



N-Channel 20-V (D-S) MOSFET

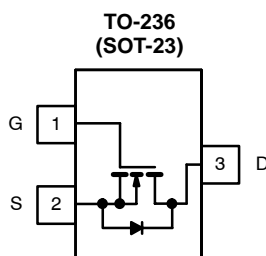
PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
20	0.033 @ $V_{GS} = 4.5$ V	4.9	11.2
	0.040 @ $V_{GS} = 2.5$ V	4.4	
	0.051 @ $V_{GS} = 1.8$ V	3.9	

FEATURES

- 1.8-V Rated
- RoHS Compliant



Pb-free
Available



Top View
Si2312DS (C2)*
*Marking Code

Ordering Information: Si2312DS-T1
Si2312DS-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}	20		V
Gate-Source Voltage		V _{GS}	±8		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	4.9	3.77	A
	T _A = 70 °C		3.9	3.0	
Pulsed Drain Current ^b		I _{DM}	15		
Avalanche Current ^b		I _{AS}	15		
Single Avalanche Energy		E _{AS}	11.25		mJ
Continuous Source Current (Diode Conduction) ^a		I _S	1.0		A
Power Dissipation ^a	T _A = 25 °C	P _D	1.25	0.75	W
	T _A = 70 °C		0.80	0.48	
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}	75	100	$^\circ\text{C/W}$
	Steady State		120	166	
Maximum Junction-to-Foot	Steady State	R_{thJF}	40	50	

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
b. Pulse width limited by maximum junction temperature

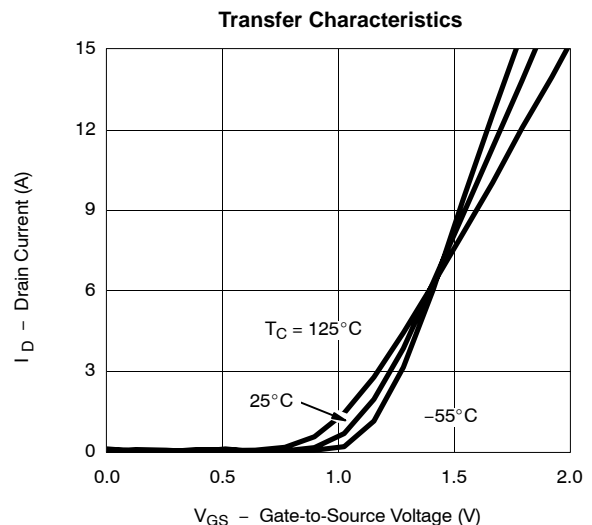
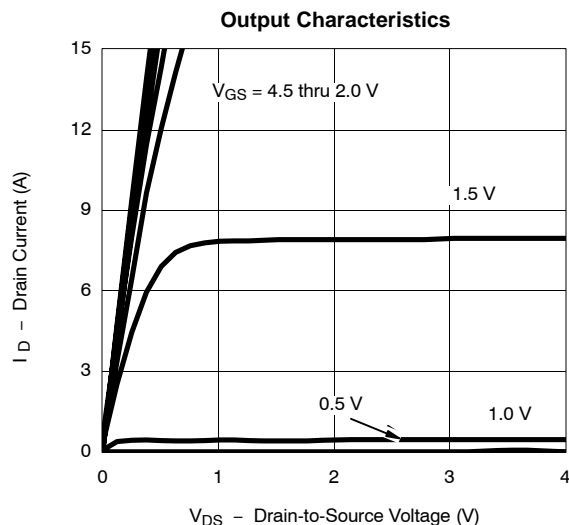
SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.45	0.65	0.85	
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}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 70^\circ\text{C}$			75	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 4.5\text{ V}$	15			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 5.0\text{ A}$		0.027	0.033	Ω
		$V_{GS} = 2.5\text{ V}, I_D = 4.5\text{ A}$		0.033	0.040	
		$V_{GS} = 1.8\text{ V}, I_D = 4.0\text{ A}$		0.042	0.051	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 5.0\text{ A}$		40		S
Diode Forward Voltage	V_{SD}	$I_S = 1.0\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5.0\text{ A}$		11.2	14.0	nC
Gate-Source Charge	Q_{gs}			1.4		
Gate-Drain Charge	Q_{gd}			2.2		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong 1.0\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 6\text{ }\Omega$		15	25	ns
Rise Time	t_r			40	60	
Turn-Off Delay Time	$t_{d(off)}$			48	70	
Fall-Time	t_f			31	45	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.0\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		13	25	

