

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

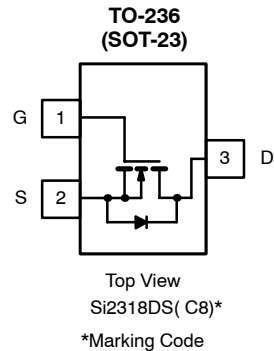
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
40	0.045 @ $V_{GS} = 10$ V	3.9
	0.058 @ $V_{GS} = 4.5$ V	3.5

### 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

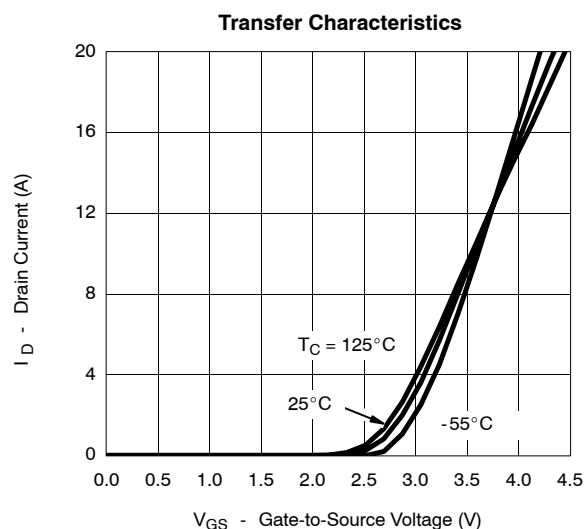
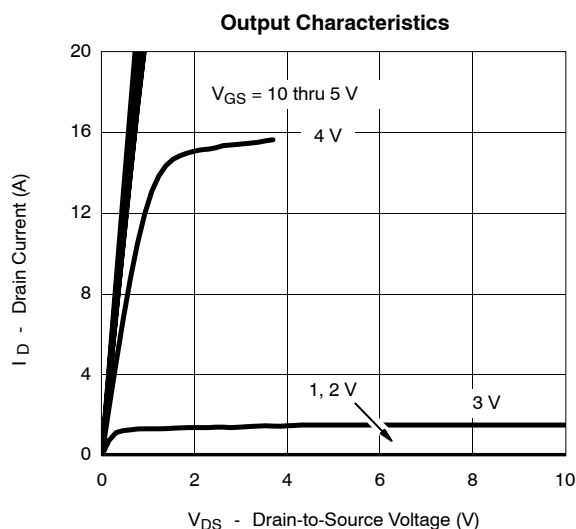
### SPECIFICATIONS (T<sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)

