



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

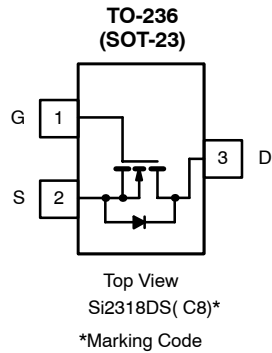
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.045 @ $V_{GS} = 10$ V	3.9
	0.058 @ $V_{GS} = 4.5$ V	3.5

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}	± 20			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^{a, b}	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 ^b	I_{DM}	16			
Continuous Source Current (Diode Conduction) ^{a, b}	I_S	0.8			
Power Dissipation ^{a, b}	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 ^a	R_{thJA}	$t \leq 5$ sec	75	100	$^\circ\text{C}/\text{W}$
		Steady State	120	166	
Maximum Junction-to-Foot (drain)	R_{thJF}	40	50		

Notes

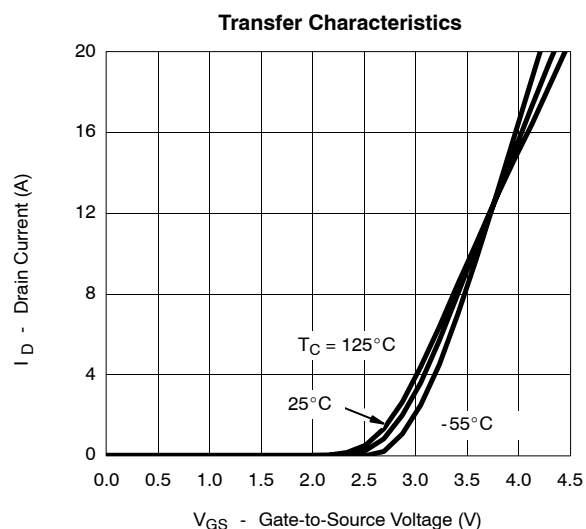
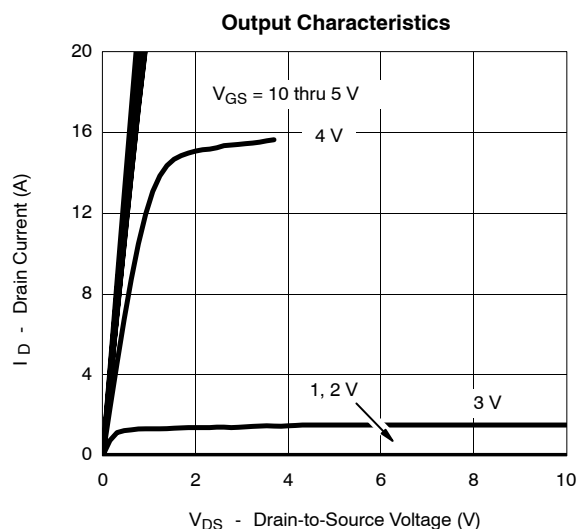
- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

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

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1		3	
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}	$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}$			0.5	μA
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 4.5\text{ V}, V_{GS} = 10\text{ V}$	6			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3.9\text{ A}$		0.036	0.045	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 3.5\text{ A}$		0.045	0.058	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 3.9\text{ A}$		11		S
Diode Forward Voltage	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	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.9\text{ A}$		10	15	nC
Gate-Source Charge	Q_{gs}			1.6		
Gate-Drain Charge	Q_{gd}			2.1		
Gate Resistance	R_g			1.8		Ω
Input Capacitance	C_{iss}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		540		μF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			45		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 20\ \Omega$ $I_D \cong 1.0\text{ A}, V_{GEN} = 10\text{ V}, R_G = 6\ \Omega$		5	10	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			20	30	
Fall-Time	t_f			15	25	

