

V_{DSS} , -30V R_{DS(ON)} , 60mΩ (max.) @ V_{GS}=-10V R_{DS(ON)} , 90mΩ (max.) @ V_{GS}=-4.5V I_D , -5A	SOP-8	

Description	Features
<p>The SG4953S is the highest performance trench P-Ch MOSFETs with extreme high cell density, which provide excellent R_{DS(ON)} and gate charge for most of the synchronous buck converter applications.</p> <p>The SG4953S meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.</p>	<ul style="list-style-type: none"> • Low On-Resistance • Low Input Capacitance • Low Miller Charge • Low Input/Output Leakage
	Applications
	<ul style="list-style-type: none"> • Motor / Body Load Control • Automotive Systems • Load Switch • DC-DC converters and Off-line UPS

Ordering Information					
Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG4953S	Halogen-Free	SOP-8	S	Tape & Reel	2,500

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	T _C =25°C	I _D	-5	A
	T _C =70°C		-3.9	A
Drain Current-Pulsed ^{Note 1}		I _{DM}	-20	A
Drain Current-Continuous	T _A =25°C	I _D	-4.2	A
	T _A =70°C		-3.3	A
Avalanche Current, L=0.1mH		I _{AS}	-15	A
Avalanche Energy, L=0.1mH		E _{AS}	11.25	mJ
Maximum Power Dissipation	T _C =25°C	P _D	2.1	W
	T _C =70°C		1.3	W
	T _A =25°C		1.5	W
	T _A =70°C		0.9	W
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 ^{Note 2}	R _{θJA}	Steady State	-	-	85	°C/W
Maximum Junction-to-Case ^{Note 2}	R _{θJC}	Steady State	-	-	60	°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	-	-3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _{DS} =-5A	-	45	60	mΩ
		V _{GS} =-4.5V, I _{DS} =-4A	-	66	90	

DYNAMIC CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	-	680	-	pF
Output Capacitance	C _{oss}		-	290	-	
Reverse Transfer Capacitance	C _{rss}		-	120	-	

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 =-5A	-	10	-	ns
Rise Time	t _r		-	17	-	
Turn-Off Delay Time	T _{d(off)}		-	22	-	
Fall Time	t _f		-	21	-	
Total Gate Charge at -4.5V	Q _g	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-5A	-	6.5	-	nC
Gate to Source Gate Charge	Q _{gs}		-	2.8	-	
Gate to Drain "Miller" Charge	Q _{gd}		-	3	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

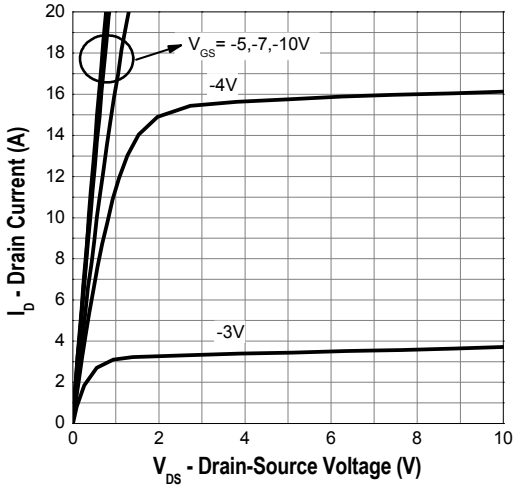
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-5A	-	-	-1.3	V
Body Diode Reverse Recovery Time	t _{rr}	I _F =-5A, di/dt=100A/μs	-	12	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	3.5	-	nC

Notes:

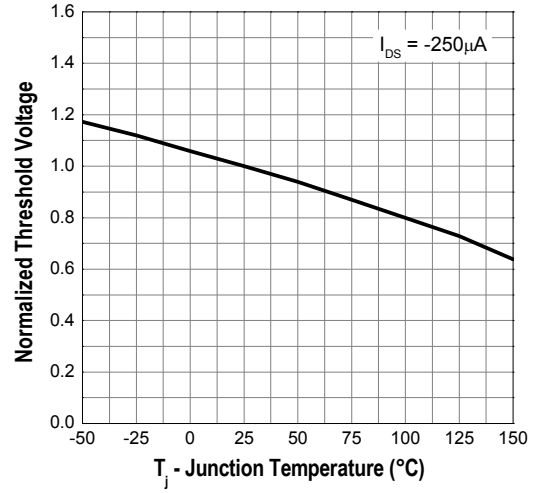
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θCA} is determined by the user's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

