

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

### PRODUCT SUMMARY

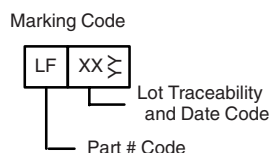
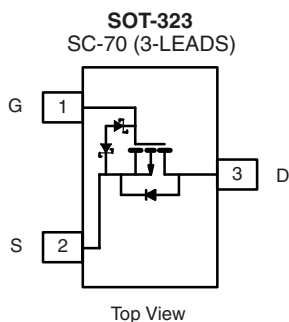
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 12	0.290 at $V_{GS} = - 4.5$ V	$\pm 0.91$
	0.435 at $V_{GS} = - 2.5$ V	$\pm 0.74$
	0.580 at $V_{GS} = - 1.8$ V	$\pm 0.64$

### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- ESD Protection: 3000 V
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available



**Ordering Information:** Si1307EDL-T1-E3 (Lead (Pb)-free)  
Si1307EDL-T1-GE3 (Lead (Pb)-free and Halogen-free)

### ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V <sub>DS</sub>	- 12		V
Gate-Source Voltage		V <sub>GS</sub>	± 8		
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 25 °C	I <sub>D</sub>	± 0.91	± 0.85	A
	T <sub>A</sub> = 70 °C		± 0.72	± 0.68	
Pulsed Drain Current		I <sub>DM</sub>	± 3		
Continuous Diode Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	- 0.28	- 0.24	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>	0.34	0.29	W
	T <sub>A</sub> = 70 °C		0.22	0.19	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	315	375	°C/W
		360	430	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	285	340	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

**SPECIFICATIONS**  $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted

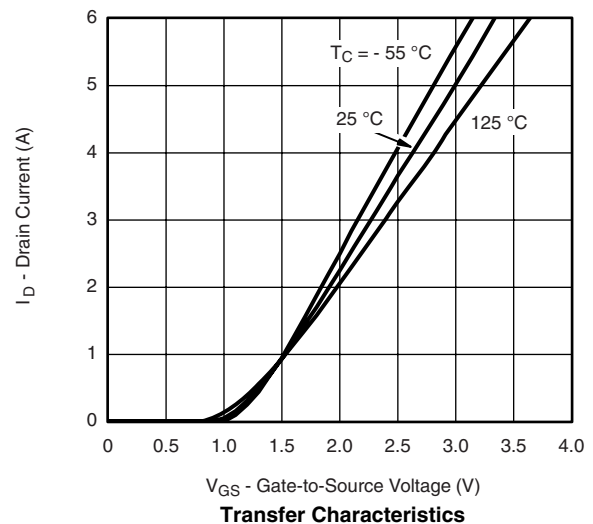
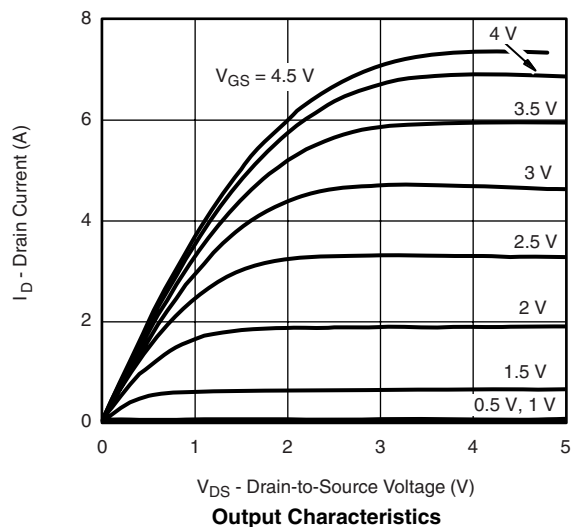
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	-0.45			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 4.5\text{ V}$			$\pm 1$	$\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -9.6\text{ V}$ , $V_{GS} = 0\text{ V}$ $V_{DS} = -9.6\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 70\text{ }^{\circ}\text{C}$			-1 -5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}$ , $V_{GS} = -4.5\text{ V}$	-3			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$ , $I_D = -1\text{ A}$		0.240	0.290	$\Omega$
		$V_{GS} = -2.5\text{ V}$ , $I_D = -0.5\text{ A}$		0.350	0.435	
		$V_{GS} = -1.8\text{ V}$ , $I_D = -0.3\text{ A}$		0.480	0.580	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}$ , $I_D = -1\text{ A}$		3.5		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -1\text{ A}$ , $V_{GS} = 0\text{ V}$			-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -6\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -1\text{ A}$		3.2	5	nC
Gate-Source Charge	$Q_{gs}$			0.69		
Gate-Drain Charge	$Q_{gd}$			0.61		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}$ , $R_L = 6\text{ }\Omega$ $I_D \cong -1\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ , $R_g = 6\text{ }\Omega$		210	340	ns
Rise Time	$t_r$			450	720	
Turn-Off Delay Time	$t_{d(off)}$			910	1550	
Fall Time	$t_f$			1000	1600	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -1\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$		540	860	

