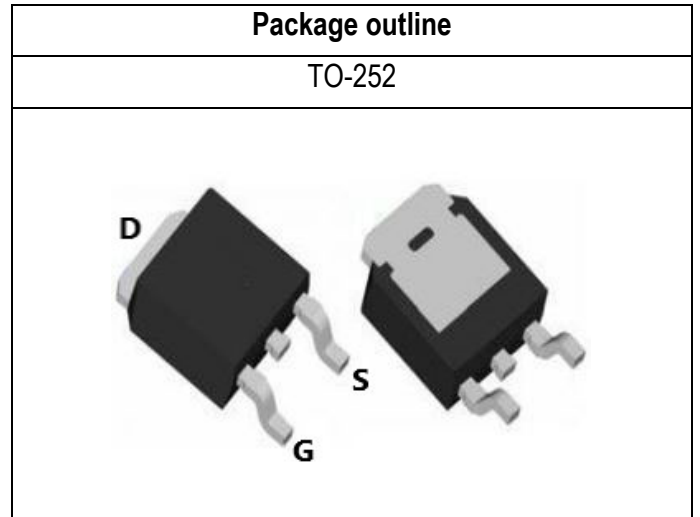


Key parameter	N <sub>channel</sub>	Unit
V <sub>(BR)DSS</sub> min.	80	V
R <sub>DS(ON)</sub> max. V <sub>GS</sub> =10V	9.5	mΩ
V <sub>GS(TH)</sub> Typ.	3.2	V
I <sub>D</sub>	80.5	A
C <sub>iss</sub> Typ.	4645	pF
Q <sub>g</sub> 10V Typ.	89.4	nC
E <sub>AS</sub>	80	mJ



### Description

The SG80N07HD uses double-gate structure of MOSFET to provide excellent electrical parameter. There is high speed switching capacity, low R<sub>DS(ON)</sub> resistance, low gate charge and stable characteristics for these devices. Moreover, it is a helpful choose for raise efficiency or reduce consumption in circuit. These features combine to be an advantage design for use in wide variety of application including converter and inverter design.

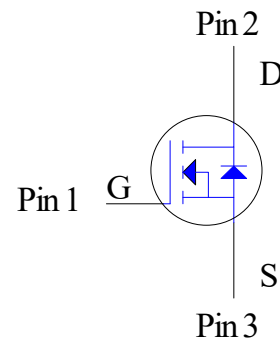
### Features

- ◇ Fast switch capacity
- ◇ Low R<sub>DS(ON)</sub> resistance
- ◇ Low input capacitance
- ◇ Low Switching Loss
- ◇ Ruggedness commutation capability
- ◇ Pb-free lead plating; RoHS compliant

### Potential application

- AC-DC adaptor
- DC-DC converter
- Load Switch
- Electric tool application
- Motor/Fan driving application
- Synchronous Rectifier for Power Delivery

### Symbol and Pin assignment



### Order Information

Item	Description
1. Order Code	SG80N07HD
2. Part Number	SG80N07HD
3. Package Type	TO-252
4. Package Code	D
5. Packing Type	Tape & Reel
6. Quantity in Pack	2,500
7. RoHS Status	Halogen-Free

## Content

Section	Subject	Page
1.	Absolute Maximum Ratings -----	3
2.	Thermal Resistance Ratings -----	3
3.	Electrical Characteristics -----	4
4.	Typical Operating Characteristics Diagram -----	5-7
5.	Marking Information -----	8
6.	Package of Dimension -----	9
7.	Land pattern (Footprint) -----	9
8.	Appendix -----	10-11

## 1. Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ 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>	$T_C=25^\circ\text{C}$	$I_D$	80.5	A
	$T_C=100^\circ\text{C}$		50.9	A
Drain Current-Continuous <sup>Note 2</sup>	$T_A=25^\circ\text{C}$	$I_D$	11.3	A
	$T_A=70^\circ\text{C}$		9.0	A
Drain Current-Pulsed <sup>Note 3</sup>	$T_A=25^\circ\text{C}$	$I_{DM}$	140	A
Avalanche Current		$I_{AR}$	40	A
Single Pulse Avalanche Energy <sup>Note 4</sup>		$E_{AS}$	80	mJ
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	132	W
	$T_C=100^\circ\text{C}$		53.1	W
	$T_A=25^\circ\text{C}$		2.6	W
	$T_A=70^\circ\text{C}$		1.6	W
	Derate Factor Above $T_C=25^\circ\text{C}$		1.0	W/ $^\circ\text{C}$
Max. Operating Junction Temperature		$T_J$	150	$^\circ\text{C}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

## 2. Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance, Junction-Case	$R_{\theta JC-N}$	Please refer to Note 5	-	-	0.94	$^\circ\text{C}/\text{W}$
Thermal resistance, Junction-Ambient	$R_{\theta JA-N}$	Please refer to Note 5	-	-	47.5	$^\circ\text{C}/\text{W}$