Notes

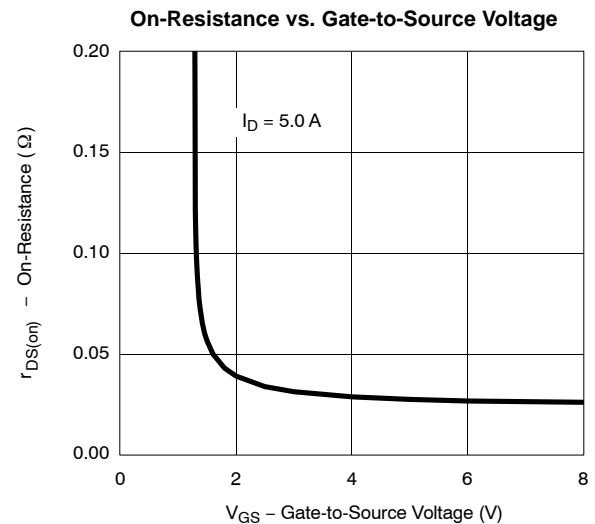
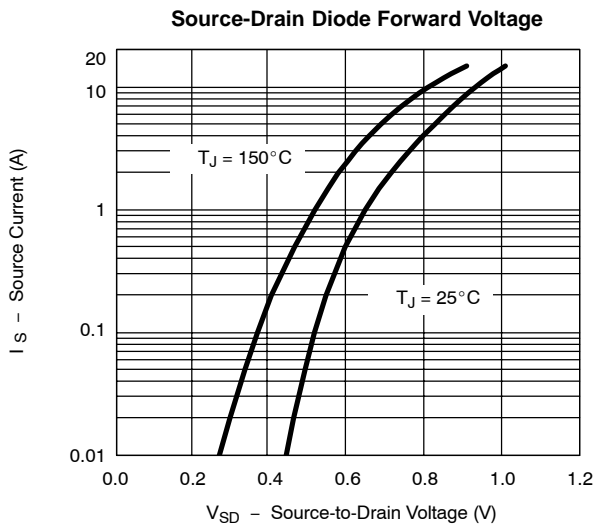
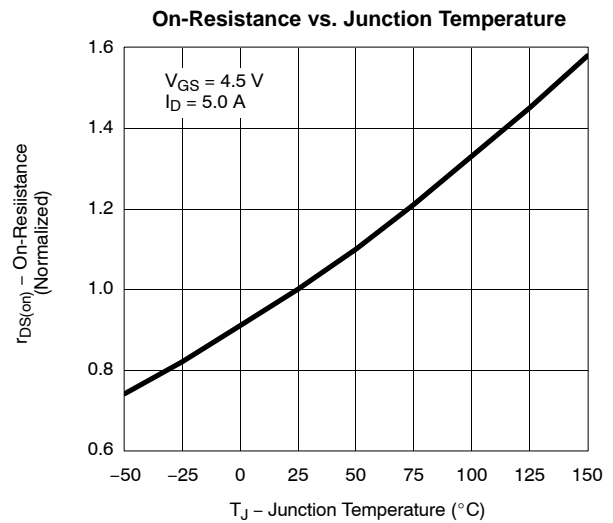
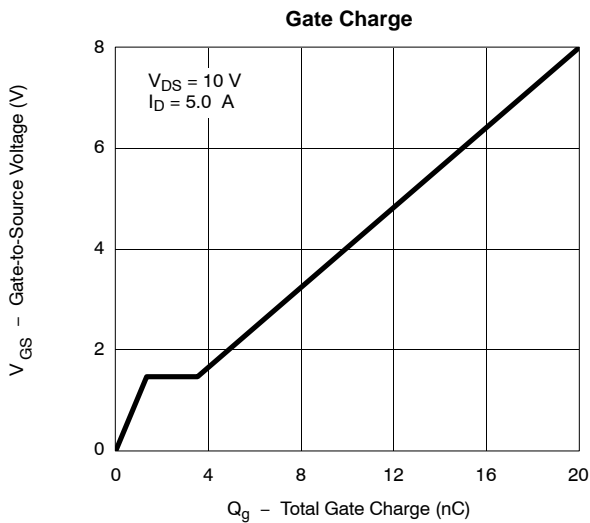
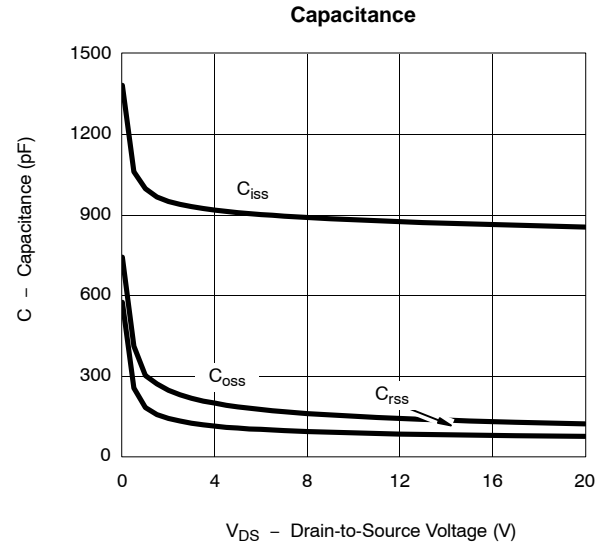
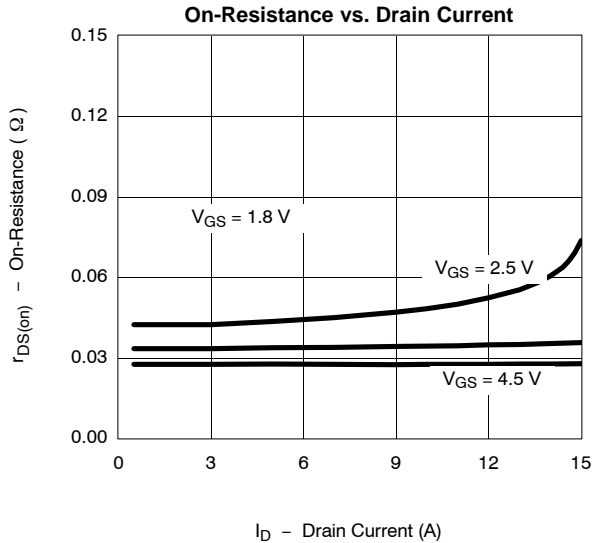
- a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