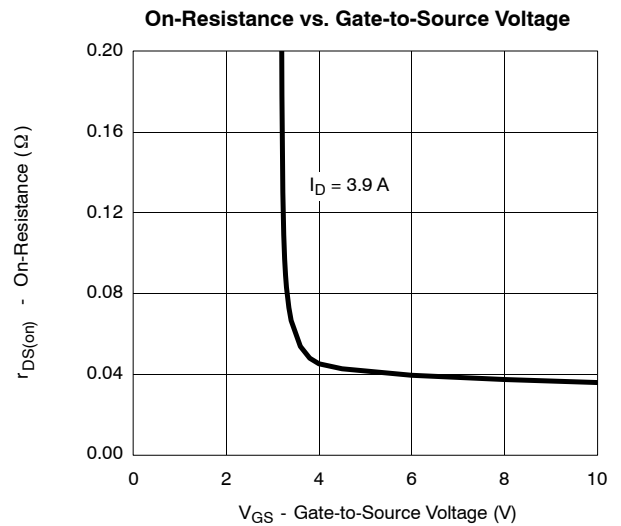
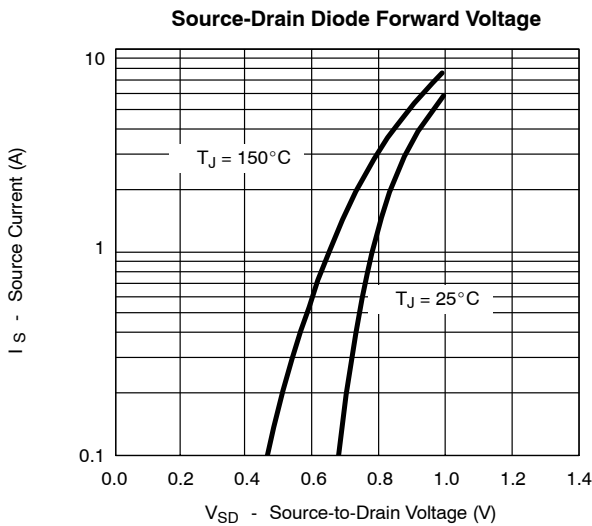
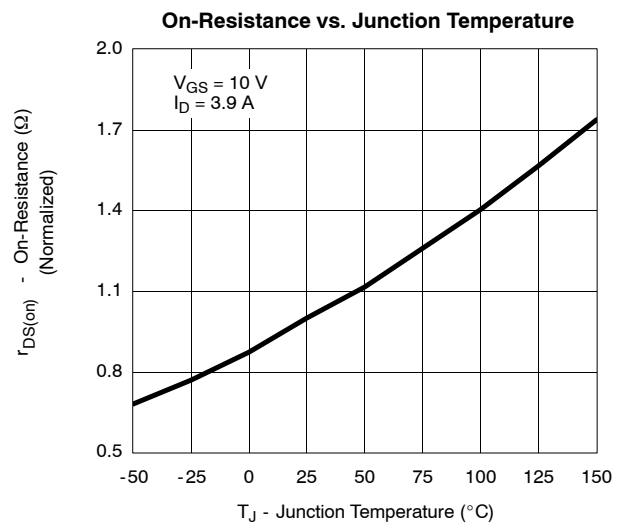
