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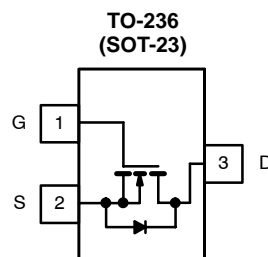


N-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
20	0.031 @ $V_{GS} = 4.5$ V	5.0	7.5
	0.037 @ $V_{GS} = 2.5$ V	4.6	
	0.047 @ $V_{GS} = 1.8$ V	4.1	

FEATURES

- TrenchFET® Power MOSFET
- 100% R_g Tested



Top View

Si2312BDS (M2)*

*Marking Code

Ordering Information: Si2312BDS-T1—E3

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 sec	Steady State	Unit	
Drain-Source Voltage	V_{DS}	20		V	
Gate-Source Voltage	V_{GS}	± 8			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	5.0	3.9	A
		$T_A = 70^\circ\text{C}$	4.0	3.1	
Pulsed Drain Current ^b	I_{DM}	15			
Avalanche Current ^b	I_{AS}	13			
Single Avalanche Energy	E_{AS}	L = 0.1 mH	8.45		mJ
Continuous Source Current (Diode Conduction) ^a			I_S	1.0	0.63
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	1.25	0.75	W
		$T_A = 70^\circ\text{C}$	0.80	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	80	100	$^\circ\text{C/W}$
		Steady State	120	166	
Maximum Junction-to-Foot	R_{thJF}	50	60		

Notes

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

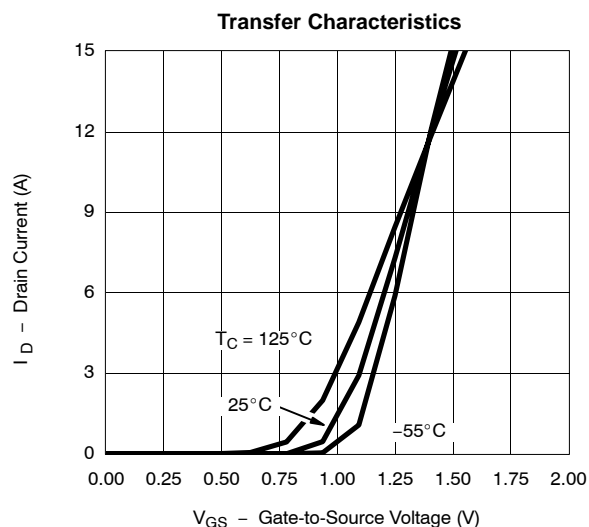
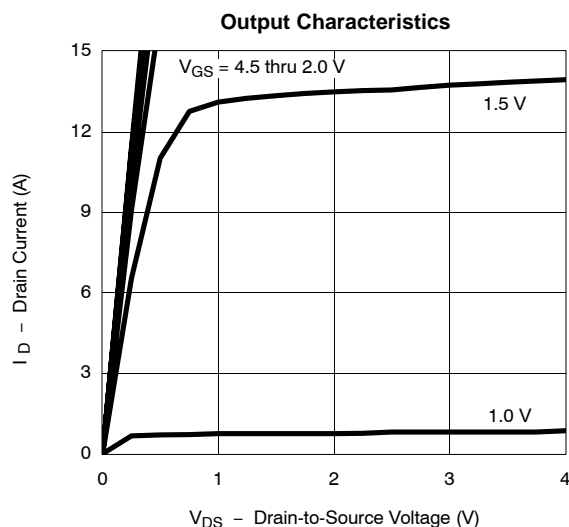
SPECIFICATIONS (T_A = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.45		0.85	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 70 °C			75	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 4.5 V	15			A
Drain-Source On-Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 5.0 A		0.025	0.031	Ω
		V _{GS} = 2.5 V, I _D = 4.6 A		0.030	0.037	
		V _{GS} = 1.8 V, I _D = 4.1 A		0.036	0.047	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 5.0 A		30		S
Diode Forward Voltage	V _{SD}	I _S = 1.0 A, V _{GS} = 0 V		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 5.0 A		7.5	12	nC
Gate-Source Charge	Q _{gs}			1.4		
Gate-Drain Charge	Q _{gd}			1.2		
Gate Resistance	R _g	f = 1.0 MHz	1.1	2.2	3.3	Ω
Switching						
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1.0 A, V _{GEN} = 4.5 V, R _g = 6 Ω		9	15	ns
Rise Time	t _r			30	45	
Turn-Off Delay Time	t _{d(off)}			35	55	
Fall-Time	t _f			10	15	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.0 A, di/dt = 100 A/μs		13	25	nC
Body Diode Reverse Recovery Charge	Q _{rr}			4.5	7	

