



## N-Channel 40-V (D-S) MOSFET

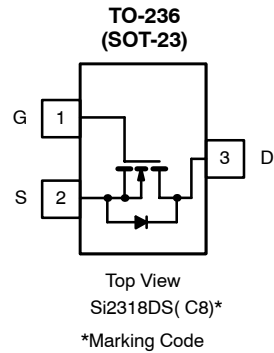
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
40	0.045 @ $V_{GS} = 10$ V	3.9
	0.058 @ $V_{GS} = 4.5$ V	3.5

### FEATURES

- TrenchFET® Power MOSFET

### APPLICATIONS

- Stepper Motors
- Load Switch



Ordering Information: Si2318DS-T1 (with Tape and Reel)

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 sec	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	40		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a, b</sup>	$I_D$	$T_A = 25^\circ\text{C}$	3.9	3.0	A
		$T_A = 70^\circ\text{C}$	3.1	2.4	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	16			
Continuous Source Current (Diode Conduction) <sup>a, b</sup>	$I_S$	0.8			
Power Dissipation <sup>a, b</sup>	$P_D$	$T_A = 25^\circ\text{C}$	1.25	0.75	W
		$T_A = 70^\circ\text{C}$	0.8	0.48	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 5$ sec	75	100	$^\circ\text{C/W}$
		Steady State	120	166	
Maximum Junction-to-Foot (drain)	$R_{thJF}$	40	50		

Notes

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

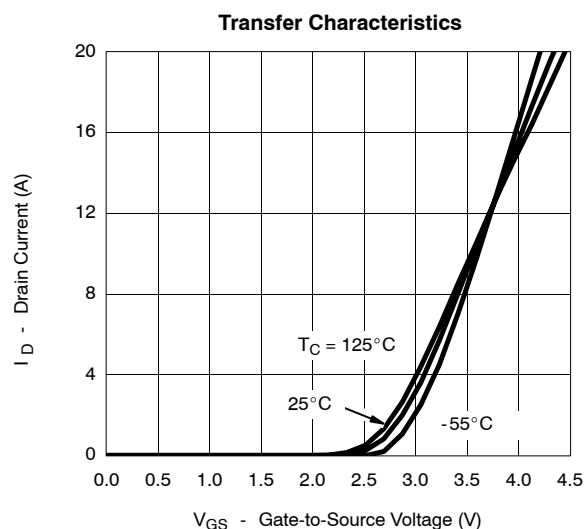
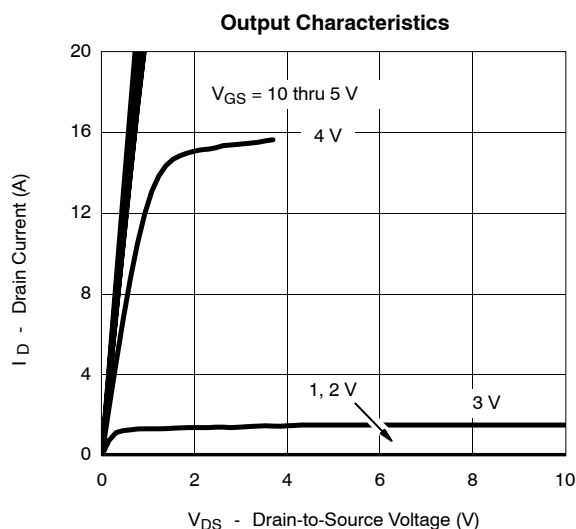
### SPECIFICATIONS (T<sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	40			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1		3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V			0.5	μA
		V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 4.5 V, V <sub>GS</sub> = 10 V	6			A
Drain-Source On-Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.9 A		0.036	0.045	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.5 A		0.045	0.058	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3.9 A		11		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1.25 A, V <sub>GS</sub> = 0 V		0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.9 A		10	15	nC
Gate-Source Charge	Q <sub>gs</sub>			1.6		
Gate-Drain Charge	Q <sub>gd</sub>			2.1		
Gate Resistance	R <sub>g</sub>			1.8		Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V, f = 1 MHz		540		pF
Output Capacitance	C <sub>oss</sub>			80		
Reverse Transfer Capacitance	C <sub>rss</sub>			45		
<b>Switching</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 20 V, R <sub>L</sub> = 20 Ω I <sub>D</sub> ≅ 1.0 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		5	10	ns
Rise Time	t <sub>r</sub>			12	20	
Turn-Off Delay Time	t <sub>d(off)</sub>			20	30	
Fall-Time	t <sub>f</sub>			15	25	

Notes

- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

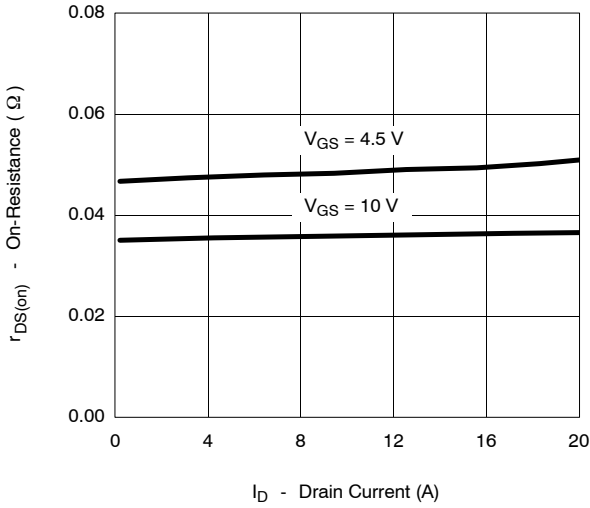
### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



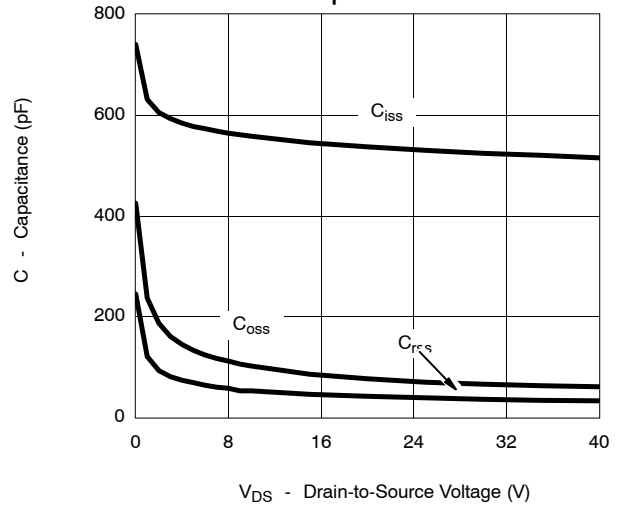


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

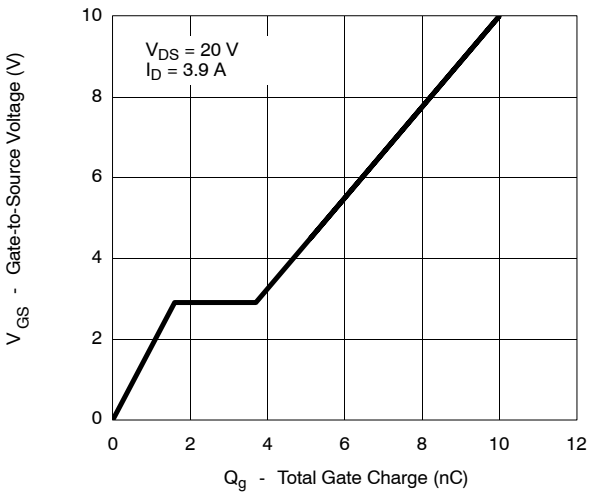
On-Resistance vs. Drain Current



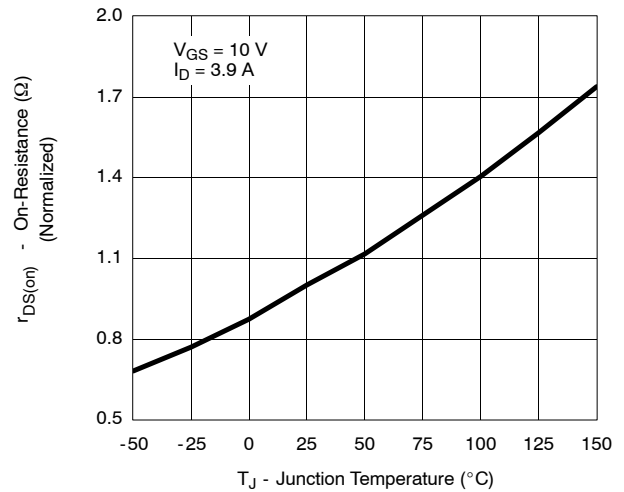
Capacitance



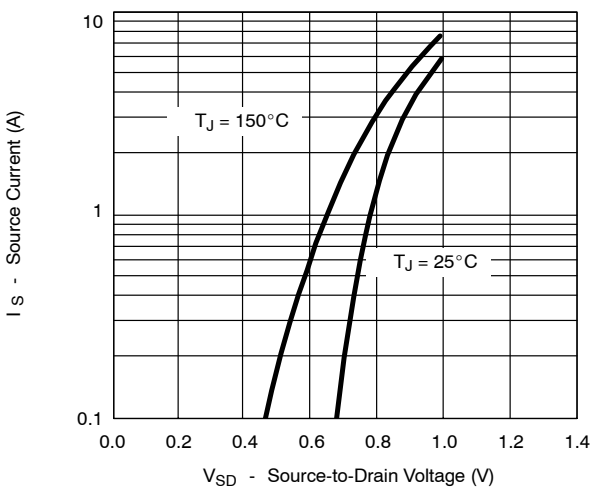
Gate Charge



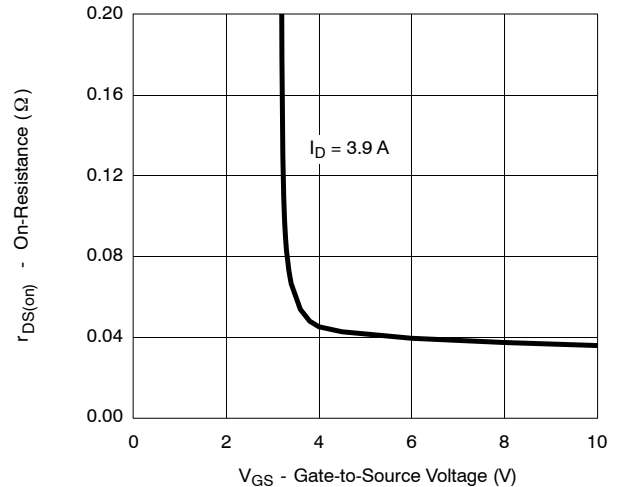
On-Resistance vs. Junction Temperature



