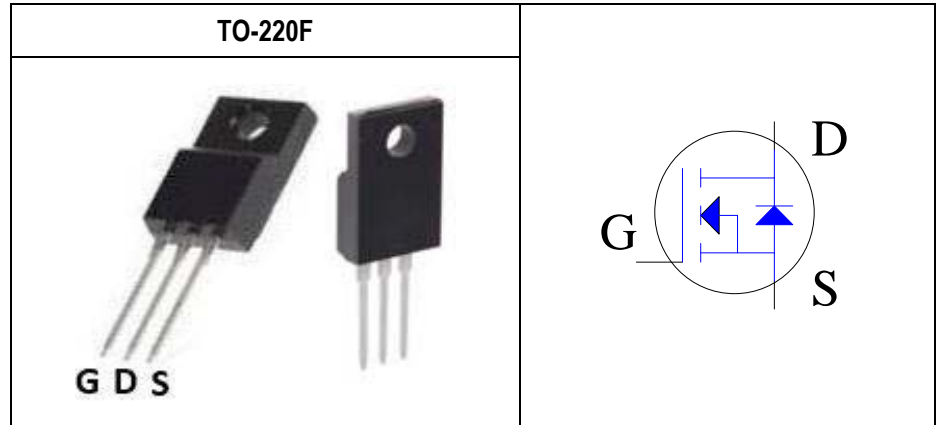


Parameter	Value	Unit
$V_{DSS}$	80	V
$R_{DS(ON) max. V_{GS}=10V}$	9.2	m $\Omega$
$I_D$	63.1	A
$V_{GS(TH) Typ.}$	3.1	V
$C_{iss} Typ.$	3937	pF
$Q_{g10V} Typ.$	77.3	nC
$E_{AS}$	57.1	mJ



Features	Application
<ul style="list-style-type: none"> <li>Low On-Resistance <math>R_{DS(on)}</math></li> <li>Low Input Capacitance</li> <li>Low Gate Charge</li> <li>Fully Characterized Capacitance and Avalanche</li> <li>Pb-free lead plating; RoHS compliant</li> </ul>	<ul style="list-style-type: none"> <li>AC to DC Adaptor</li> <li>DC to DC Converter</li> <li>Load Switch Application</li> <li>Motor Driving Application</li> <li>Switch Mode Power Supply</li> </ul>

### Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG80N07HF	Halogen-Free	TO-220F	F	Tube	50

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

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DS}$	80	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Drain Current-Continuous <sup>Note 1</sup>	$I_D$	$T_C=25^{\circ}C$	63.1	A
		$T_C=100^{\circ}C$	39.9	A
Drain Current-Continuous <sup>Note 2</sup>	$I_D$	$T_A=25^{\circ}C$	14.2	A
		$T_A=70^{\circ}C$	11.3	A
Drain Current-Pulsed <sup>Note 3</sup>	$I_{DM}$	140	A	
Avalanche Current	$I_{AR}$	33.8	A	
Single Pulse Avalanche Energy <sup>Note 4</sup>	$E_{AS}$	57.1	mJ	
Maximum Power Dissipation	$P_D$	$T_C=25^{\circ}C$	79.6	W
		$T_C=100^{\circ}C$	31.8	W
		$T_A=25^{\circ}C$	4	W
		$T_A=70^{\circ}C$	2.5	W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^{\circ}C$	

### Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance, Junction-Case <sup>Note 5</sup>	$R_{\theta JC}$	Steady State	-	-	1.57	$^{\circ}C/W$
Thermal resistance, Junction-Ambient <sup>Note 5</sup>	$R_{\theta JA}$	Steady State	-	-	30.92	$^{\circ}C/W$

#### Notes:

- Limited by silicon chip capability and  $R_{\theta JC}$  junction-to-case thermal resistance.
- The maximum current rating is limited by package and  $R_{\theta JA}$  junction-to-ambient thermal resistance.
- Must be ensure junction temperature does not exceed 150-degree C. (Pulse Width  $\leq 100\mu s$ , Duty  $\leq 2\%$ )
- Limited by  $T_{Jmax}$ , starting  $T_J=25^{\circ}C$ ,  $L=0.1mH$ ,  $R_g=25\Omega$ ,  $I_D=33.8A$ ,  $V_{GS}=10V$ .
- The value of thermal resistance is measured with the single device put on cooling plate under a still air environment temperature is 25 degree C based on JEDEC standard JESD51-14 and JESD51-2a. Thermal resistance obtained depends on the user's specific board design and given application.

