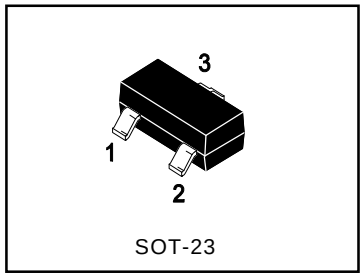
P-Channel 1.8-V (G-S) MOSFET

SI1013L
S-SI1013L



SOT-23

FEATURES

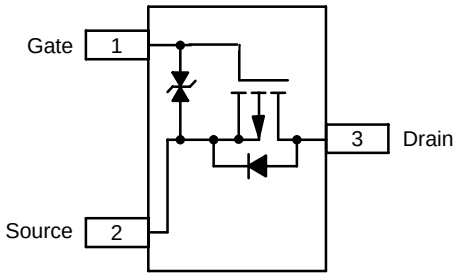
- TrenchFET® Power MOSFET: 1.8-V Rated
- Gate-Source ESD Protected: 2000 V
- High-Side Switching
- Low On-Resistance: 1.2 Ω
- Low Threshold: 0.8 V (typ)
- Fast Switching Speed: 14 ns
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

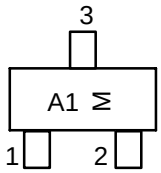


(Top View)

ORDERING INFORMATION

Device	Marking	Shipping
SI1013L S-SI1013L	A1	3000/Tape&Reel

MARKING DIAGRAM



A1 = Specific Device Code
M = Month Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±6		
Continuous Drain Current (T_J = 150°C)[b]	T_A = 25°C	I_D	-400	-350	mA
	T_A = 85°C		-300	-275	
Pulsed Drain Current[a]		I_{DM}	-1000		
Continuous Source Current (diode conduction)[b]		I_S	-275	-250	
Maximum Power Dissipation		P_D	225		mW
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C
Gate-Source ESD Rating (HBM, Method 3015)		ESD	2000		V

Notes
d. Pulse width limited by maximum junction temperature.
e. Surface Mounted on FR4 Board.

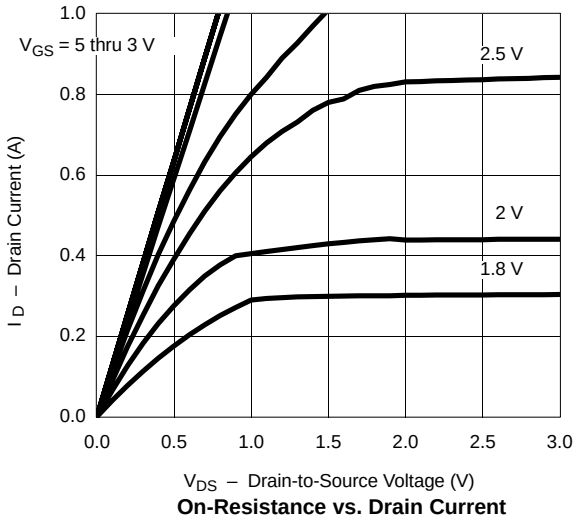
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ**	**Max**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 μA	–0.45		–1.3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±4.5 V		±1	±2	μA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –16 V, V_{GS} = 0 V		–0.3	–100	nA
		V_{DS} = –16 V, V_{GS} = 0 V, T_J = 85°C			–5	μA
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = –5 V, V_{GS} = –4.5 V	–700			mA
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = –4.5 V, I_D = –350 mA		0.8	1.2	Ω
		V_{GS} = –2.5 V, I_D = –300 m A		1.2	1.6	
		V_{GS} = –1.8 V, I_D = –10 m A		1.8	2.7	
Forward Transconductance[a]	g_{fs}	V_{DS} = –10 V, I_D = –250 mA		0.4		S
Diode Forward Voltage[a]	V_{SD}	I_S = –150 mA, V_{GS} = 0 V		–0.8	–1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = –10 V, V_{GS} = –4.5 V, I_D = –250 mA		1500		pC
Gate-Source Charge	Q_{gs}			150		
Gate-Drain Charge	Q_{gd}			450		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = –10 V, R_L = 47 Ω I_D ≅ –200 mA, V_{GEN} = –4.5 V, R_G = 10 Ω		5		ns
Rise Time	t_r			9		
Turn-Off Delay Time	$t_{d(off)}$			35		
Fall Time	t_f			11		

Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

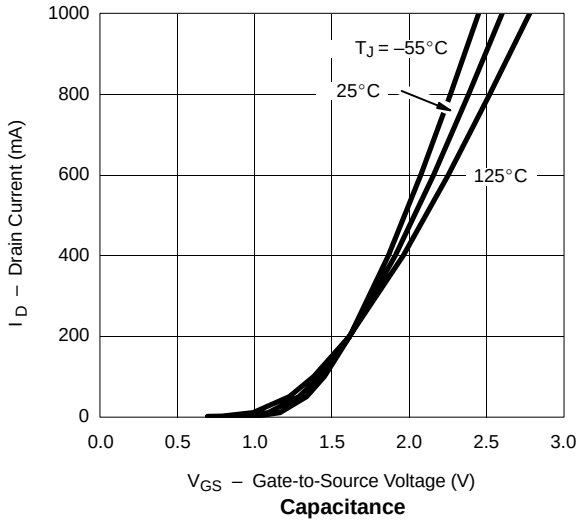
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

For the following graphs, p-channel negative polarities for all voltage and current values are represented as positive values.

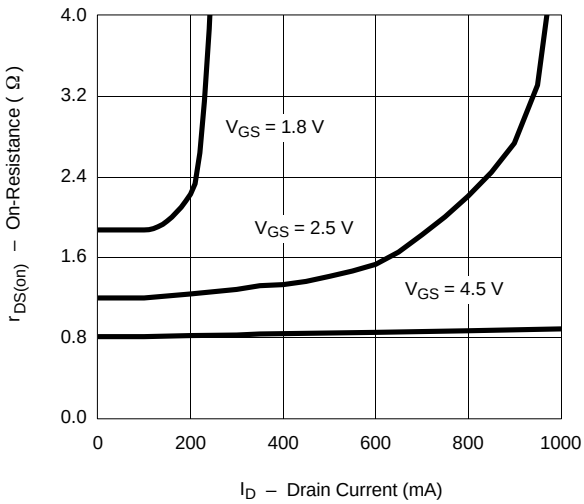
