

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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
- 12	0.048 at $V_{GS} = - 4.5$ V	- 3.6
	0.062 at $V_{GS} = - 2.5$ V	- 3.2
	0.090 at $V_{GS} = - 1.8$ V	- 2.7

FEATURES

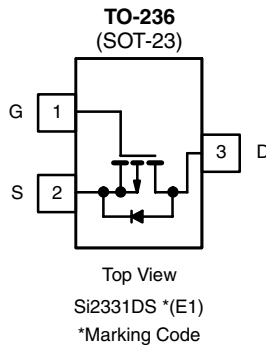
- TrenchFET[®] Power MOSFETS

APPLICATIONS

- Load Switch
- PA Switch



RoHS*
COMPLIANT



Ordering Information: Si2331DS-T1
Si2331DS-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	5 sec	Steady State	Unit	
Drain-Source Voltage	V_{DS}	- 12		V	
Gate-Source Voltage	V_{GS}	± 8			
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	- 3.6	- 3.2	A
		$T_A = 70$ °C	- 2.9	- 2.6	
Pulsed Drain Current ^a	I_{DM}	- 12			
Continuous Source Current (Diode Conduction) ^a	I_S	- 0.74	- 0.59		
Power Dissipation ^a	P_D	$T_A = 25$ °C	0.89	0.71	W
		$T_A = 70$ °C	0.57	0.45	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 5$ sec	R_{thJA}	115	140	°C/W
	Steady State		140	175	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes:

a. Surface Mounted on FR4 Board.

