

P-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^b
- 40	0.082 at $V_{GS} = - 10$ V	- 3.0
	0.130 at $V_{GS} = - 4.5$ V	- 2.4

FEATURES

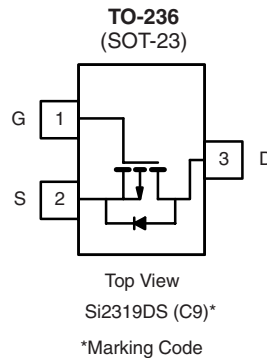
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET[®] Power MOSFET



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Load Switch



Ordering Information: Si2319DS-T1-E3 (Lead (Pb)-free)
Si2319DS-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}	- 40		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150$ °C) ^b	$T_A = 25$ °C	- 3.0	- 2.3	A	
	$T_A = 70$ °C	- 2.4	- 1.85		
Pulsed Drain Current ^a	I_{DM}	- 12			
Continuous Source Current (Diode Conduction) ^b	I_S	- 1.0	- 0.62		
Power Dissipation ^b	$T_A = 25$ °C	1.25	0.75	W	
	$T_A = 70$ °C	0.8	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 ^b	R_{thJA}	75	100	°C/W
Maximum Junction-to-Ambient ^c		120	166	
Maximum Junction-to-Foot (Drain)	R_{thJF}	40	50	

Notes:

- Pulse width limited by maximum junction temperature.
- Surface mounted on FR4 board, $t \leq 5$ s.
- Surface Mounted on FR4 board.

For Spice model information via the worldwide web: www.vishay.com/www/product/spice.htm.

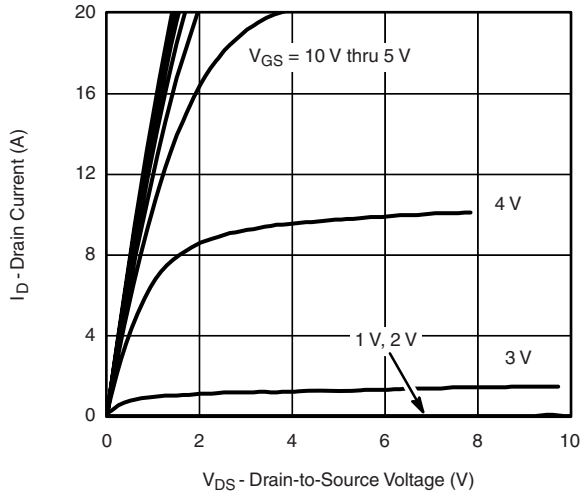
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	- 40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	- 1		- 3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40\text{ V}$, $V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -40\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$, $V_{GS} = -10\text{ V}$	- 6			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$, $I_D = -3.0\text{ A}$		0.065	0.082	Ω
		$V_{GS} = -4.5\text{ V}$, $I_D = -2.4\text{ A}$		0.100	0.130	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -3.0\text{ A}$		7.0		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.25\text{ A}$, $V_{GS} = 0\text{ V}$		- 0.8	- 1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -20\text{ V}$, $V_{GS} = -10\text{ V}$ $I_D \cong -3\text{ A}$		11.3	17	nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			3.3		
Input Capacitance	C_{iss}	$V_{DS} = -20\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		470		pF
Output Capacitance	C_{oss}			85		
Reverse Transfer Capacitance	C_{rss}			65		
Switching^c						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -20\text{ V}$, $R_L = 20\text{ }\Omega$ $I_D \cong -1.0\text{ A}$, $V_{GEN} = -4.5\text{ V}$ $R_g = 6\text{ }\Omega$		7	15	ns
	t_r			15	25	
Turn-Off Time	$t_{d(off)}$			25	40	
	t_f			25	40	

Notes:

