



**THE DATASHEET OF  
SI2311DS-T1-E3**



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

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
- 8	0.045 at V <sub>GS</sub> = - 4.5 V	- 3.5
	0.072 at V <sub>GS</sub> = - 2.5 V	- 2.8
	0.120 at V <sub>GS</sub> = - 1.8 V	- 2.0

### FEATURES

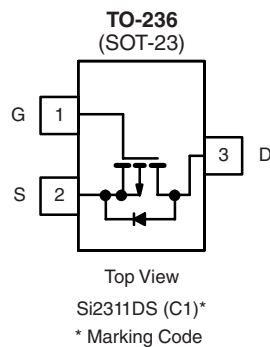
- Halogen-free Option Available
- TrenchFET<sup>®</sup> Power MOSFET



**RoHS**  
COMPLIANT

### APPLICATIONS

- Load Switch



**Ordering Information:** Si2311DS-T1-E3 (Lead (Pb)-free)  
Si2311DS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted				
Parameter	Symbol	5 s	Steady State	Unit
Drain-Source Voltage	V <sub>DS</sub>	- 8		V
Gate-Source Voltage	V <sub>GS</sub>	± 8		
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a, b</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	- 3.5	- 3.0
		T <sub>A</sub> = 70 °C	- 2.8	- 2.4
Pulsed Drain Current	I <sub>DM</sub>	- 10		A
Continuous Source Current (Diode Conduction) <sup>a, b</sup>	I <sub>S</sub>	- 0.8	- 0.6	
Maximum Power Dissipation <sup>a, b</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	0.96	0.71
		T <sub>A</sub> = 70 °C	0.62	0.46
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>	t ≤ 5 s	R <sub>thJA</sub>	100	130	°C/W
	Steady State		140	175	
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	60	75	

Notes:

- Surface Mounted on FR4 board.
- Pulse width limited by maximum junction temperature.

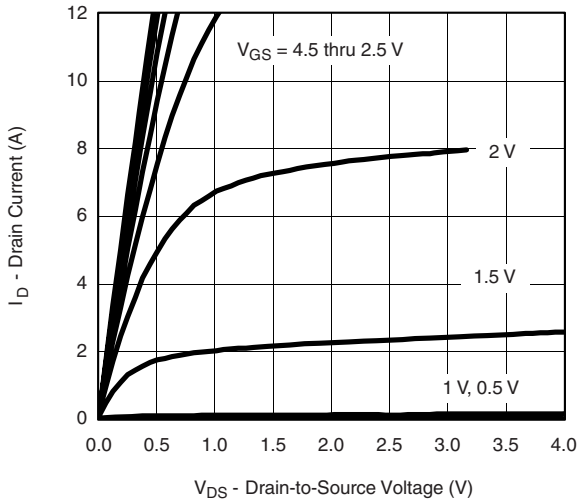
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\text{ }\mu\text{A}$	- 8			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 0.45		- 0.8	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -6.4\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -6.4\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$	- 6			A
		$V_{DS} \leq -5\text{ V}, V_{GS} = -2.5\text{ V}$	- 3			
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -3.5\text{ A}$		0.036	0.045	$\Omega$
		$V_{GS} = -2.5\text{ V}, I_D = -3\text{ A}$		0.058	0.072	
		$V_{GS} = -1.8\text{ V}, I_D = -0.7\text{ A}$		0.096	0.120	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}, I_D = -3.5\text{ A}$		9.0		S
Diode Forward Voltage	$V_{SD}$	$I_S = -0.8\text{ A}, V_{GS} = 0\text{ V}$			- 1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -4\text{ V}, V_{GS} = -4.5\text{ V}$ $I_D \cong -3.5\text{ A}$		8.5	12	nC
Gate-Source Charge	$Q_{gs}$			1.5		
Gate-Drain Charge	$Q_{gd}$			2.1		
Input Capacitance	$C_{iss}$	$V_{DS} = -4\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		970		pF
Output Capacitance	$C_{oss}$			485		
Reverse Transfer Capacitance	$C_{rss}$			160		
<b>Switching<sup>b</sup></b>						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}, R_L = 4\text{ }\Omega$ $I_D \cong -1.0\text{ A}, V_{GEN} = -4.5\text{ V}$ $R_G = 6\text{ }\Omega$		18	25	ns
	$t_r$			45	65	
Turn-Off Time	$t_{d(off)}$			40	60	
	$t_f$			45	65	

