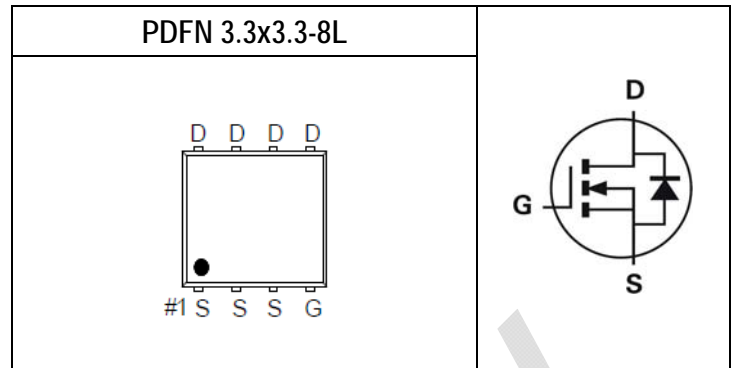


Key Performance Parameters		
Parameter	Value	Unit
$V_{DSS}$	30	V
$R_{DS(ON) \text{ max. } V_{GS}=10V}$	2.7	m $\Omega$
$I_D$	43	A
$Q_g$	43.4	nC
$Q_{gd}$	9.62	nC
$Q_{SW}$	13.8	nC



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

### Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
DG30N17E	Halogen-Free	PDFN 3.3x3.3-8L	E	Tape & Reel	5,000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	$T_C=25^\circ\text{C}$	43
		$T_C=100^\circ\text{C}$	27
Drain Current-Pulsed <sup>Note 1</sup>	$I_{DM}$	111	A
Avalanche Current	$I_{AR}$	36	A
Single Pulse Avalanche Energy <sup>Note 3</sup>	$E_{AS}$	64	mJ
Maximum Power Dissipation	$P_{tot}$	7.3	W
Operating Junction Temperature Range	$T_J$	150	$^\circ\text{C}$

### Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance, Junction-to-Ambient <sup>Note 2</sup>	$R_{\theta JA}$	Steady State	-	50.7	-	$^\circ\text{C/W}$
Thermal resistance, Junction-to-Case	$R_{\theta JC}$	Steady State	-	17.2	-	$^\circ\text{C/W}$

#### Notes:

- Pulse Test: Pulse Width  $\leq 10\text{ms}$ , Duty Cycle  $\leq 1\%$ .
- For surface-mounted devices, both  $R_{\theta CA}$  and  $R_{\theta JC}$  are measured with the device mounted on approximately  $1'' \times 1''$  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  $T_J=25^\circ\text{C}$ ,  $V_D=20\text{V}$ ,  $L=0.1\text{mH}$ ,  $V_{GS}=10\text{V}$ .

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =1mA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1	μA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	25	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1.0	-	2.4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>DS</sub> =30A	-	-	2.7	mΩ
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>DS</sub> =15A	-	-	4.2	mΩ
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	2.5	5.3	Ω
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>DS</sub> =20A	-	7.5	-	S

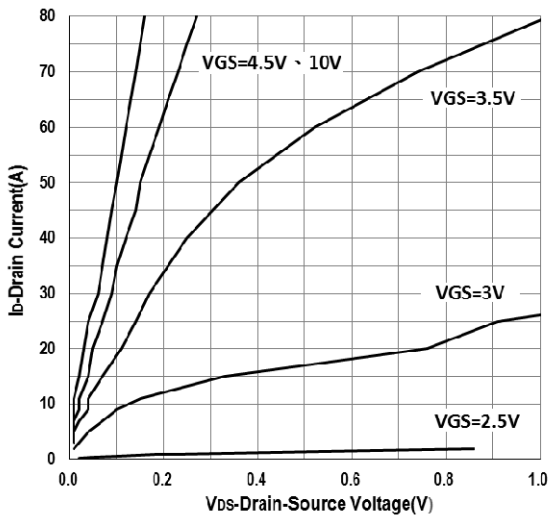
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	-	2271	-	pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	-	1339	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	-	122	-	pF
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =3Ω	-	9.84	-	ns
Rise Time	t <sub>r</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =3Ω	-	54.4	-	ns
Turn-Off Delay Time	T <sub>d(off)</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =3Ω	-	52.2	-	ns
Fall Time	t <sub>f</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =3Ω	-	32.0	-	ns

GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q <sub>gs</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A	-	8.17	-	nC
Gate charge at threshold	Q <sub>g(th)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A	-	4.03	-	nC
Gate to Drain Charge	Q <sub>gd</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A	-	9.62	-	nC
Switching charge	Q <sub>SW</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A	-	13.8	-	nC
Gate charge total	Q <sub>g</sub>	V <sub>DD</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	43.4	-	nC
Gate plateau voltage	V <sub>plateau</sub>	V <sub>DD</sub> =20V	-	3.32	-	V
Gate charge total, sync. FET (Q <sub>g</sub> - Q <sub>gd</sub> )	Q <sub>g(sync)</sub>		-	33.7	-	nC

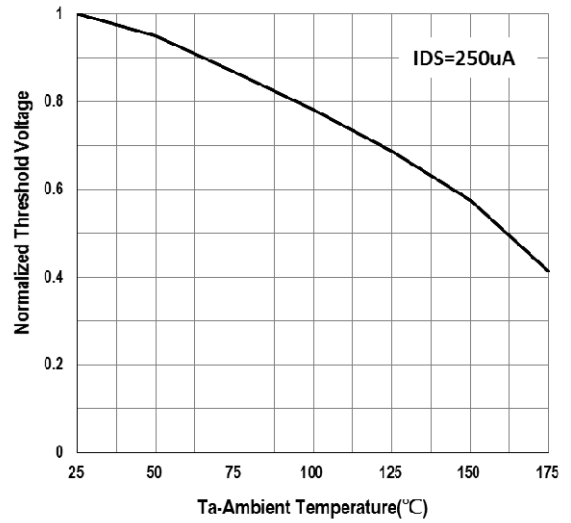
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>F</sub> =20A	-	0.7	1.3	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>DD</sub> =15V, I <sub>F</sub> =20A, di/dt=100A/μs	-	42.5	-	ns
		V <sub>DD</sub> =24V, I <sub>F</sub> =20A, di/dt=200A/μs	-	43.2	-	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	V <sub>DD</sub> =15V, I <sub>F</sub> =20A, di/dt=100A/μs	-	33.3	-	nC
		V <sub>DD</sub> =24V, I <sub>F</sub> =20A, di/dt=200A/μs	-	60.0	-	nC
Reverse Recovery Current	I <sub>RRM</sub>	V <sub>DD</sub> =15V, I <sub>F</sub> =20A, di/dt=100A/μs	-	1.36	-	A
		V <sub>DD</sub> =24V, I <sub>F</sub> =20A, di/dt=200A/μs	-	2.42	-	A