Notes:

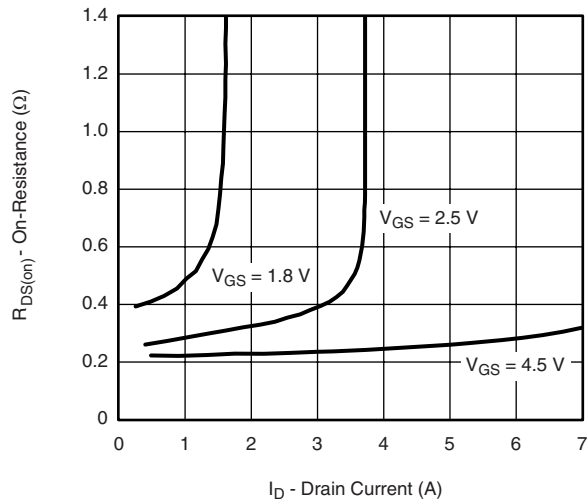
a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to production testing.

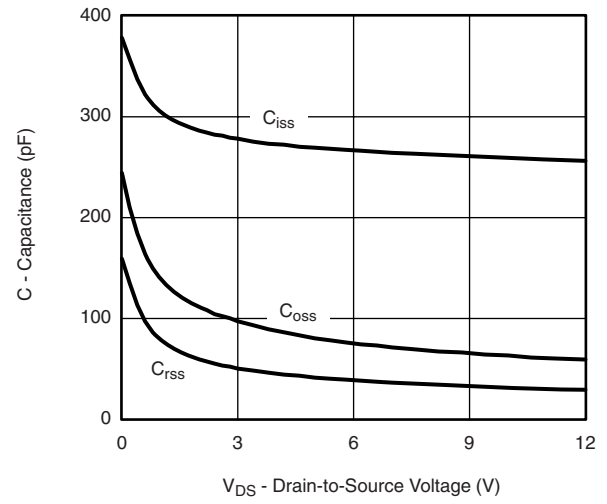
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS**  $25\text{ }^{\circ}\text{C}$ , unless otherwise noted

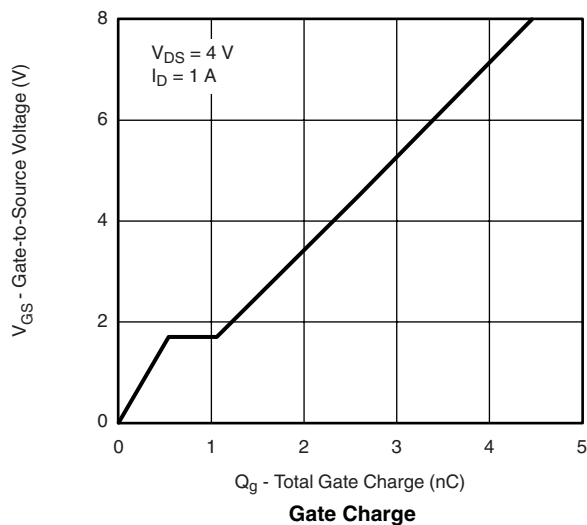
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