b. $t \leq 5$ sec.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

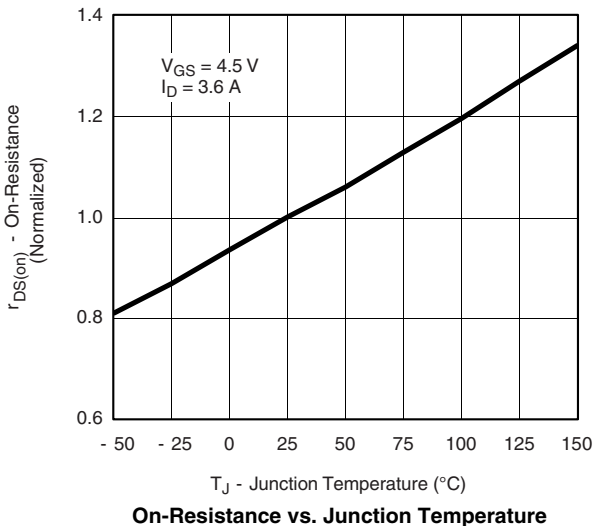
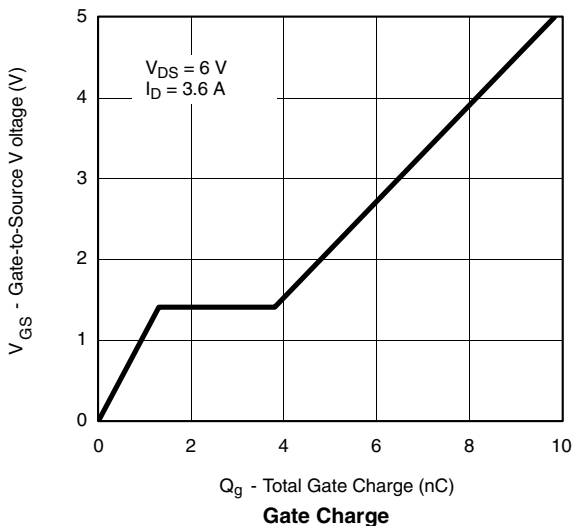
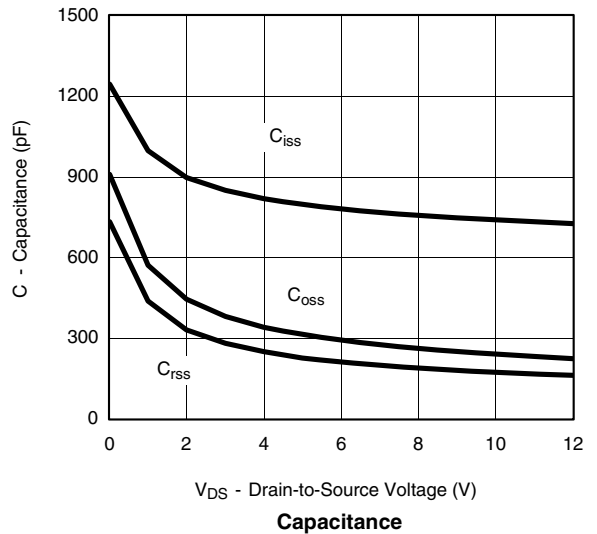
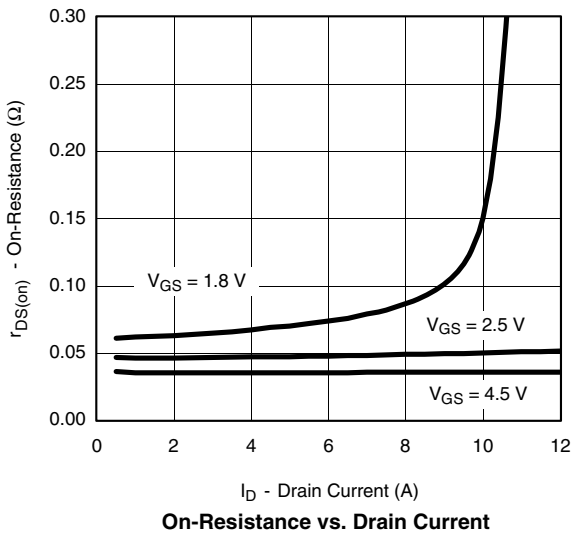
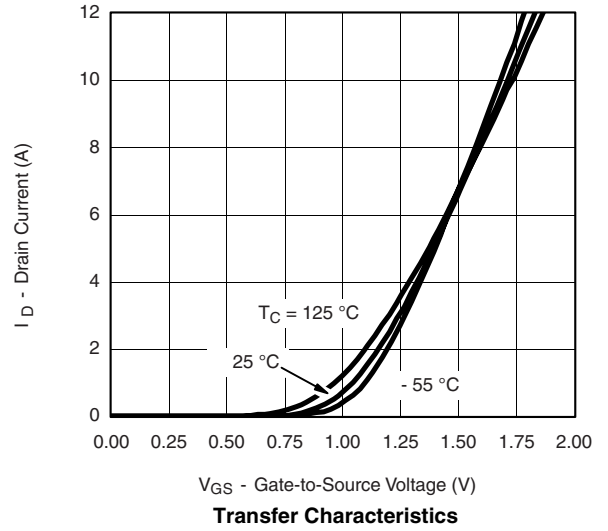
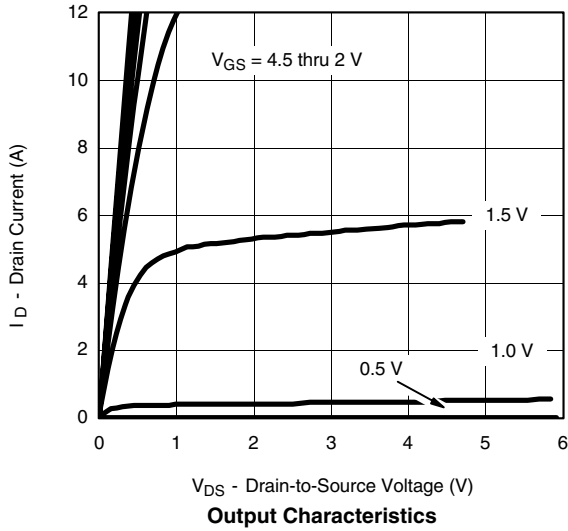
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = -10\text{ }\mu\text{A}$	-12			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-0.45		-0.90	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -12\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$, $V_{GS} = -4.5\text{ V}$	-6			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -3.6\text{ A}$		0.038	0.048	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -3.2\text{ A}$		0.049	0.062	
		$V_{GS} = -1.8\text{ V}$, $I_D = -2.7\text{ A}$		0.070	0.090	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -3.6\text{ A}$		3		S
Diode Forward Voltage	V_{SD}	$I_S = -1.6\text{ A}$, $V_{GS} = 0\text{ V}$			-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}$, $V_{GS} = -4.5\text{ V}$ $I_D \cong -3.6\text{ A}$		9	14	nC
Gate-Source Charge	Q_{gs}			1.3		
Gate-Drain Charge	Q_{gd}			2.5		
Input Capacitance	C_{iss}	$V_{DS} = -6\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		780		pF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{rss}			210		
Switching^b						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}$, $R_L = 6\text{ }\Omega$ $I_D \cong -1.0\text{ A}$, $V_{GEN} = -4.5\text{ V}$ $R_G = 6\text{ }\Omega$		20	30	ns
	t_r			35	55	
Turn-Off Time	$t_{d(off)}$			65	100	
	t_f			50	75	