## 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> =-250μA	80	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	100	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA

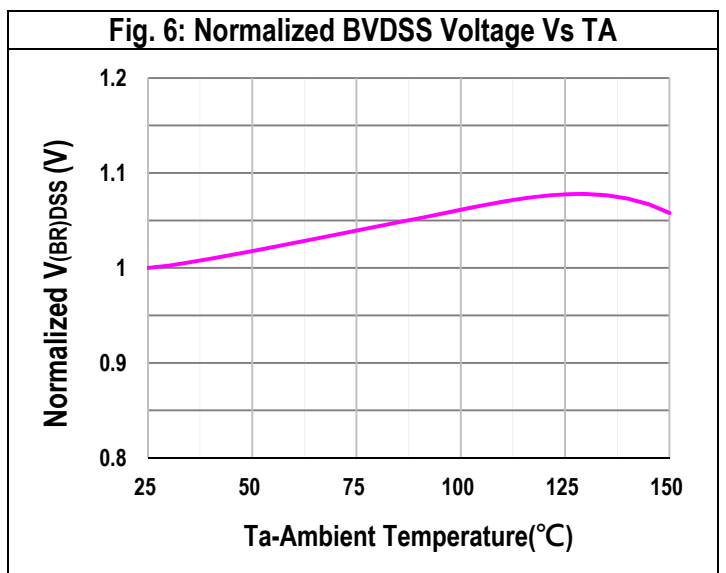
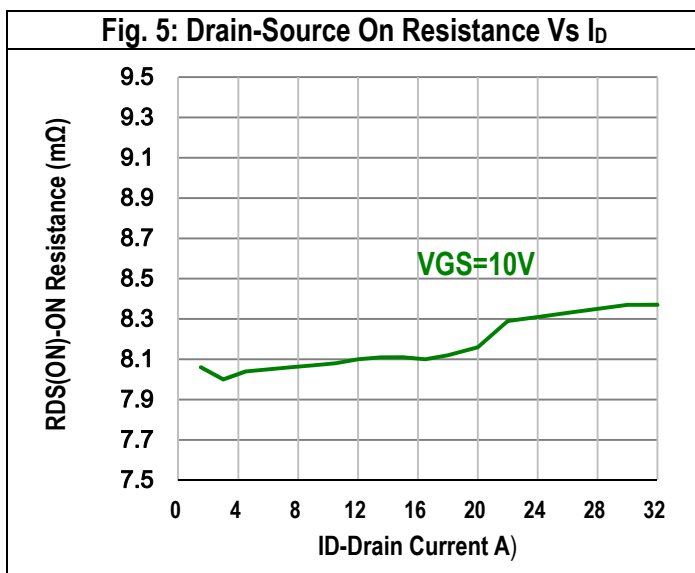
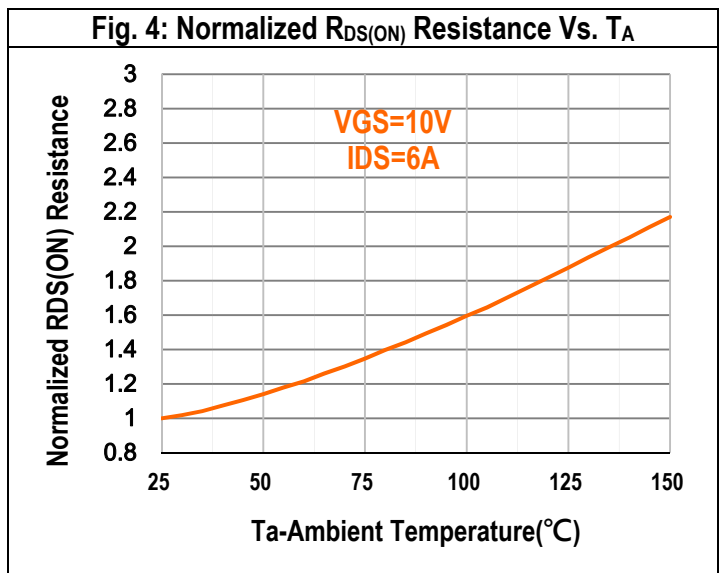
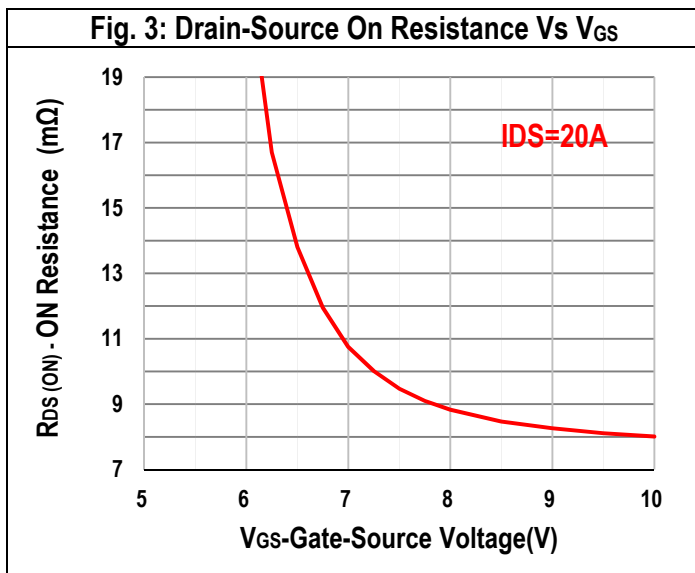