Typical Operating Characteristics

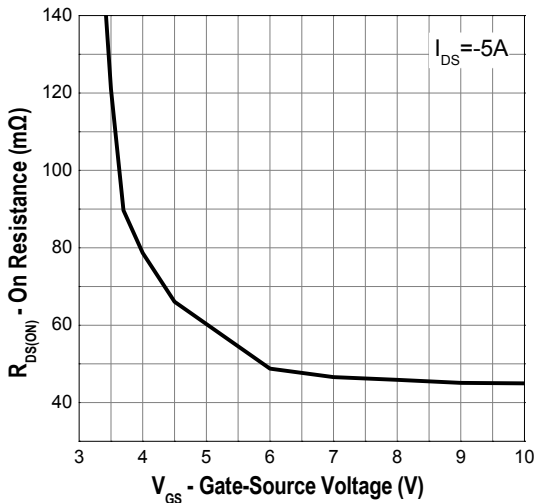
Output Characteristics



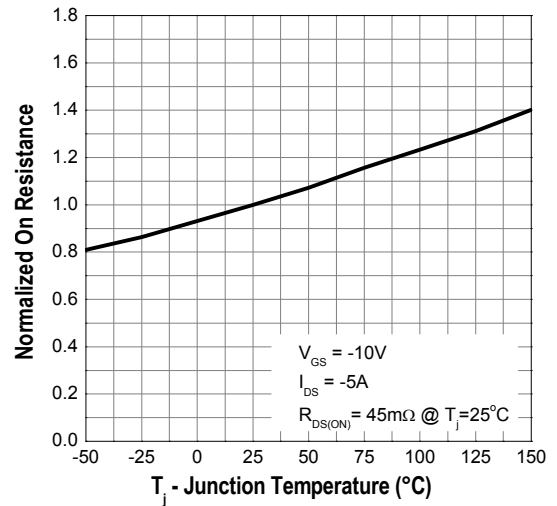
Gate Threshold Voltage



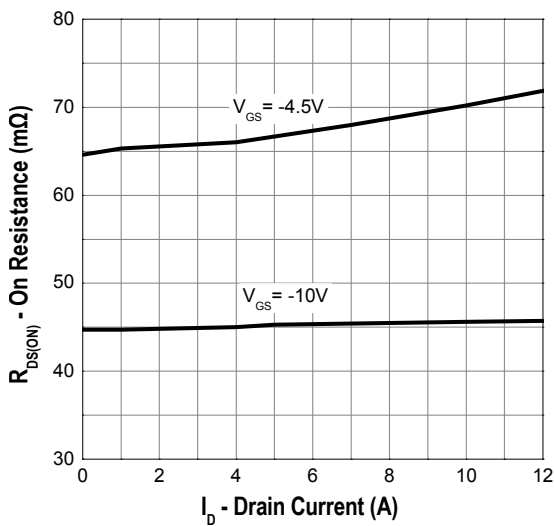
Gate-Source On Resistance



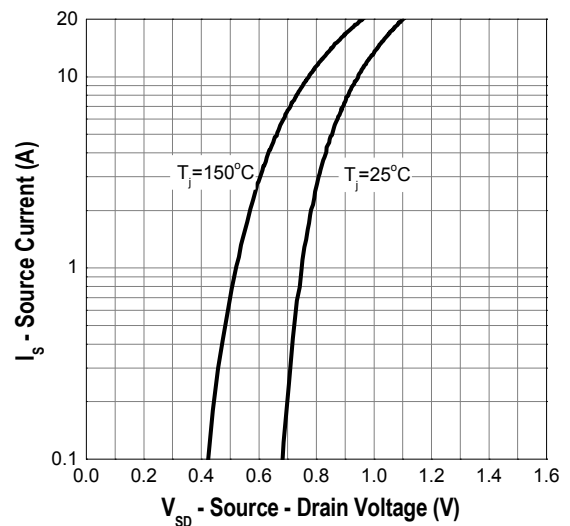
Drain-Source On Resistance



Drain-Source On Resistance

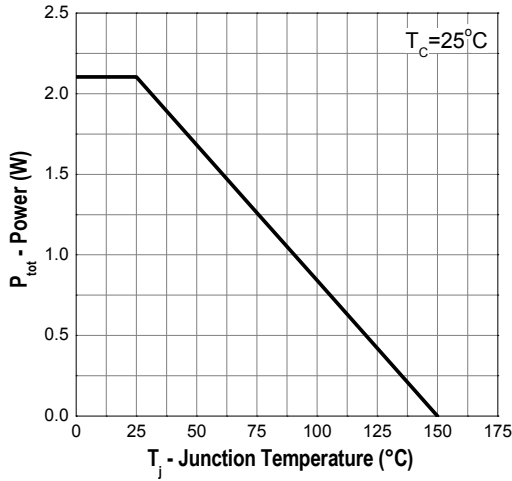


Source-Drain Diode Forward

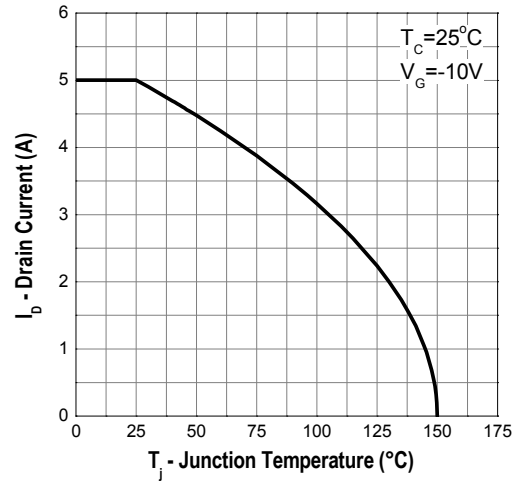


Typical Operating Characteristics (Cont.)

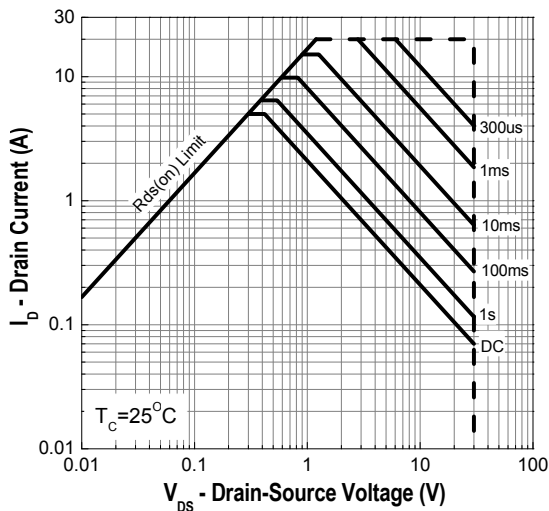
Power Dissipation



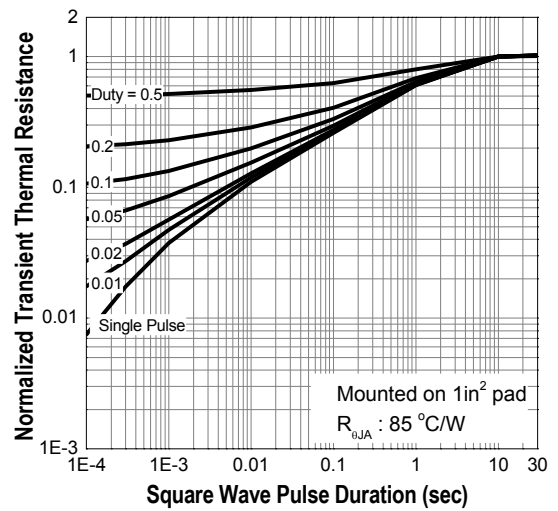
Drain Current



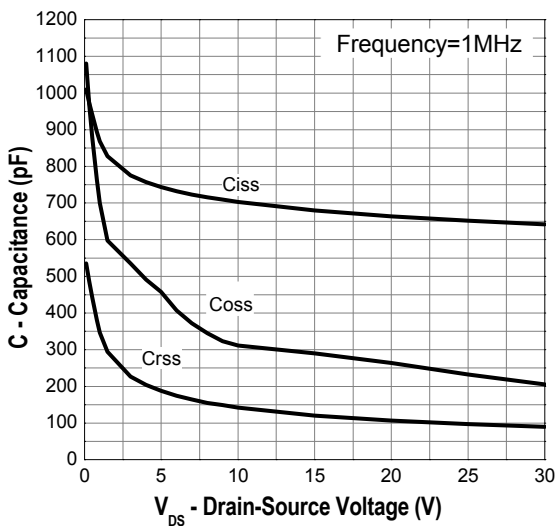
Safe Operation Area



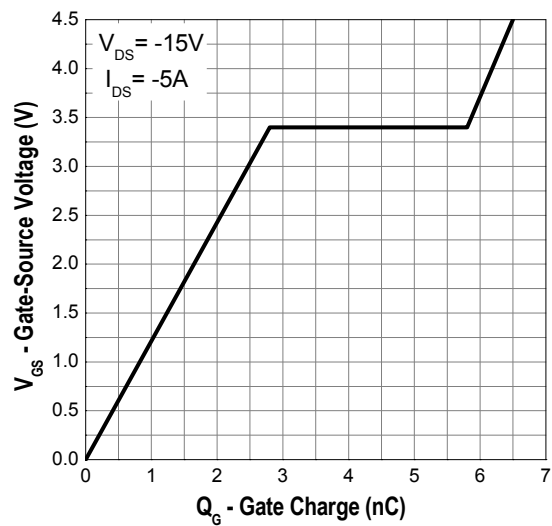
