



New Product

**Si1413EDH**  
Vishay Siliconix

**P-Channel 20-V (D-S) MOSFET**

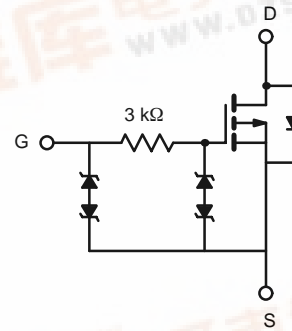
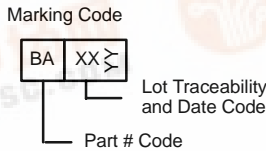
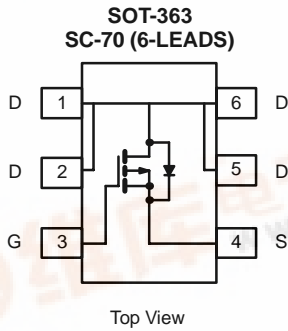
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
-20	0.115 @ V <sub>GS</sub> = -4.5 V	-2.9
	0.155 @ V <sub>GS</sub> = -2.5 V	-2.4
	0.220 @ V <sub>GS</sub> = -1.8 V	-2.0

**FEATURES**

- TrenchFET® Power MOSFETS: 1.8-V Rated
- ESD Protected: 3000 V
- Thermally Enhanced SC-70 Package

**APPLICATIONS**

- Load Switching
- PA Switch
- Level Switch



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)					
Parameter	Symbol	5 secs	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	-20		V	
Gate-Source Voltage	V <sub>GS</sub>	± 12			
Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25°C	-2.9	-2.3	A
		T <sub>A</sub> = 85°C	-2.0	-1.6	
Pulsed Drain Current	I <sub>DM</sub>	-8			
Continuous Diode Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-1.4	-0.9		
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25°C	1.56	1.0	W
		T <sub>A</sub> = 85°C	0.81	0.52	
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>	t ≤ 5 sec	R <sub>thJA</sub>	60	80	°C/W
	Steady State		100	125	
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	34	45	

Notes:  
a. Surface Mounted on 1" x 1" FR4 Board.

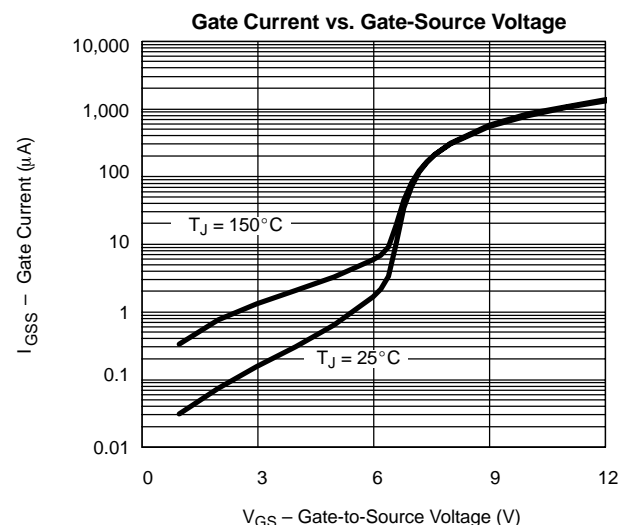
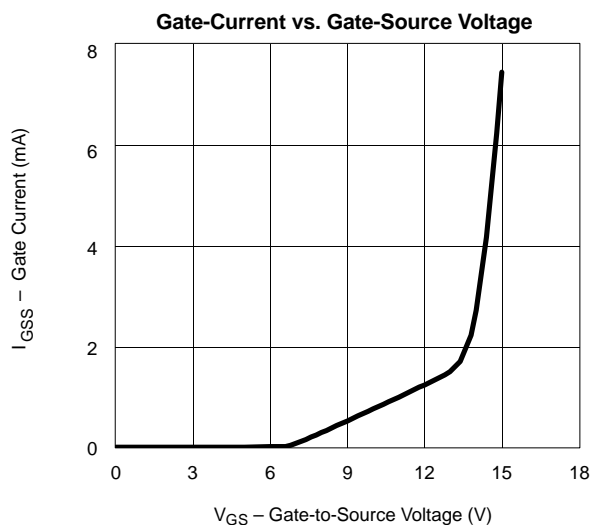


SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -100 μA	-0.45			V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±4.5 V			±1.5	μA
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V			±10	mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			-5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V	-4			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -2.9 A		0.095	0.115	Ω
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -2.4 A		0.125	0.155	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -1.0 A		0.180	0.220	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -2.9 A		6		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = -1.4 A, V <sub>GS</sub> = 0 V		-0.80	-1.1	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> = -2.9 A		5.6	8	nC
Gate-Source Charge	Q <sub>gs</sub>			1.2		
Gate-Drain Charge	Q <sub>gd</sub>			1.2		
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 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω		0.75	1.1	μs
Rise Time	t <sub>r</sub>			1.6	2.3	
Turn-Off Delay Time	t <sub>d(off)</sub>			3.9	5.5	
Fall Time	t <sub>f</sub>			3.9	5.5	

Notes

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

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

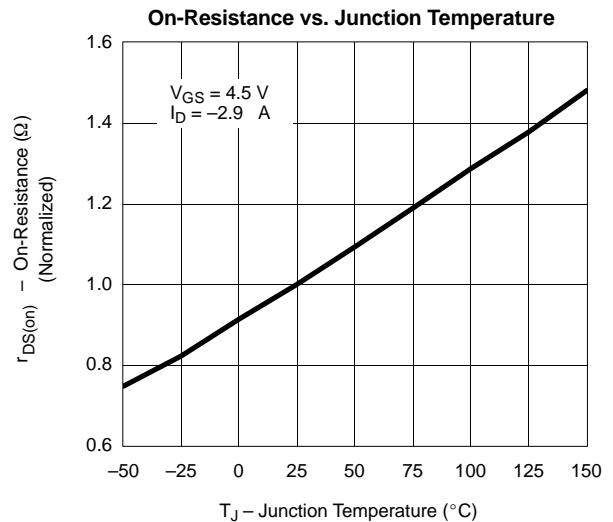
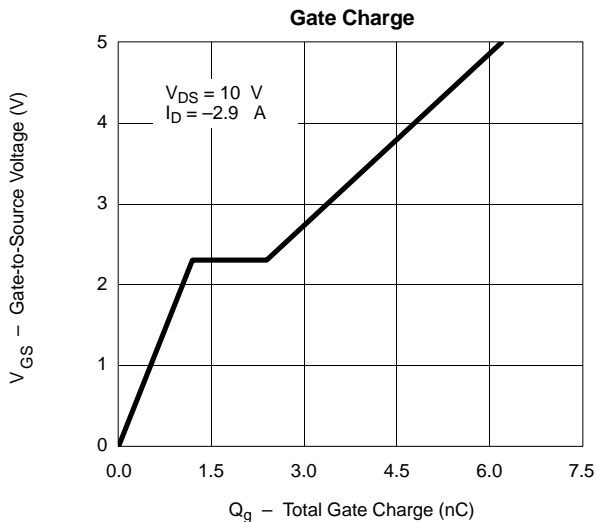
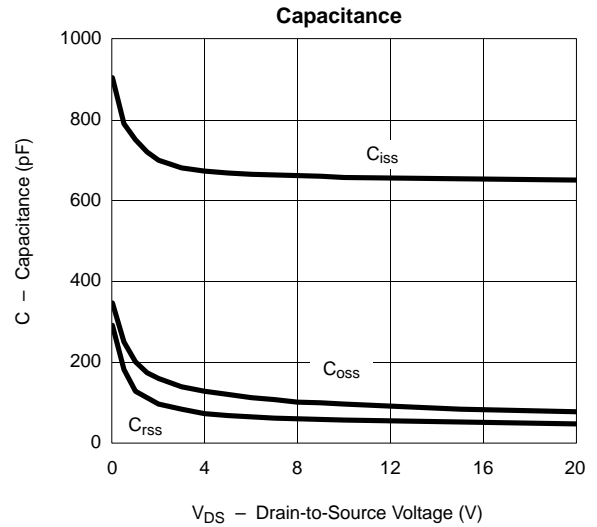
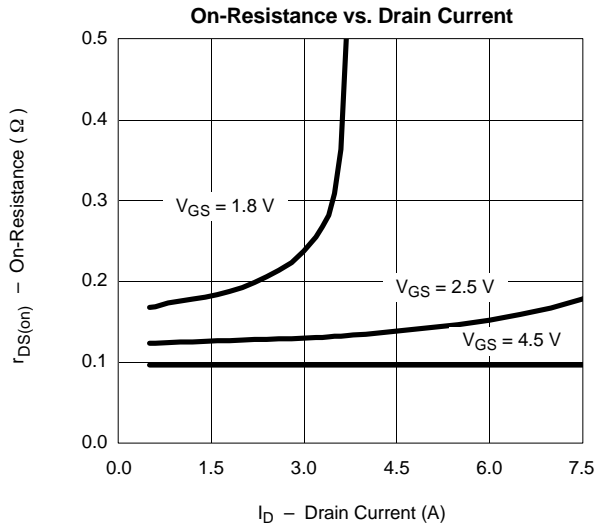
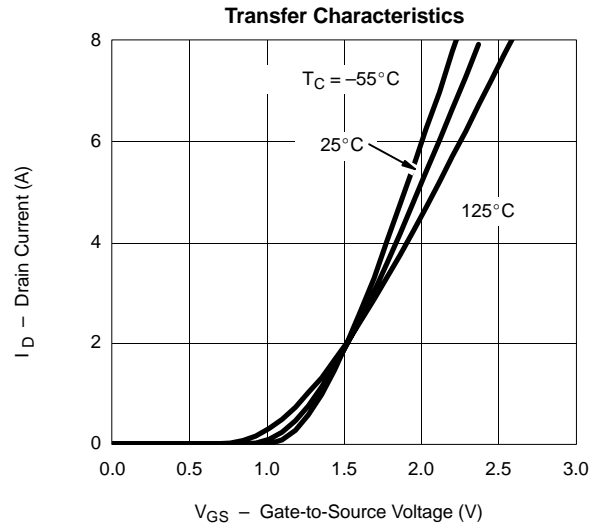
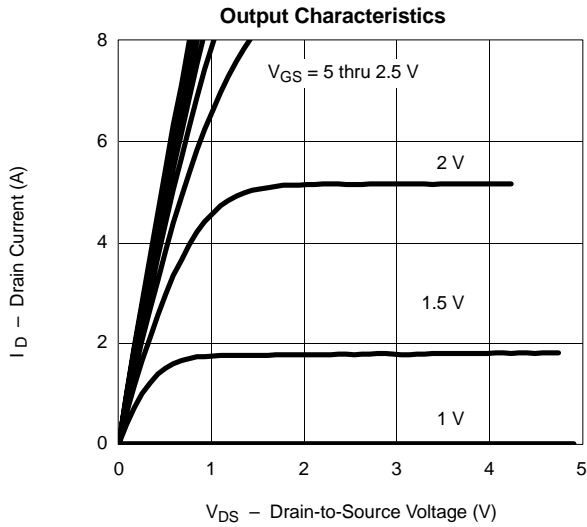