### Notes:

- Limited by silicon chip capability and  $R_{\theta JC-N}$  junction-to-case thermal resistance.
- The maximum current rating is limited by package and  $R_{\theta JA-P}$  junction-to-ambient thermal resistance.
- Must be ensure junction temperature does not exceed 150-degree C. (Pulse Width  $\leq 380\mu\text{s}$ , Duty  $\leq 2\%$ )
- Limited by  $T_{Jmax}$ , starting  $T_J=25^\circ\text{C}$ ,  $L=0.1\text{mH}$ ,  $R_g=25\Omega$ ,  $I_D=40\text{A}$ ,  $V_{GS}=10\text{V}$ .
- 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.

### 3. 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

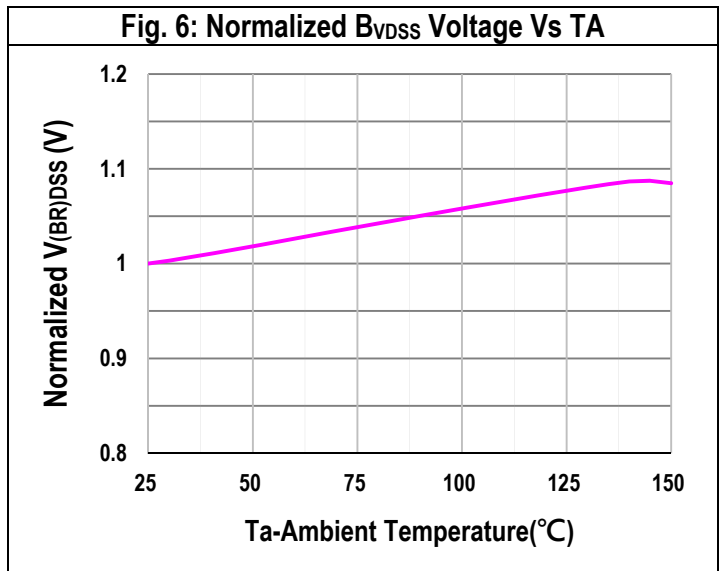
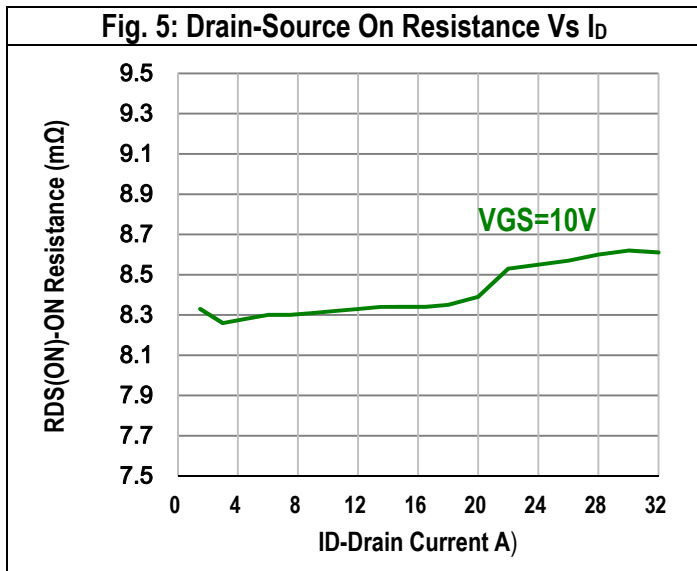
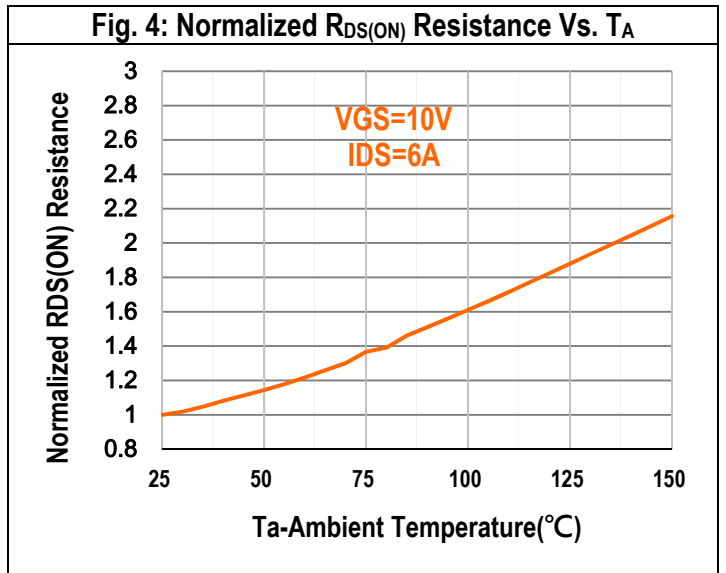
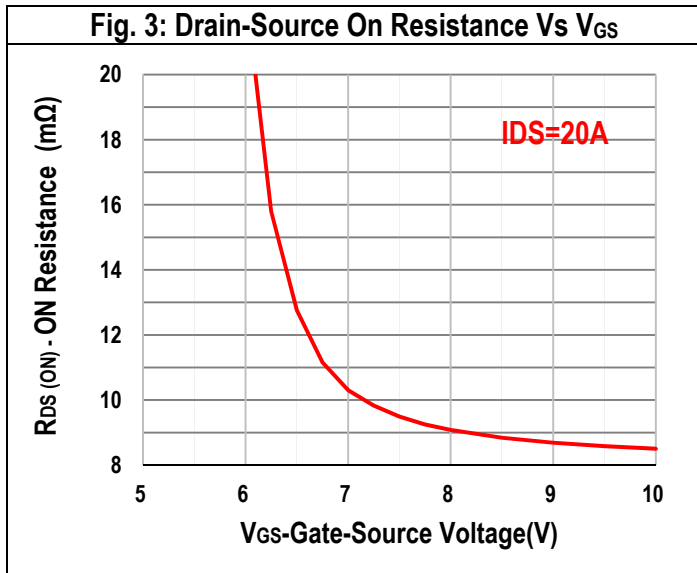
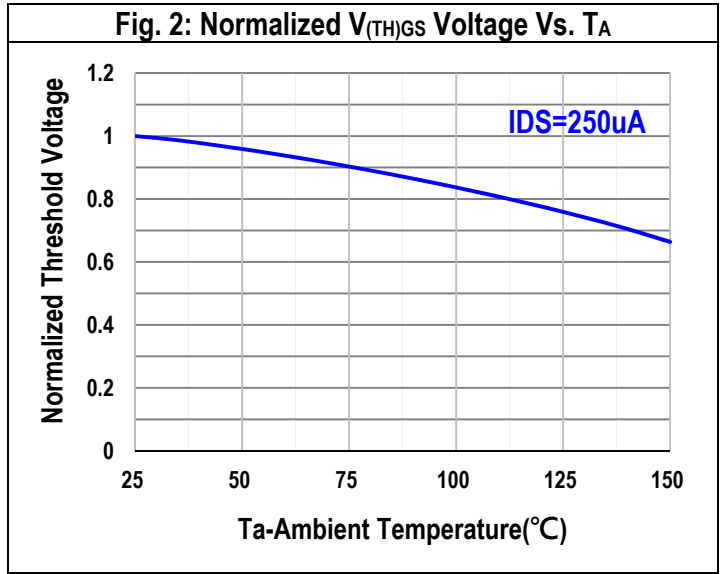