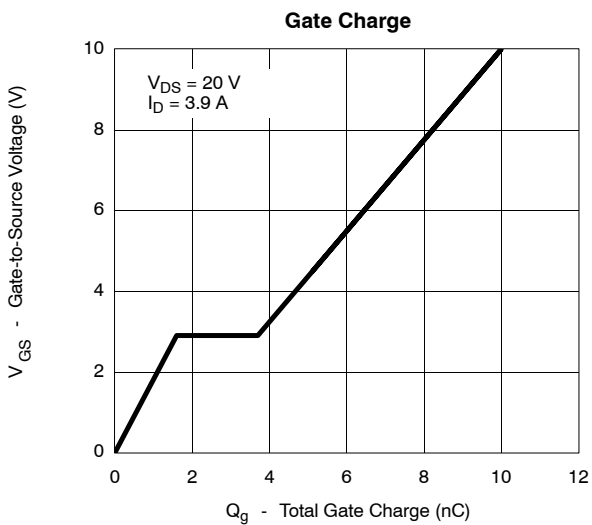
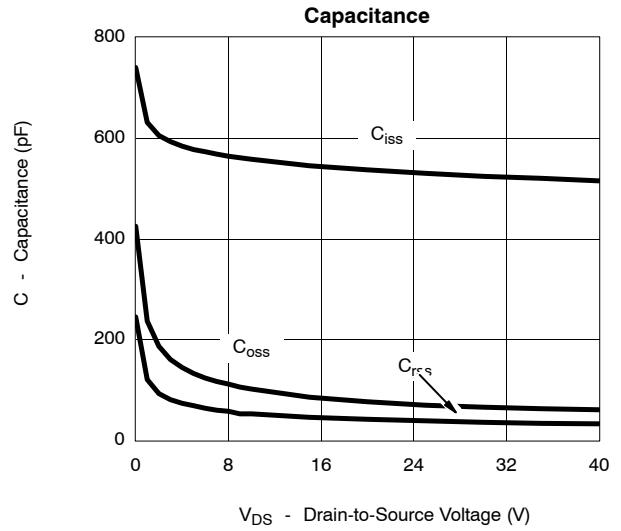
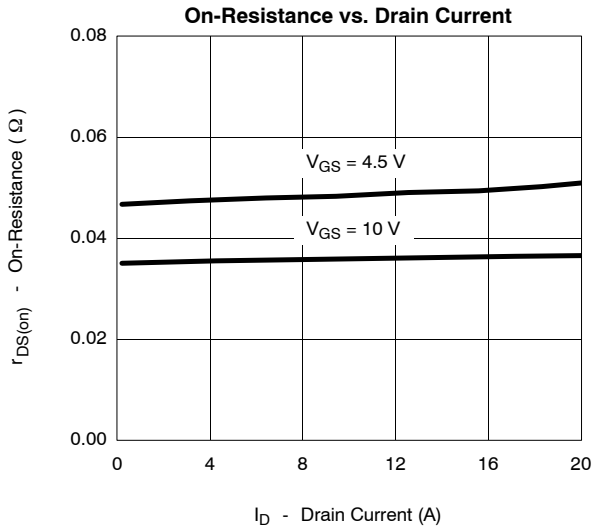
Notes

