

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
40	0.045 at $V_{GS} = 10$ V	3.9
	0.058 at $V_{GS} = 4.5$ V	3.5

FEATURES

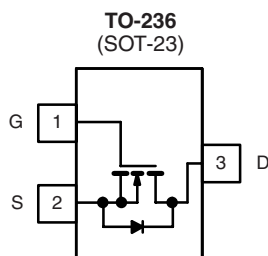
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET

APPLICATIONS

- Stepper Motors
- Load Switch



RoHS
COMPLIANT
HALOGEN
FREE
Available



Top View
Si2318DS(C8)*
*Marking Code

Ordering Information: Si2318DS-T1-E3 (Lead (Pb)-free)
Si2318DS-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) ^{a, b}	I_D	3.9	3.0	A
		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	1.25	0.75	W
		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 ^a	R_{thJA}	75	100	°C/W
		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 $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

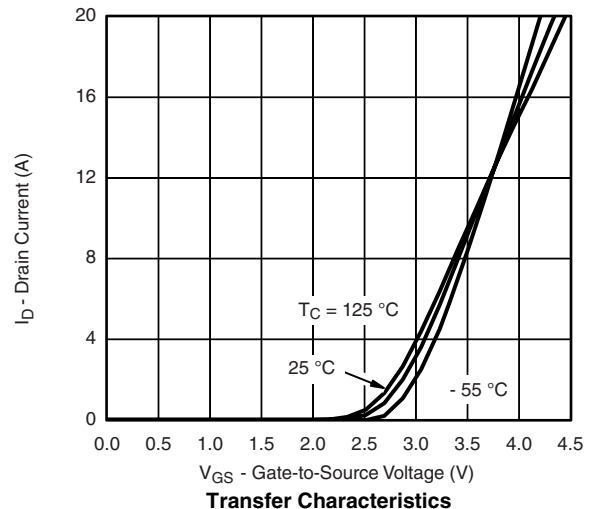
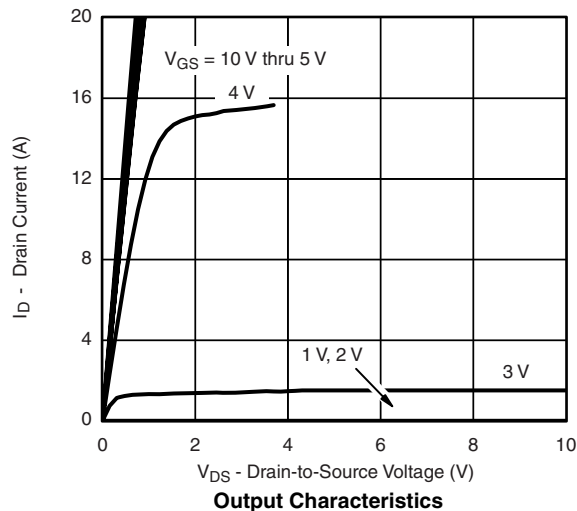
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	40			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1		3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32\text{ V}$, $V_{GS} = 0\text{ V}$			0.5	μA
		$V_{DS} = 32\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			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		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			45		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}$, $R_L = 20\text{ }\Omega$ $I_D \cong 1.0\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$		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:

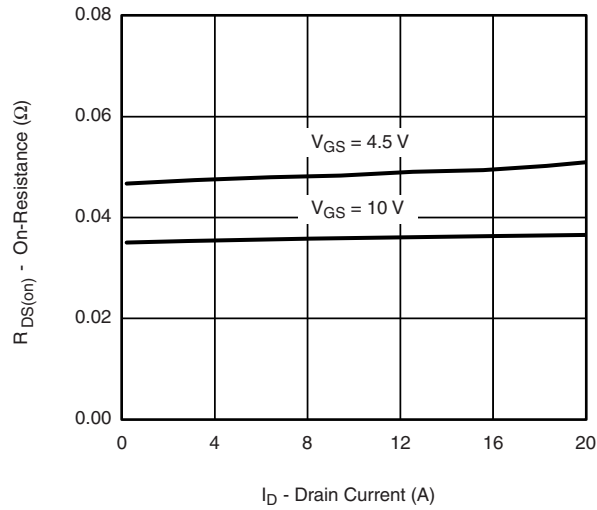
a. Pulse test; $PW \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

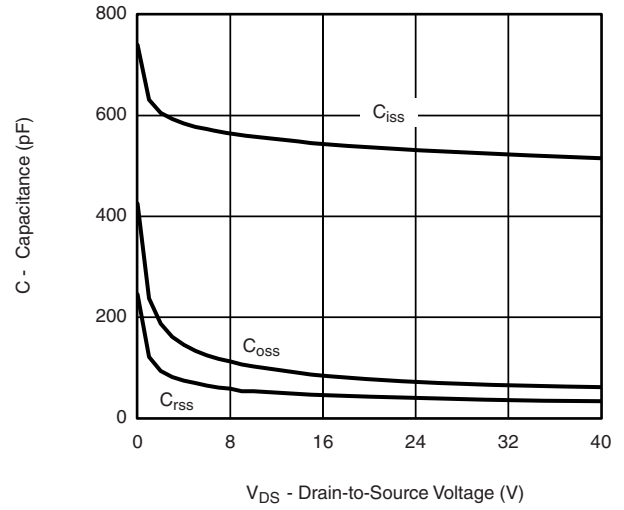
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS $25\text{ }^{\circ}\text{C}$, unless otherwise noted

