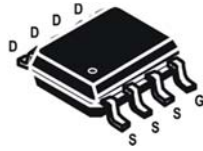
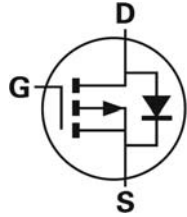


V_{DSS} , -30V R_{DS(ON)} , 14mΩ (max.) @ V_{GS}=-10V R_{DS(ON)} , 24mΩ (max.) @ V_{GS}=-4.5V I_D , -9A	SOP-8 	

Description	Features
<p>The SGP3011S uses advanced trench technology MOSFETs to provide excellent R_{DS(ON)} and low gate charge.</p> <p>The complementary Power MOSFETs may be used in H-bridge, Inverters and other applications.</p>	<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"> • Motor / Body Load Control • Automotive Systems • Load Switch

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SGP3011S	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}	-30	V	
Gate-Source Voltage	V _{GS}	±20	V	
Drain Current-Continuous	I _D	T _A =25°C	-9	A
		T _A =70°C	-6	A
Drain Current-Pulsed ^{Note 1}	I _{DM}	-45	A	
Avalanche Current	I _{AS}	-50	A	
Avalanche Energy, L=0.1mH	E _{AS}	125	mJ	
Maximum Power Dissipation	P _D	T _A =25°C	1.7	W
		T _A =70°C	0.7	W
Operating Junction Temperature Range	T _J T _{STG}	-55 to +150	°C	

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient ^{Note 2}	R _{θJA}	Steady State	-	-	75	°C/W
Maximum Junction-to-Case	R _{θJC}	Steady State	-	-	24	°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	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, 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	-1.5	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _{DS} =-10A	-	-	14	mΩ
		V _{GS} =-4.5V, I _{DS} =-5A	-	-	24	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	-	2170	-	pF
Output Capacitance	C _{oss}		-	303	-	
Reverse Transfer Capacitance	C _{rss}		-	232	-	
Forward Transconductance	g _{fs}	V _D =-5V, I _D =-9A	-	29	-	S

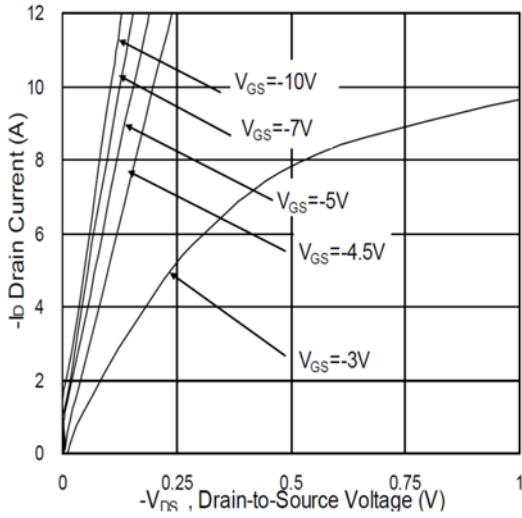
SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-9A	-	8	-	ns
Rise Time	t _r		-	73.7	-	
Turn-Off Delay Time	T _{d(off)}		-	61.8	-	
Fall Time	t _f		-	24.4	-	
Total Gate Charge at -4.5V	Q _g	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-9A	-	21	-	nC
Gate to Source Gate Charge	Q _{gs}		-	8.5	-	
Gate to Drain "Miller" Charge	Q _{gd}		-	7.1	-	

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 _S =-9A	-	-	-1.2	V
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	-49	A
Pulsed Source Current	I _{SM}		-	-	-150	A
Body Diode Reverse Recovery Time	t _{rr}	V _{DD} =-15V, I _F =-9A, di/dt=100A/μs	-	18	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}	V _{DD} =-15V, I _F =-9A, di/dt=100A/μs	-	8	-	nC

