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

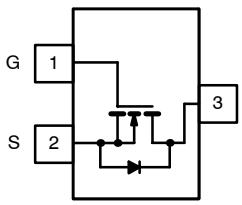
FEATURES

- TrenchFET® Power MOSFET

APPLICATIONS

- Stepper Motors
- Load Switch

TO-236
(SOT-23)



Top View
Si2318DS(C8)*
*Marking Code

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

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C)[a, b]	T_A= 25°C	I_D	3.9	3.0	A
	T_A= 70°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]	T_A= 25°C	P_D	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[a]	t ≤ 5 sec	R_{thJA}	75	100	°C/W
	Steady State		120	166	
Maximum Junction-to-Foot (drain)	Steady State	R_{thJF}	40	50	

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

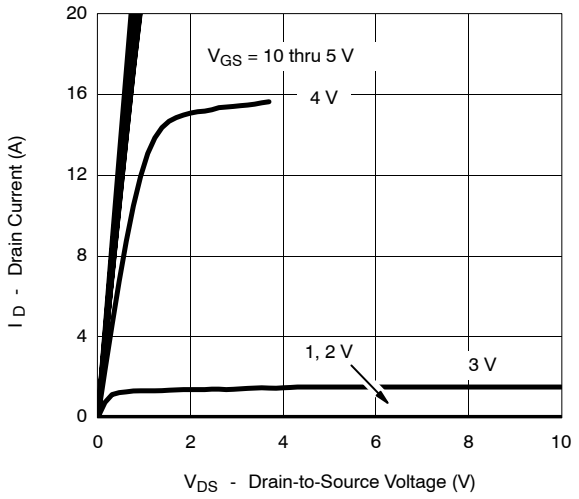
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA	40			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1		3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32 V, V_{GS} = 0 V			0.5	μA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55°C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 4.5 V, V_{GS} = 10 V	6			A
Drain-Source On-Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 3.9 A		0.036	0.045	Ω
		V_{GS} = 4.5 V, I_D = 3.5 A		0.045	0.058	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 3.9 A		11		S
Diode Forward Voltage	V_{SD}	I_S = 1.25 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 3.9 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 V, V_{GS} = 0 V, f = 1 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 V, R_L = 20 Ω I_D ≅ 1.0 A, V_{GEN} = 10 V, R_G = 6 Ω		5	10	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			20	30	
Fall-Time	t_f			15	25	

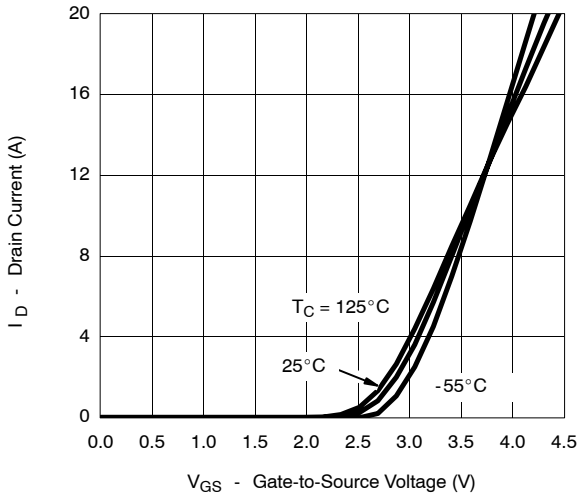
Notes
a. Pulse test: PW ≤300 μs duty cycle ≤2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