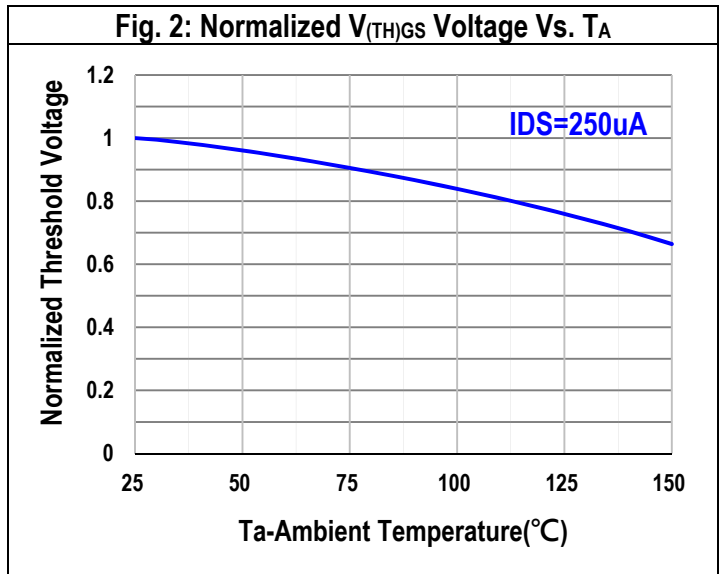
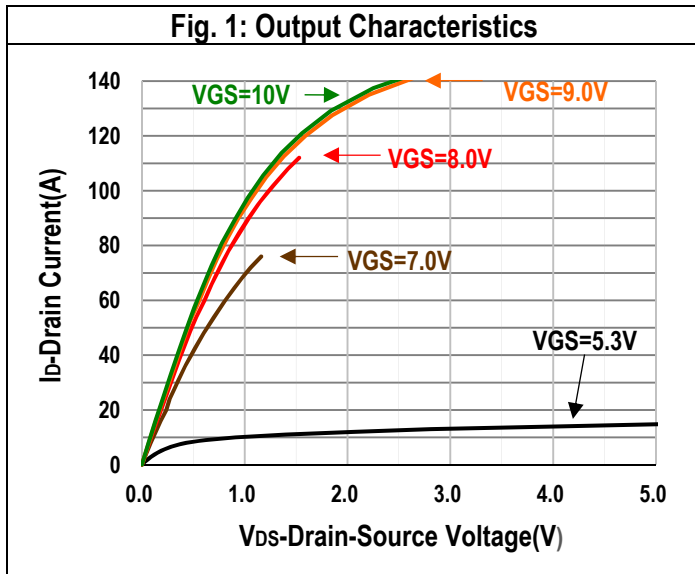
STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.6	3.1	3.4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>DS</sub> =20A	-	8.0	9.2	mΩ
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	0.8	-	Ω
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>DS</sub> =20A	-	20	-	S