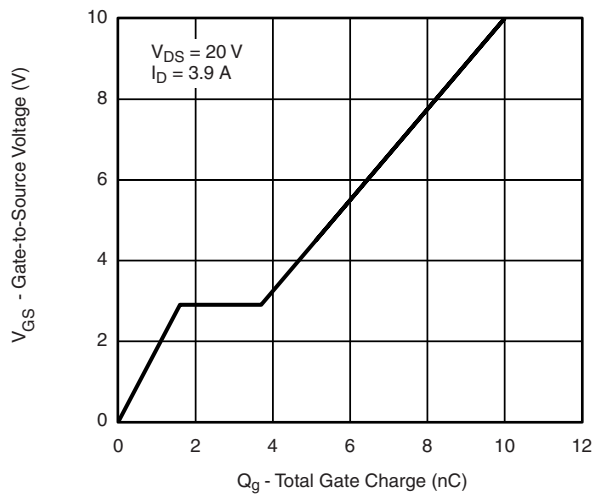
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



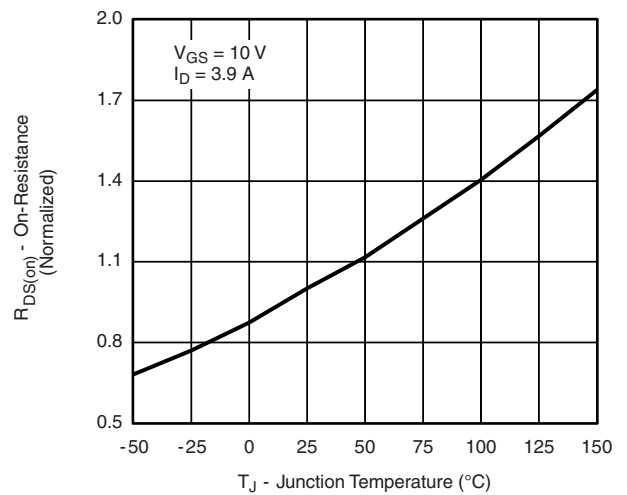
On-Resistance vs. Drain Current



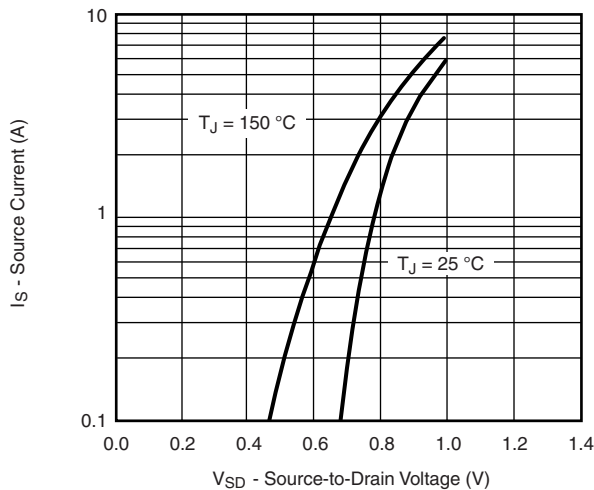
Capacitance



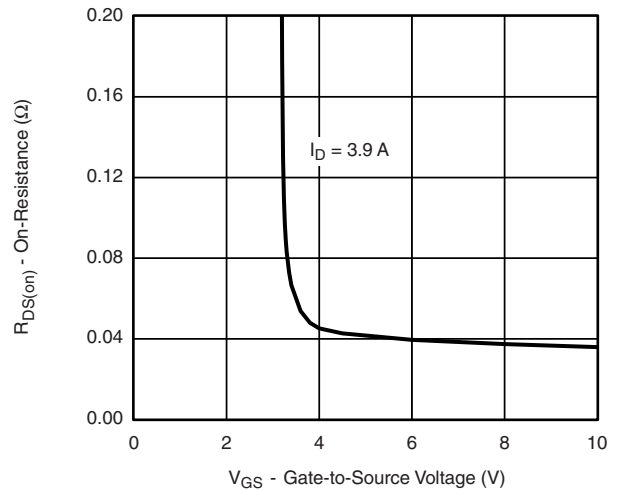