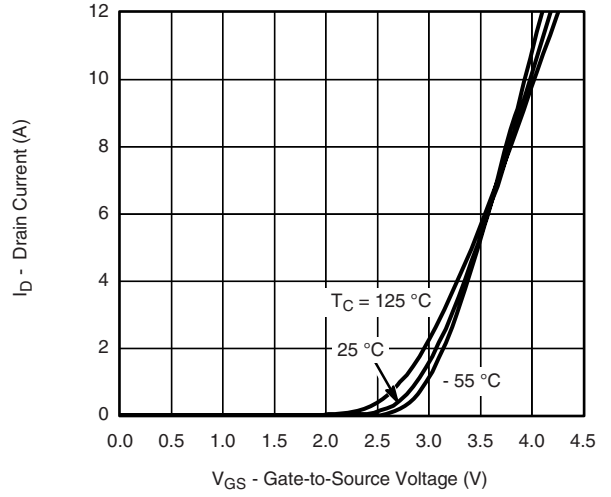
- a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
b. For design aid only, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

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.

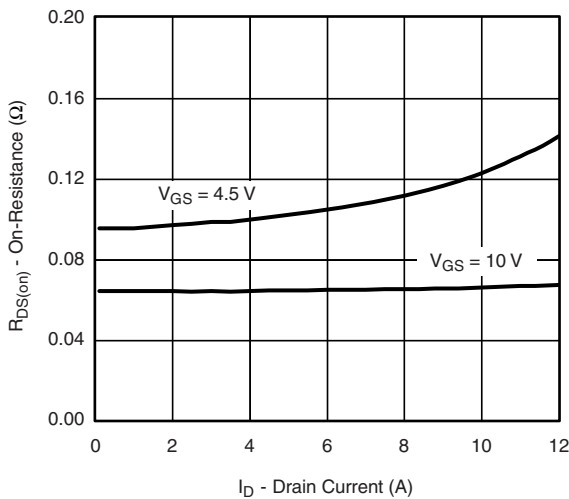
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