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C <sub>iss</sub>	V <sub>DD</sub> =80V, V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	-	3937	-	pF
Output Capacitance	C <sub>oss</sub>	V <sub>DD</sub> =80V, V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	-	210	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DD</sub> =80V, V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	-	123	-	pF
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =2.4Ω	-	18.3	-	nS
Rise Time	T <sub>r</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =2.4Ω	-	49.5	-	nS
Turn-Off Delay Time	T <sub>d(off)</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =2.4Ω	-	36.6	-	nS
Fall Time	T <sub>f</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A, R <sub>GEN</sub> =2.4Ω	-	37.5	-	nS

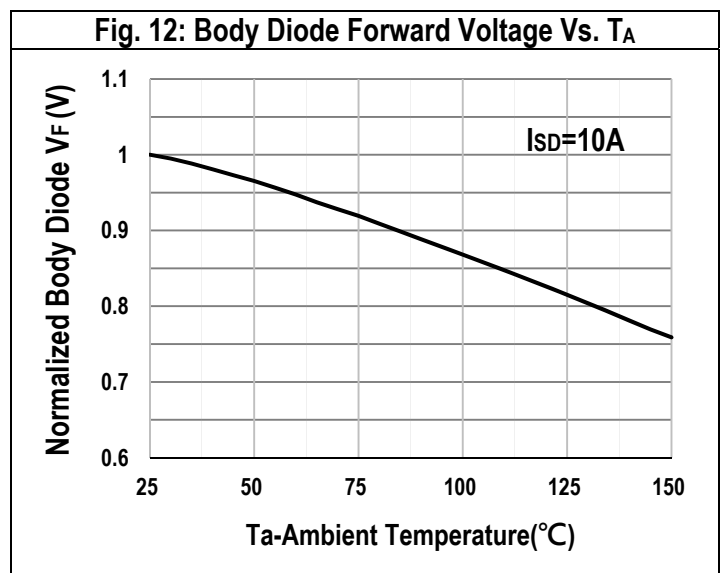
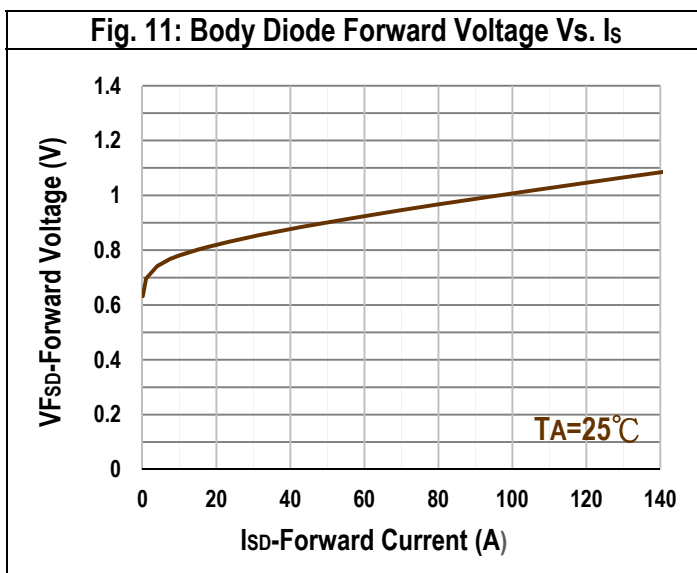
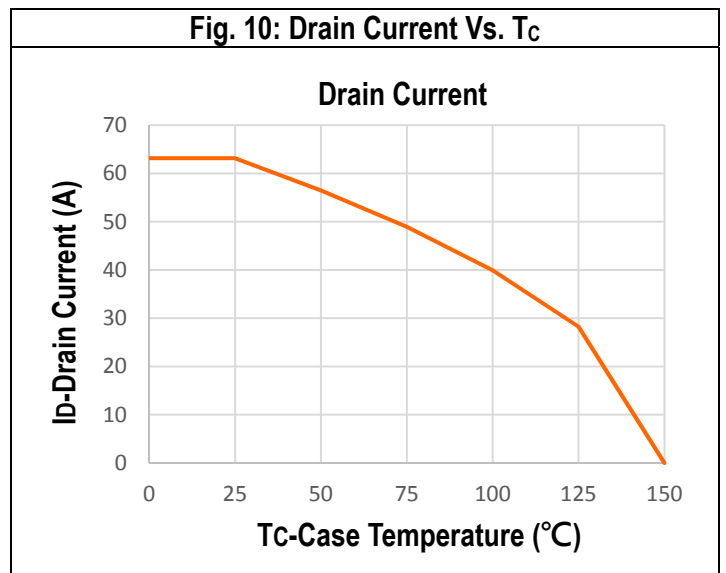
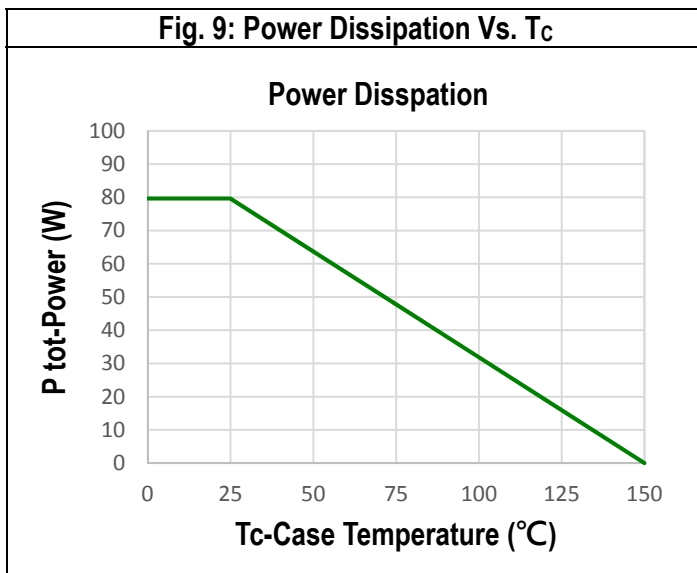
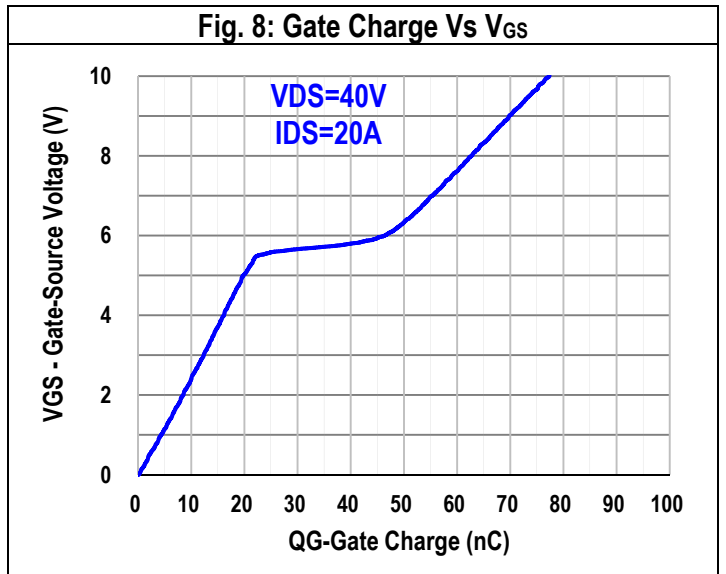
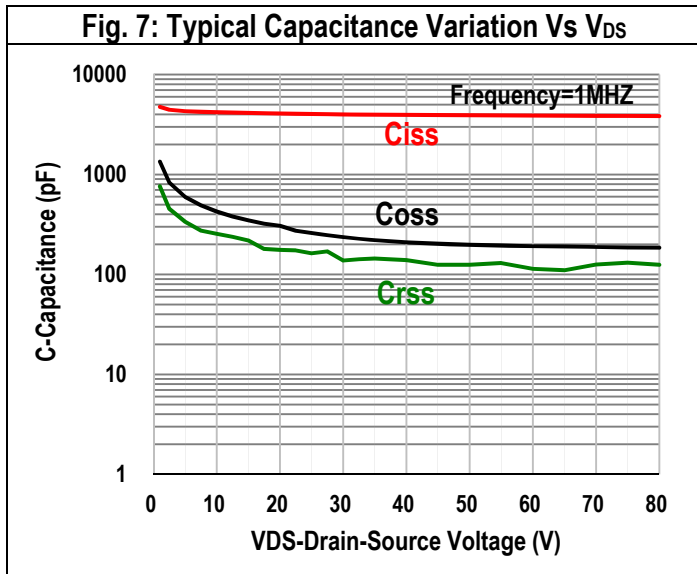
GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q <sub>gs</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	24.1	-	nC