Gate Charge



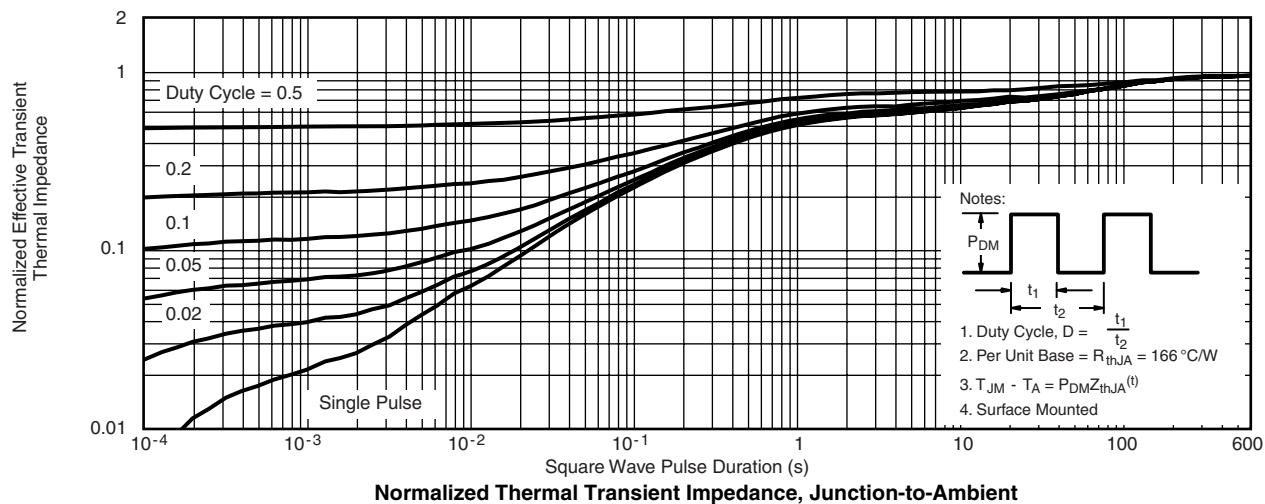
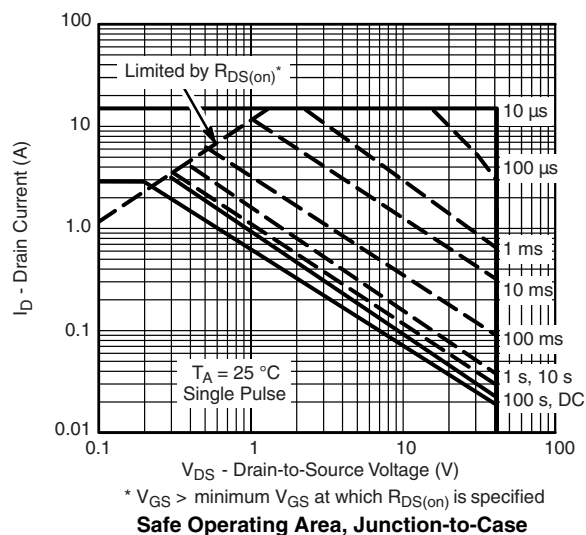
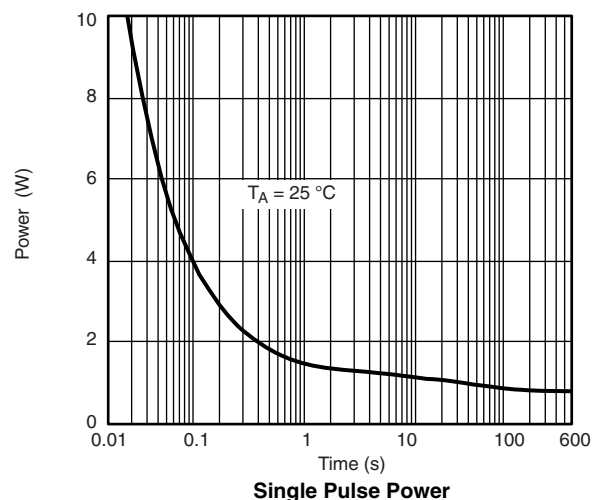
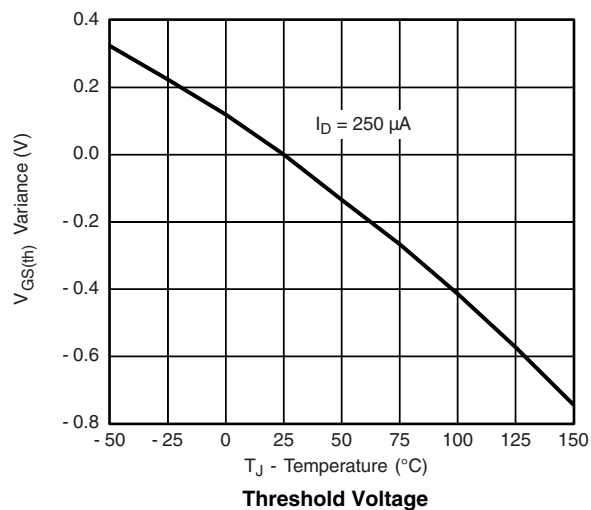
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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