Notes:

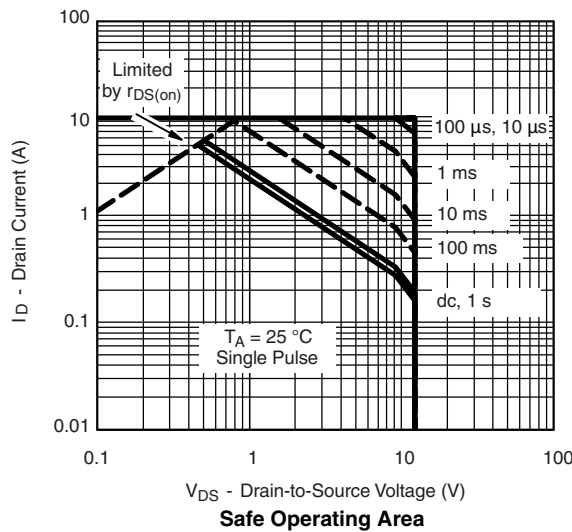
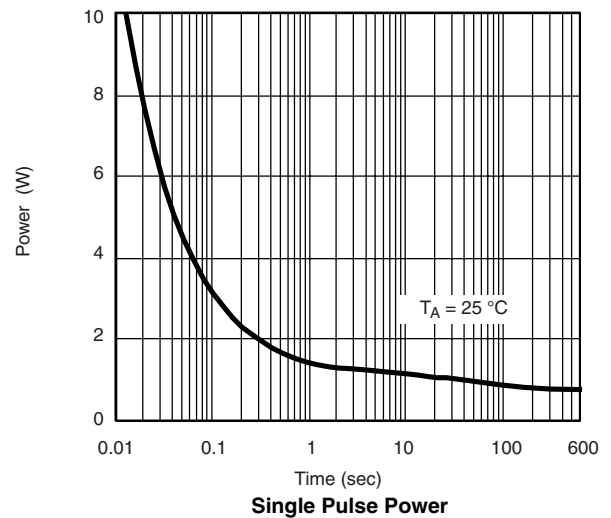
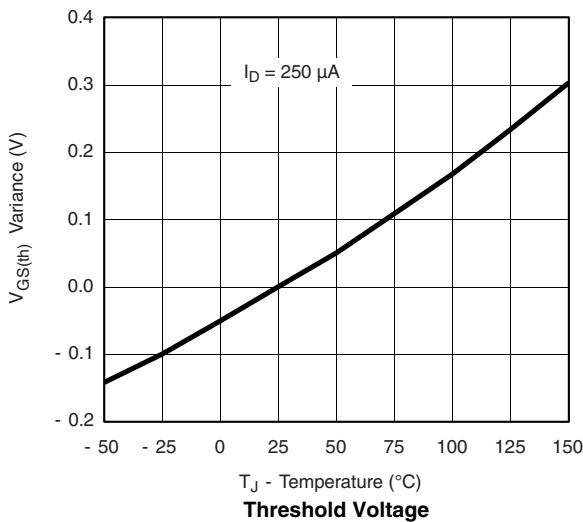
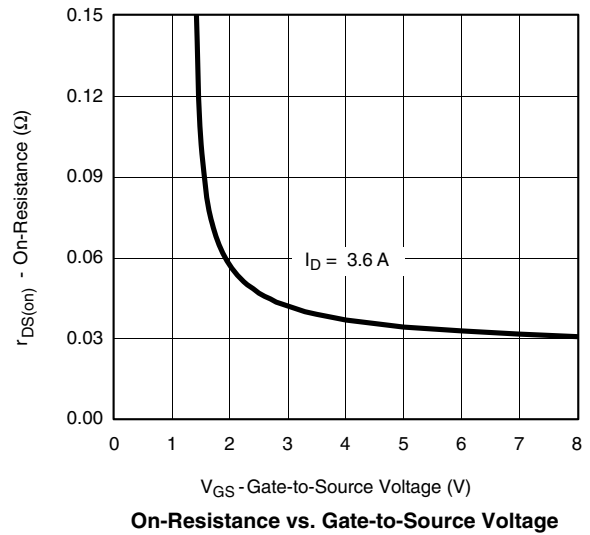
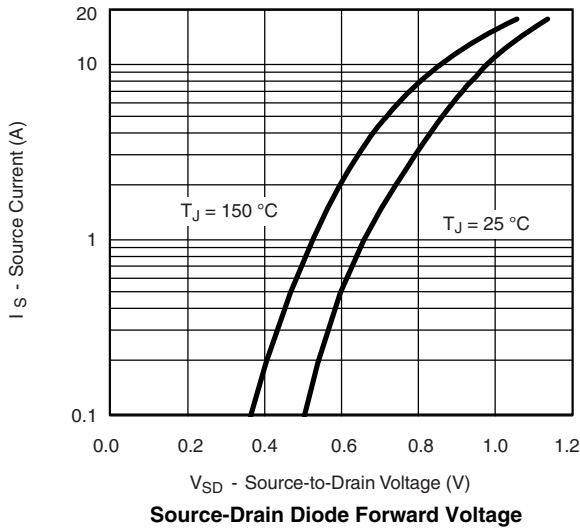
- a. For DESIGN AID ONLY, not subject to production testing.
 b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
 c. Switching time is essentially independent of operating temperature.