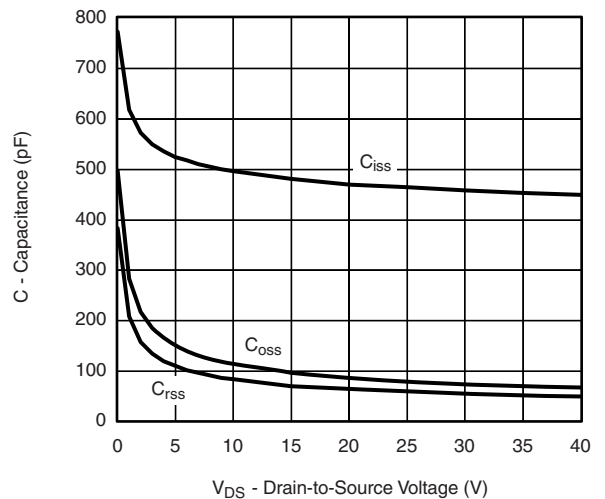
Output Characteristics



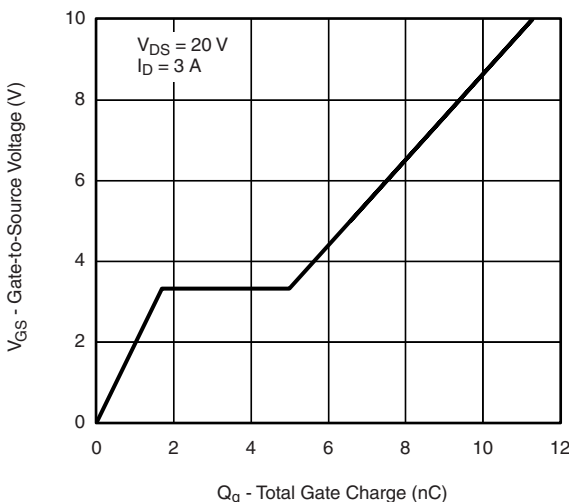
Transfer Characteristics



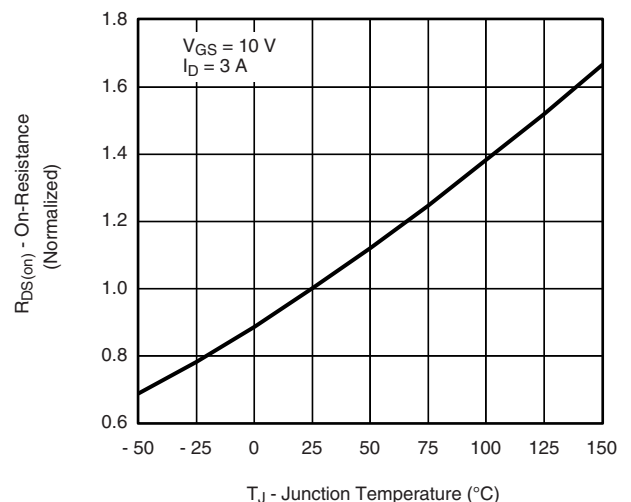
On-Resistance vs. Drain Current



Capacitance

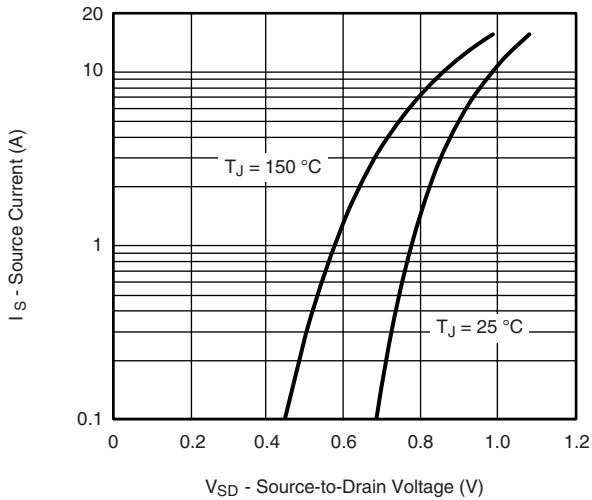


Gate Charge

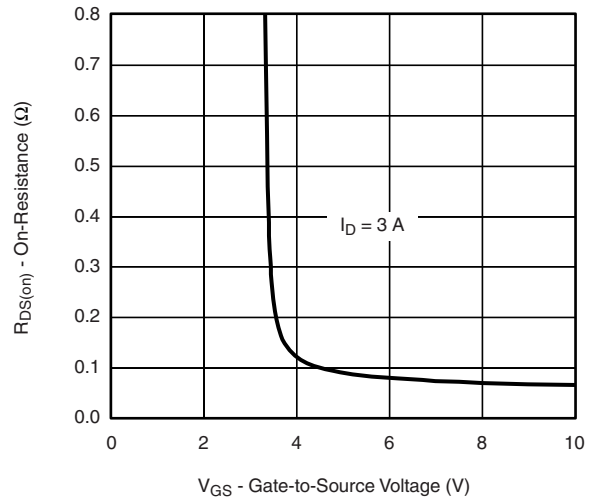


On-Resistance vs. Junction Temperature

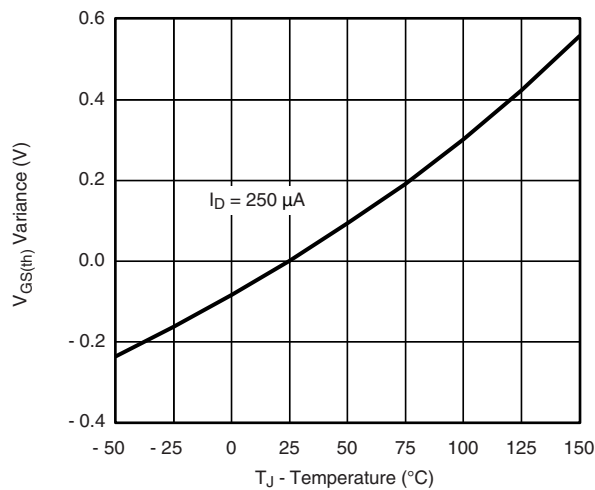
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



