

V_{DSS} , 100V R_{DS(ON)} , 80mΩ (max.) @ V_{GS}=10V R_{DS(ON)} , 94mΩ (max.) @ V_{GS}=4.5V I_D , 3.4A	SOP-8	

Description	Features
The SG100N13S uses advanced Trench technology and designs to provide excellent R _{DS(ON)} with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.	<ul style="list-style-type: none"> • Low On-Resistance • Low Input Capacitance • Low Miller Charge • Low Input / Output Leakage • Pb-free lead plating; RoHS compliant
	Applications
	<ul style="list-style-type: none"> • Lithium-Ion Secondary Batteries • Load Switch • DC-DC converters and Off-line UPS

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG100N13S	Halogen-Free	SOP-8	S	Tape & Reel	3,000

Absolute Maximum Ratings (T_A=25°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 _A =25°C	3.4
		T _A =70°C	2.7
Drain Current-Pulsed ^{Note 1}	I _{DM}	10	A
Avalanche Current	I _{AS}	12	A
Avalanche Energy, L=0.1mH	E _{AS}	7.2	mJ
Maximum Power Dissipation	P _D	T _A =25°C	1.5
		T _A =70°C	0.9
Storage Temperature Range	T _{STG}	-55 to +150	°C
Operating Junction Temperature Range	T _J	-55 to +150	°C

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient	R _{θJA}	Steady State	-	-	85	°C/W
Maximum Junction-to-Case	R _{θJC}	Steady State	-	-	25	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =80V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250μA	1.0	-	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =5A	-	-	80	mΩ
		V _{GS} =4.5V, I _{DS} =3A	-	-	94	mΩ
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =2A	-	20	-	S

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz	-	1488	-	pF
Output Capacitance	C _{oss}		-	58	-	
Reverse Transfer Capacitance	C _{rss}		-	35	-	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2	-	Ω

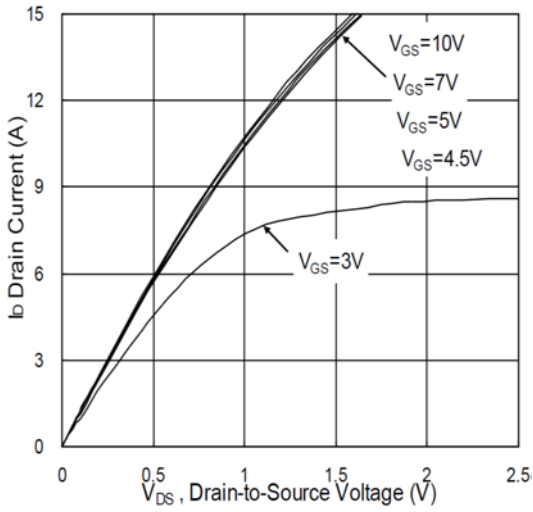
SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{DS} =50V, I _D =2A, V _{GS} =10V, R _{GEN} =3.3Ω	-	4	-	ns
Rise Time	t _r		-	7.4	-	
Turn-Off Delay Time	T _{d(off)}		-	40	-	
Fall Time	t _f		-	13	-	
Total Gate Charge at 10V	Q _g	V _{DS} =80V, I _{DS} =2A, V _{GS} =10V	-	25.4	-	nC
Gate to Source Gate Charge	Q _{gs}		-	3.6	-	
Gate to Drain "Miller" Charge	Q _{gd}		-	4.6	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{DS} =1A	-	-	1.2	V
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	1.6	A
Pulsed Source Current	I _{SM}		-	-	5	A
Body Diode Reverse Recovery Time	t _{rr}	I _F =1A, di/dt=100A/μs	-	15	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	9.5	-	nC

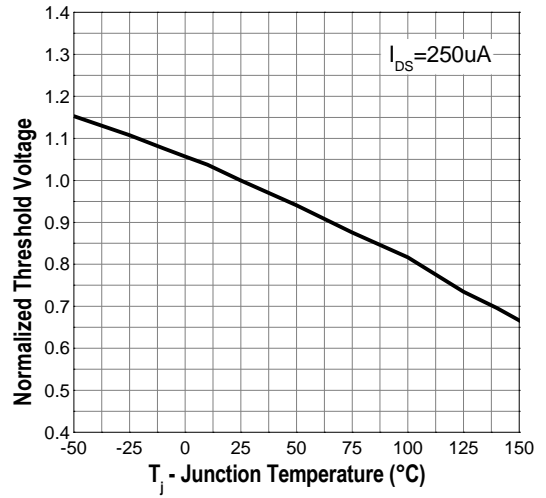
- Notes:**
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
 2. R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design. R_{θJA} shown below for single device operation on FR-4 in still air.