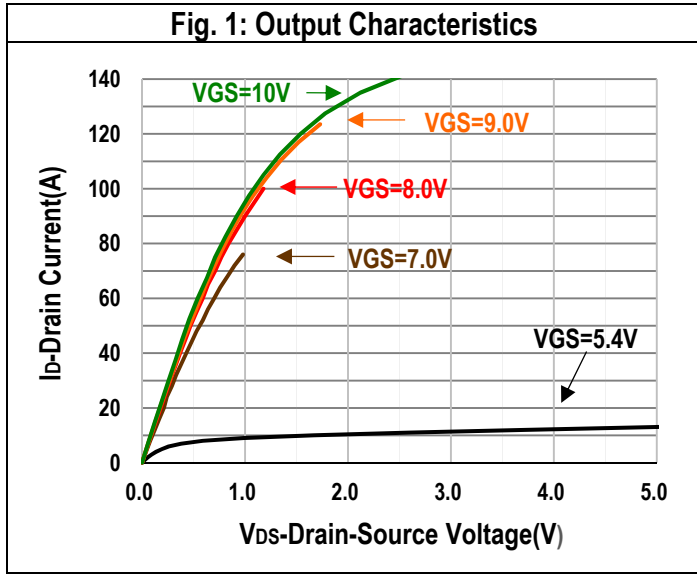
STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.6	3.2	3.4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>DS</sub> =20A	-	8.3	9.5	mΩ
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	0.9	-	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	-	4645	-	pF
Output Capacitance	C <sub>oss</sub>	V <sub>DD</sub> =80V, V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	-	211	-	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	-	114	-	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> =3.0Ω	-	20.9	-	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> =3.0Ω	-	45.9	-	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> =3.0Ω	-	45.3	-	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> =3.0Ω	-	31.4	-	nS