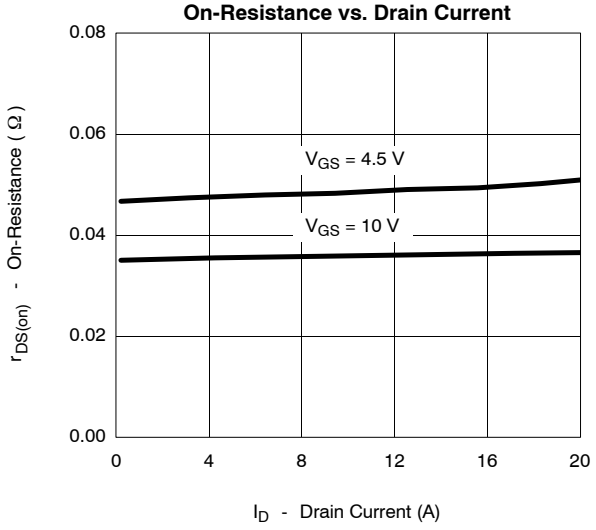


Transfer Characteristics

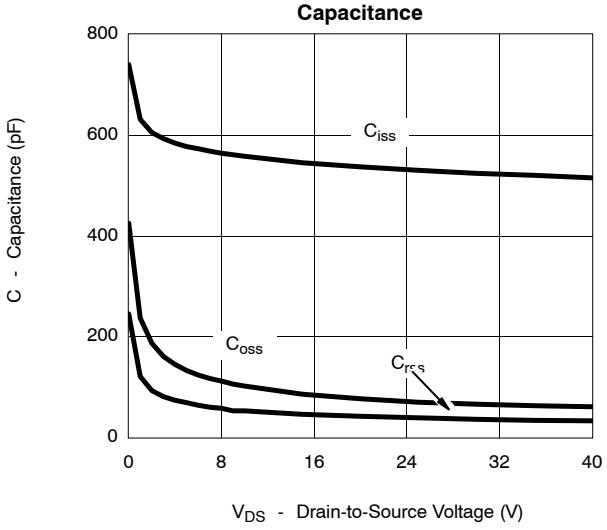


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

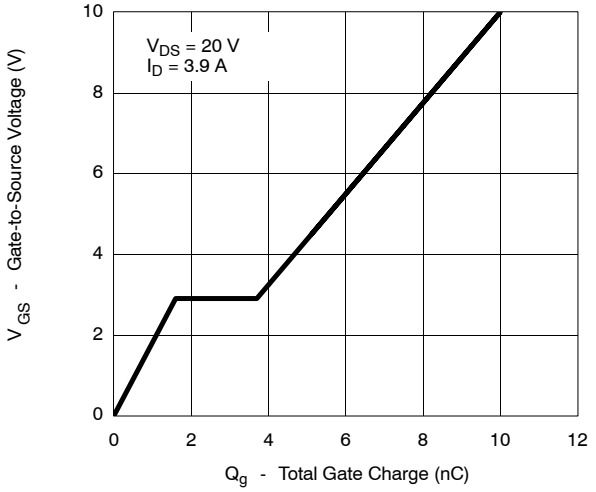
On-Resistance vs. Drain Current



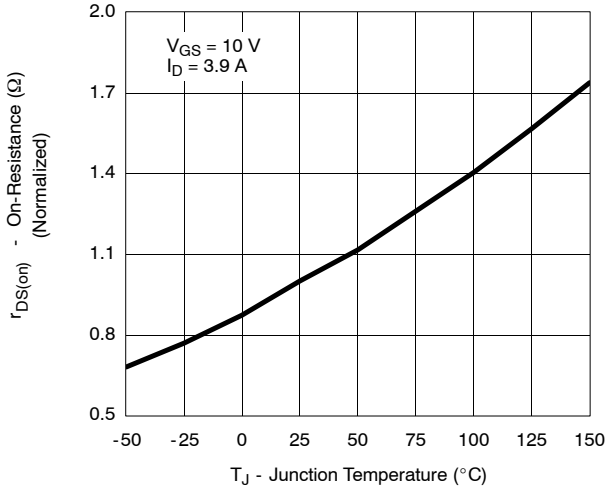
Capacitance



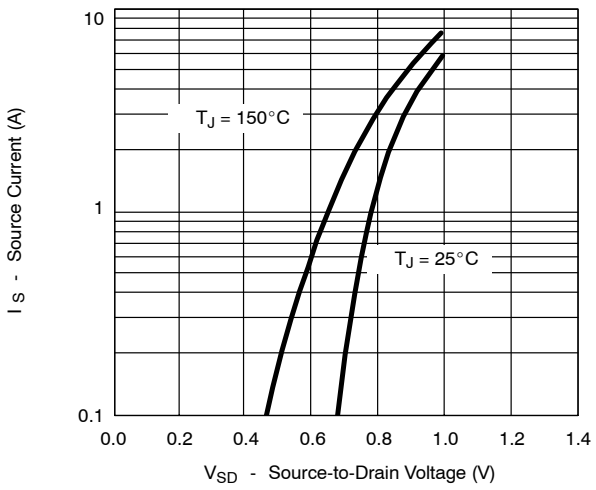
Gate Charge