## Typical Operating Characteristics

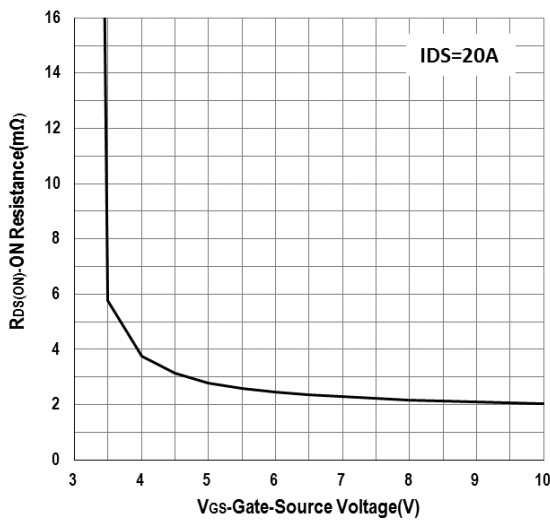
Output Characteristics



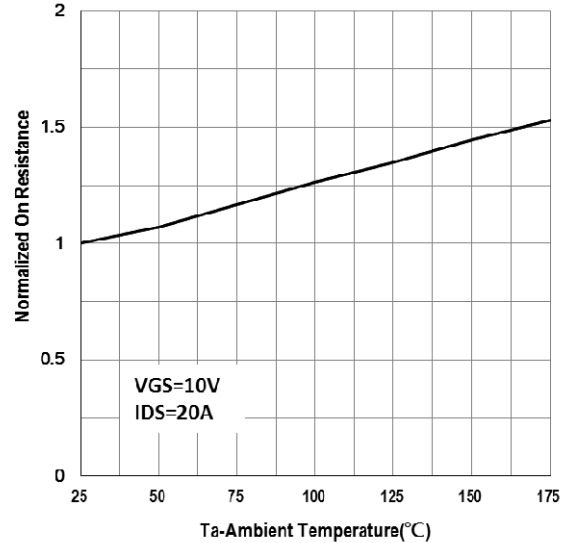
Gate Threshold Voltage



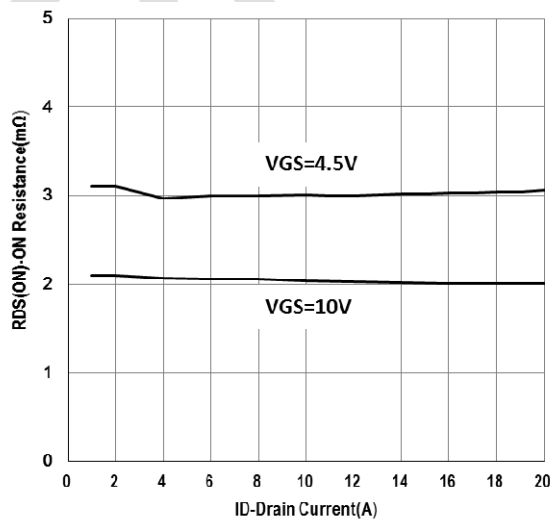
Gate-Source On Resistance



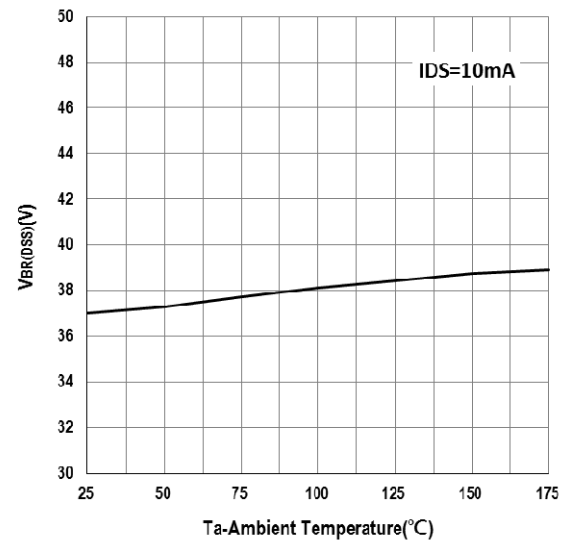
Drain-Source On Resistance



Drain-Source On Resistance

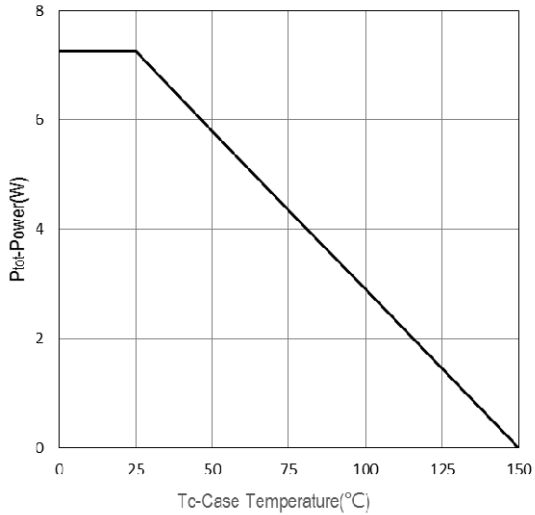


Drain-source Breakdown Voltage