Notes

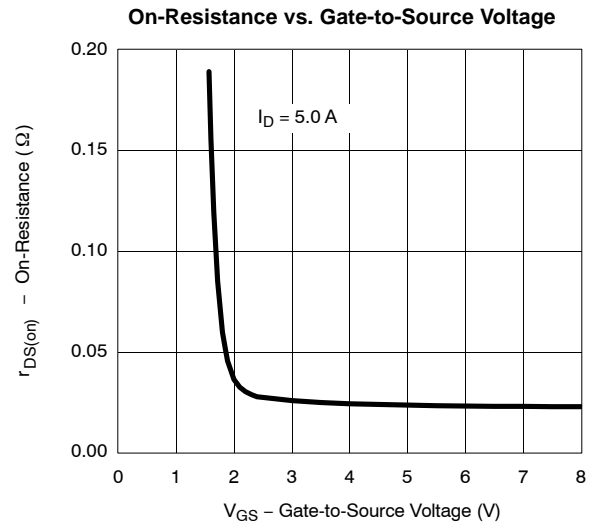
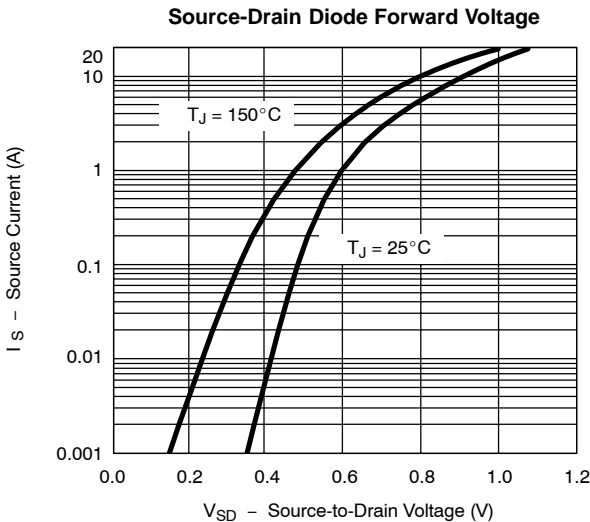
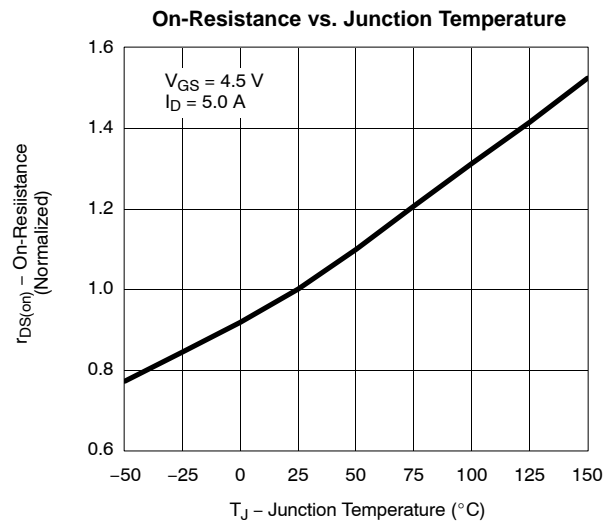
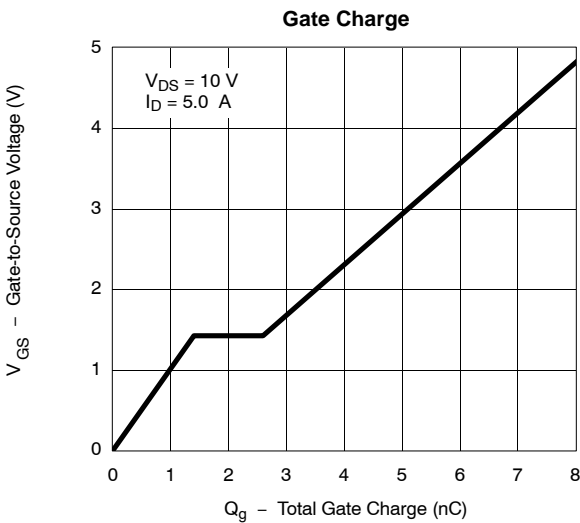