## Notes:

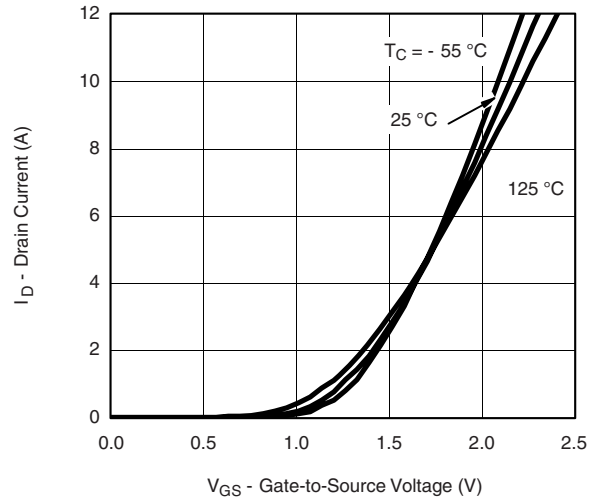
- a. For DESIGN AID ONLY, not subject to production testing.  
b. Pulse test:  $PW \leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
c. Switching time is essentially independent of operating temperature.

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.

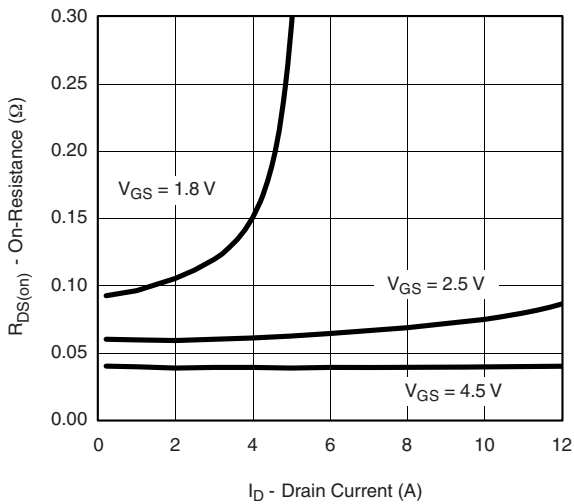
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