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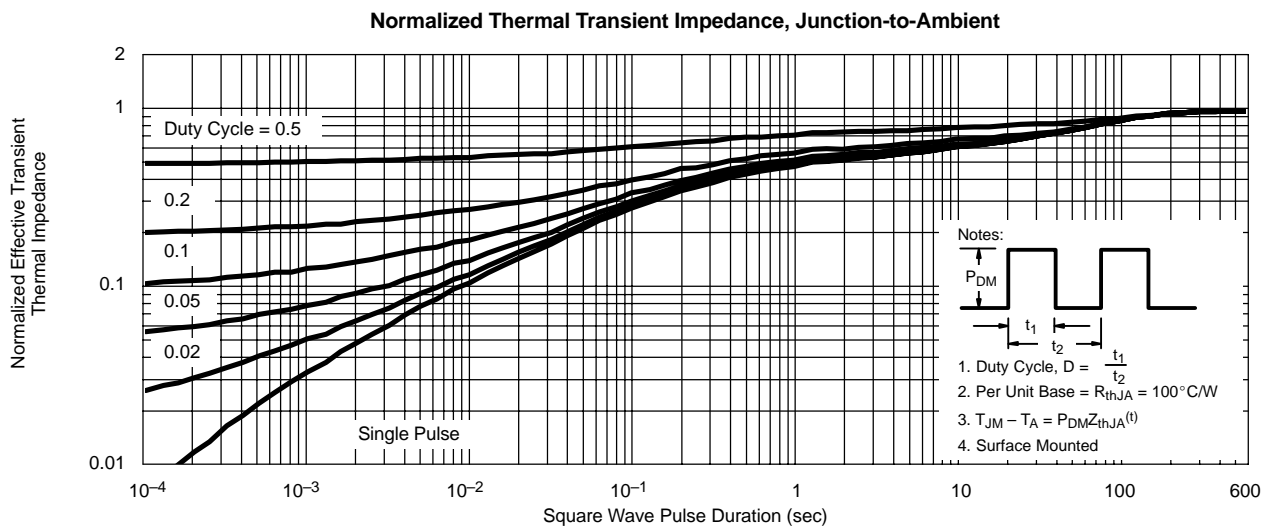
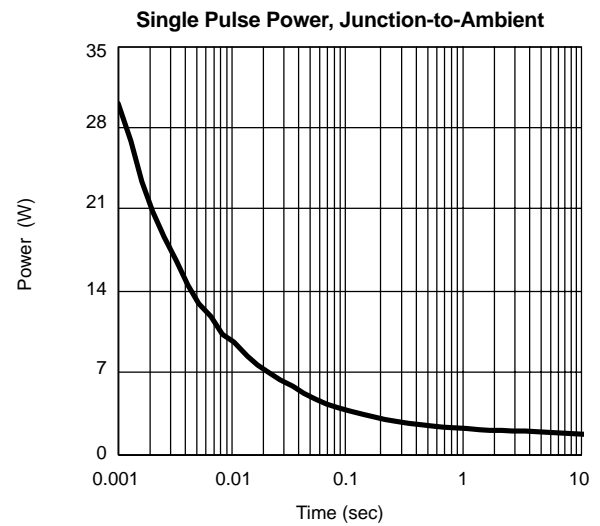
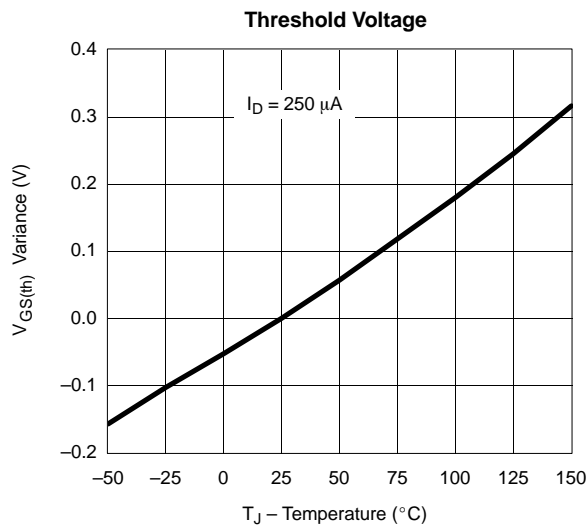
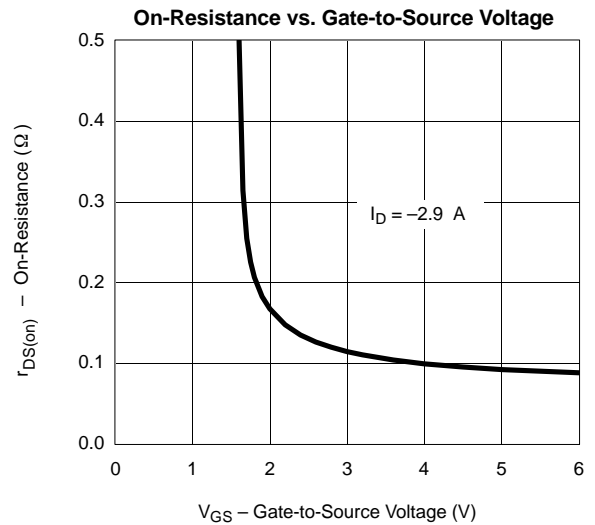
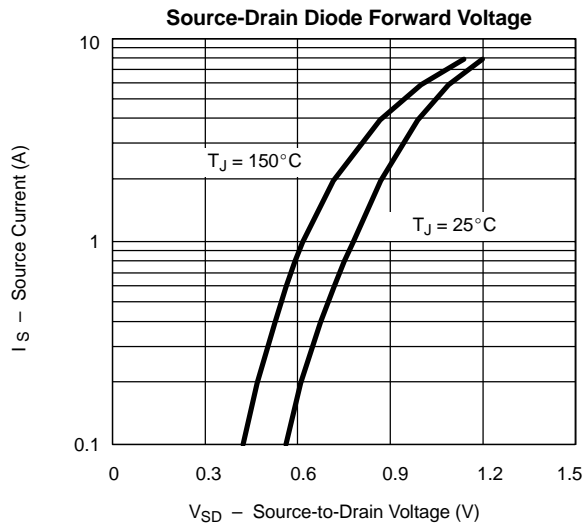
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