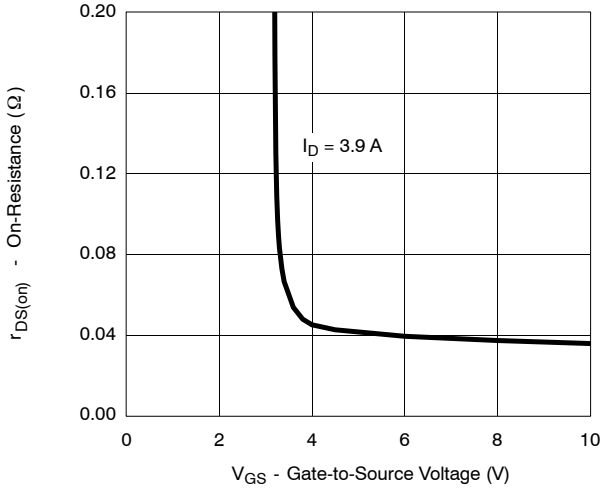
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

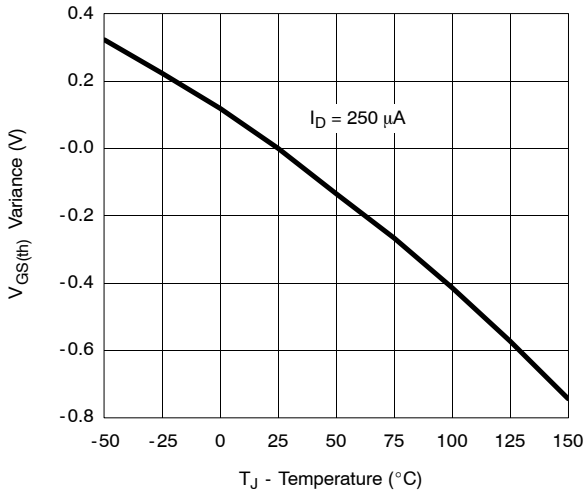


On-Resistance vs. Gate-to-Source Voltage

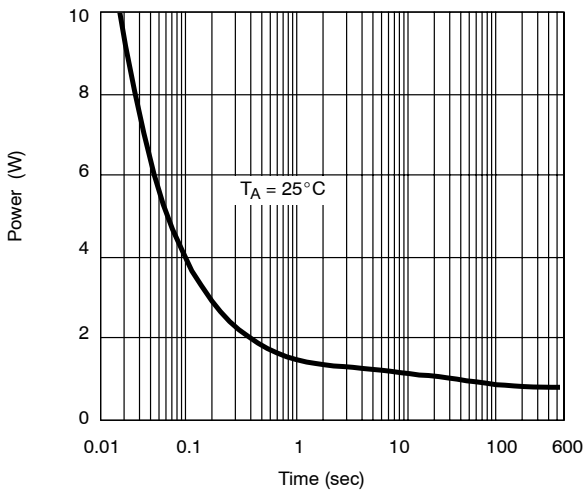


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

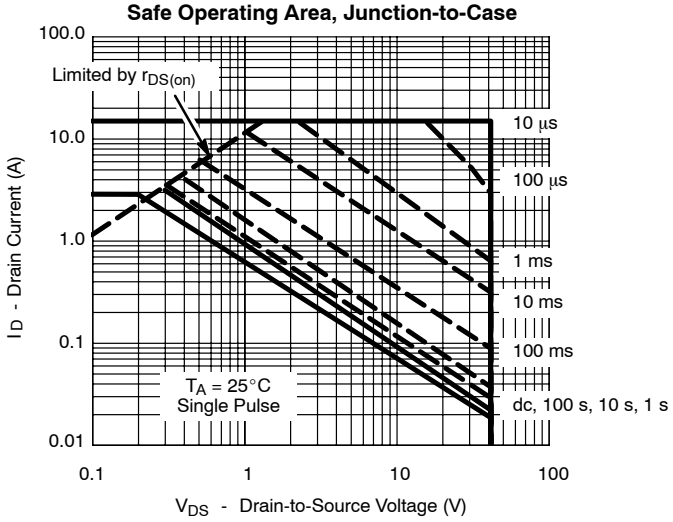
Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient