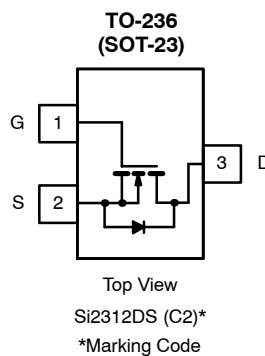


## N-Channel 20-V (D-S) MOSFET

1.8-V Rated

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
20	0.033 @ V <sub>GS</sub> = 4.5 V	4.9
	0.040 @ V <sub>GS</sub> = 2.5 V	4.4
	0.051 @ V <sub>GS</sub> = 1.8 V	3.9



Ordering Information: Si2312DS-T1

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 sec	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	20		V	
Gate-Source Voltage	V <sub>GS</sub>	±8			
Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25°C	4.9	3.77	
		T <sub>A</sub> = 70°C	3.9	3.0	
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	15		A	
Avalanche Current <sup>b</sup>	I <sub>AS</sub>	15			
Single Avalanche Energy	E <sub>AS</sub>	11.25			
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	1.0		A
Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25°C	1.25	0.75	W
		T <sub>A</sub> = 70°C	0.80	0.48	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 5 sec	75	100	°C/W
		Steady State	120	166	
Maximum Junction-to-Foot	R <sub>thJF</sub>	40	50		

**Notes**

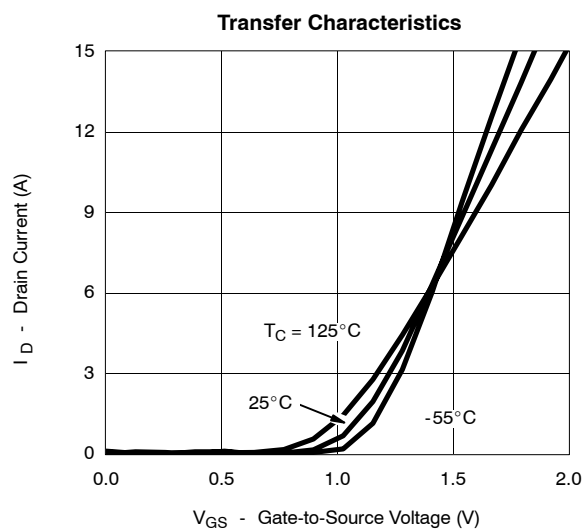
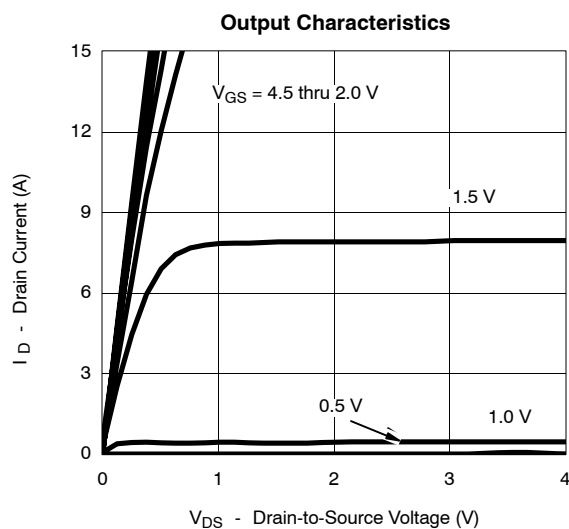
- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

**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	20			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	0.45	0.65	0.85	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C			75	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 10 V, V <sub>GS</sub> = 4.5 V	15			A
Drain-Source On-Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5.0 A		0.027	0.033	Ω
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 4.5 A		0.033	0.040	
		V <sub>GS</sub> = 1.8 V, I <sub>D</sub> = 4.0 A		0.042	0.051	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 5.0 A		40		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1.0 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> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5.0 A		11.2	14.0	nC
Gate-Source Charge	Q <sub>gs</sub>			1.4		
Gate-Drain Charge	Q <sub>gd</sub>			2.2		
<b>Switching</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> ≅ 1.0 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 6 Ω		15	25	ns
Rise Time	t <sub>r</sub>			40	60	
Turn-Off Delay Time	t <sub>d(off)</sub>			48	70	
Fall-Time	t <sub>f</sub>			31	45	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, di/dt = 100 A/μs		13	25	