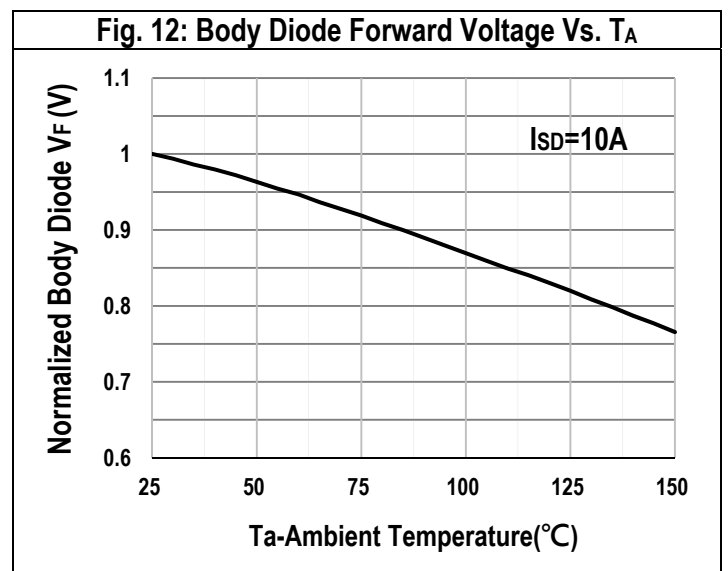
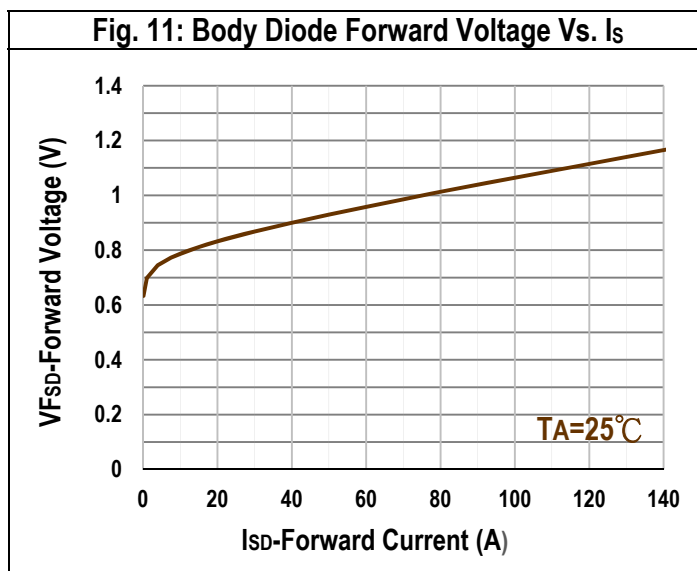
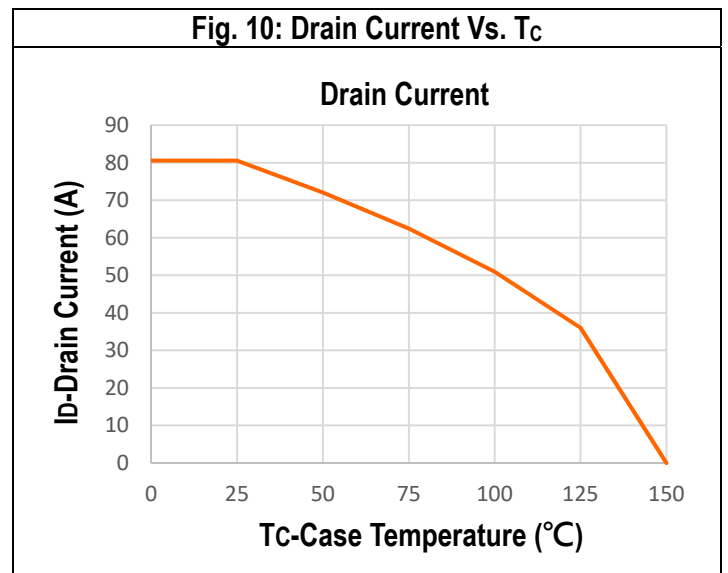
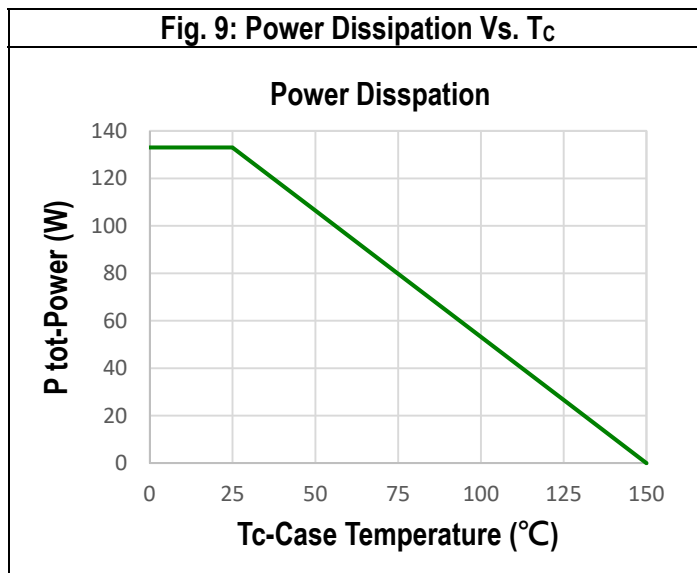
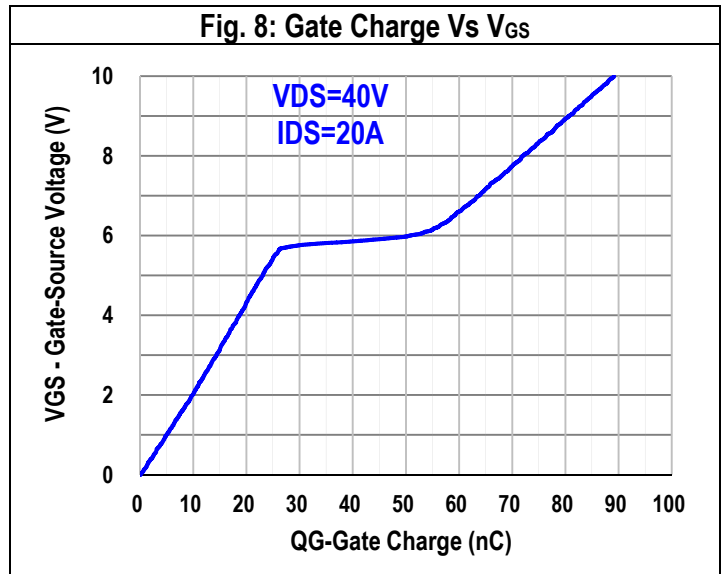
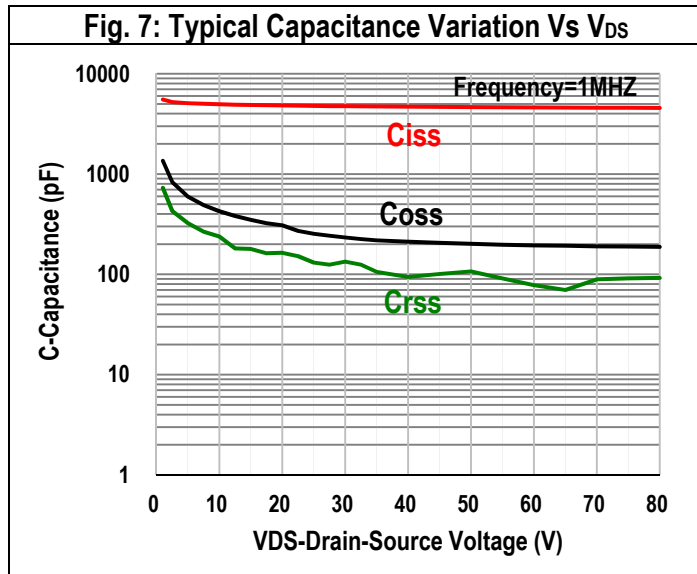
GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q <sub>gs</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	28.8	-	nC
Gate charge at threshold	Q <sub>g(th)</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	15.2	-	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	-	26.7	-	nC
Switching charge	Q <sub>sw</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =20A, V <sub>GS</sub> =0 to 10V	-	40.3	-	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	-	89.4	-	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	-	62.7	-	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	-	-	80.5	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	-	0.82	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	-	27.4	-	nS
Body diode reverse recovery charge	Q <sub>rr</sub>	V <sub>DD</sub> =40V, I <sub>F</sub> =20A, di/dt=100A/μs	-	31.1	-	nC
Body diode peak reverse recovery charge	I <sub>rm</sub>	V <sub>DD</sub> =40V, I <sub>F</sub> =20A, di/dt=100A/μs	-	2.3	-	A

