P-Channel 2.5-V (G-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[b]
- 20	0.100 at V_{GS} = - 4.5 V	- 2.4
	0.150 at V_{GS} = - 2.5 V	- 2.0

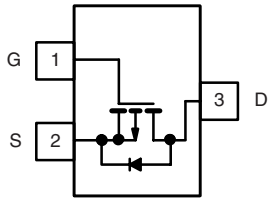
FEATURES

- **Halogen-free Option Available**

Pb-free Available

RoHS* COMPLIANT

TO-236
(SOT-23)



Top View

Si2301 BDS (L1)*

* Marking Code

Ordering Information: Si2301BDS-T1
Si2301BDS-T1-E3 (Lead (Pb)-free)
Si2301BDS-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_{DS}	- 20		V
Gate-Source Voltage		V_{GS}	± 8		
Continuous Drain Current (T_J = 150 °C)[b]	T_A = 25 °C	I_D	- 2.4	- 2.2	A
	T_A = 70 °C		- 1.9	- 1.8	
Pulsed Drain Current[a]		I_{DM}	- 10		
Continuous Source Current (Diode Conduction)[b]		I_S	- 0.72	- 0.6	
Power Dissipation[b]	T_A = 25 °C	P_D	0.9	0.7	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[b]	R_{thJA}	120	145	°C/W
Maximum Junction-to-Ambient[c]		140	175	

Notes:
a. Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 board, t ≤ 5 s.
c. Surface Mounted on FR4 board.

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

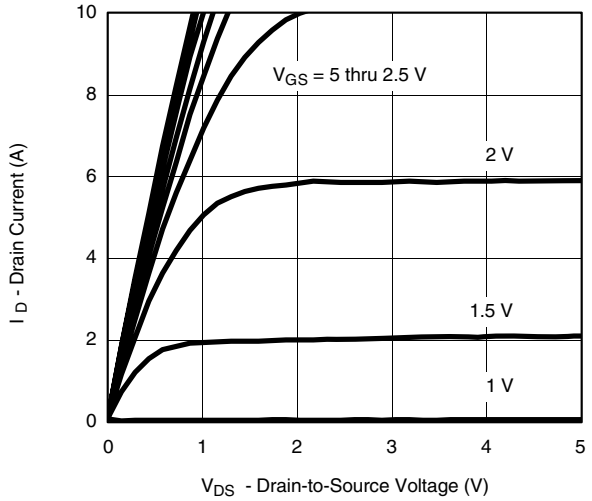
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
			Limits			
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.45		- 0.95	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 20 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 20 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \leq$ - 5 V, V_{GS} = - 4.5 V	- 6			A
		$V_{DS} \leq$ - 5 V, V_{GS} = - 2.5 V	- 3			
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 2.8 A		0.080	0.100	Ω
		V_{GS} = - 2.5 V, I_D = - 2.0 A		0.110	0.150	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 2.8 A		6.5		S
Diode Forward Voltage	V_{SD}	I_S = - 0.75 A, V_{GS} = 0 V		- 0.80	- 1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = - 6 V, V_{GS} = - 4.5 V $I_D \cong$ - 2.8 A		4.5	10	nC
Gate-Source Charge	Q_{gs}			0.7		
Gate-Drain Charge	Q_{gd}			1.1		
Input Capacitance	C_{iss}	V_{DS} = - 6 V, V_{GS} = 0 V, f = 1 MHz		375		pF
Output Capacitance	C_{oss}			95		
Reverse Transfer Capacitance	C_{rss}			65		
Switching[c]						
Turn-On Time	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 6 Ω $I_D \cong$ - 1.0 A, V_{GEN} = - 4.5 V R_g = 6 Ω		20	30	ns
	t_r			40	60	
Turn-Off Time	$t_{d(off)}$			30	45	
	t_f			20	30	