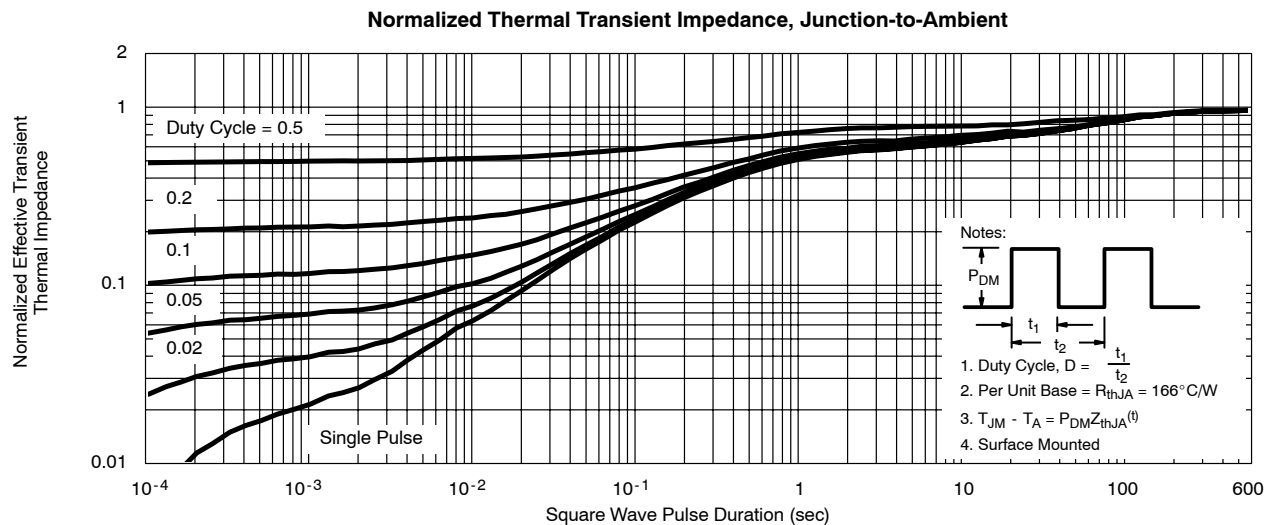
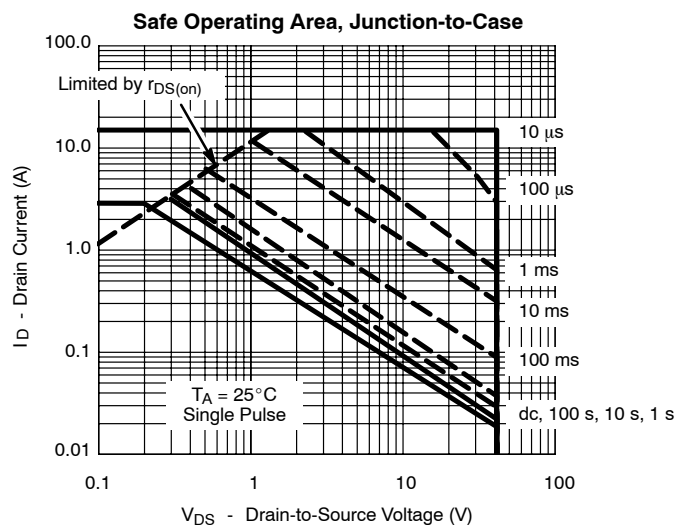
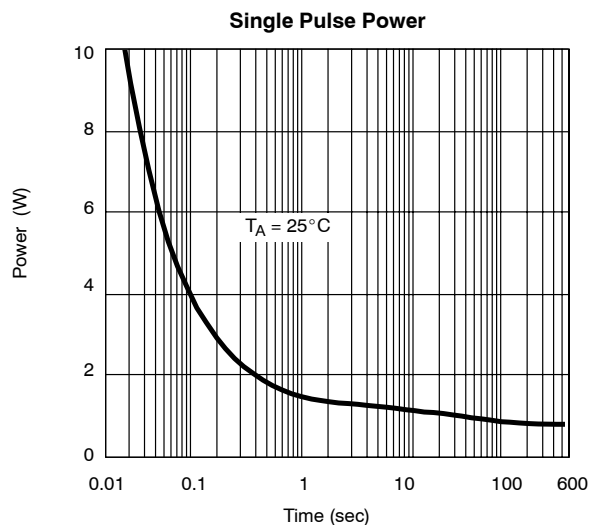
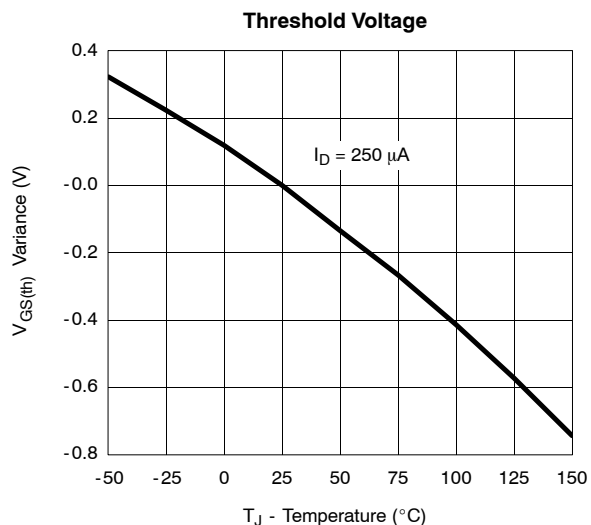
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**





## 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.