Gate charge at threshold	Q <sub>g(th)</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	12.7	-	nC
Gate to Drain Charge	Q <sub>gd</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	23.8	-	nC
Switching charge	Q <sub>sw</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	35.2	-	nC
Gate charge total	Q <sub>g 10V</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	77.3	-	nC
Gate plateau voltage	V <sub>plateau</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	5.8	-	V
Gate charge total, sync. FET (Q <sub>g</sub> - Q <sub>gd</sub> )	Q <sub>g(sync)</sub>	V <sub>DS</sub> =0.1V, V <sub>GS</sub> =0 to 10V	-	53.5	-	nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Body Diode continuous forward current	I <sub>S</sub>	T <sub>C</sub> =25°C	-	-	63.1	A
Body Diode pulse current	I <sub>SM</sub>	T <sub>C</sub> =25°C	-	-	140	A
Body Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	0.81	1.0	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>DD</sub> =40V, I <sub>F</sub> =20A, di/dt=100A/μs	-	28.5	-	nS
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	V <sub>DD</sub> =40V, I <sub>F</sub> =20A, di/dt=100A/μs	-	32.7	-	nC
Body Diode Reverse Recovery Current	I <sub>rm</sub>	V <sub>DD</sub> =40V, I <sub>F</sub> =20A, di/dt=100A/μs	-	2.3	-	A