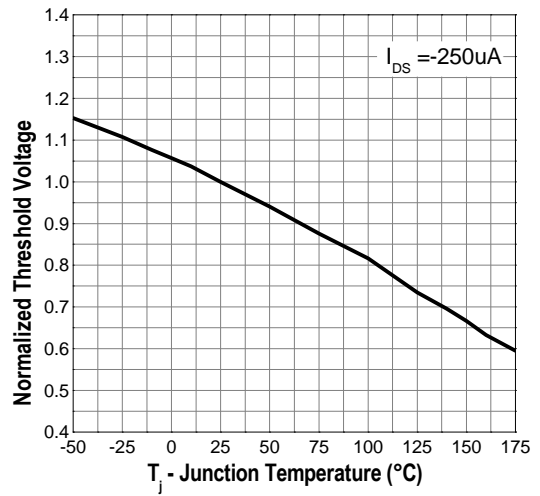
- Notes:**
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
 2. R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θJA} is determined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

Typical Operating Characteristics

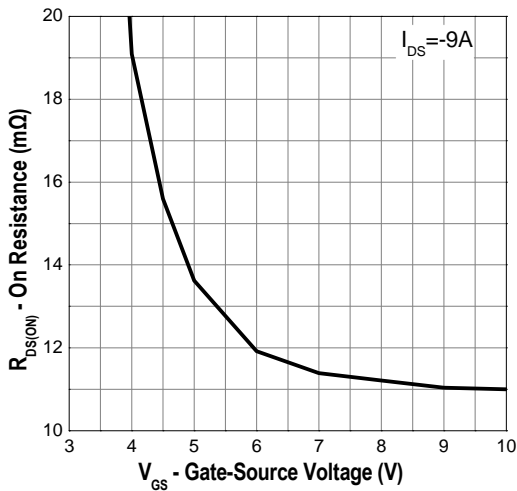
Output Characteristics



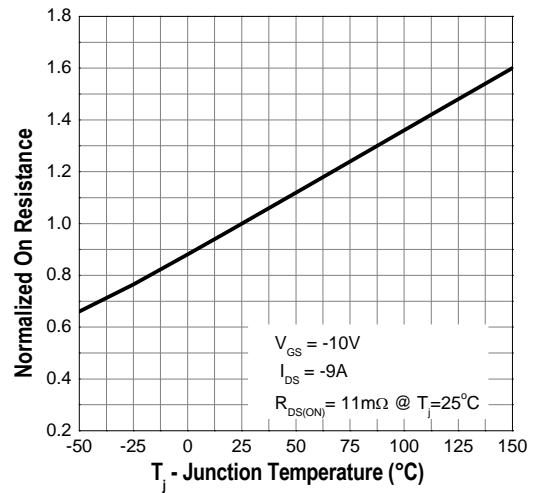
Gate Threshold Voltage



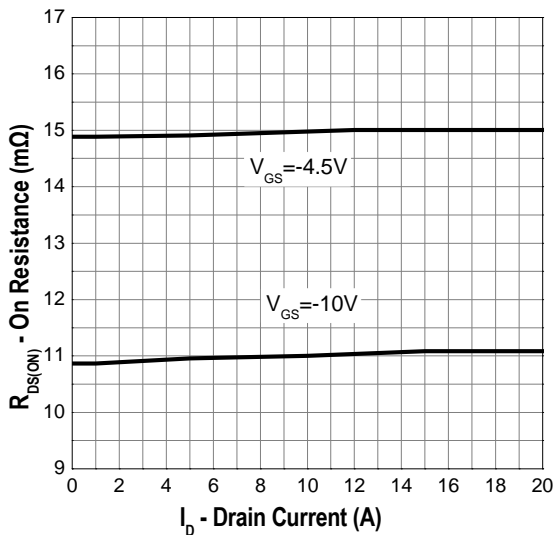
Gate-Source On Resistance



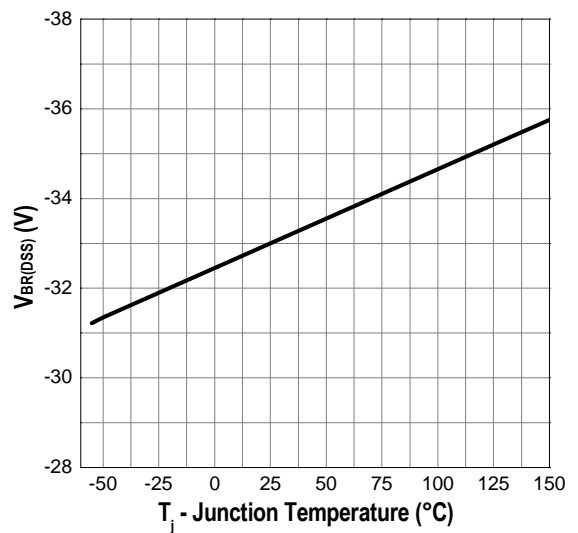
Drain-Source On Resistance



Drain-Source On Resistance

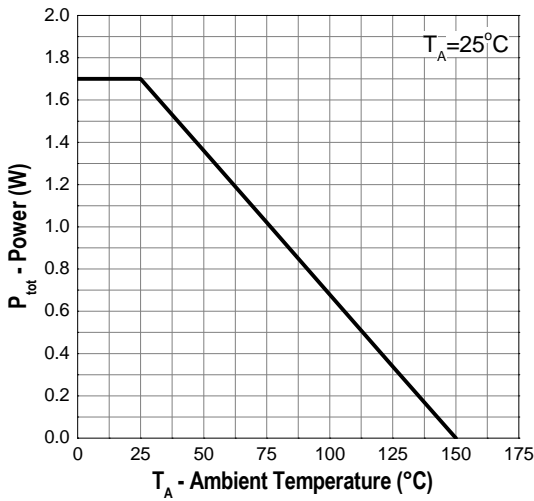


Drain-source Breakdown Voltage

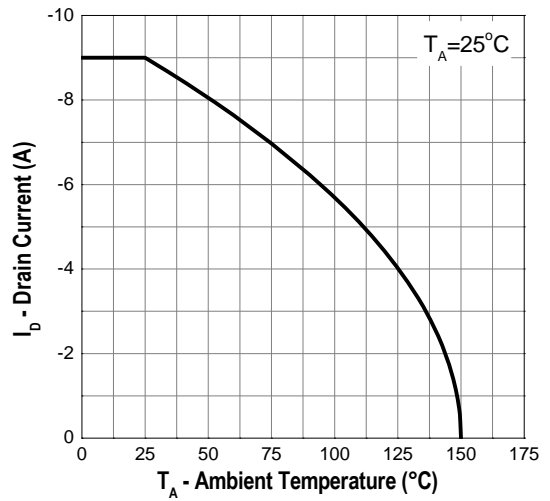


Typical Operating Characteristics (Cont.)