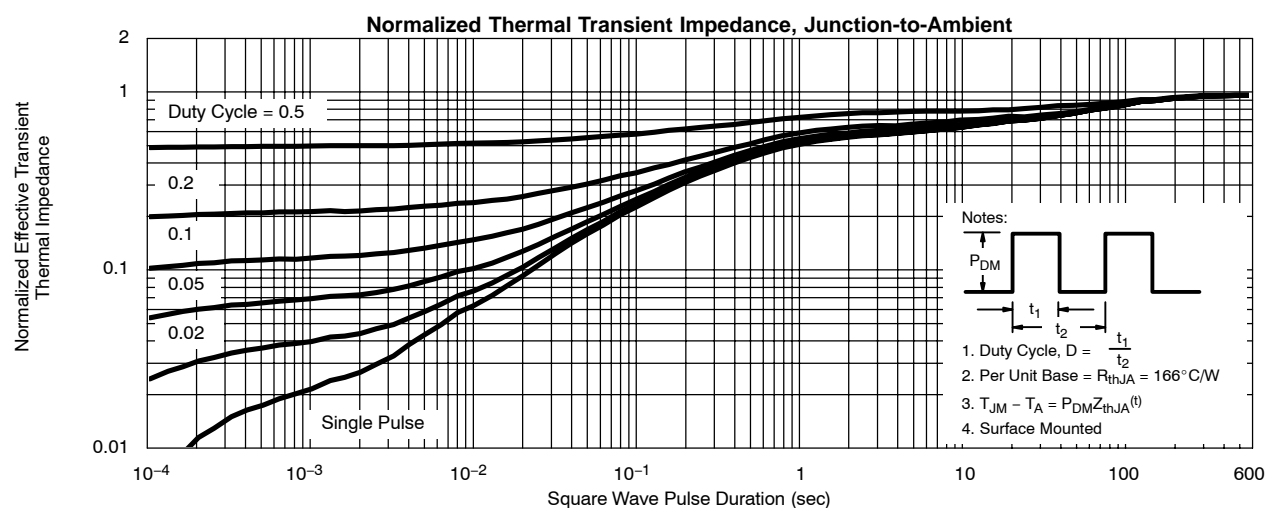
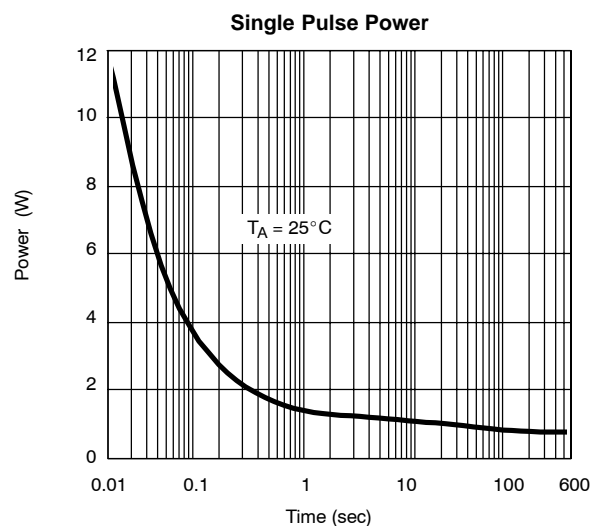
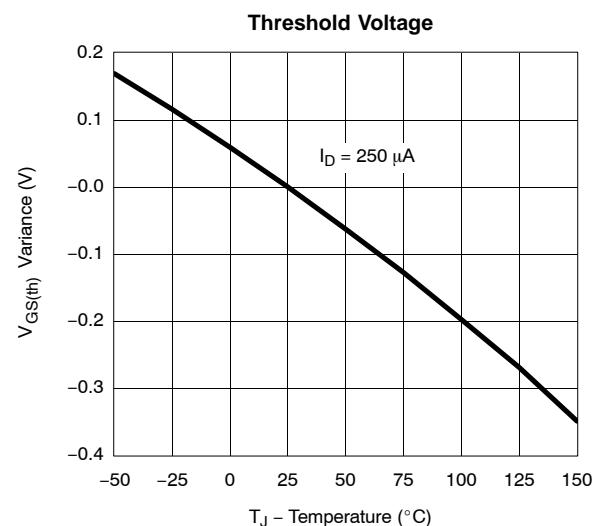
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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?71338>.



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.