Typical Operating Characteristics

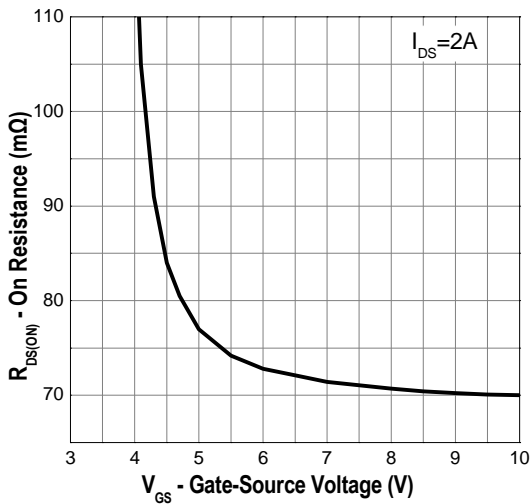
Output Characteristics



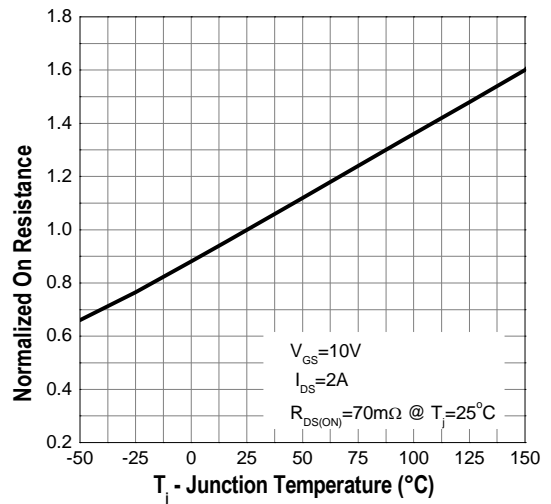
Gate Threshold Voltage



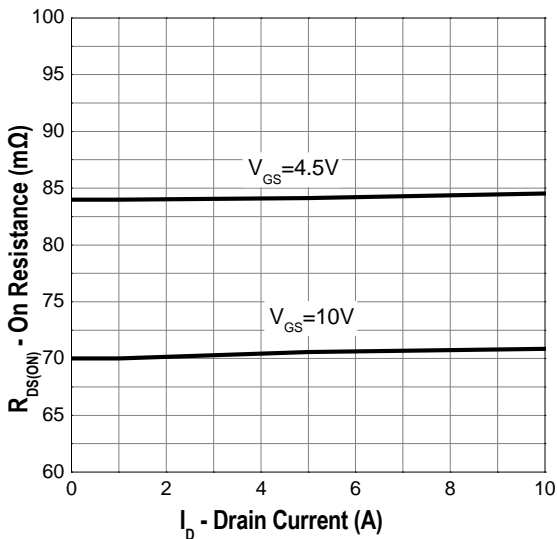
Gate-Source On Resistance