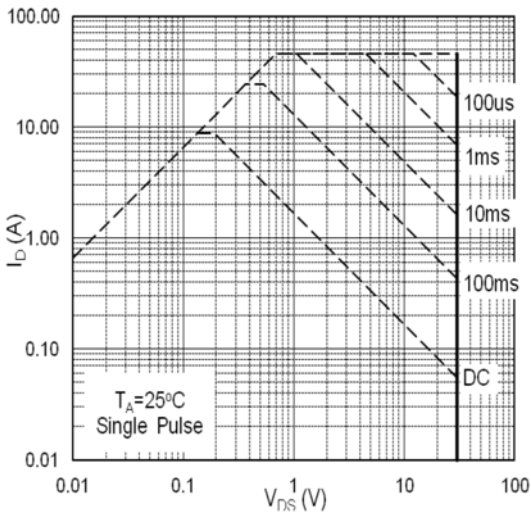
Power Dissipation



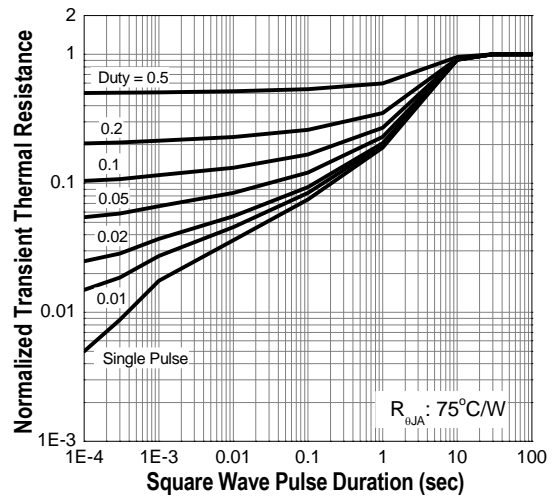
Drain Current



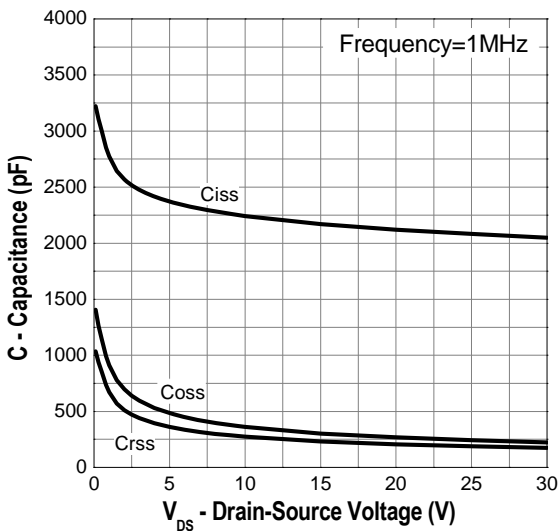
Safe Operation Area



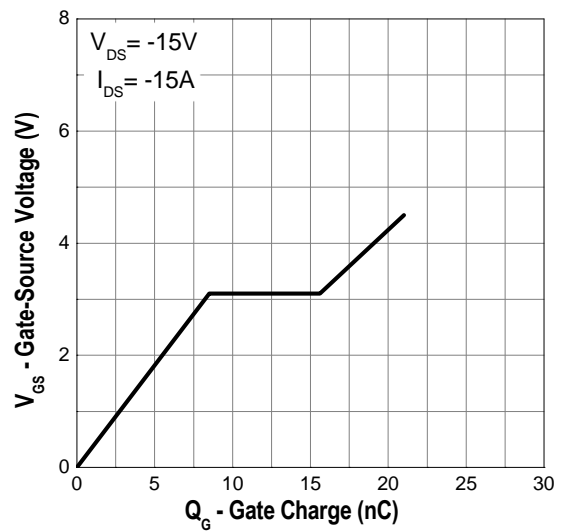
Transient Thermal Impedance



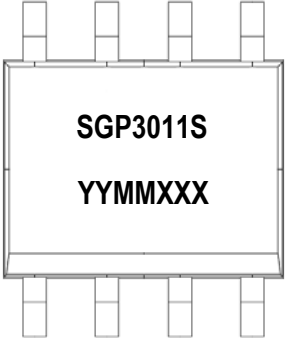
Capacitance



Gate Charge

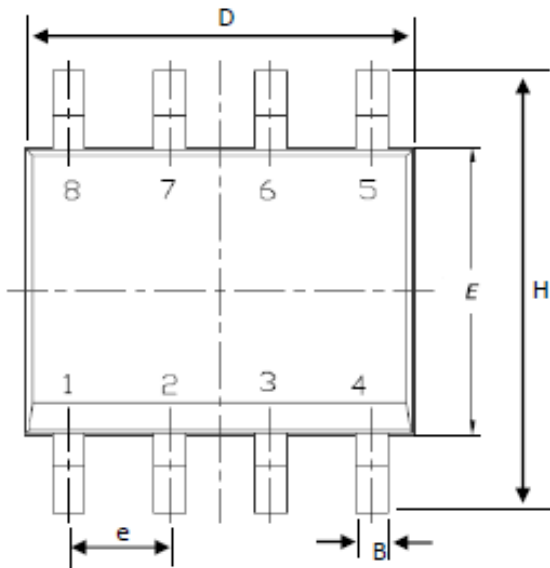


Marking Information

SOP-8 (S)	Marking Rule
<p>Laser Marking</p> 	<p><u>Line 1</u> : Device SGP3011S</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