## 4. Typical Operating Characteristics



## 4. Typical Operating Characteristics



4. Typical Operating Characteristics

Fig. 13: Safe Operation Area

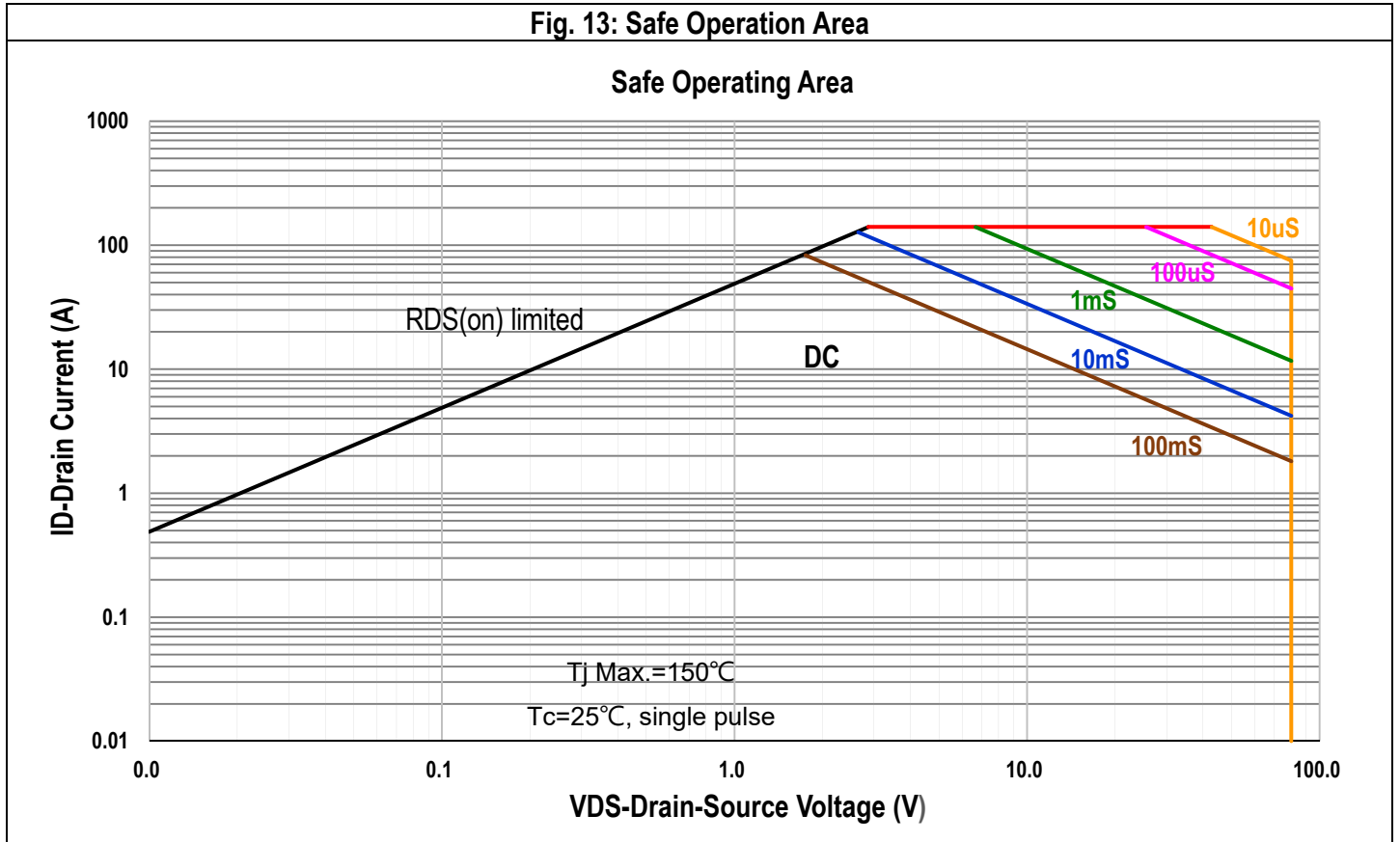
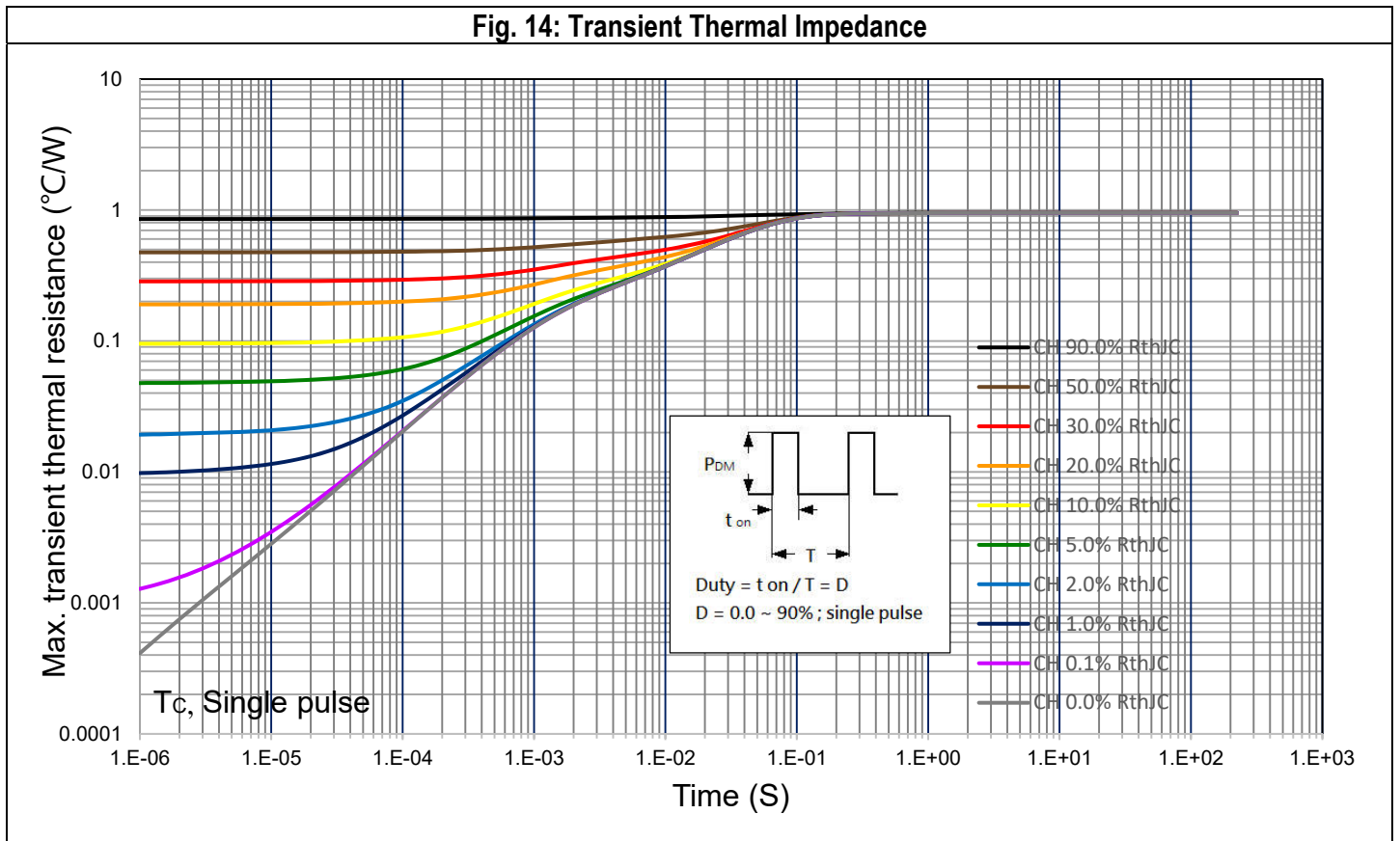
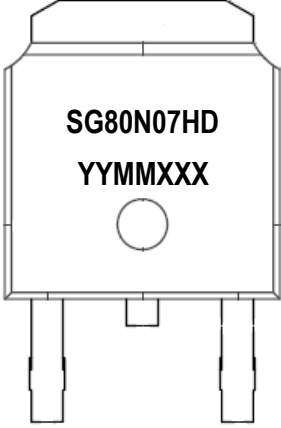


