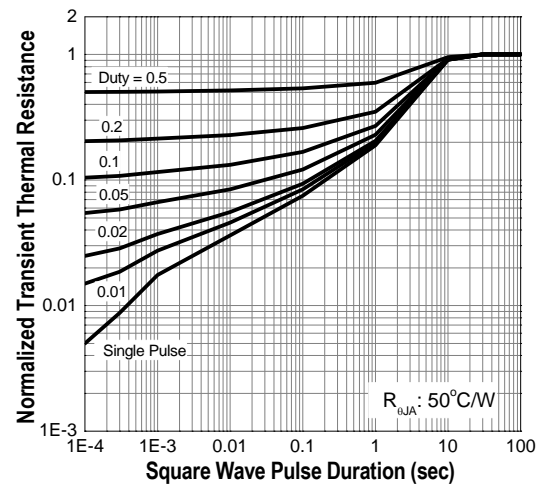
Drain Current



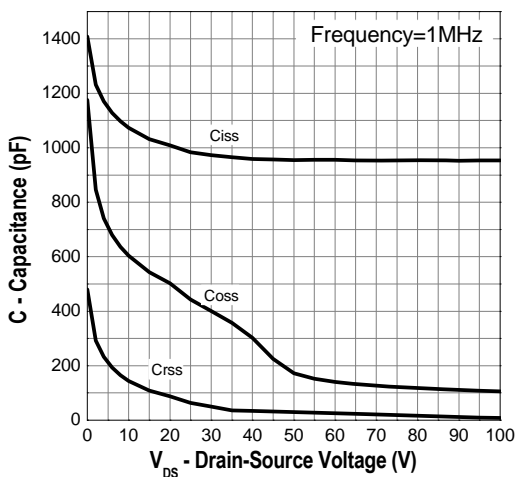
Safe Operation Area



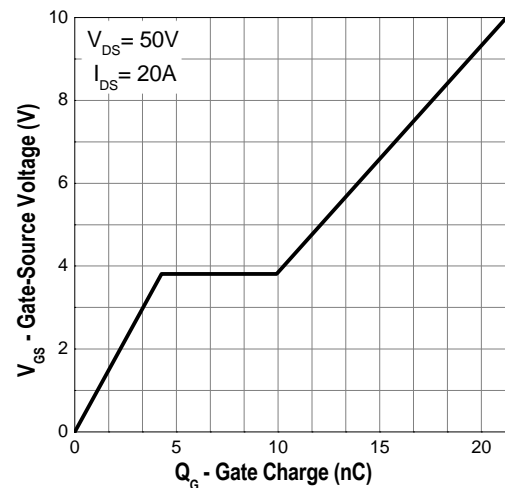
Transient Thermal Impedance



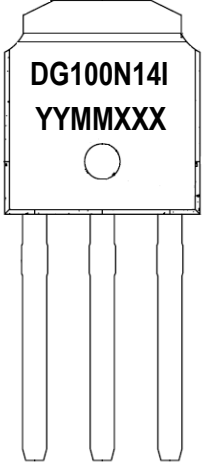
Capacitance



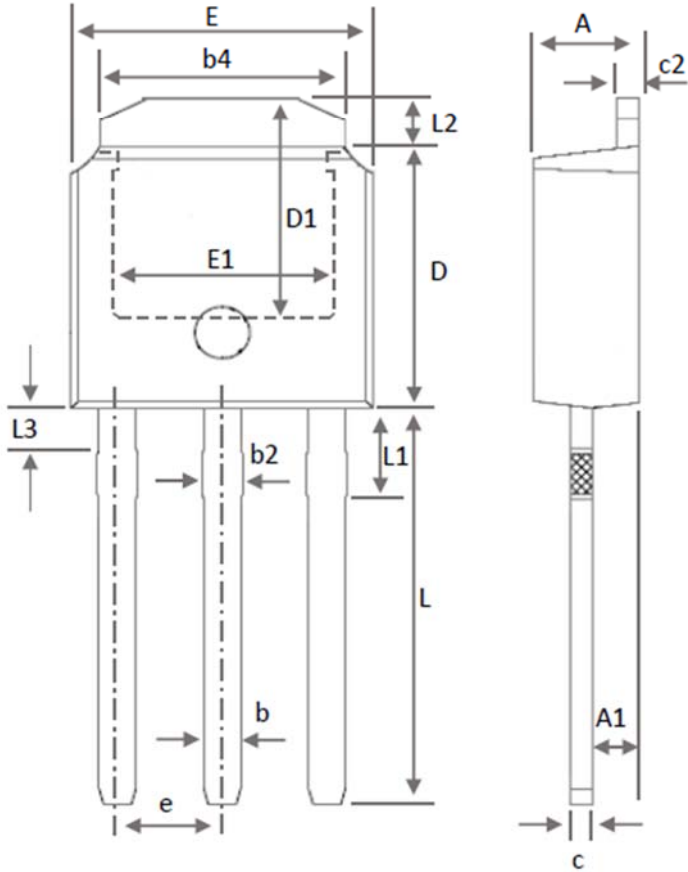
Gate Charge



Marking Information

TO-251AA (I)	Marking Rule
<p>Laser Marking</p>  <p>The diagram shows a TO-251AA MOSFET package with three leads. The top surface of the package is marked with the text 'DG100N14I' on the first line and 'YYMMXXX' on the second line. A small circle is located below the date code.</p>	<p><u>Line 1</u> : Device DG100N14I</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

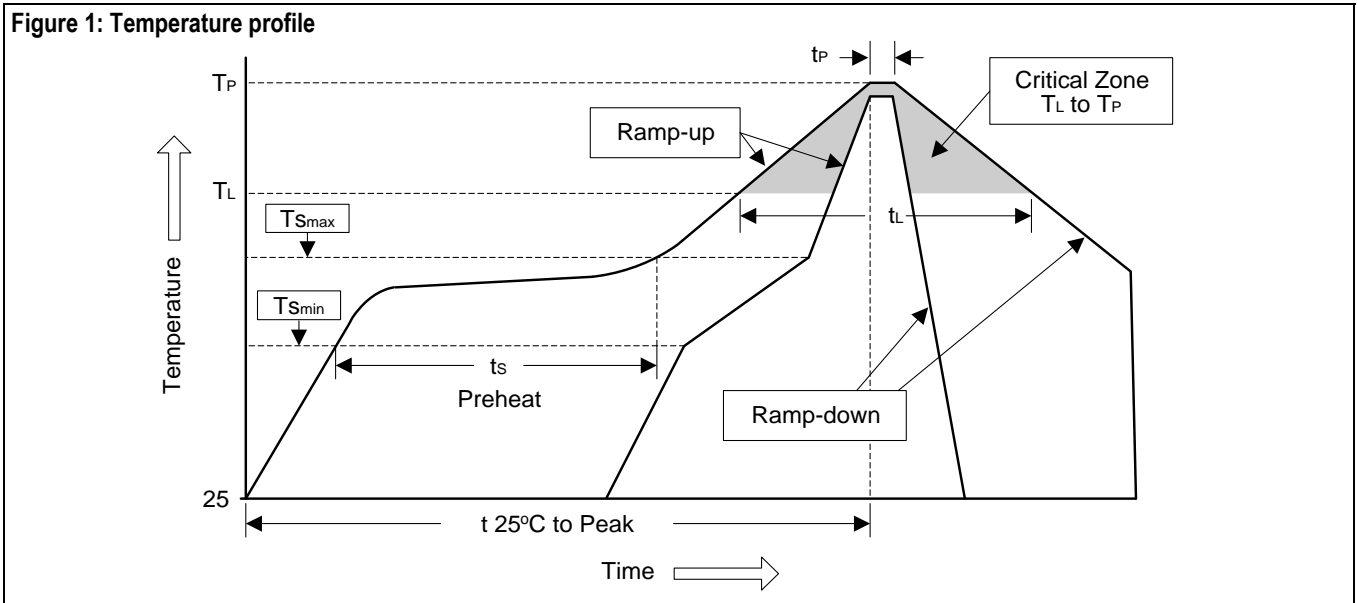
Package of Dimension



Symbol	Min	Nor	Max
A	2.20	2.30	2.38
A1	0.89	1.02	1.14
b	0.65	0.81	0.88
b2	0.95	1.05	1.14
b4	5.00	5.33	5.46
c	0.46	0.50	0.60
c2	0.46	-	0.70
D	6.00	6.10	6.20
D1	5.21	-	-
E	6.40	6.60	6.73
E1	4.32	-	-
e	2.29	2.29	2.29
L	9.00	9.20	9.40
L1	1.91	2.11	2.28
L2	1.00	1.15	1.27
L3	0.94	-	1.19

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)	$<3^\circ\text{C}/\text{sec}$	$<3^\circ\text{C}/\text{sec}$
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	$<3^\circ\text{C}/\text{sec}$	$<3^\circ\text{C}/\text{sec}$
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 $\pm 0/-5^\circ\text{C}$	260°C $\pm 0/-5^\circ\text{C}$
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	$<6^\circ\text{C}/\text{sec}$	$<6^\circ\text{C}/\text{sec}$
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 $\pm 5^\circ\text{C}$	5sec ± 1 sec
Pb-Free devices.	260°C $\pm 0/-5^\circ\text{C}$	5sec ± 1 sec

Important Notice

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