

## P-Channel 12 V (D-S) MOSFET

### PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
- 12	0.156 at V <sub>GS</sub> = - 4.5 V	1.18	6.7 nC
	0.190 at V <sub>GS</sub> = - 2.5V	1.07	
	0.245 at V <sub>GS</sub> = - 1.8V	0.49	

### FEATURES

- TrenchFET® Power MOSFET
- 100 % R<sub>g</sub> Tested
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

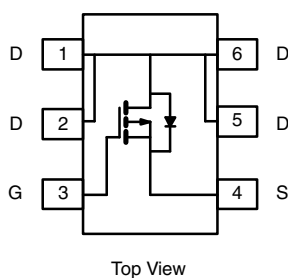


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

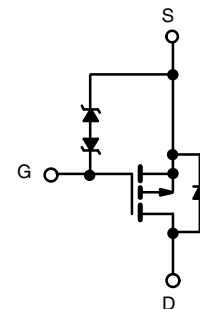
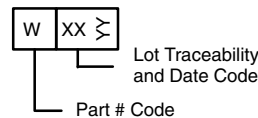
### APPLICATIONS

- Load Switch for Portable Devices

SC-89 (3-LEADS)



Marking Code



P-Channel MOSFET

Ordering Information: Si1065X-T1-GE3 (Lead (Pb)-free and Halogen-free)

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	- 12	V
Gate-Source Voltage	V <sub>GS</sub>	± 8	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	- 1.18 <sup>b, c</sup>	A
		- 0.94 <sup>b, c</sup>	
Pulsed Drain Current	I <sub>DM</sub>	- 8	
Continuous Source-Drain Diode Current	I <sub>S</sub>	- 0.2 <sup>b, c</sup>	W
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	0.236 <sup>b, c</sup>	
		0.151 <sup>b, c</sup>	
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, b</sup>	R <sub>thJA</sub>	440	530	°C/W
		540	650	

Notes:

a. Maximum under steady state conditions is 650 °C/W.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	- 12			V
V <sub>DS</sub> Temperature Coefficient	ΔV <sub>DS</sub> /T <sub>J</sub>	I <sub>D</sub> = - 250 μA		- 8.47		mV/°C
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub> /T <sub>J</sub>			2.33		
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = - 250 μA	- 0.45		- 0.95	V
Gate-Source 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> = - 12 V, V <sub>GS</sub> = 0 V			- 1	nA
		V <sub>DS</sub> = - 12 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			- 10	μA
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	- 8			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> = - 1.18 A		0.108	0.156	Ω
		V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 1.07 A		0.131	0.190	
		V <sub>GS</sub> = - 1.8 V, I <sub>D</sub> = - 0.49 A		0.158	0.245	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = - 6 V, I <sub>D</sub> = - 1.18 A		5.18		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = - 6 V, V <sub>GS</sub> = 0 V, f = 1 MHz		480		pF
Output Capacitance	C <sub>oss</sub>			190		
Reverse Transfer Capacitance	C <sub>rss</sub>			145		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = - 6 V, V <sub>GS</sub> = - 5 V, I <sub>D</sub> = - 1.18 A		7.2	10.8	nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = - 6 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 1.18		6.7	10.1	
Gate-Drain Charge	Q <sub>gd</sub>			0.84		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		10	15	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = - 6 V, R <sub>L</sub> = 6.32 Ω I <sub>D</sub> ≅ - 0.95 A, V <sub>GEN</sub> = - 4.5 V, R <sub>g</sub> = 1 Ω		13	19.5	ns
Rise Time	t <sub>r</sub>			27	40.5	
Turn-Off DelayTime	t <sub>d(off)</sub>			45	67.5	
Fall Time	t <sub>f</sub>			27	40.5	
Drain-Source Body Diode Characteristics						
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				8	A
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 0.63 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 0.7 A, dI/dt = 100 A/μs		29.2	44	nC
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			10.22	15.3	ns
Reverse Recovery Fall Time	t <sub>a</sub>			13.7		
Reverse Recovery Rise Time	t <sub>b</sub>			15.5		

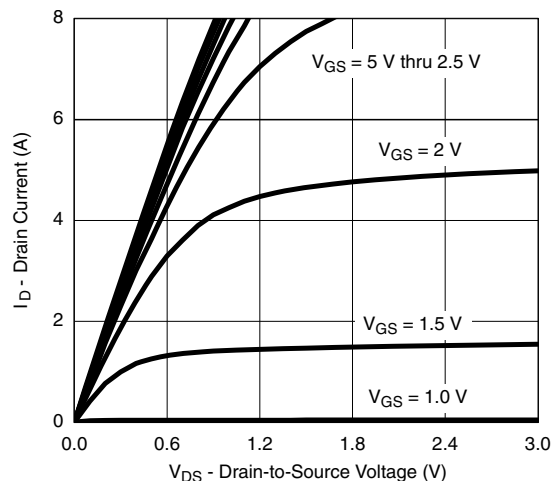
Notes:

a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

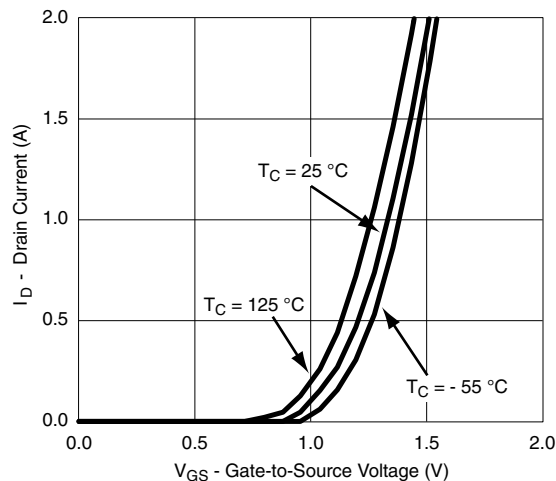
b. Guaranteed by design, not subject to production testing.