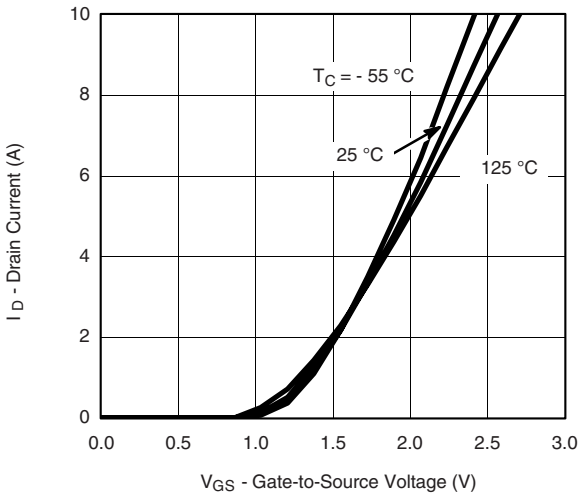
Notes:
a. Pulse test: pulse width ≤ 300 µs duty cycle ≤ 2 %.
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

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.

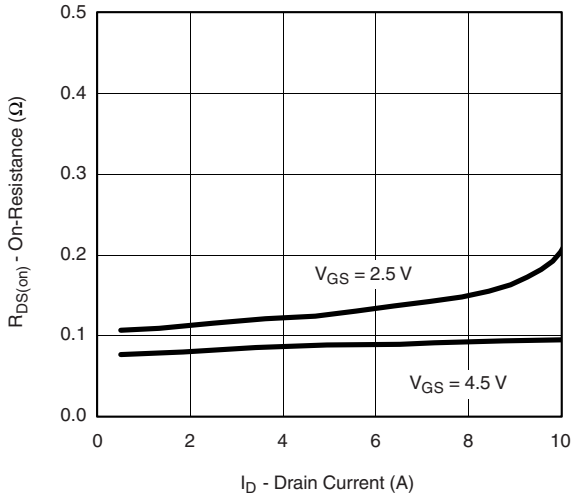
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