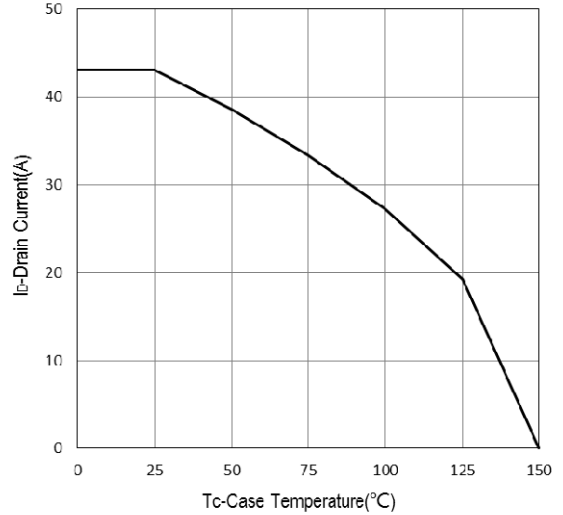


## Typical Operating Characteristics (Cont.)

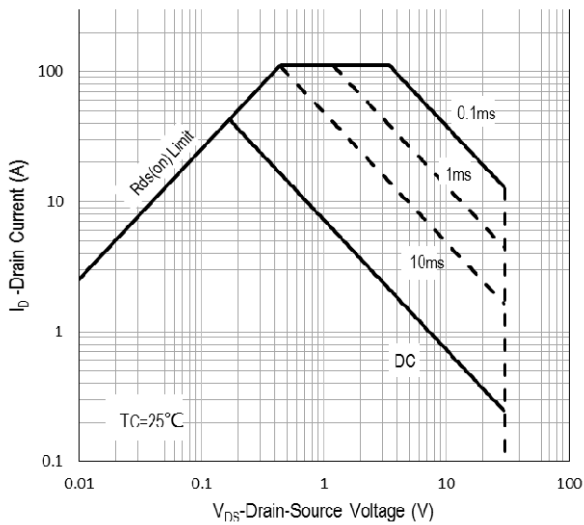
Power Dissipation



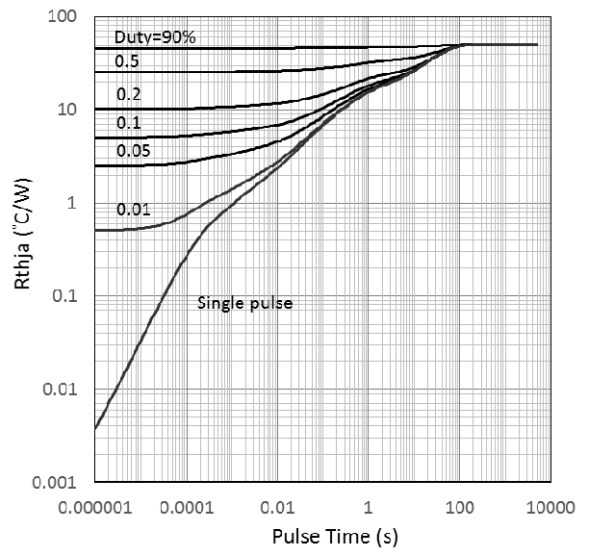
Drain Current



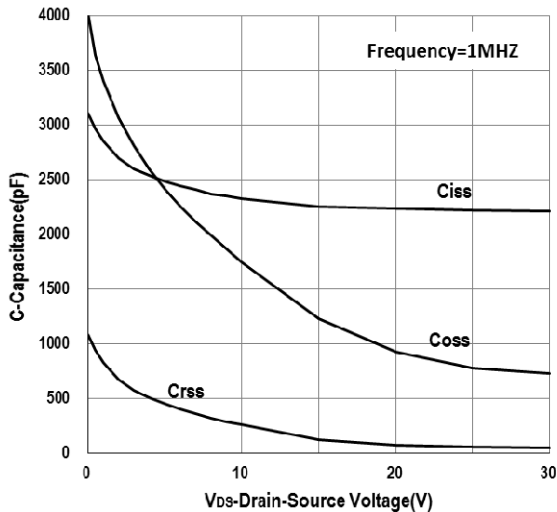
Safe Operation Area



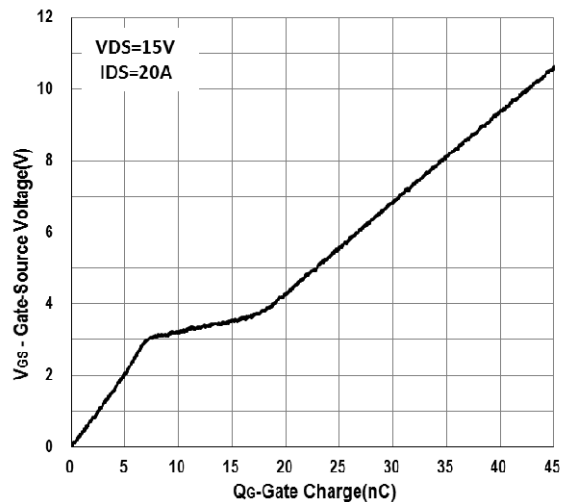
Transient Thermal Impedance



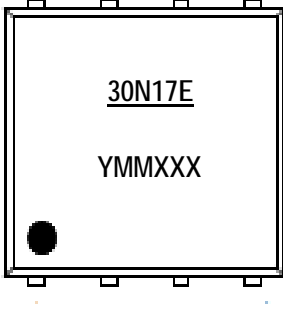
Capacitance



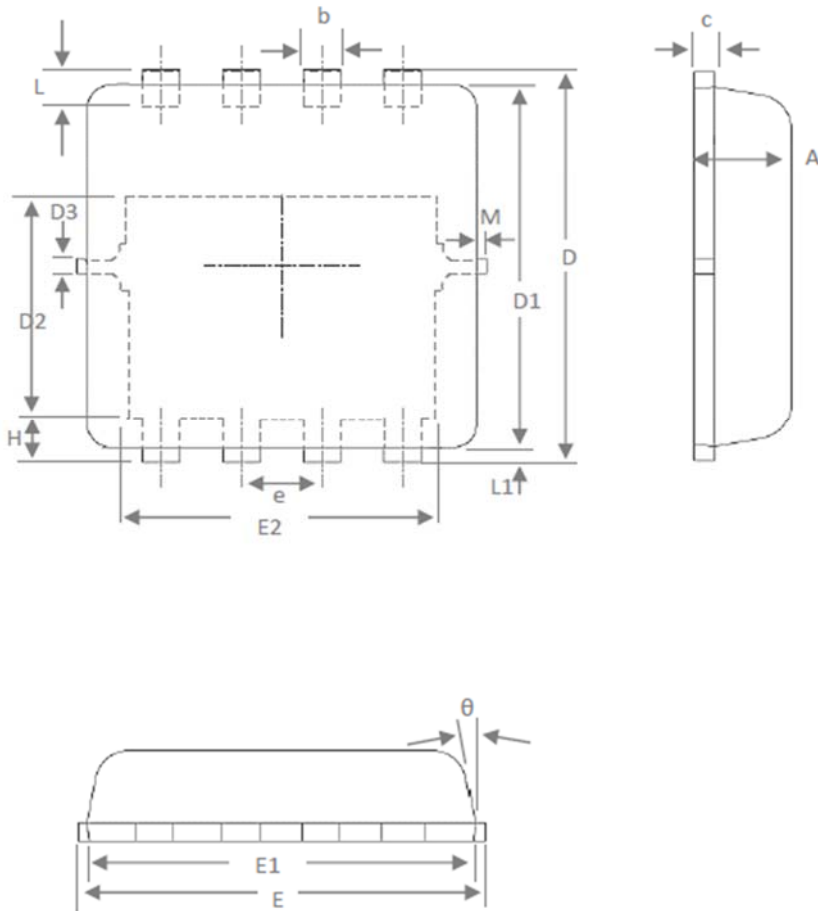
