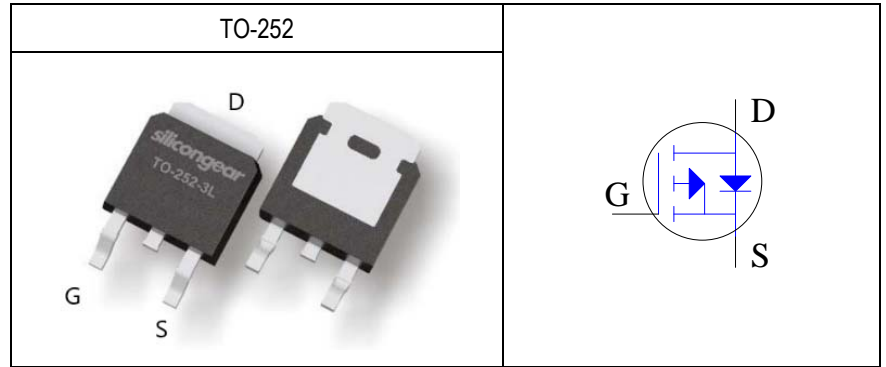


Parameter	Value	Unit
$V_{DS}$	-100	V
$R_{DS(ON) \max.} V_{GS}=-10V$	270	m $\Omega$
$R_{DS(ON) \max.} V_{GS}=-4.5V$	300	m $\Omega$
$I_D$	-8	A
$Q_{g10v}$	16.9	nC
$Q_{gd}$	2.6	nC
$Q_{sw}$	5.2	nC



Features	Application
<ul style="list-style-type: none"> <li>Low Miller 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>Load Switch</li> <li>High Speed Power Switching</li> <li>With Logic Level Driving capacity</li> <li>MOSFET for synchronous rectification in SMPS</li> </ul>

### Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG100P08D	Halogen-Free	TO-252	D	Tape & Reel	2,500

### 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	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous <sup>Note 1</sup>	$T_C=25^\circ\text{C}$	-8	A
	$T_C=100^\circ\text{C}$	-5	A
Drain Current-Continuous <sup>Note 2</sup>	$T_A=25^\circ\text{C}$	-1.6	A
	$T_A=70^\circ\text{C}$	-1.3	A
Drain Current-Pulsed <sup>Note 2</sup>	$T_C=25^\circ\text{C}$	-18	A
Avalanche Current	$I_{AS}$	-8.8	A
Single Pulse Avalanche Energy <sup>Note 3</sup>	$E_{AS}$	38.7	mJ
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	39	W
	$T_C=100^\circ\text{C}$	16	W
	$T_A=25^\circ\text{C}$	1.5	W
	$T_A=70^\circ\text{C}$	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
Maximum Junction-to- Case <sup>Note 4</sup>	$R_{\theta JC}$	Steady State	-	-	2.9	$^\circ\text{C/W}$
Maximum Junction-to- Ambient <sup>Note 4</sup>	$R_{\theta JA}$	Steady State	-	-	73.4	$^\circ\text{C/W}$

- Limited by silicon chip capability and junction temperature.
- Must be ensure junction temperature does not exceed 150-degree C. (Pulse Width  $\leq 100\mu\text{s}$ , Duty  $\leq 2\%$ )
- Limited by  $T_{J\max}$ , starting  $T_J=25^\circ\text{C}$ ,  $L=1\text{mH}$ ,  $R_g=25\Omega$ ,  $I_D=-8.8\text{A}$ ,  $V_{GS}=10\text{V}$ .
- $R_{\theta JA}$  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.

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

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_{DS}=-250\mu A$	-100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-100V, V_{GS}=0V$	-	-	-1	$\mu A$
		$V_{DS}=-100V, V_{GS}=0V, T_J=125^\circ C$	-	-	-100	$\mu A$
Gate-Body Leakage	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA

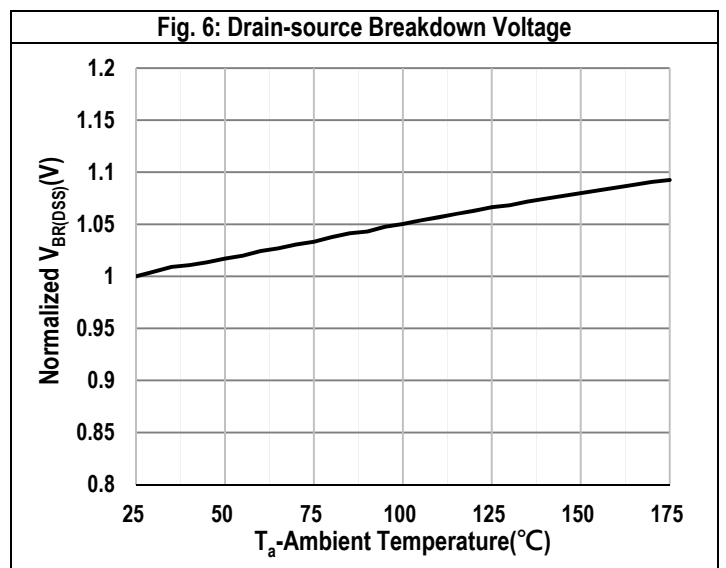
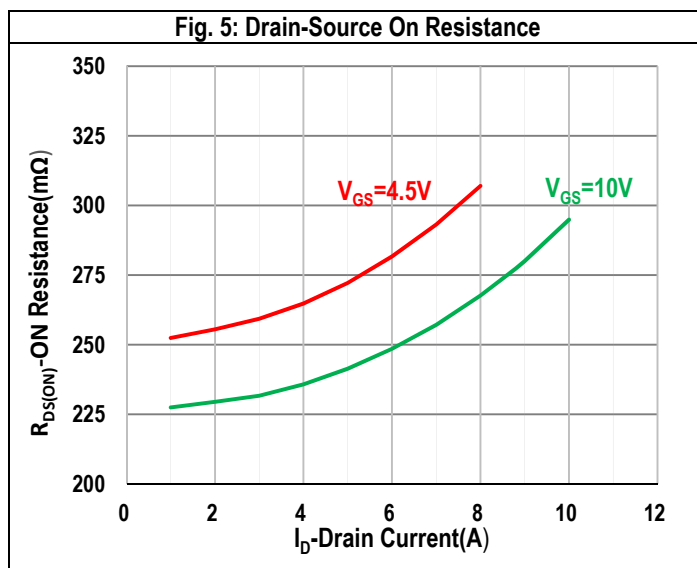
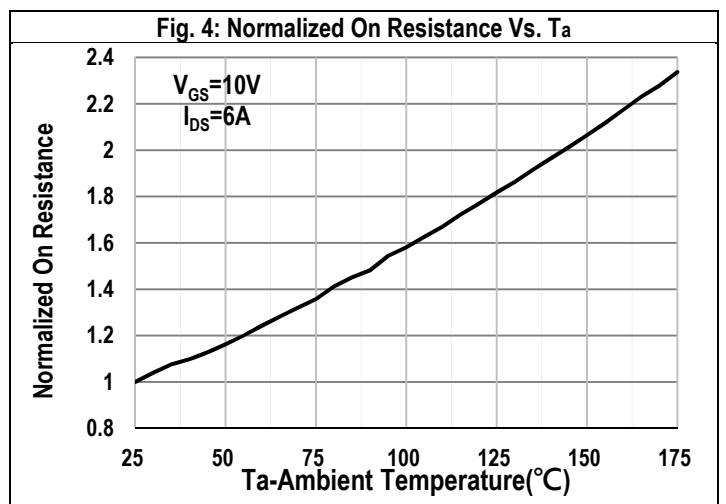
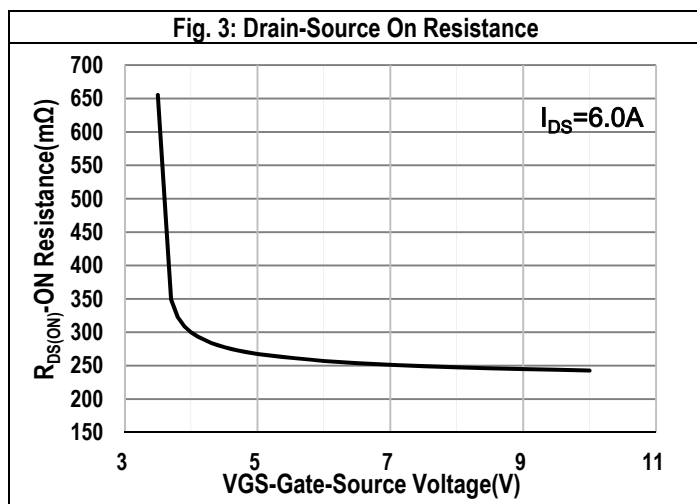
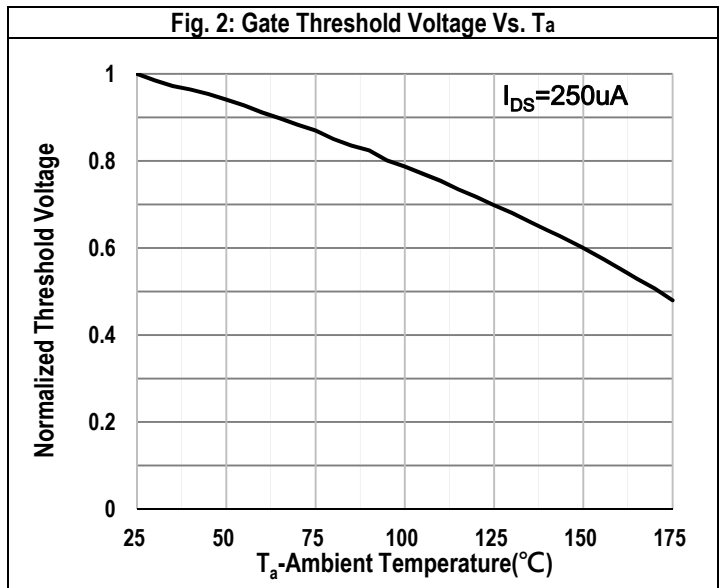
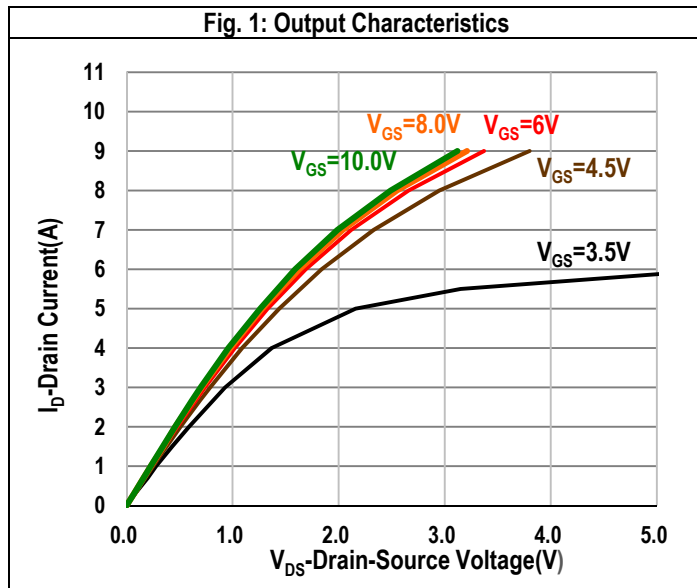
STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-1.4	-1.8	-2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_{DS}=-6A$	-	245	270	m $\Omega$
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_{DS}=-3A$	-	260	300	m $\Omega$
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	14.5	-	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS}=-5V, I_{DS}=-6A$	-	8.3	-	S