Transient Thermal Impedance



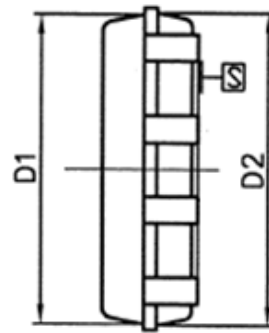
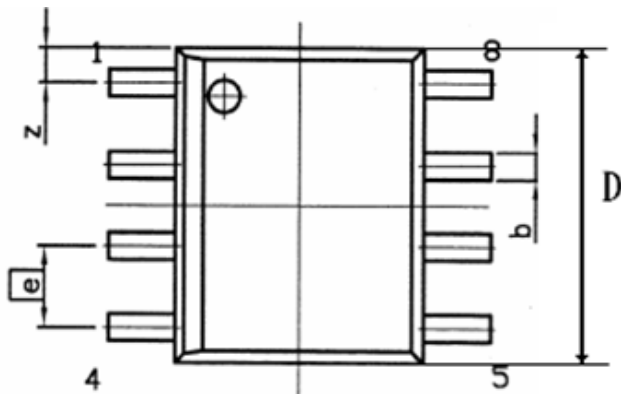
Capacitance



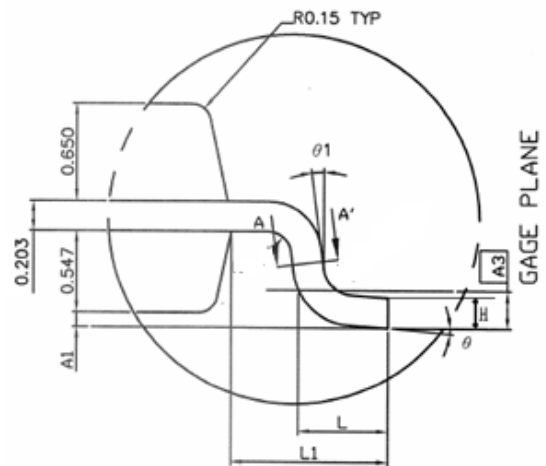
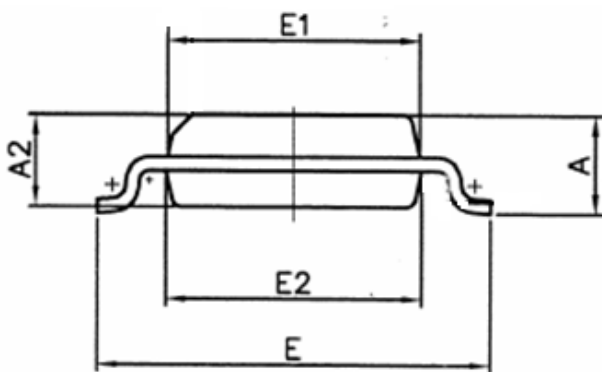
Gate Charge