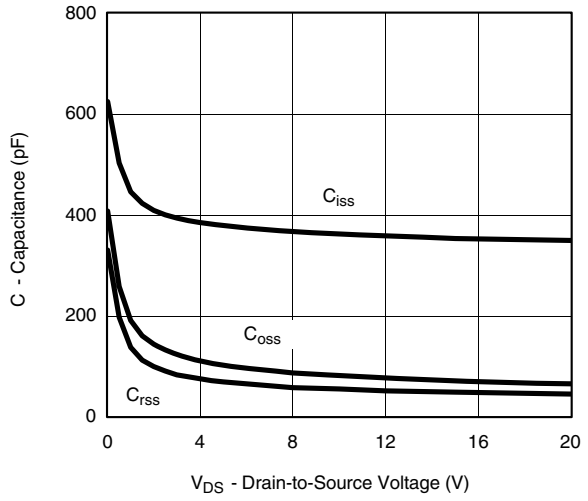
Output Characteristics



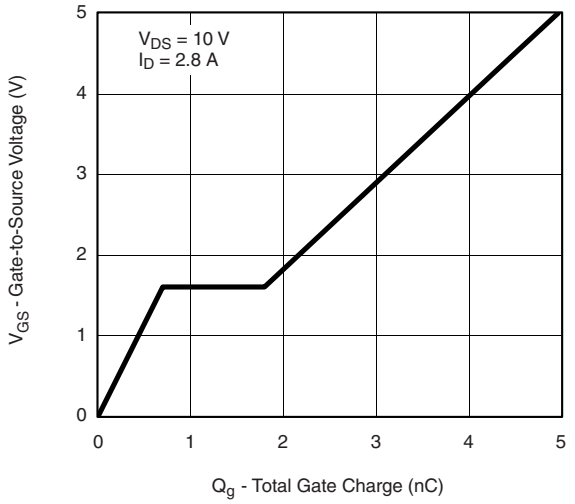
Transfer Characteristics



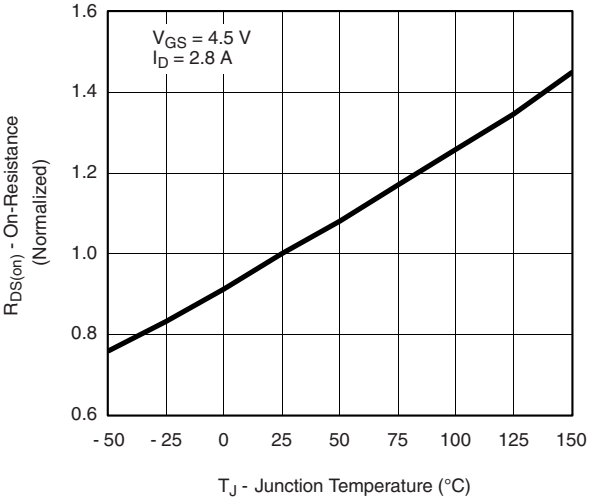
On-Resistance vs. Drain Current



Capacitance

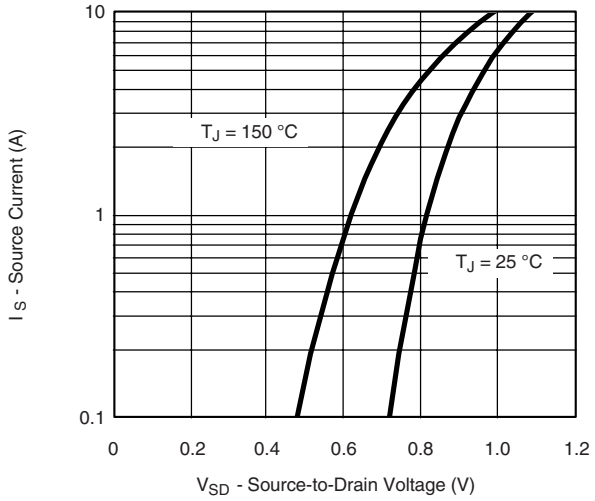


Gate Charge

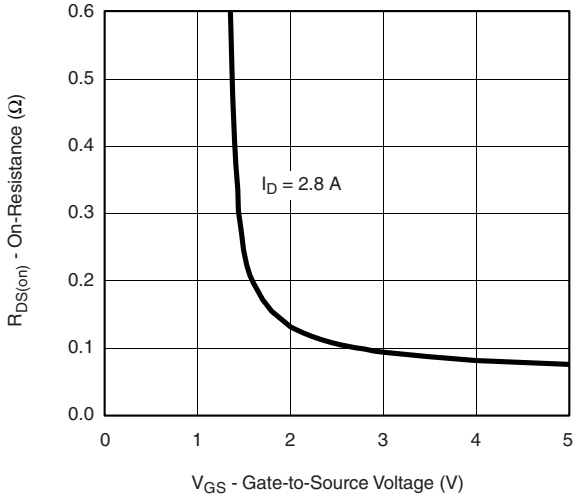


On-Resistance vs. Junction Temperature

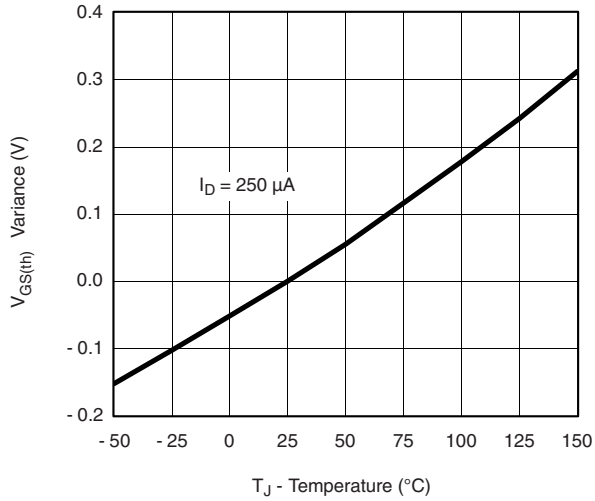
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