Output Characteristics



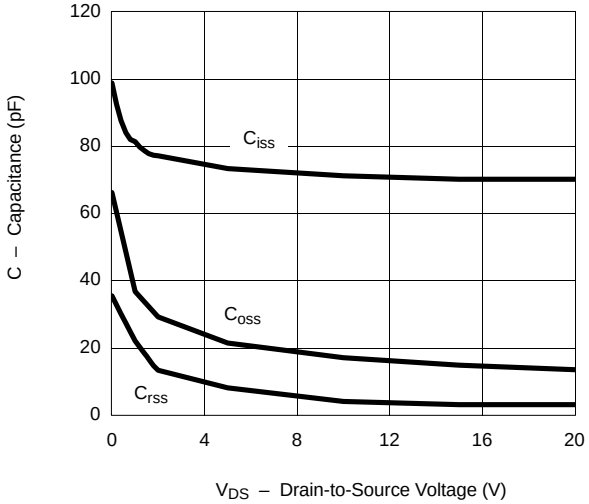
Transfer Characteristics



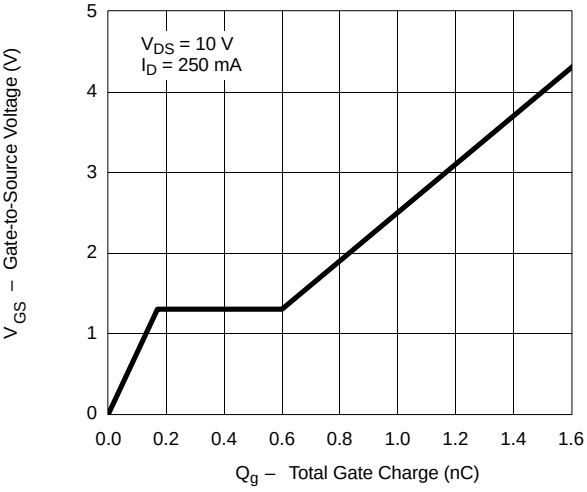
On-Resistance vs. Drain Current



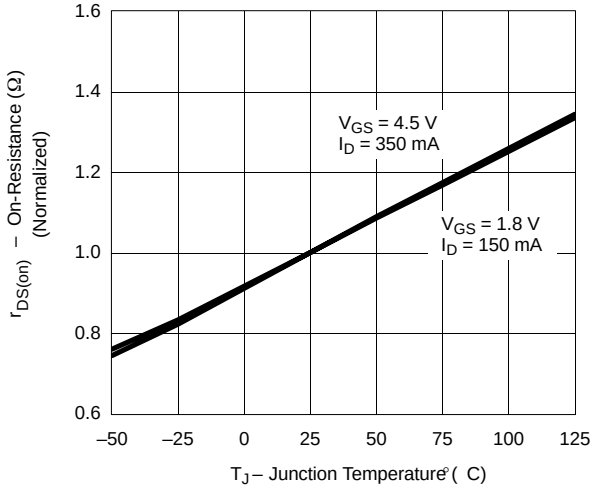
Capacitance



Gate Charge

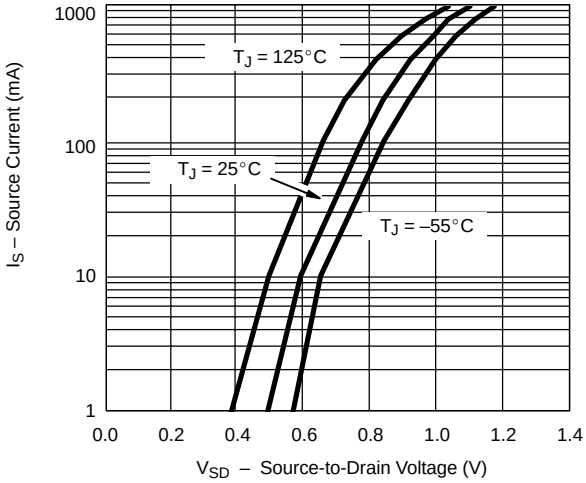


On-Resistance vs. Junction Temperature