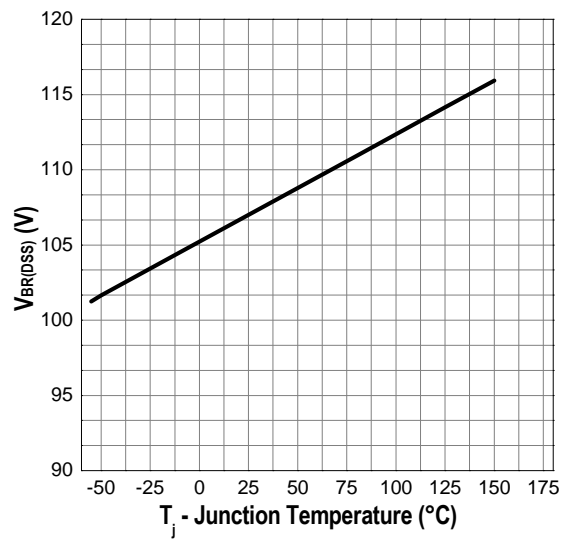
Drain-Source On Resistance



Drain-Source On Resistance

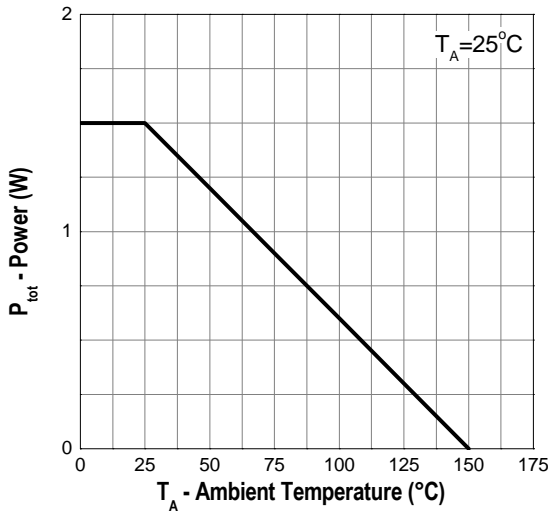


Source-Drain Diode Forward

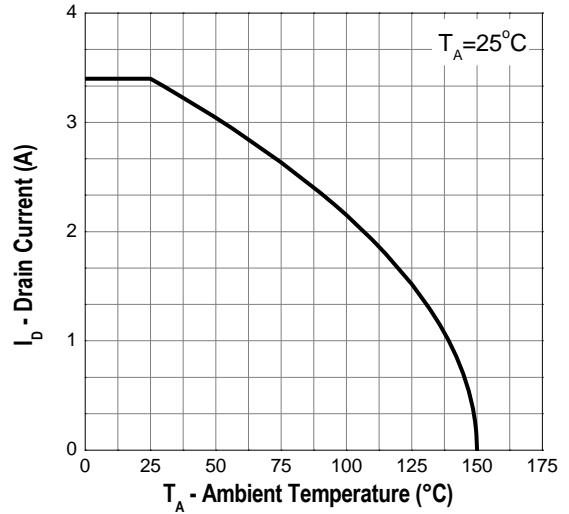


Typical Operating Characteristics (Cont.)