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**

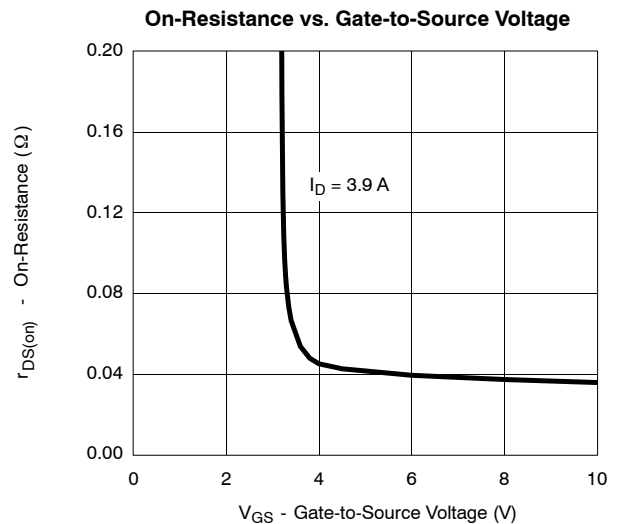
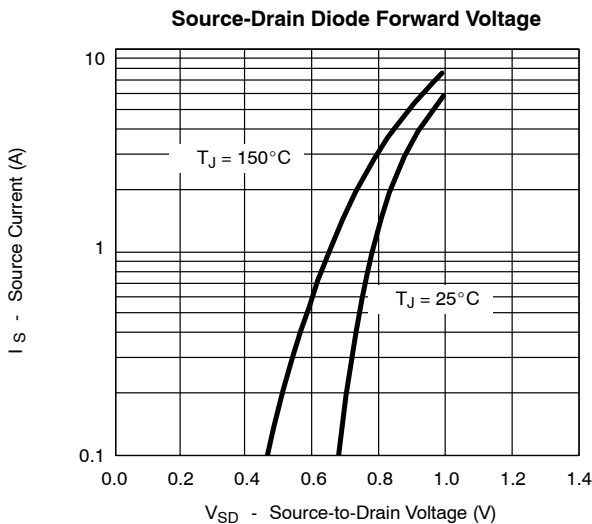
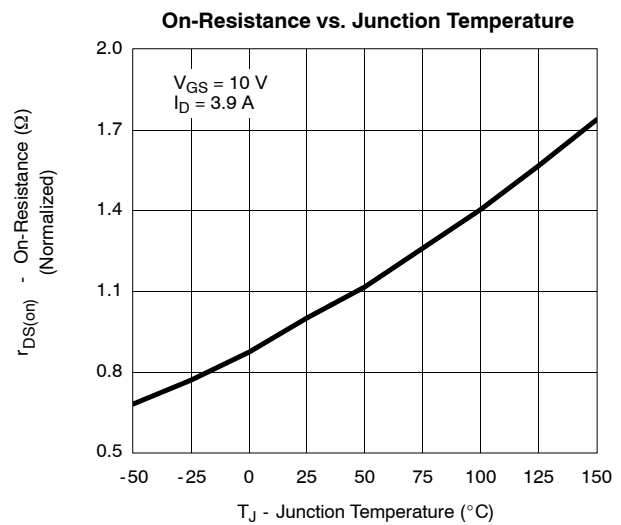
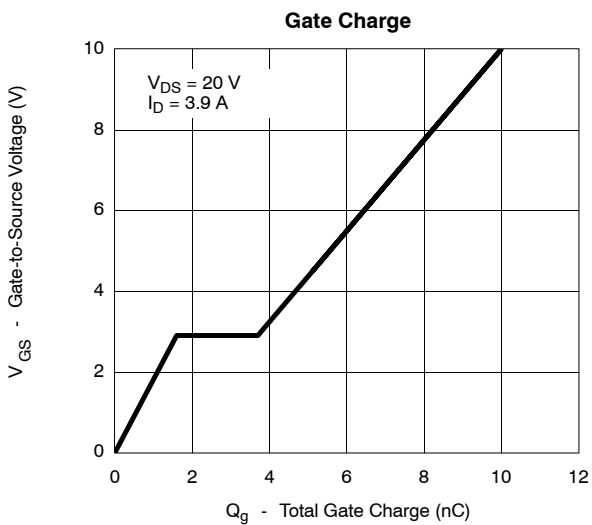
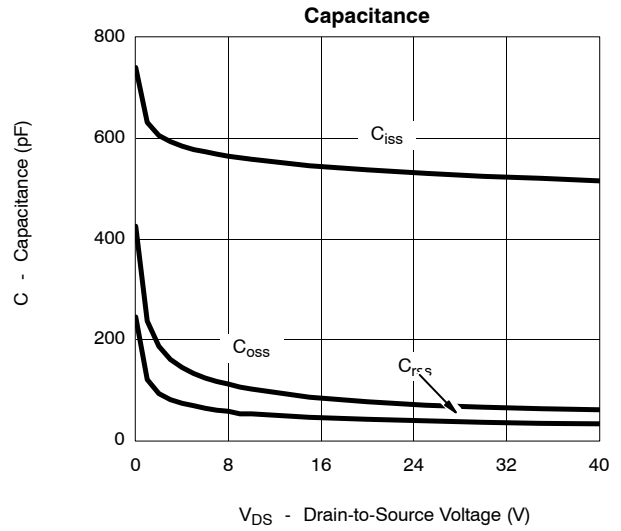
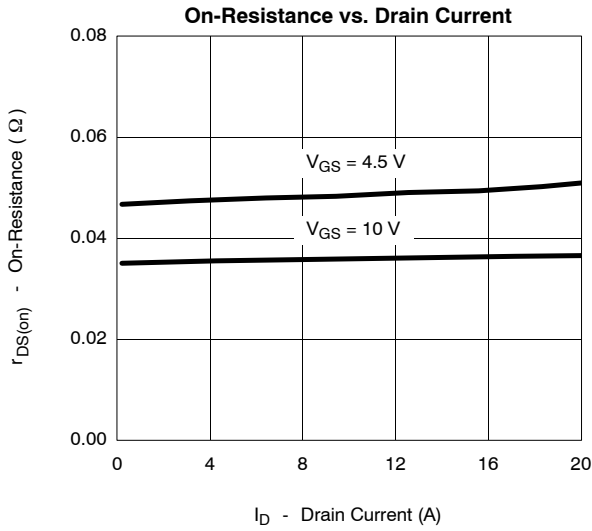
- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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

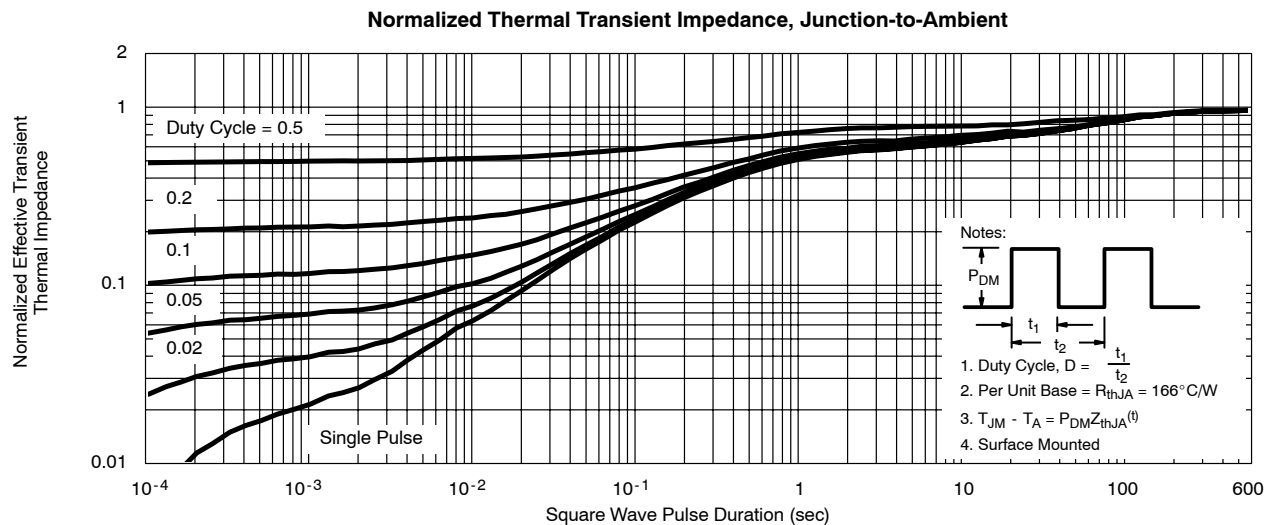
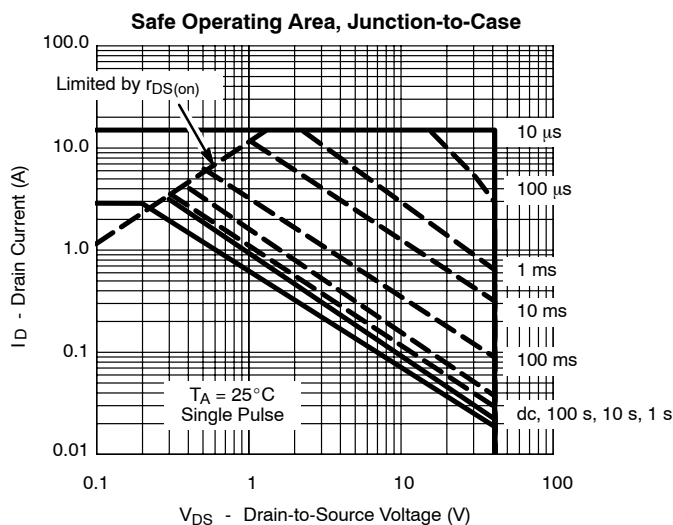
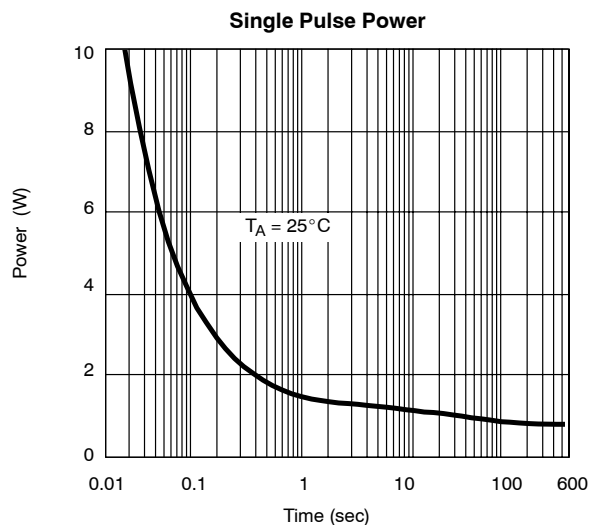
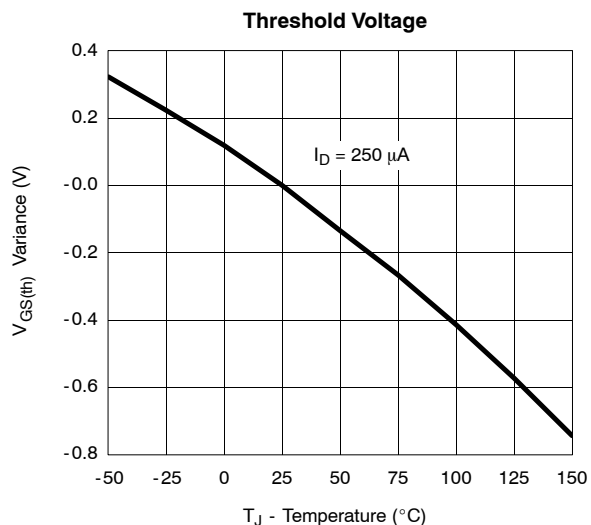




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



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