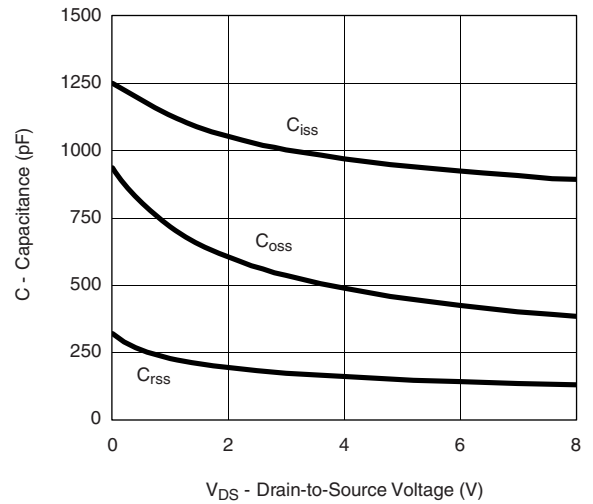
**Output Characteristics**



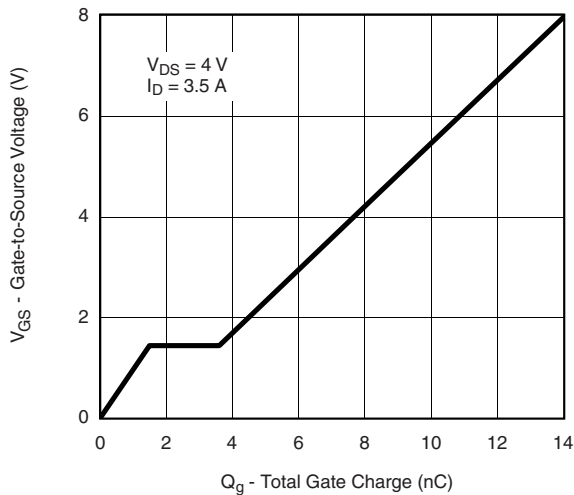
**Transfer Characteristics**



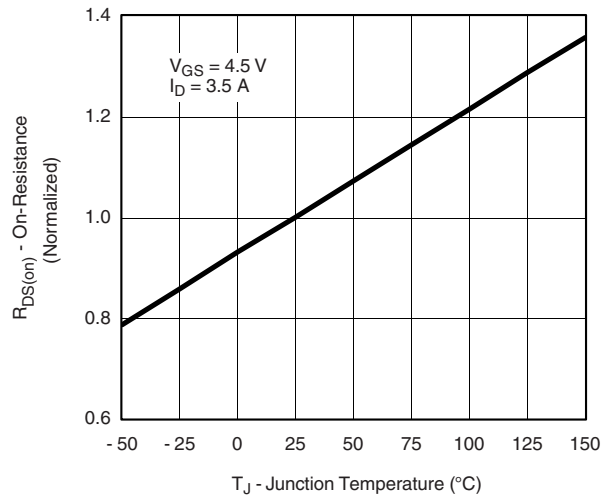
**On-Resistance vs. Drain Current**



**Capacitance**

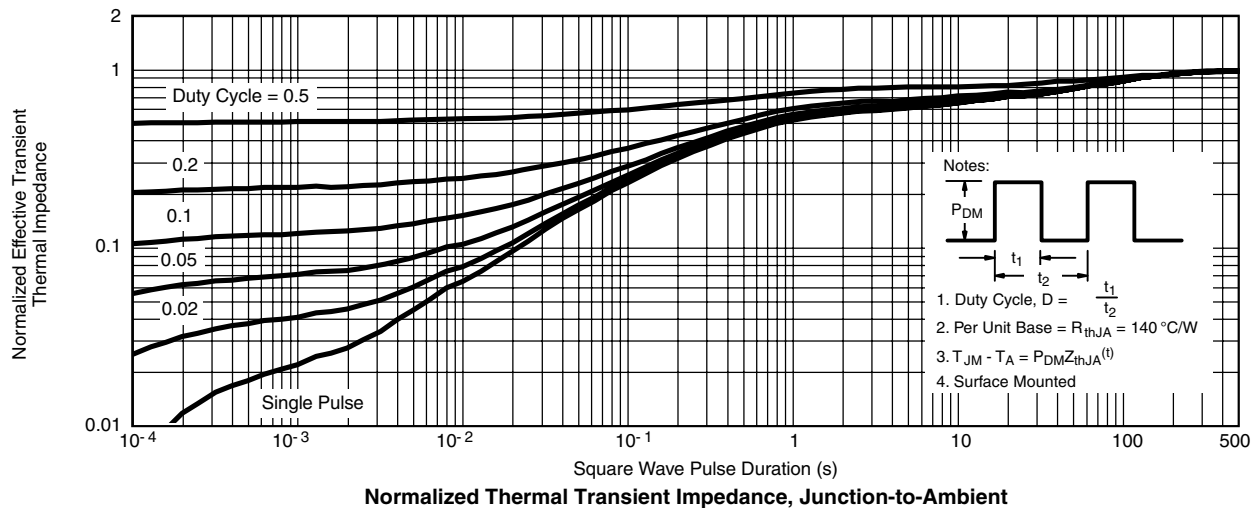
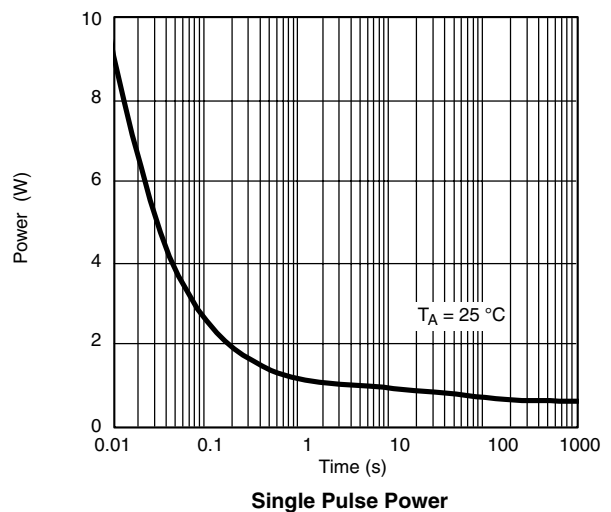