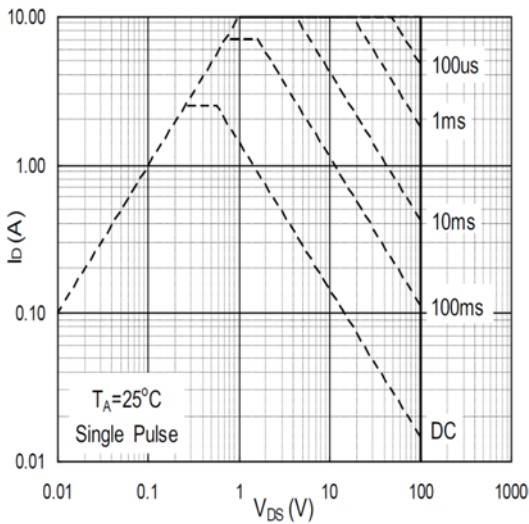
Power Dissipation



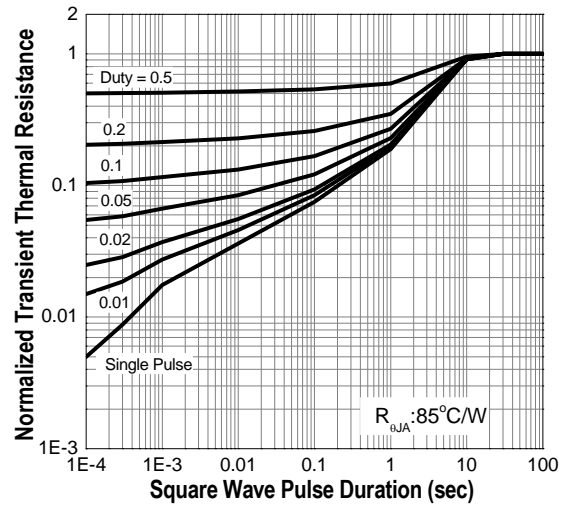
Drain Current



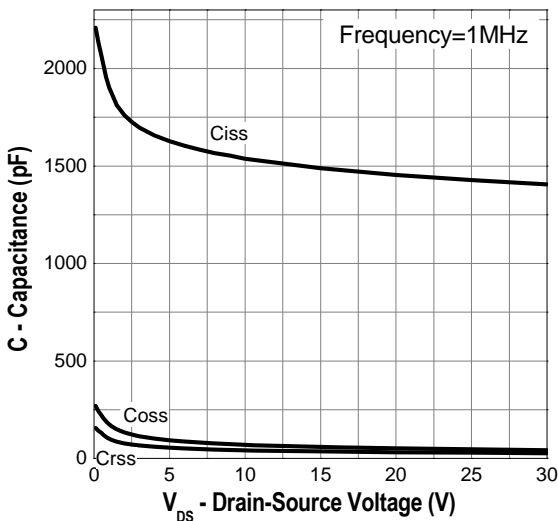
Safe Operation Area



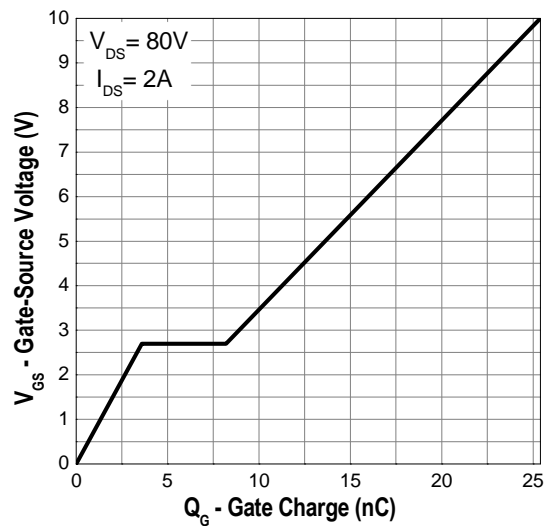
Transient Thermal Impedance



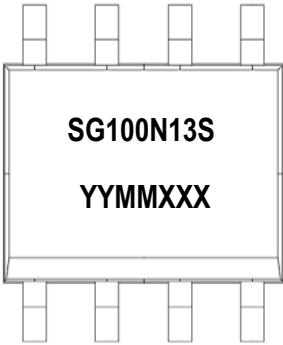
Capacitance



Gate Charge

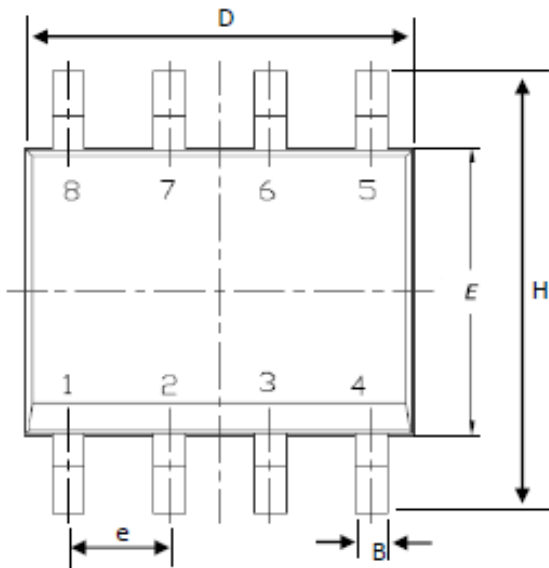


Marking Information

SOP-8 (S)	Marking Rule
<p data-bbox="140 362 306 394">Laser Marking</p> 	<p data-bbox="826 362 1088 394"><u>Line 1</u> : Device Name</p> <p data-bbox="826 407 976 439">SG100N13S</p> <p data-bbox="826 497 1056 528"><u>Line 2</u> : Date Code</p> <p data-bbox="826 542 960 573">YYMMXXX</p> <p data-bbox="826 631 1024 663">YY : Year Code</p> <p data-bbox="826 676 1046 707">MM : Month Code</p> <p data-bbox="826 721 1082 752">XXX : Serial Number</p>