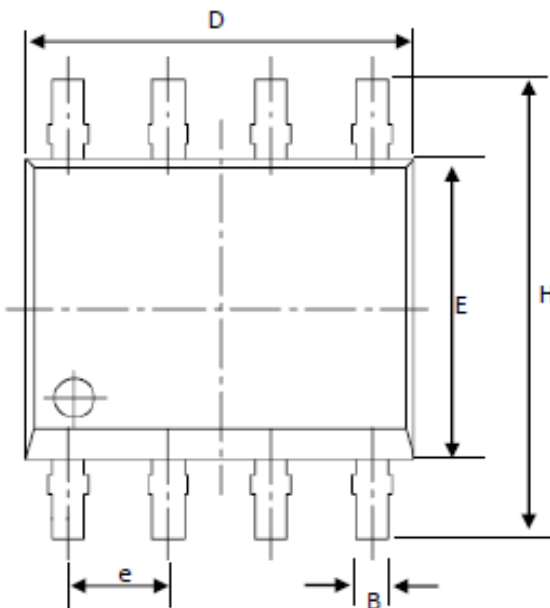
Package of Dimension

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

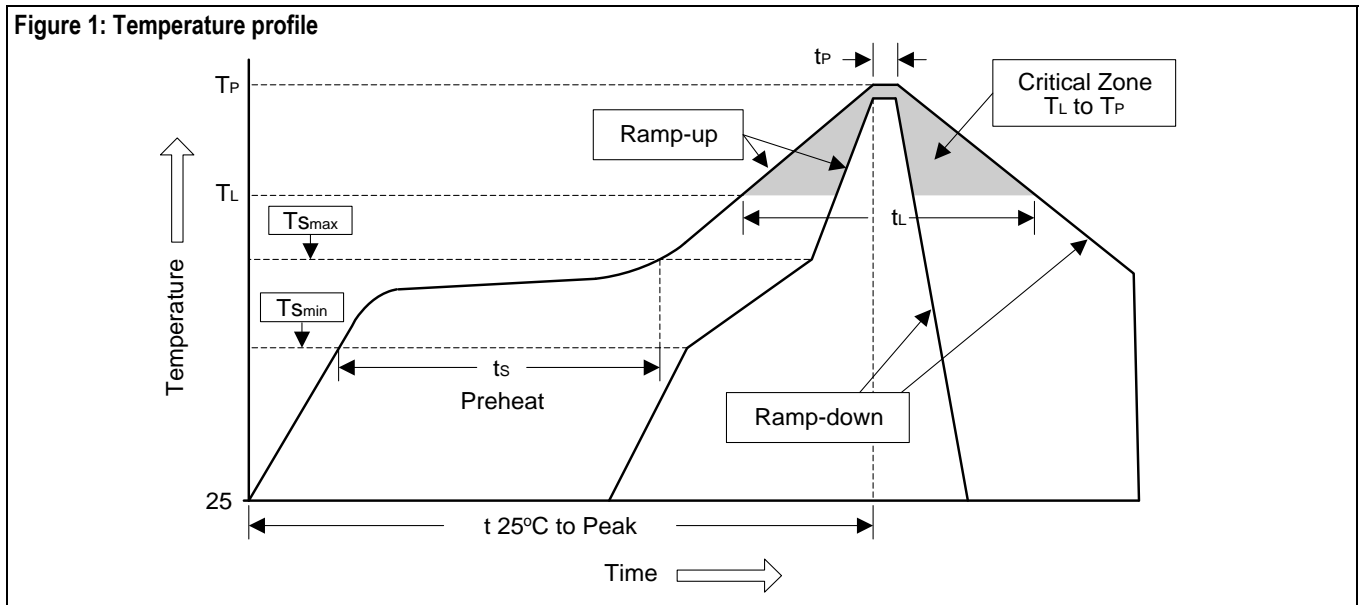


1. All dimension are in millimeters.
2. Dimension does not include burrs and mold flash/protrusions.

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

Figure 1: Temperature profile



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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