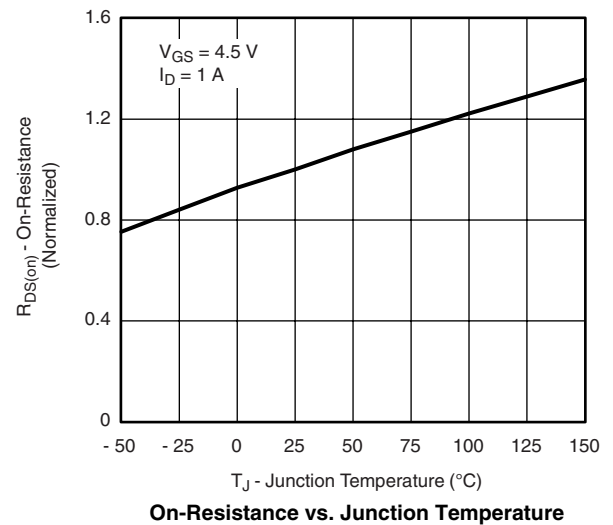
On-Resistance vs. Drain Current



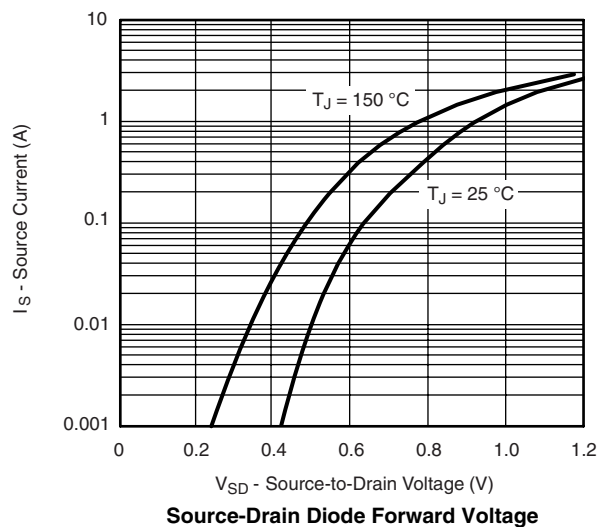
Capacitance



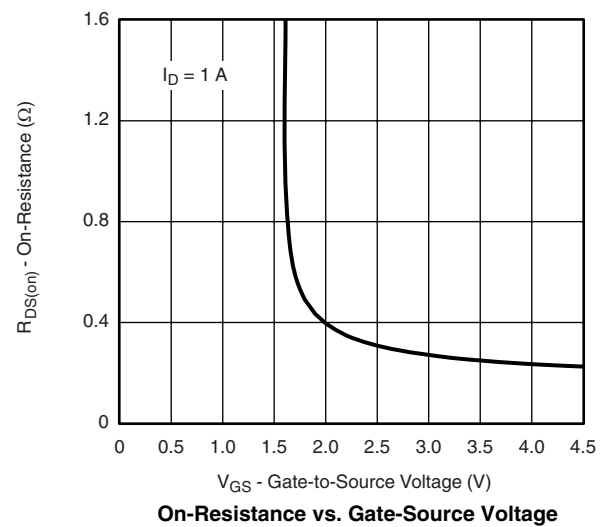
Gate Charge