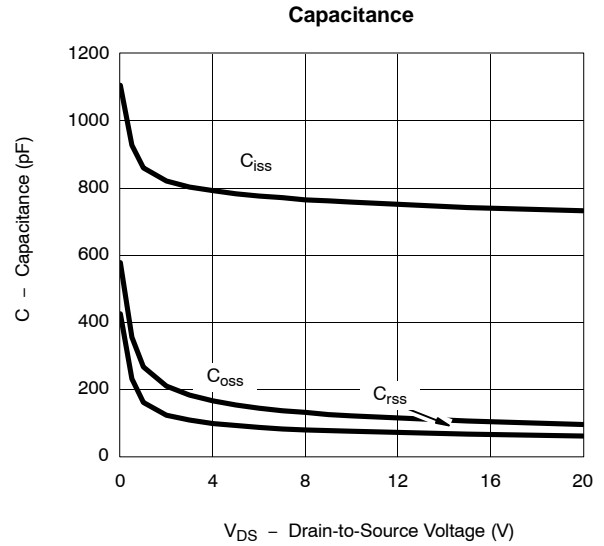
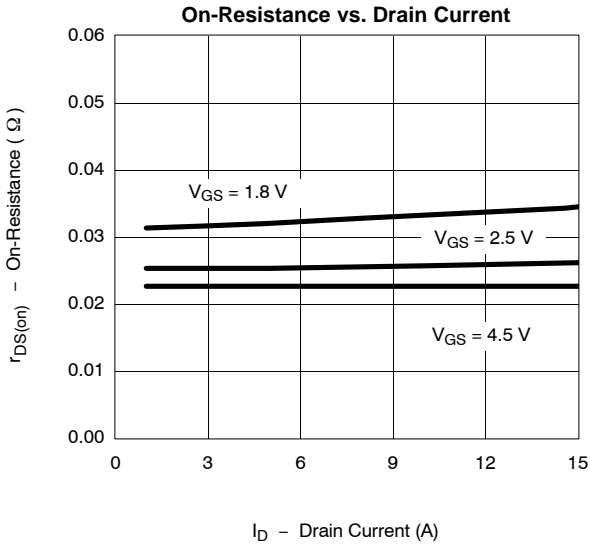
- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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.