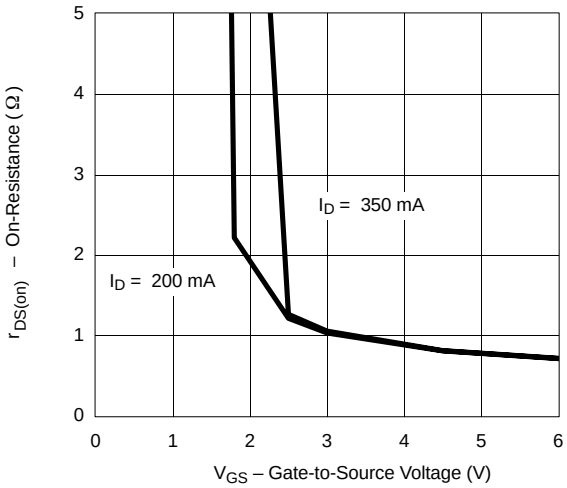


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

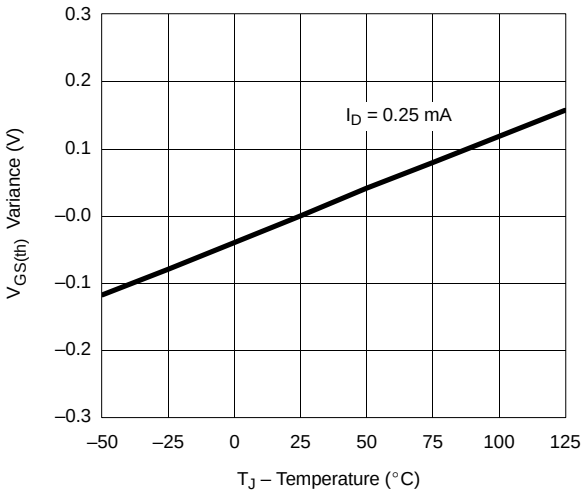
Source-Drain Diode Forward Voltage



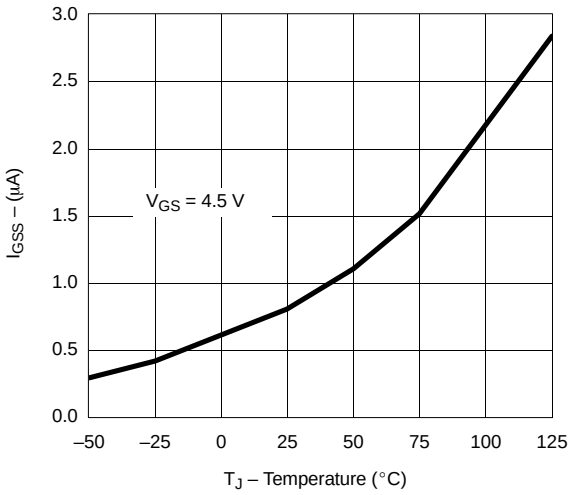
On-Resistance vs. Gate-to-Source Voltage



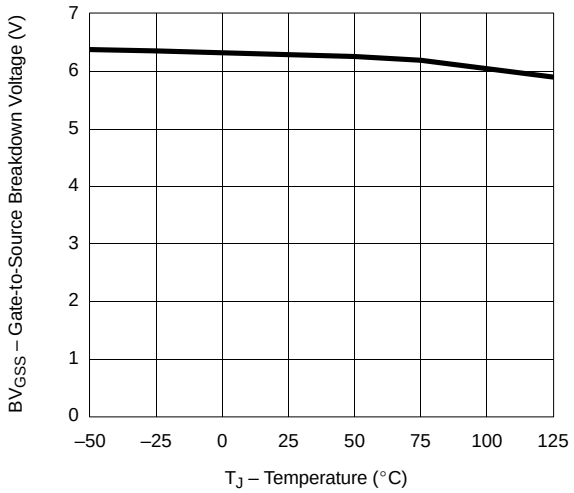
Threshold Voltage Variance vs. Temperature