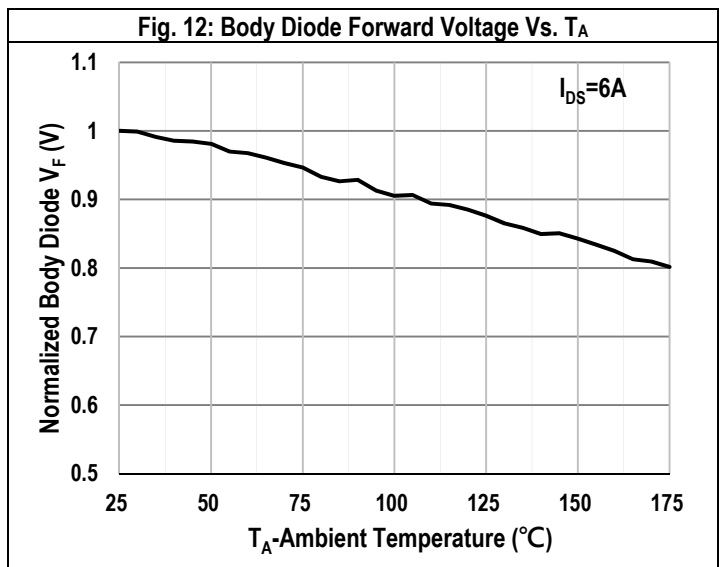
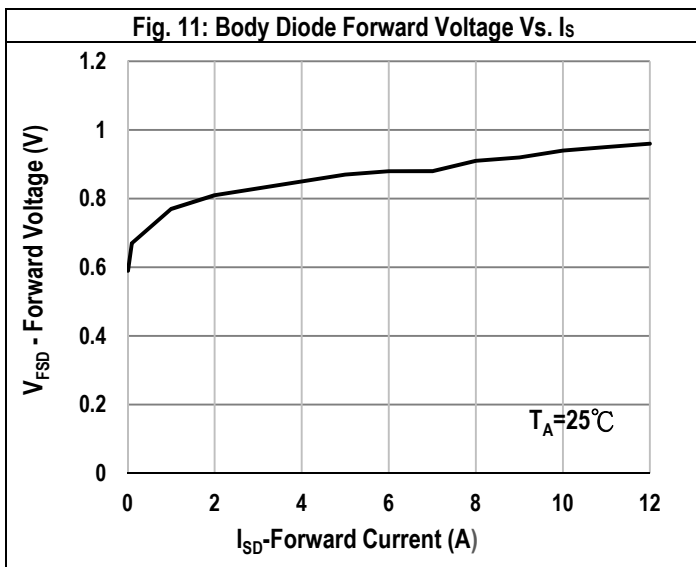
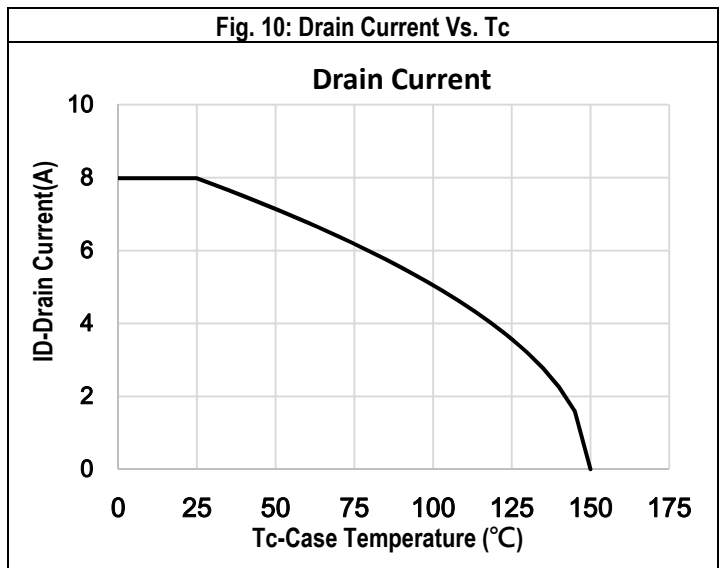
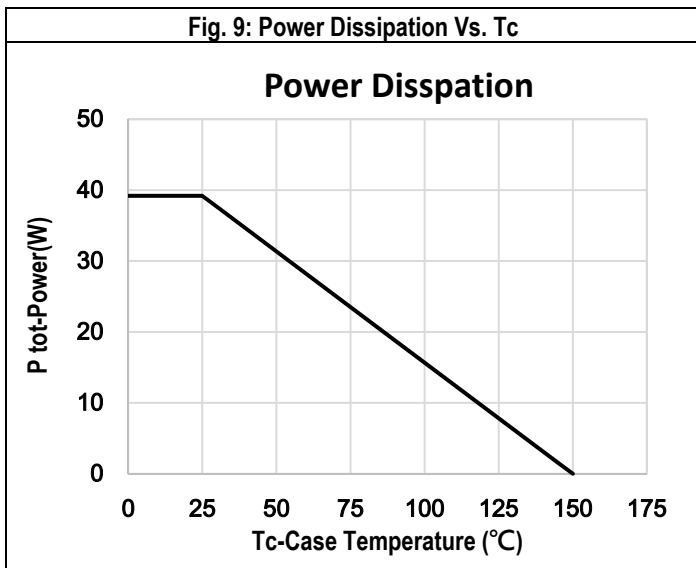
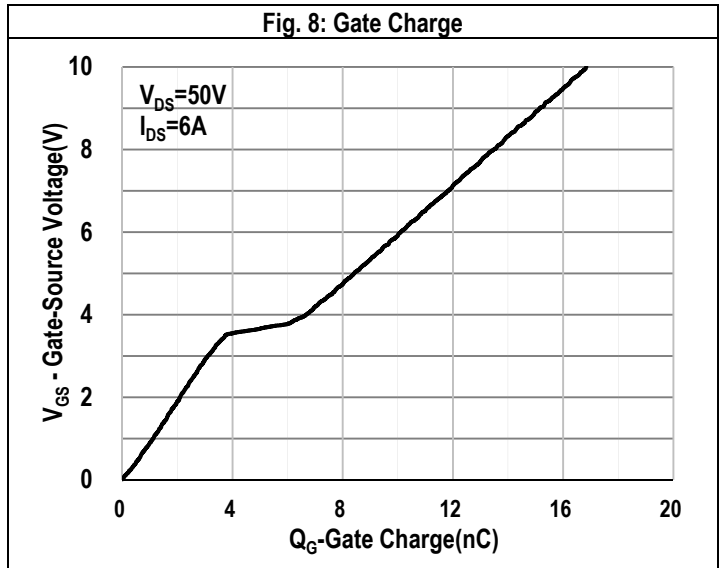
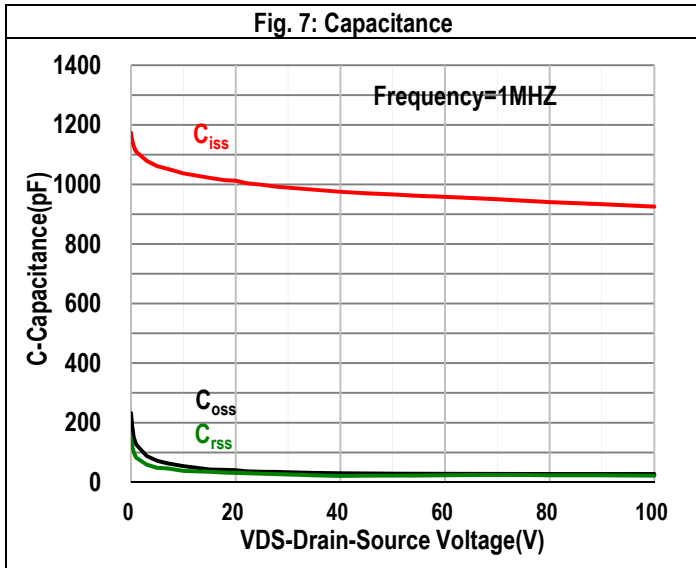
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	$C_{iss}$	$V_{DS}=-100V, V_{GS}=0V, f=1MHz$	-	966	-	pF
Output Capacitance	$C_{oss}$	$V_{DS}=-100V, V_{GS}=0V, f=1MHz$	-	29	-	pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=-100V, V_{GS}=0V, f=1MHz$	-	25	-	pF
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=-50V, V_{GS}=-10V, I_{DS}=-6A, R_{GEN}=3.0\Omega$	-	17.8	-	nS
Rise Time	$t_r$	$V_{DS}=-50V, V_{GS}=-10V, I_{DS}=-6A, R_{GEN}=3.0\Omega$	-	26.2	-	nS
Turn-Off Delay Time	$T_{d(off)}$	$V_{DS}=-50V, V_{GS}=-10V, I_{DS}=-6A, R_{GEN}=3.0\Omega$	-	120.6	-	nS
Fall Time	$t_f$	$V_{DS}=-50V, V_{GS}=-10V, I_{DS}=-6A, R_{GEN}=3.0\Omega$	-	48.4	-	nS

GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	$Q_{gs}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	4.4	-	nC
Gate charge at threshold	$Q_{g(th)}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	1.9	-	nC
Gate to Drain Charge	$Q_{gd}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	2.6	-	nC
Switching charge	$Q_{SW}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	5.2	-	nC
Gate charge total	$Q_{g10v}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	16.9	-	nC
	$Q_{g4.5v}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -4.5V	-	7.6	-	nC
Gate plateau voltage	$V_{plateau}$	$V_{DD}=-50V, I_{DS}=-6A, V_{GS}=0$ to -10V	-	4.1	-	V
Gate charge total, sync. FET (Q <sub>g</sub> - Q <sub>gd</sub> )	$Q_{g(sync)}$	$V_{DS}=0.1V, V_{GS}=0$ to 10V	-	14.3	-	nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Body Diode continuous forward current	$I_S$	T <sub>C</sub> =25°C	-	-	-8	A
Diode pulse current	$I_{SM}$	T <sub>C</sub> =25°C	-	-	-18	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-6A$	-	-0.9	-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$V_{DD}=-50V, I_F=-6A, di/dt=100A/\mu s$	-	24.6	-	nS
		$V_{DD}=-50V, I_F=-6A, di/dt=200A/\mu s$	-	20.4	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$	$V_{DD}=-50V, I_F=-6A, di/dt=100A/\mu s$	-	26.9	-	nC
		$V_{DD}=-50V, I_F=-6A, di/dt=200A/\mu s$	-	41.9	-	nC