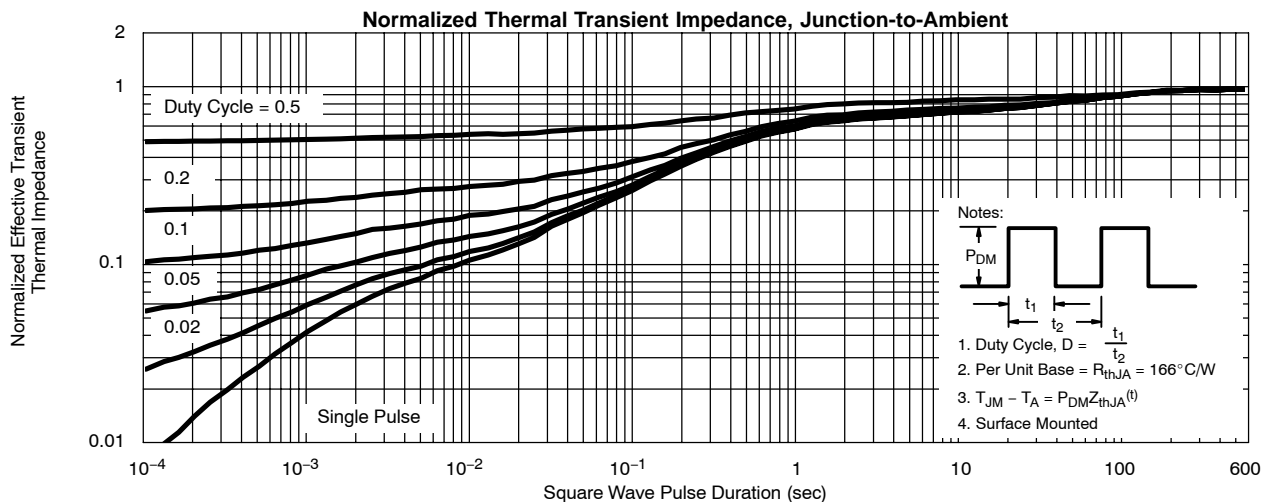
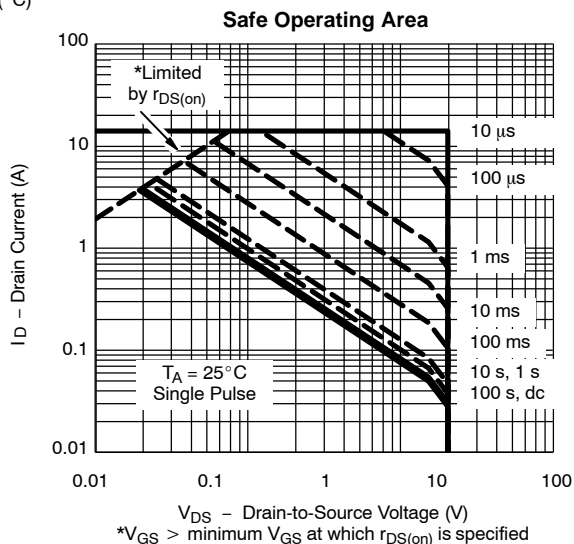
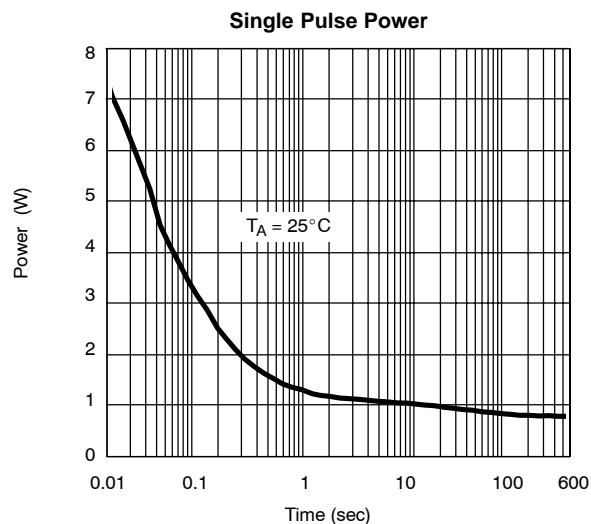
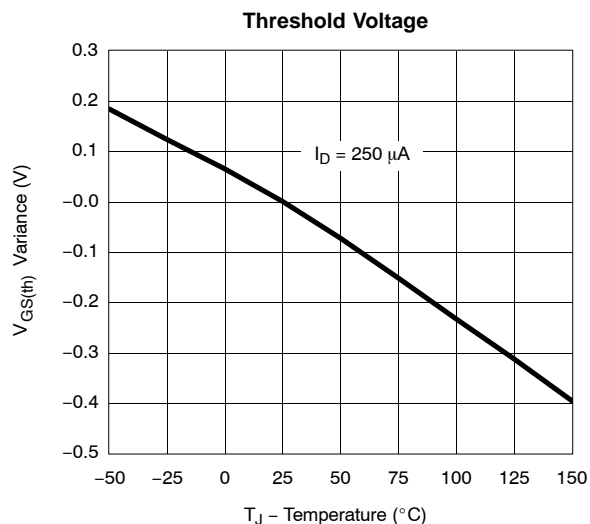
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



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