SOP-8 Dimensions



DETAIL A

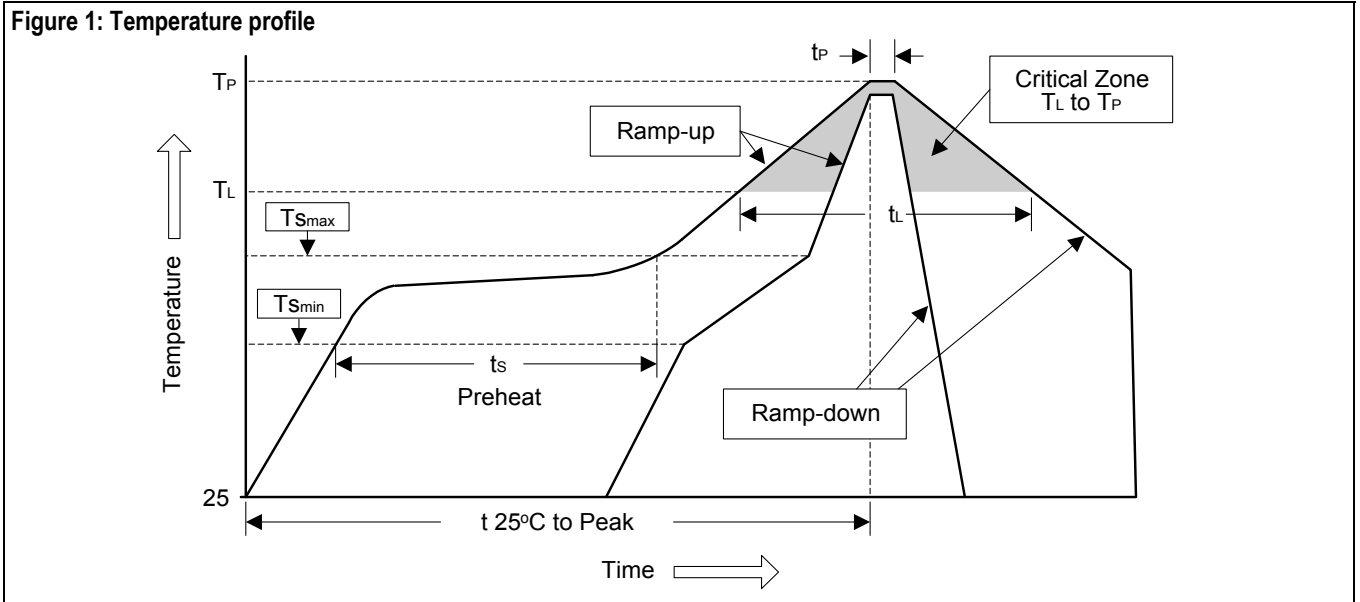


SOP-8 Dimensions

Symbols	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35	1.55	1.753	0.053	0.061	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2	1.27	1.52	1.626	0.050	0.060	0.064
A3	-	0.254	-	-	0.010	-
b	0.30	0.40	0.51	0.012	0.016	0.020
D	4.70	4.90	5.10	0.185	0.193	0.201
D1	4.70	4.90	5.00	0.185	0.193	0.197
D2	4.80	4.90	5.00	0.189	0.193	0.197
E	5.79	6.00	6.20	0.228	0.236	0.244
E1	3.75	3.90	4.00	0.148	0.154	0.157
E2	3.75	3.90	4.00	0.148	0.154	0.157
H	0.17	0.21	0.25	0.007	0.008	0.010
e	-	1.27	-	-	0.050	-
L	0.40	0.76	1.27	0.016	0.030	0.050
L1	0.95	1.05	1.15	0.037	0.041	0.045
θ	0°	4°	8°	0°	4°	8°
θ1	0°	-	-	0°	-	-

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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