## Typical Operating Characteristics



Typical Operating Characteristics



4. Typical Operating Characteristics

Fig. 13: Safe Operation Area

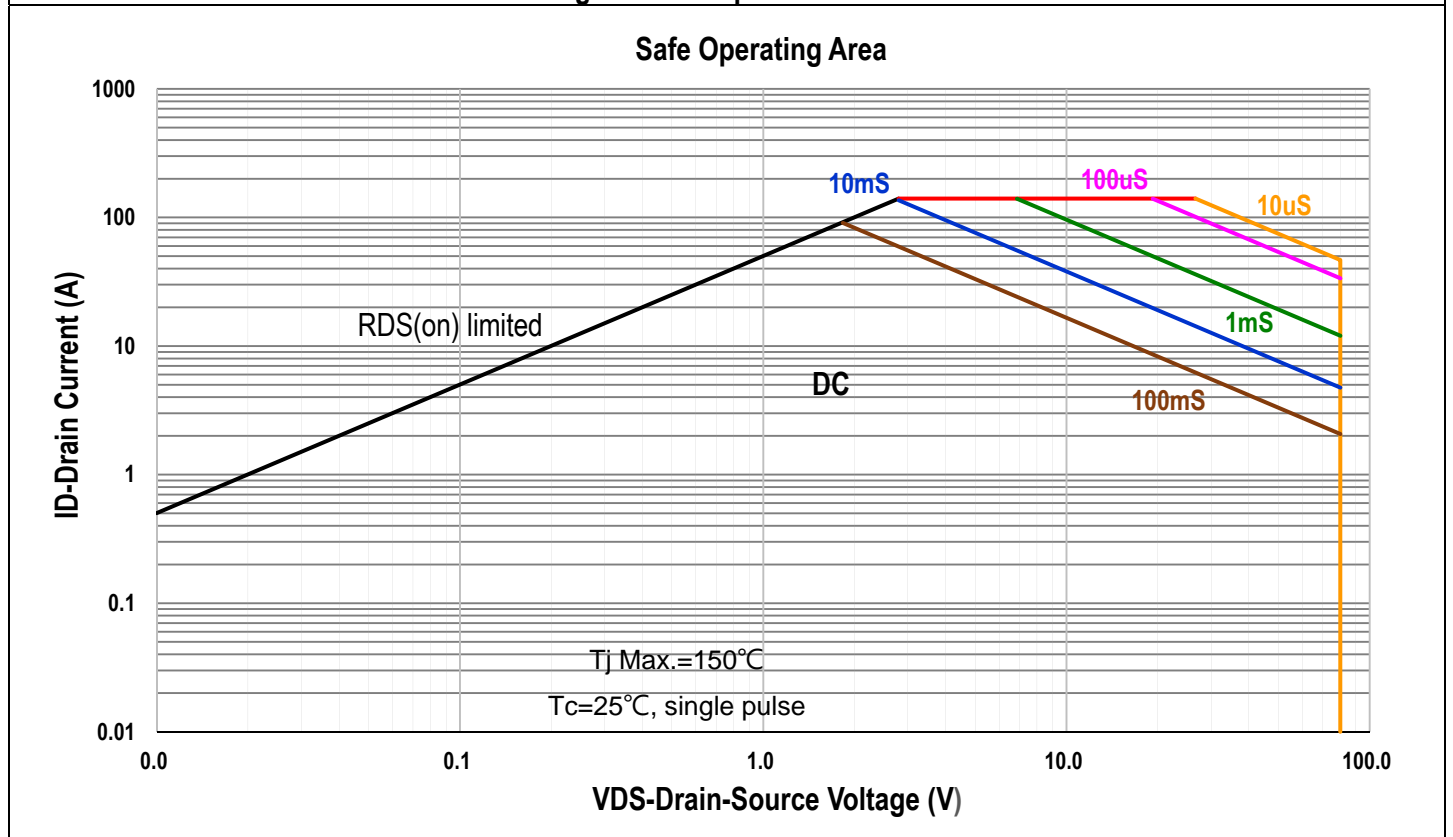
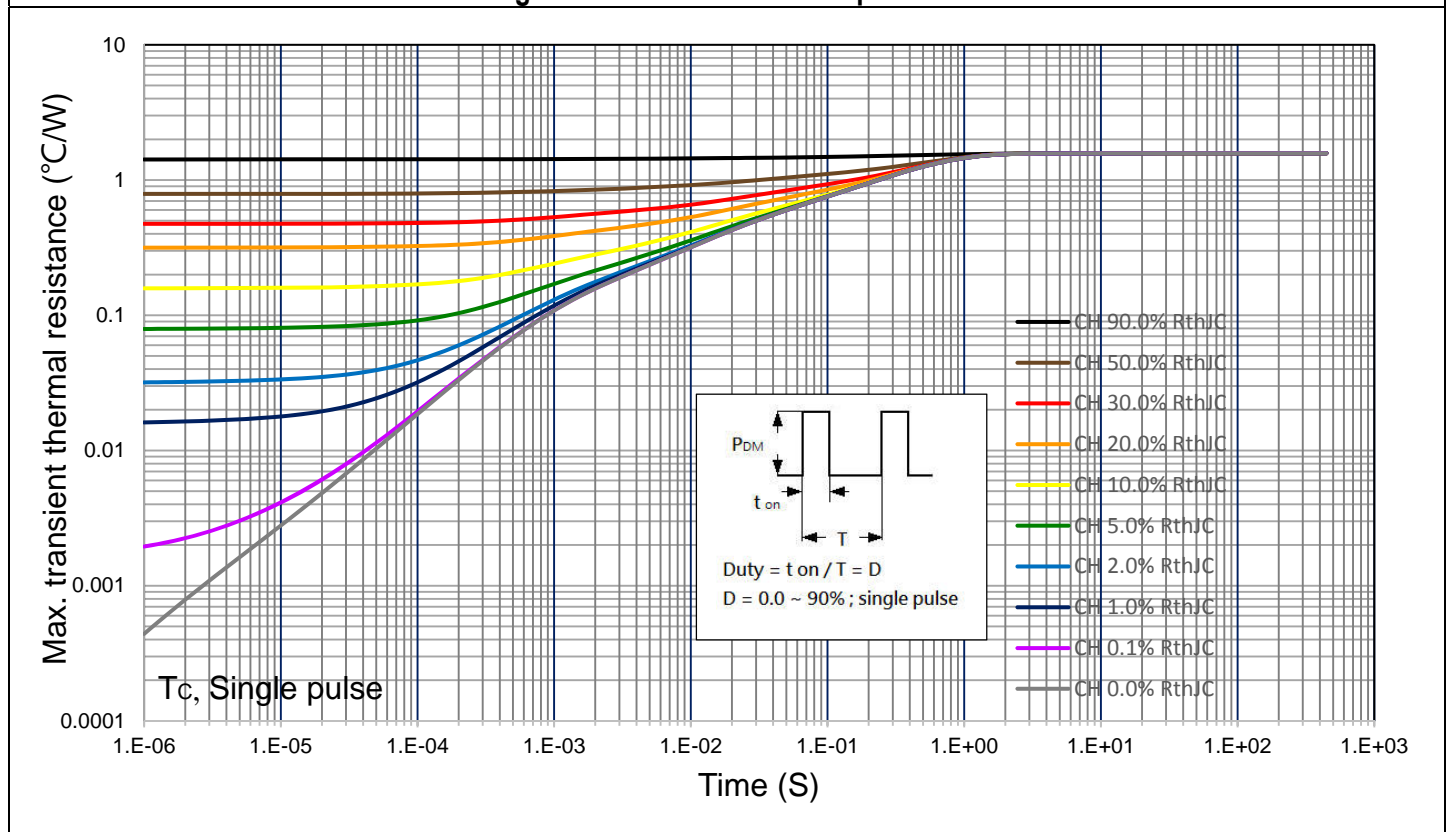
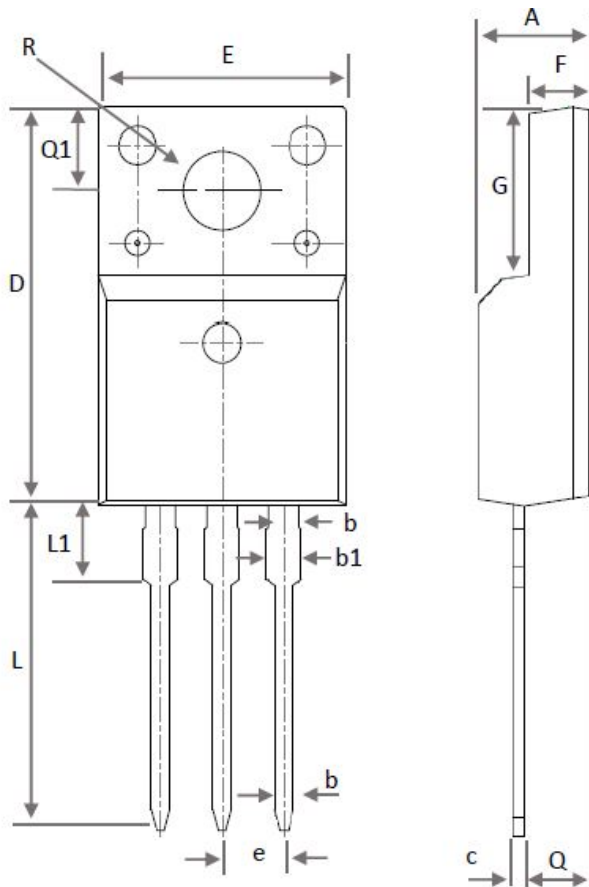