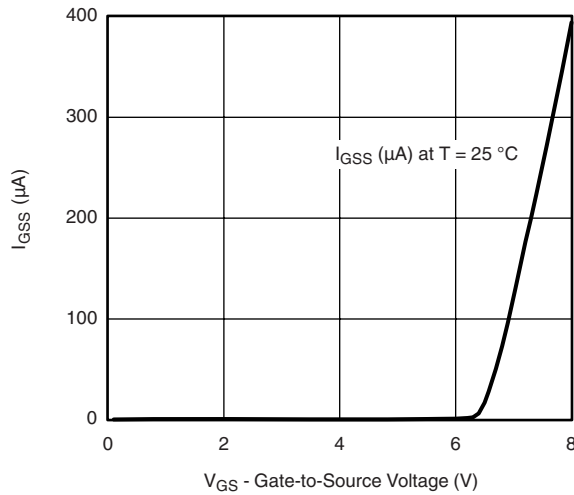
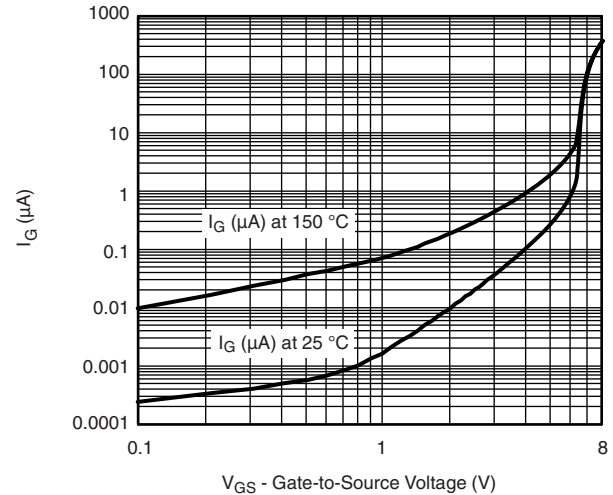
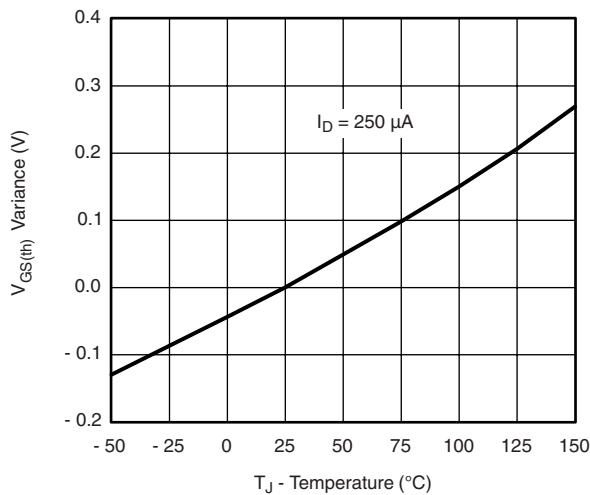
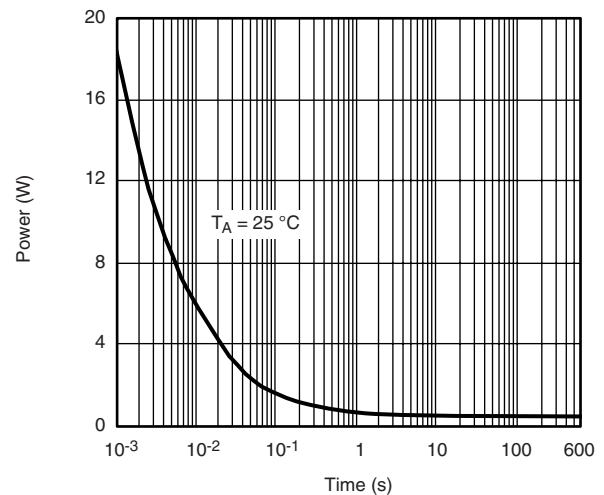
On-Resistance vs. Junction Temperature