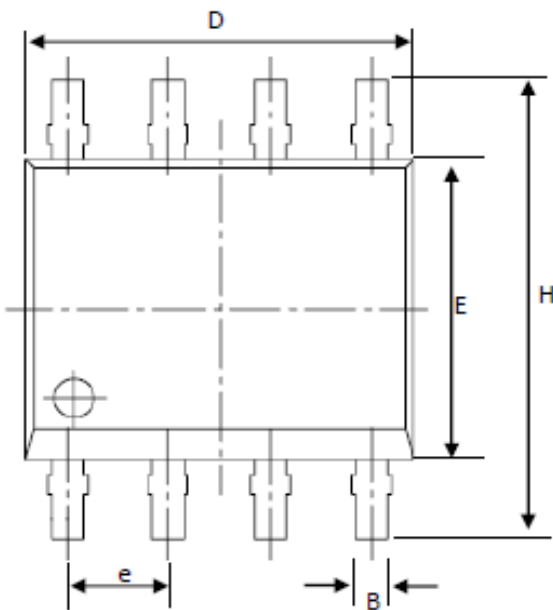
Package of Dimension

G-TYPE



Symbol	Min	Nor	Max
A	1.35	1.55	1.75
A1	0.10	0.18	0.25
B	0.31	0.41	0.51
c	0.17	0.21	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27	1.27	1.27
H	5.80	6.00	6.20
L	0.40	0.84	1.27
α	0.00	4.00	8.00

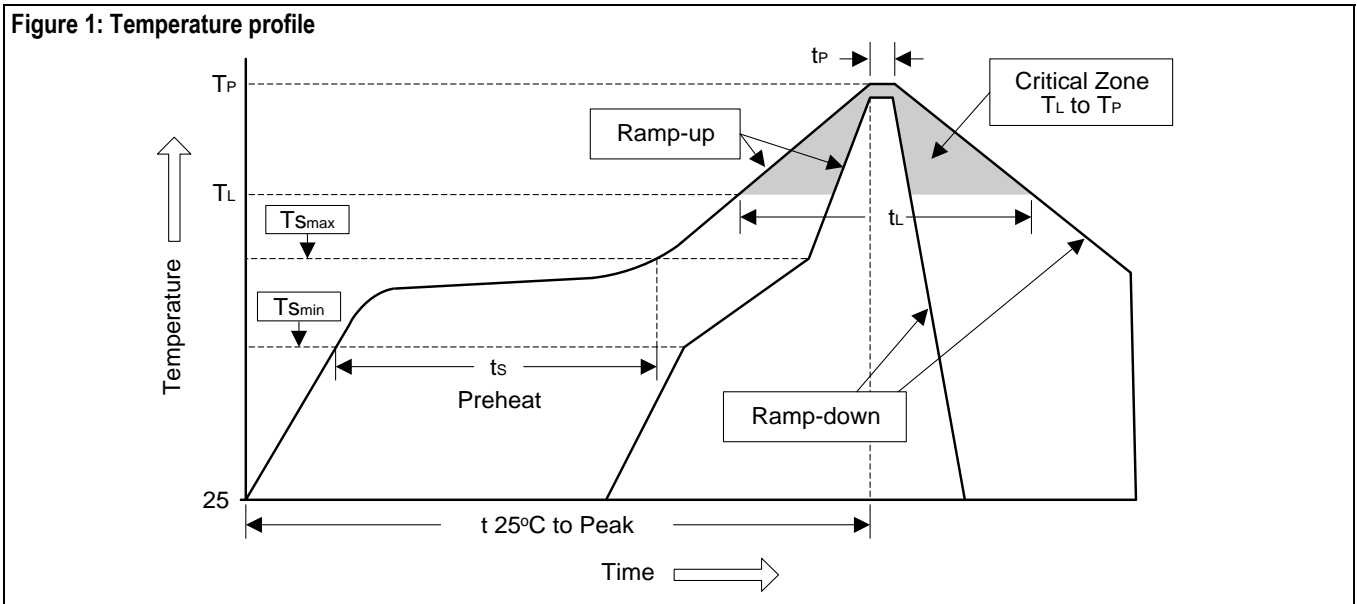
B-TYPE



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

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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