Fig. 14: Transient Thermal Impedance

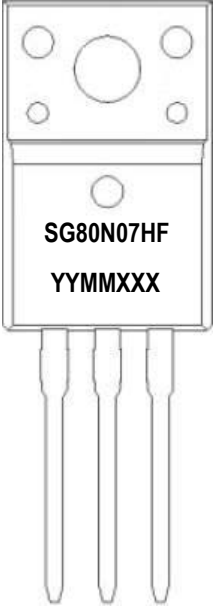


Package of Dimension



Symbol	Min	Nor	Max
A	4.50	4.67	4.83
b	0.70	0.81	0.91
b1	1.20	1.34	1.47
b2	1.10	1.24	1.38
C	0.40	0.52	0.63
D	15.67	15.87	16.07
e	2.54 BSC		
E	9.96	10.16	10.36
F	2.34	2.54	2.74
G	6.48	6.69	6.90
L	12.68	12.99	13.30
L1	3.13	3.32	3.50
Q	2.54	2.74	2.93
Q1	3.20	3.30	3.40
R	3.08	3.18	3.28

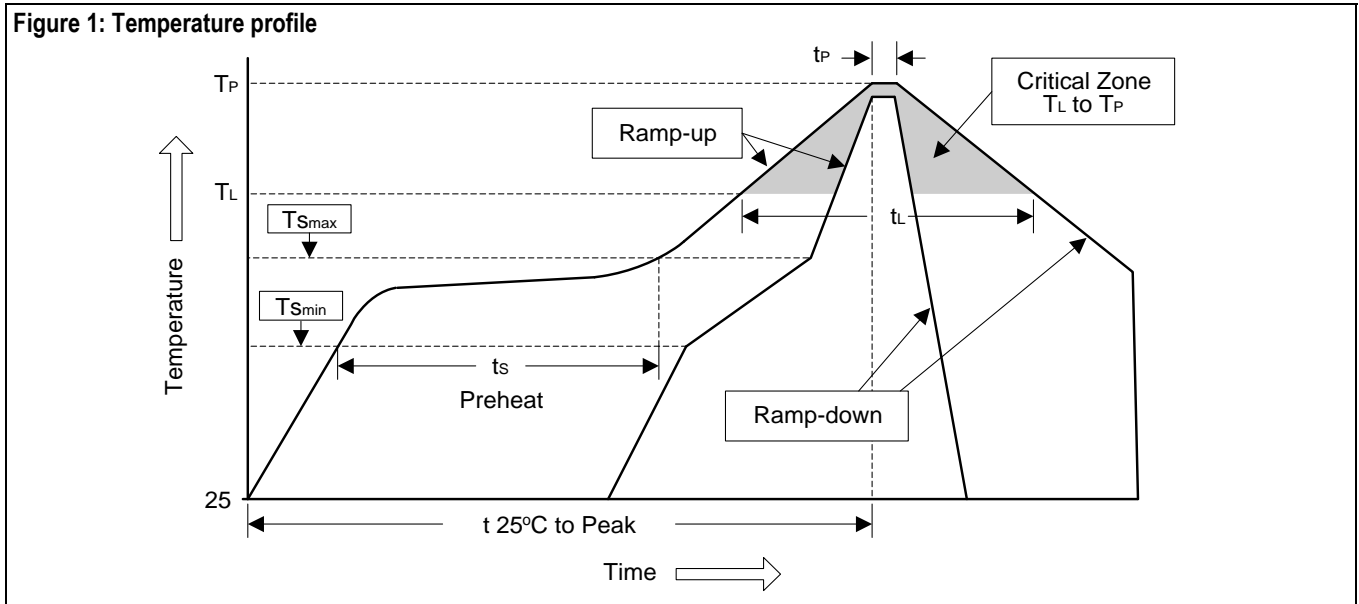
**Marking Information**

TO-220F (F)	Marking Rule
<p>Laser Marking</p> 	<p><u>Line 1</u> : Device SG80N07HF</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

## Appendix-A

### Soldering Methods for Silicongear's Products (Just for SMD type of device)

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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T <sub>smin</sub> )	100°C	150°C
- Temperature Max (T <sub>smax</sub> )	150°C	200°C
- Time (min to max) (ts)	60 to 120 sec	60 to 180 sec
T <sub>smax</sub> to T <sub>L</sub>		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60 to 150 sec	60 to 150 sec
Peak Temperature (T <sub>P</sub> )	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t <sub>P</sub> )	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



**Appendix-B****Important Notice****© Silicongear Corporation**

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