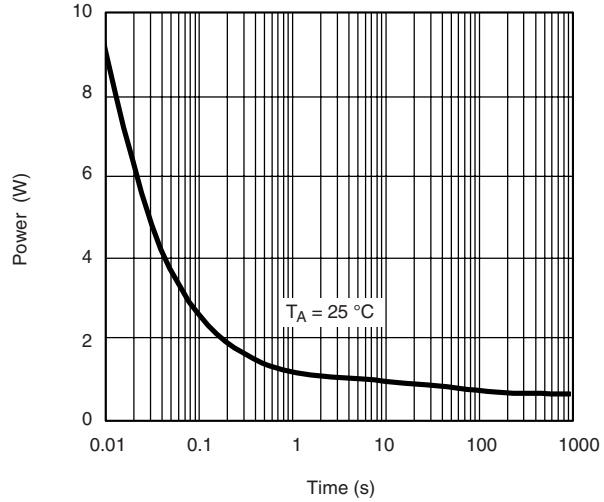
Source-Drain Diode Forward Voltage



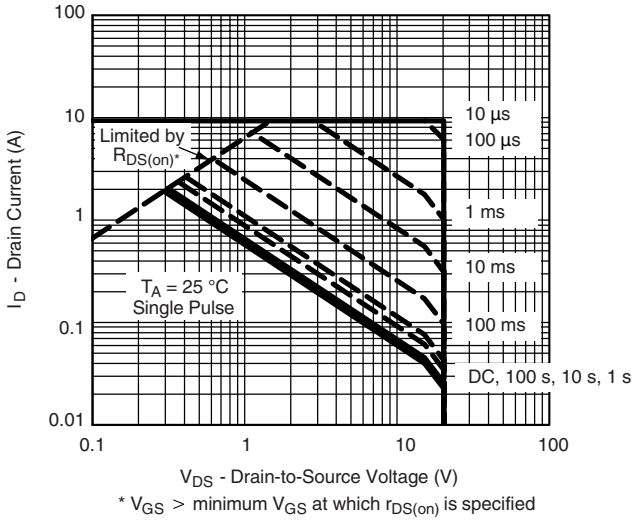
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



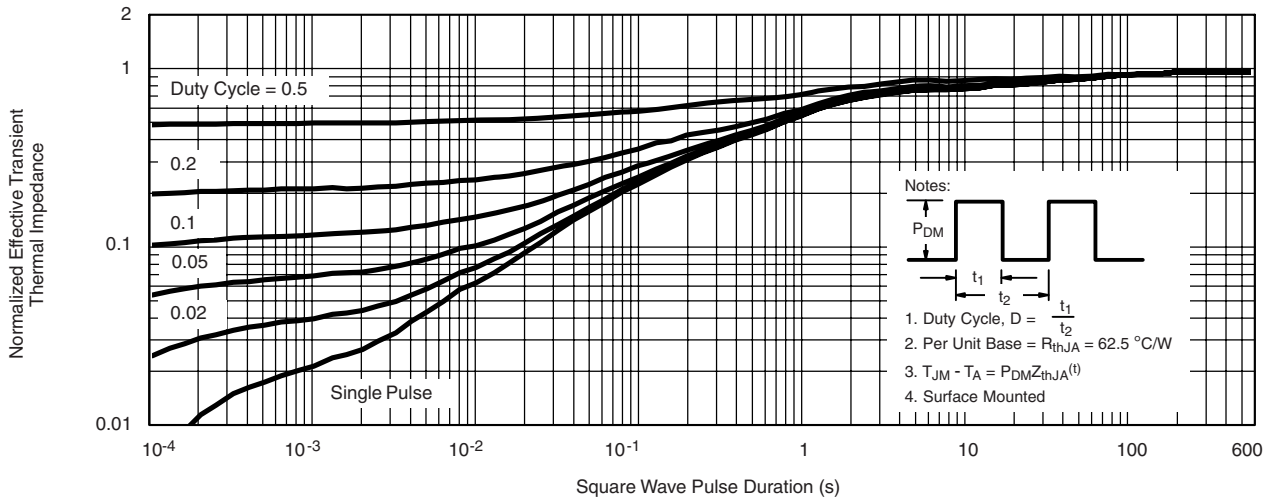
Single Pulse Power



* V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified
Square Wave Pulse Duration (s)

Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient

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?72066.

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.