## Typical Operating Characteristics





Typical Operating Characteristics (Cont.)

Fig. 13: Safe Operation Area

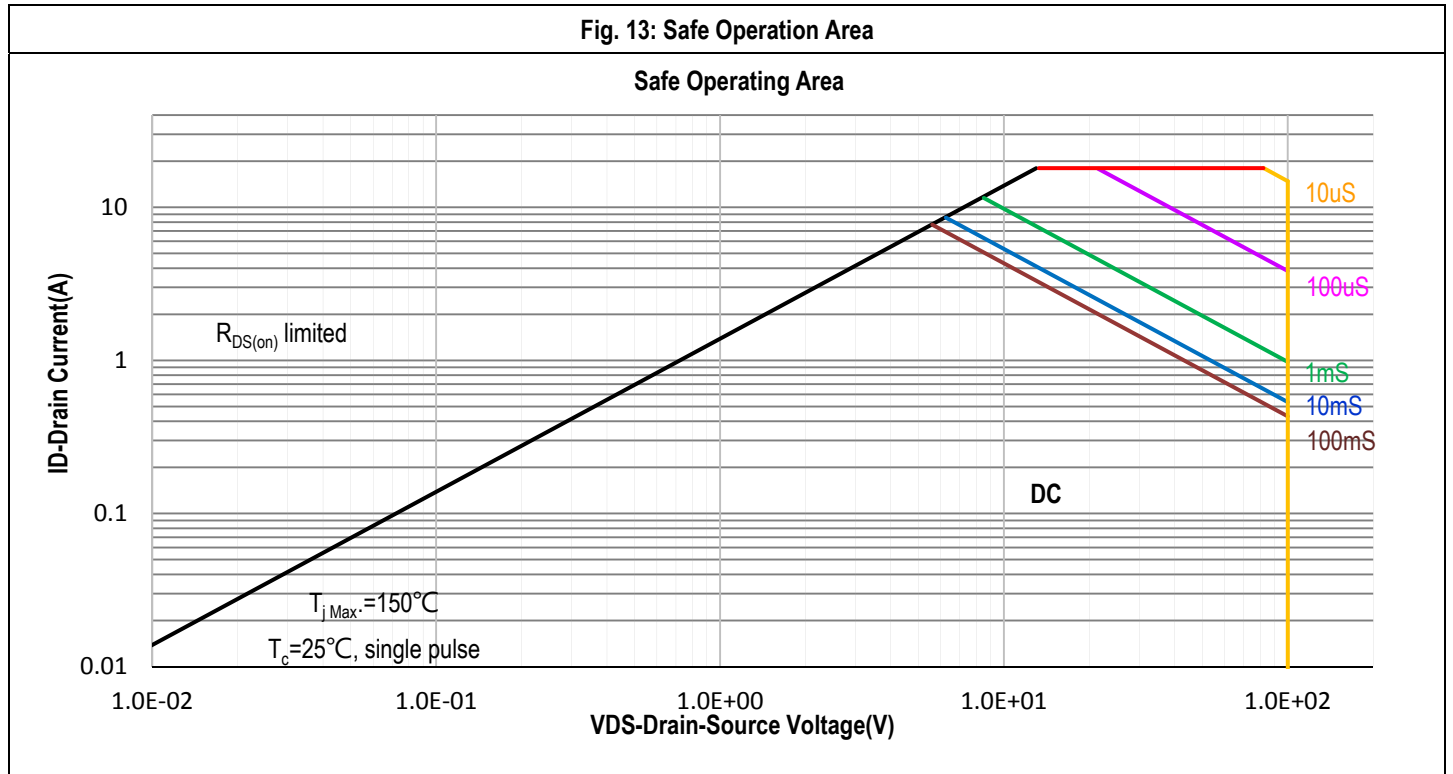
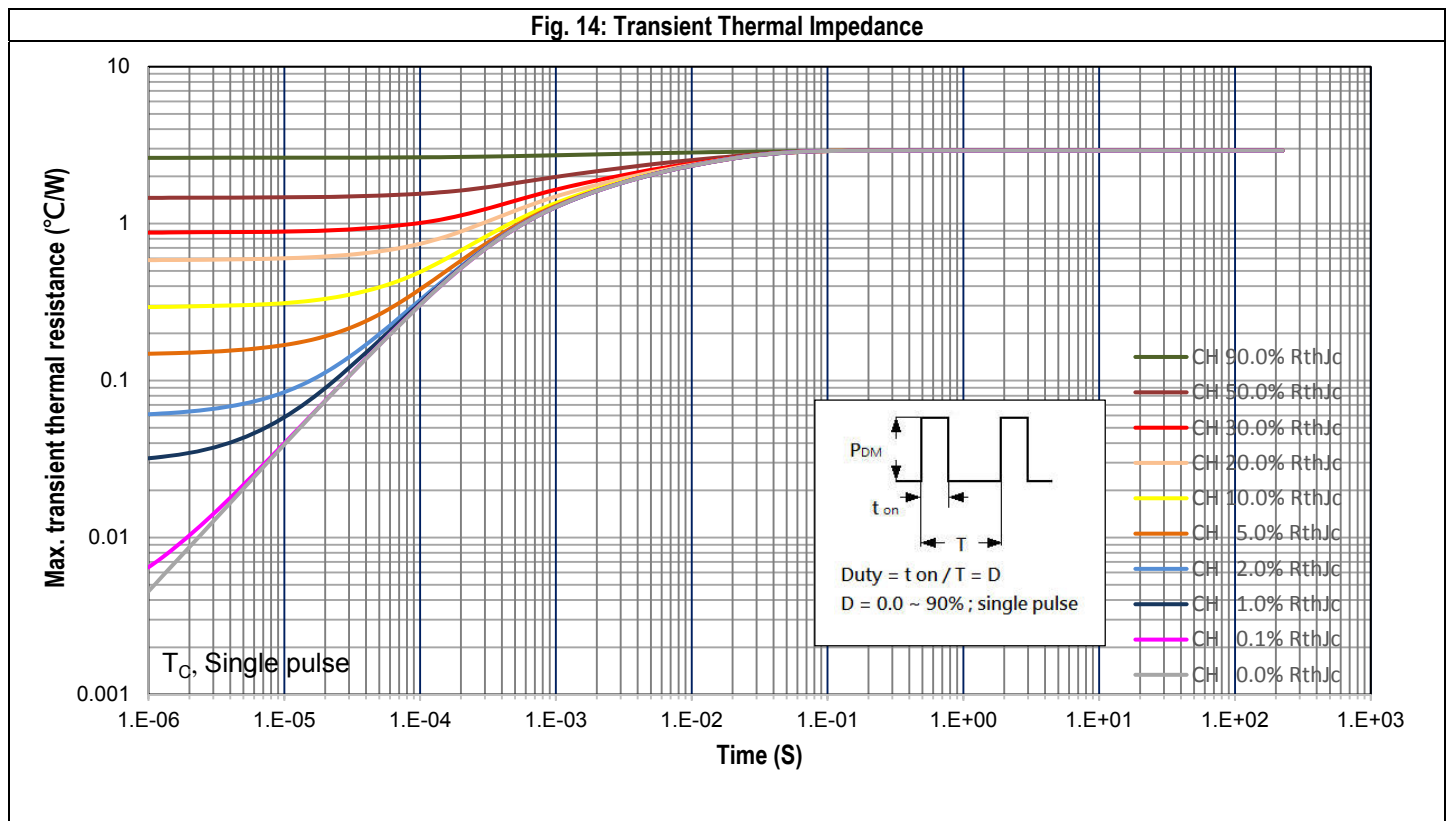
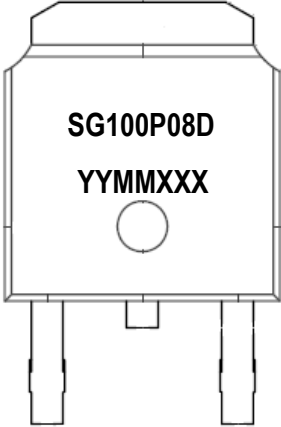