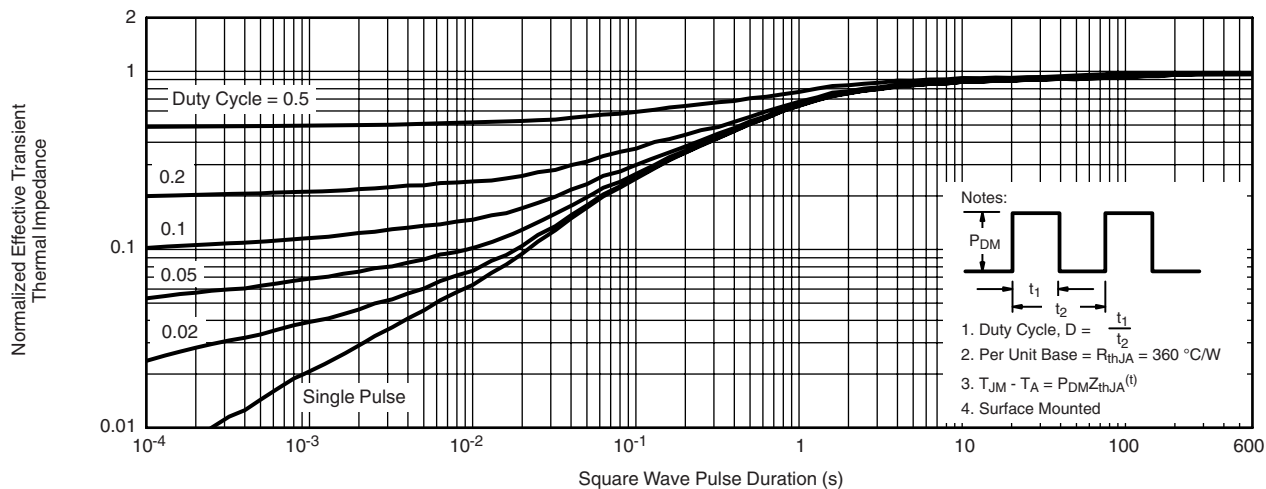
Source-Drain Diode Forward Voltage



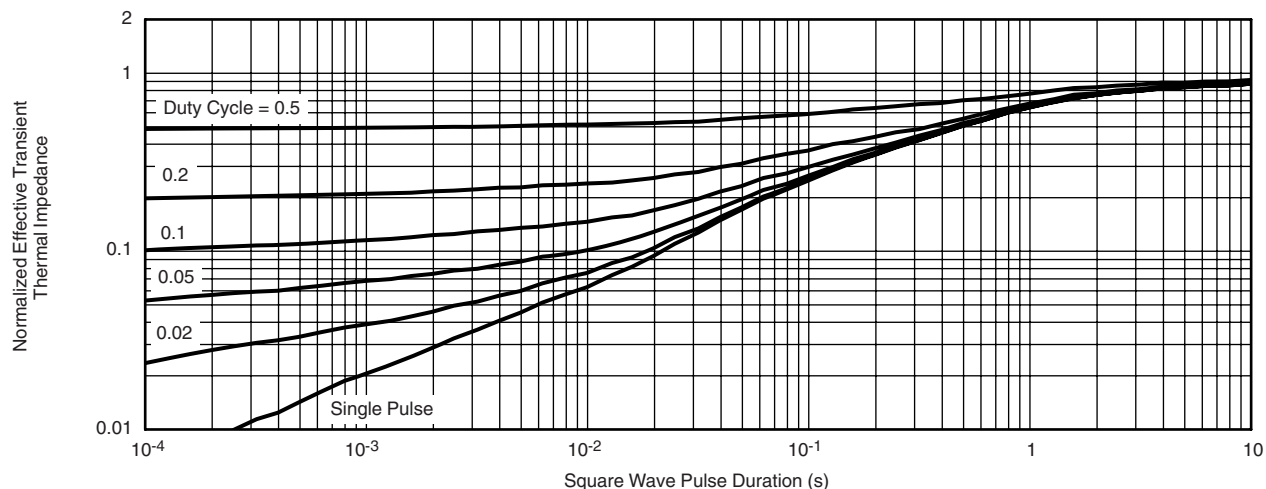
On-Resistance vs. Gate-Source Voltage

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted**Gate-Current vs. Gate-to-Source Voltage****Gate-to-Source Voltage vs. Gate Current****Threshold Voltage****Single Pulse Power**

## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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