I_{GSS} vs. Temperature

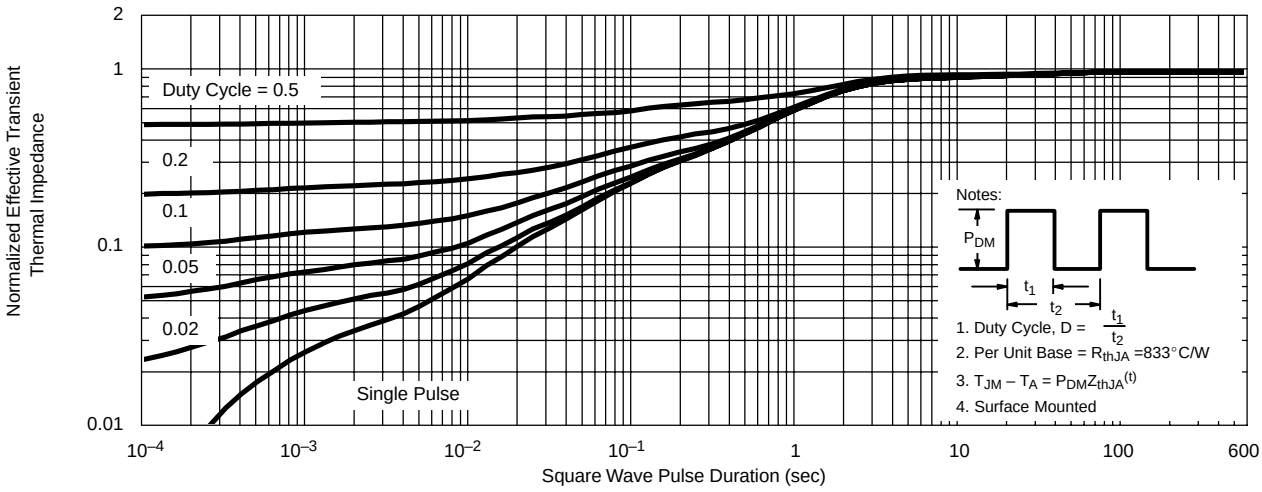


BV_{GSS} vs. Temperature

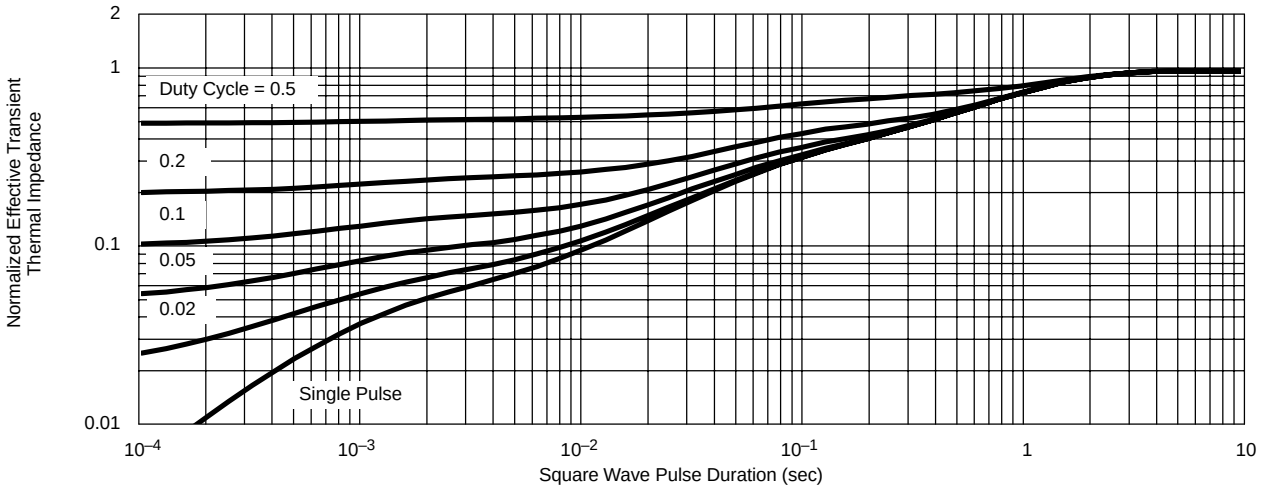


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

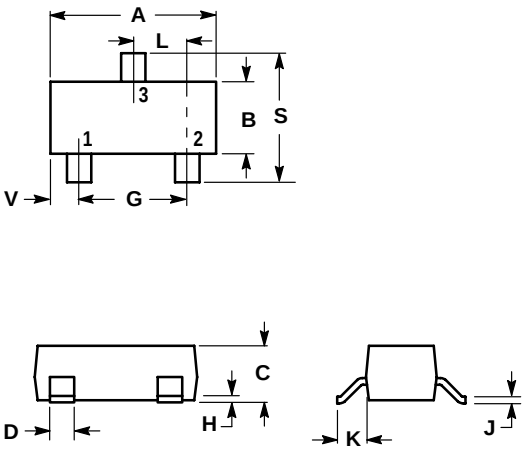
Normalized Thermal Transient Impedance, Junction-to-Ambient (SC-75A)



Normalized Thermal Transient Impedance, Junction-to-Foot



SOT–23



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60