Fig. 14: Transient Thermal Impedance



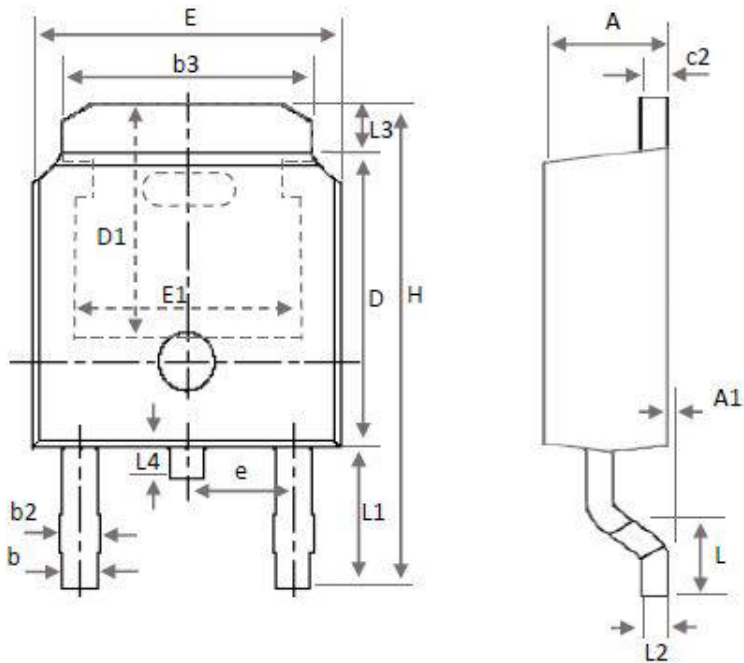
## 5. Marking Information

TO-252 (D)	Marking Rule
<p>Laser Marking</p> 	<p><u>Line 1</u> : Device SG80N07HD</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>