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.

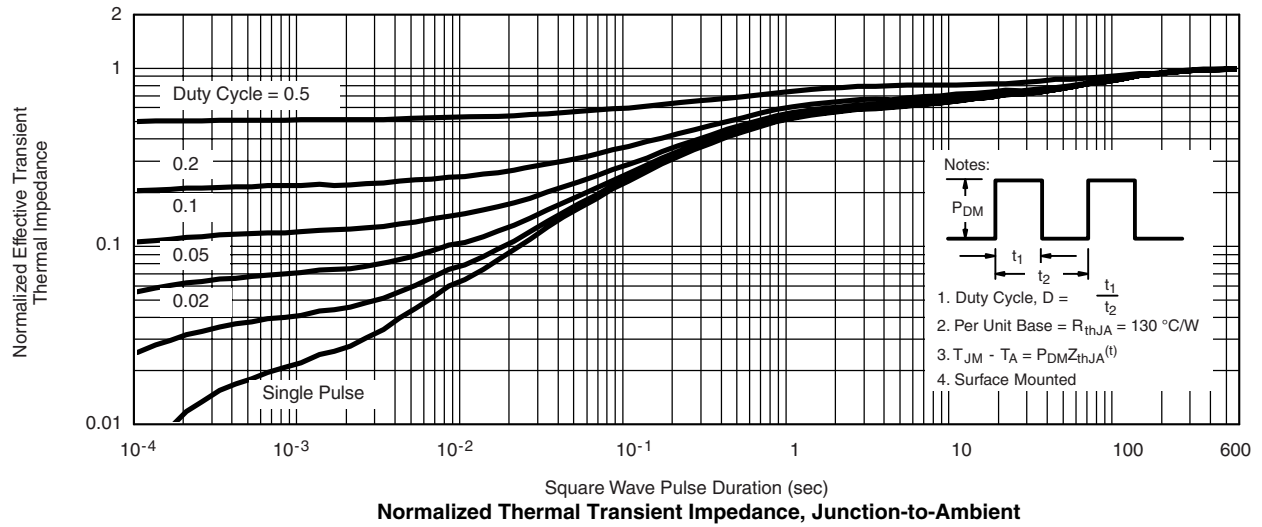
TYPICAL CHARACTERISTICS 25 °C, unless noted



TYPICAL CHARACTERISTICS 25 °C, unless noted



TYPICAL CHARACTERISTICS 25 °C, unless noted



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?72152>.



Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.