Gate Charge



## Marking Information

PDFN 3.3x3.3-8L (E)	Marking Rule
<p data-bbox="132 432 288 461">Laser Marking</p> 	<p data-bbox="804 432 976 461"><u>Line 1</u> : Device</p> <p data-bbox="804 472 895 501">30N17E</p> <p data-bbox="804 551 1018 580"><u>Line 2</u> : Date Code</p> <p data-bbox="804 591 911 620">YMMXXX</p> <p data-bbox="804 672 967 701">Y : Year Code</p> <p data-bbox="804 712 1007 741">MM : Month Code</p> <p data-bbox="804 752 1038 781">XXX : Serial Number</p>

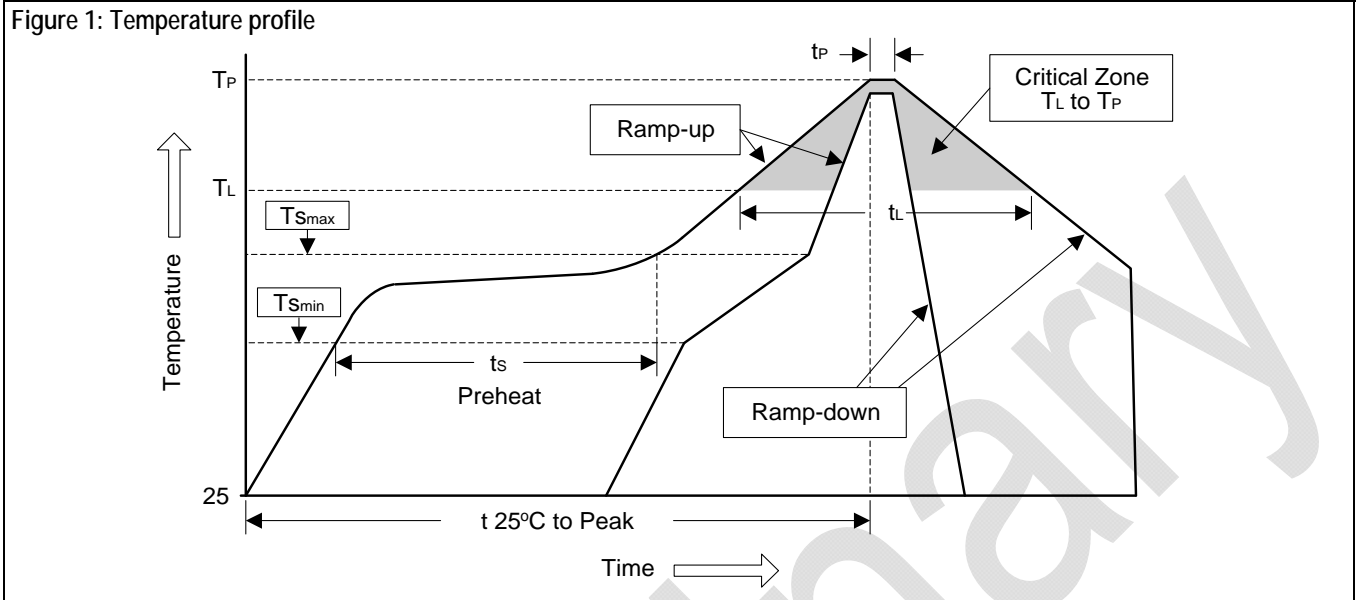
Package of Dimension



Symbol	Min	Nor	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	-	0.13	-
E	3.00	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
$\theta$	-	10°	12°
M	-	-	0.15

## 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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