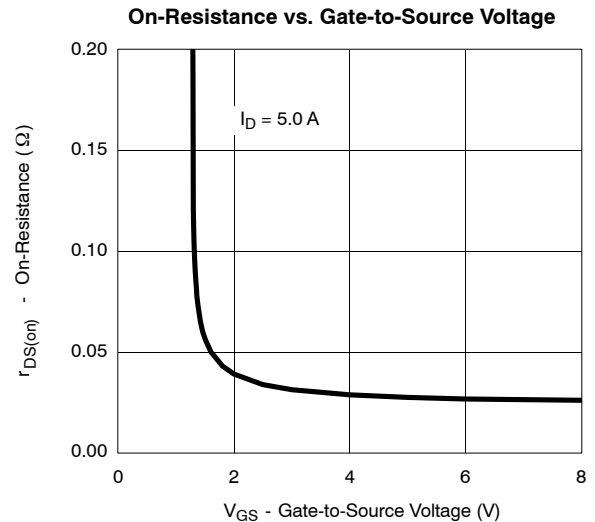
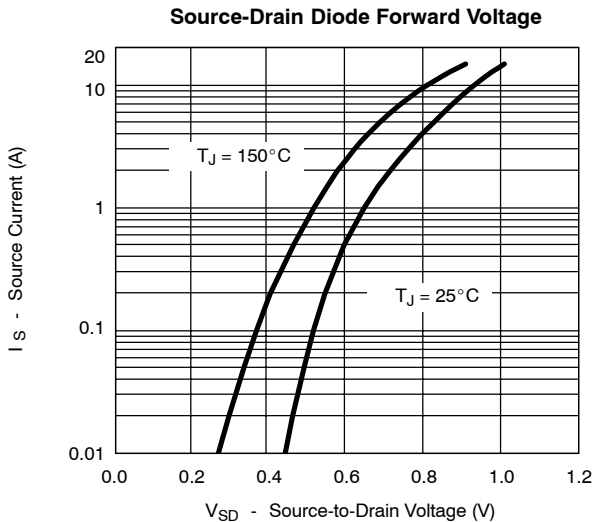
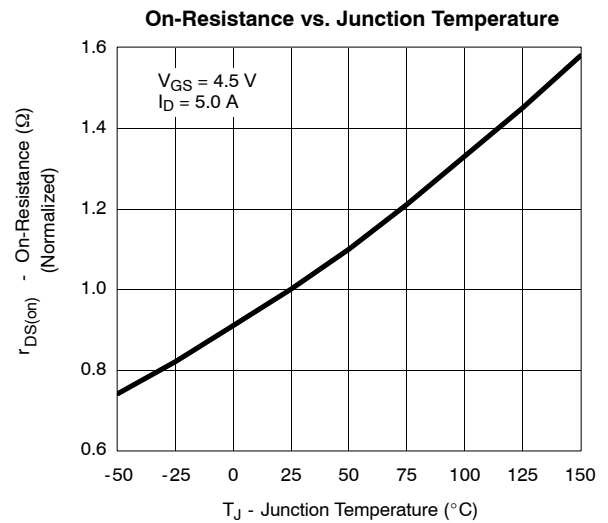
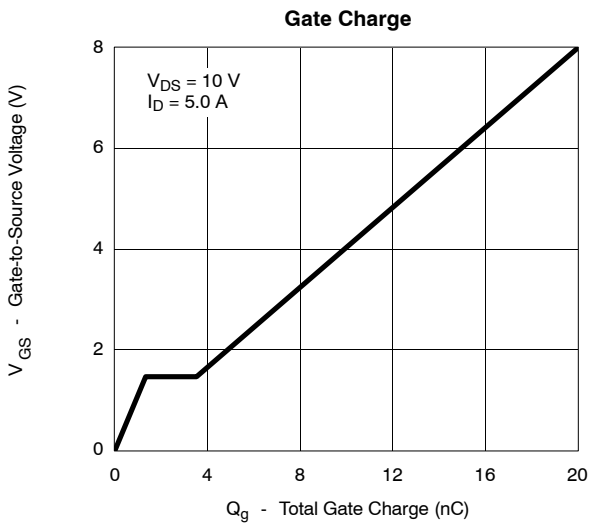
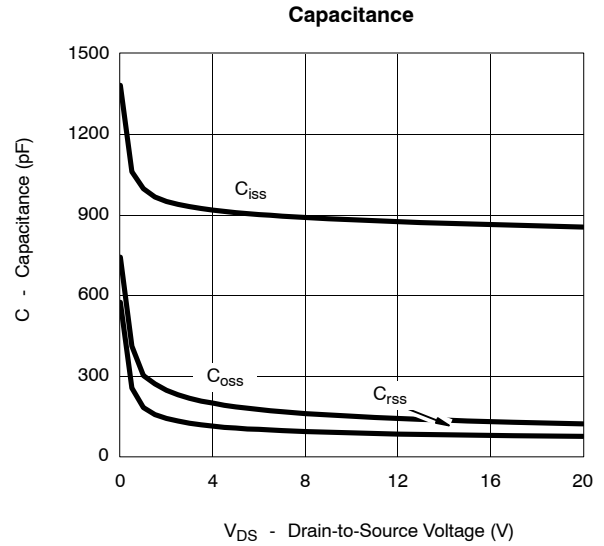
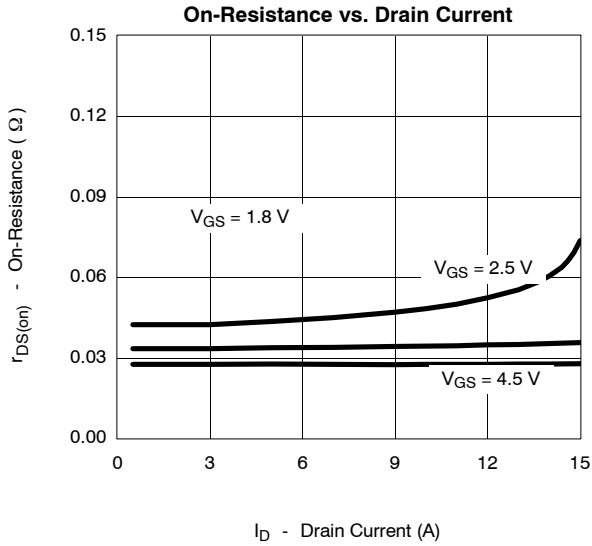
## Notes

- 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)**





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