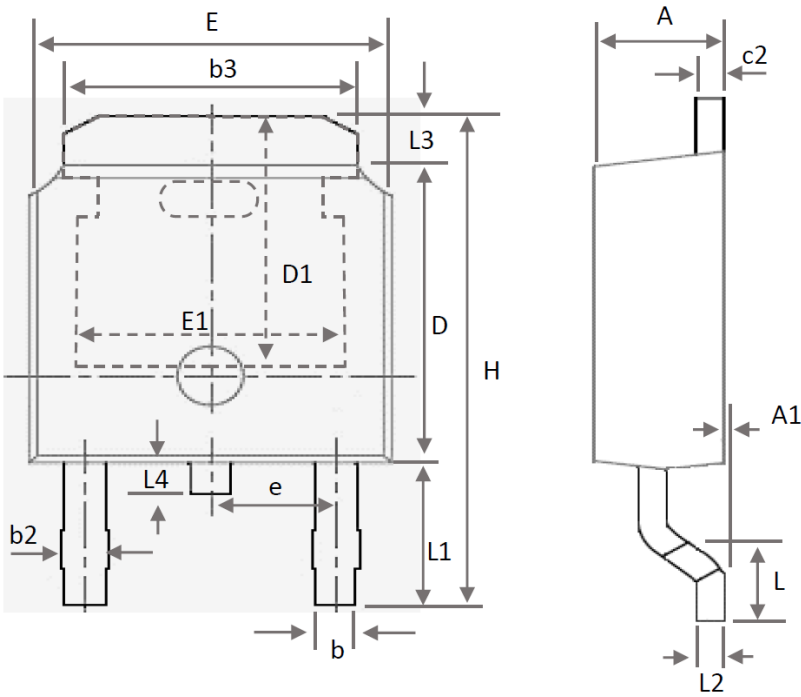
Fig. 14: Transient Thermal Impedance



**Marking Information**

TO-252 (D)	Marking Rule
<p>Laser Marking</p> 	<p><u>Line 1</u> : Device <b>SG100P08D</b></p> <p><u>Line 2</u> : Date Code <b>YYMMXXX</b></p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

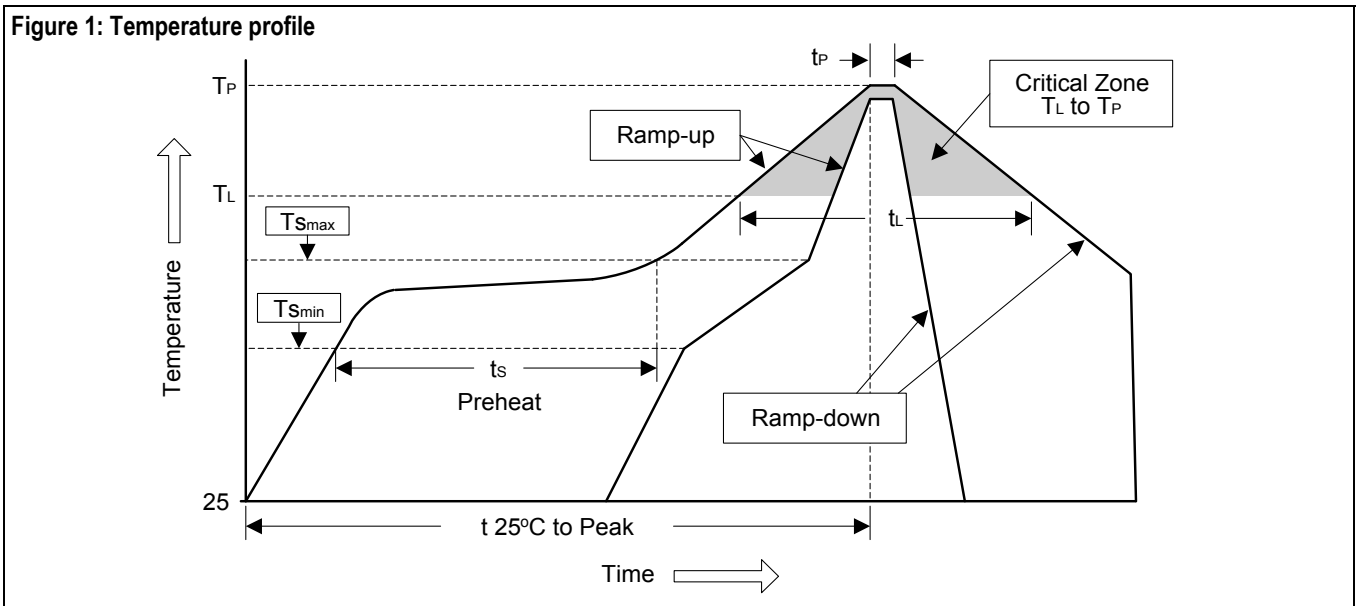
**Package of Dimension**



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	-	-

## 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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T <sub>smmin</sub> )	100°C	150°C
- Temperature Max (T <sub>smmax</sub> )	150°C	200°C
- Time (min to max) (ts)	60 to 120 sec	60 to 180 sec
T <sub>smmax</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



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## Revision History

Document Revision History			
Device	Date	Revision	Description (major change from last revision)
SG100P08D	Dec-16-2022	01	- Release of first
SG100P08D	Feb-10-2023	02	<ol style="list-style-type: none"> <li>1. ID估算值修訂</li> <li>2. PD估算值修訂</li> <li>3. Fig. 9: Power Dissipation Vs. Tc修訂</li> <li>4. Fig. 10: Drain Current Vs. Tc修訂</li> <li>5. Qg修訂</li> <li>6. Qg(sync)新增</li> <li>7. Marking Information新增</li> </ol>