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

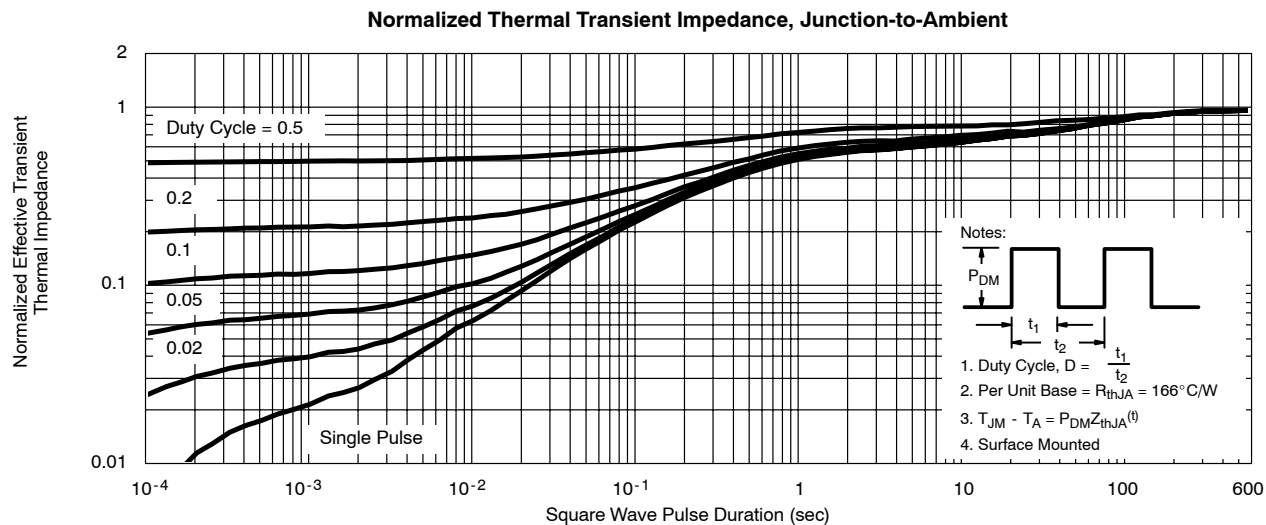
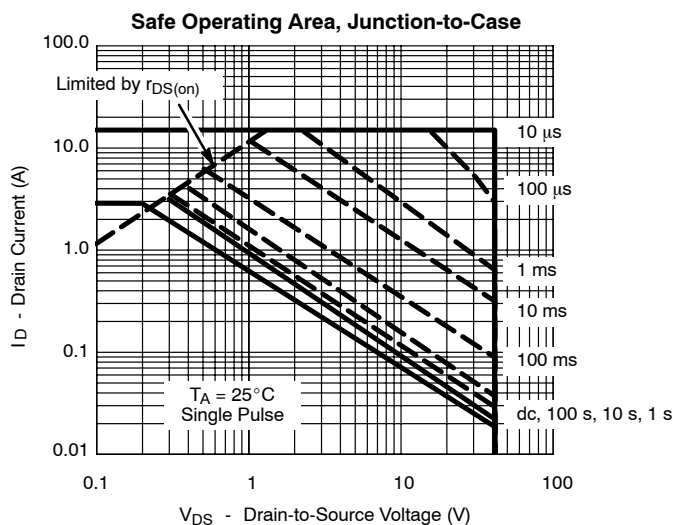
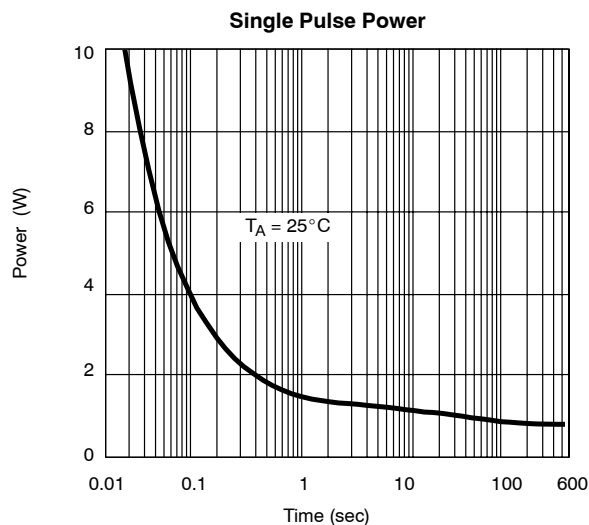
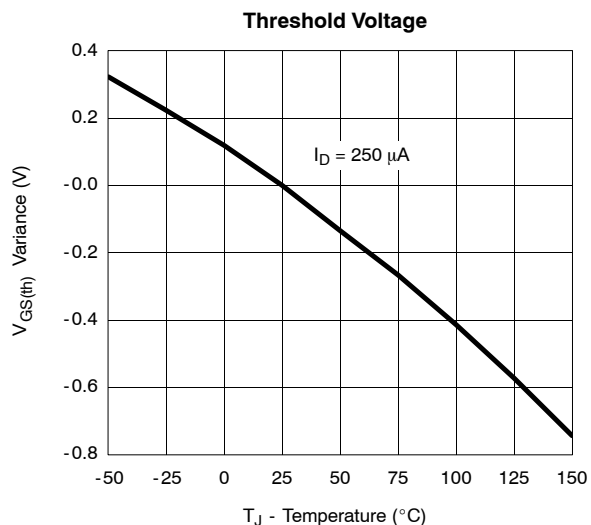
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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