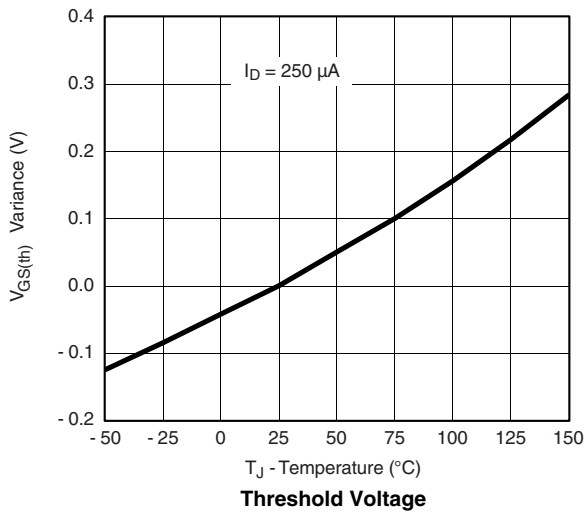
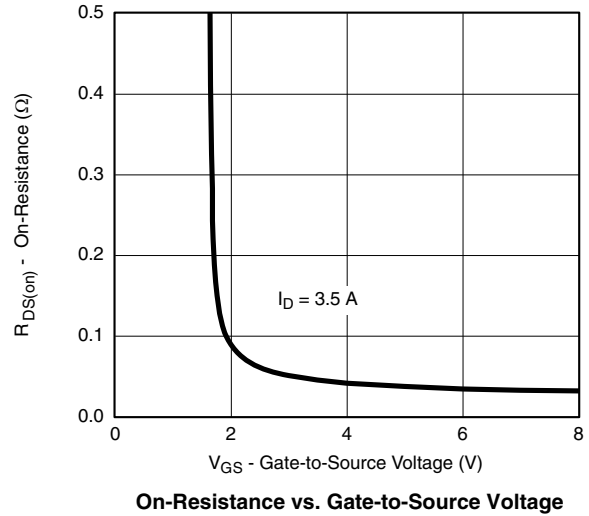
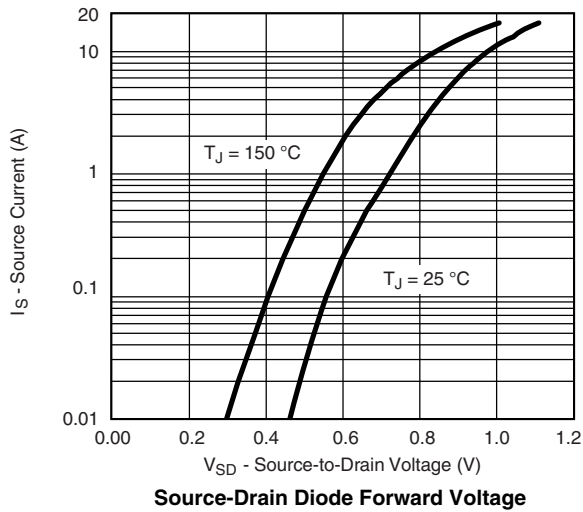


**Gate Charge**



**On-Resistance vs. Junction Temperature**

### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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