## 6. Package of Dimension

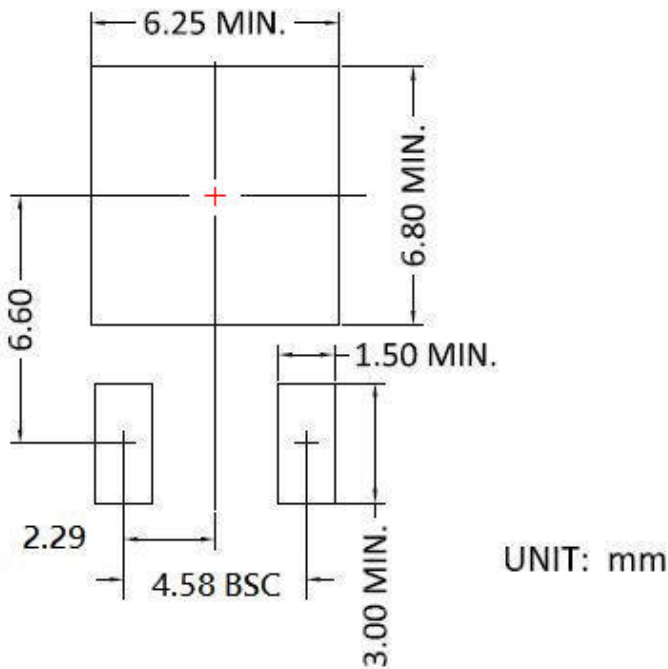
Package type: TO-252



Symbol	Min	Nor	Max
E	6.35	6.54	6.731
L	1.40	1.59	1.78
L1	2.743 Ref.		
L2	0.508 BSC		
L3	0.89	1.08	1.27
L4	0.60	0.81	1.01
D	5.97	6.10	6.223
H	9.40	9.91	10.41
b	0.64	0.77	0.89
b2	0.76	0.95	1.14
b3	4.95	5.21	5.46
e	2.286 BSC		
A	2.18	2.29	2.39
A1	0.00	0.07	0.13
c2	0.46	0.68	0.89
D1	5.21	-	-
E1	4.32	-	-

1. All dimension are in millimeters.
2. Dimension dose not include burrs and mold flash/protrusions.

## 7. Land pattern (Footprint)



Note 1: Land pattern (Footprint) design is for reference only.

Note 2: Package body sizes exclude mold flash and burrs.

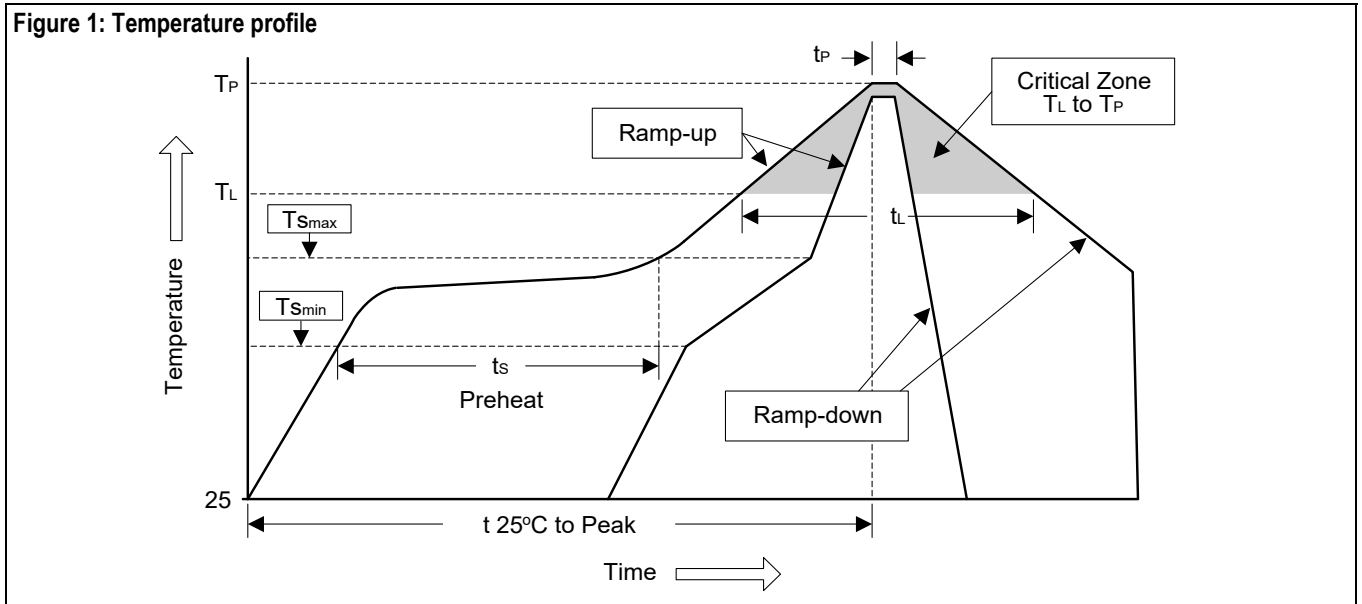
Note 3: Dimension is measured in gauge plane.

Note 4: Tolerance 0.1mm unless otherwise specified.

## 8. 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 (TL to TP)	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (Tsmmin)	100°C	150°C
- Temperature Max (Tsmmax)	150°C	200°C
- Time (min to max) (ts)	60 to 120 sec	60 to 180 sec
Tsmmax to TL		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (TL)	183°C	217°C
- Time (tL)	60 to 150 sec	60 to 150 sec
Peak Temperature (TP)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (tP)	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

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

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