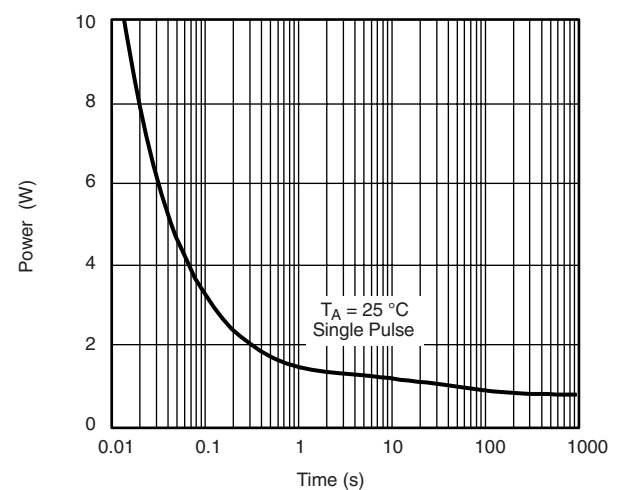
Source-Drain Diode Forward Voltage



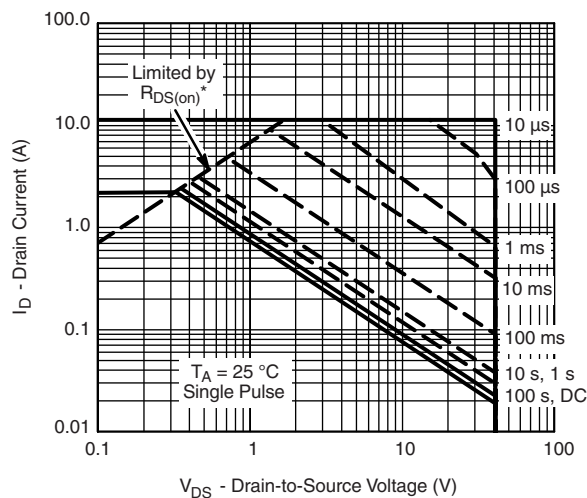
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



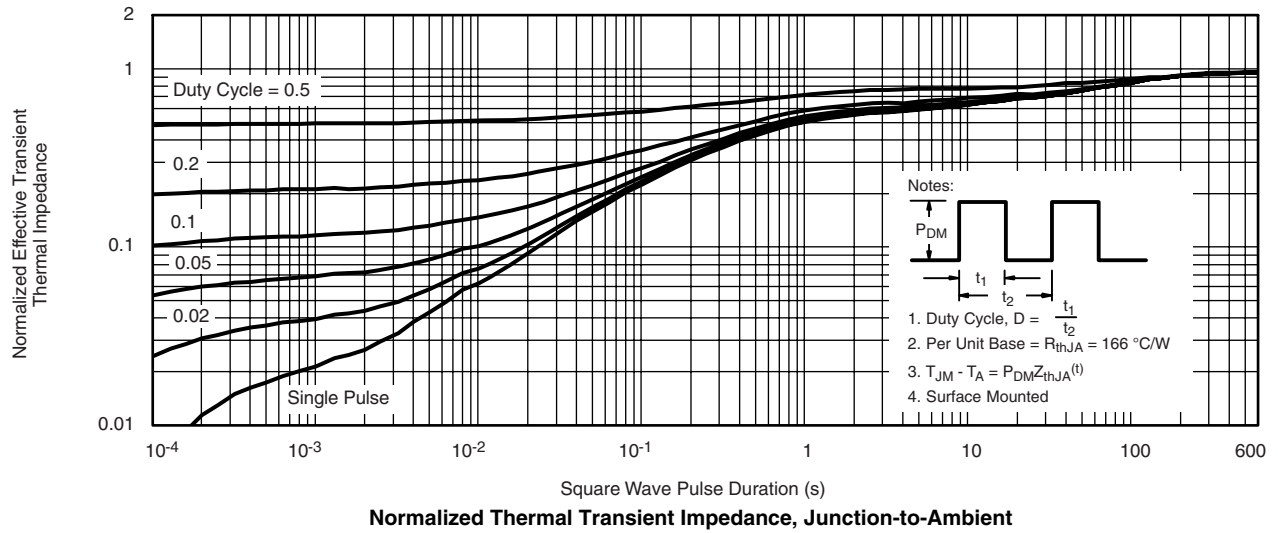
Single Pulse Power



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

TYPICAL CHARACTERISTICS 25 °C, unless otherwise 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 www.vishay.com/ppg?72315.



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.