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.

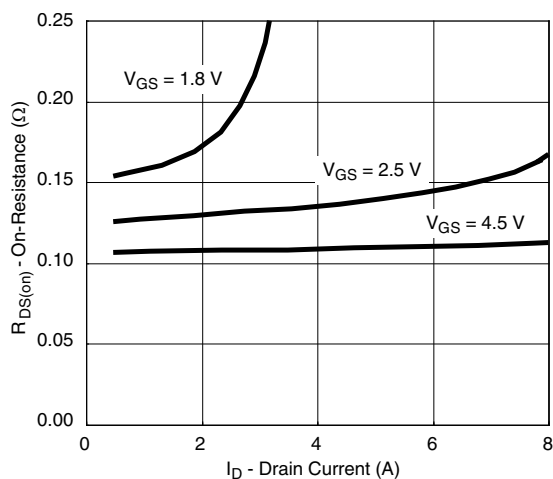
## TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)



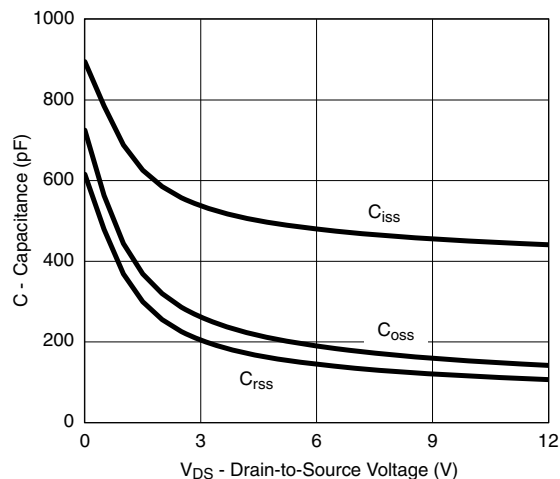
Output Characteristics



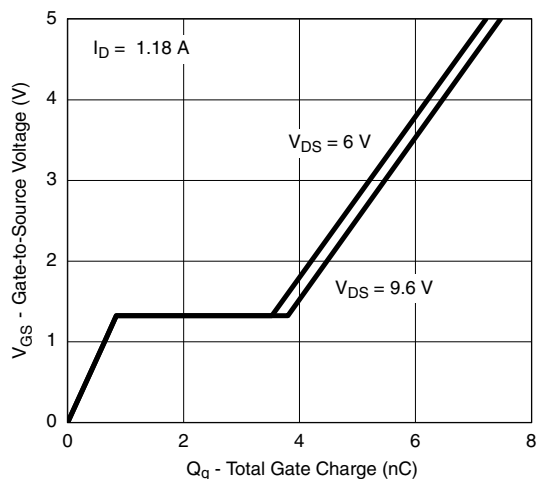
Transfer Characteristics Curves vs. Temp.



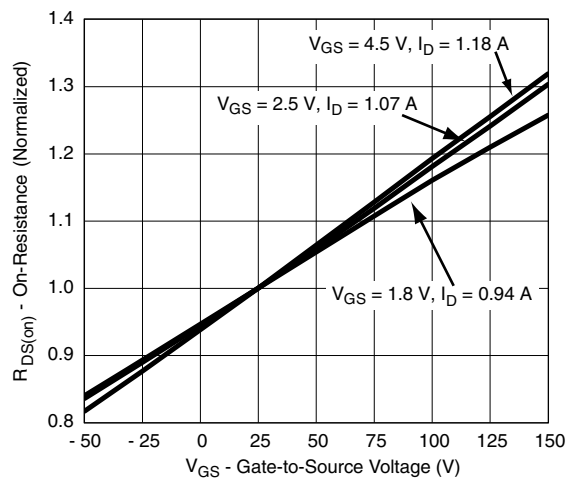
On-Resistance vs. Drain Current



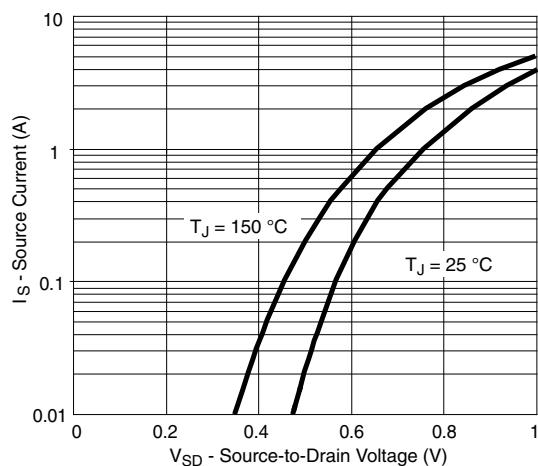
Capacitance



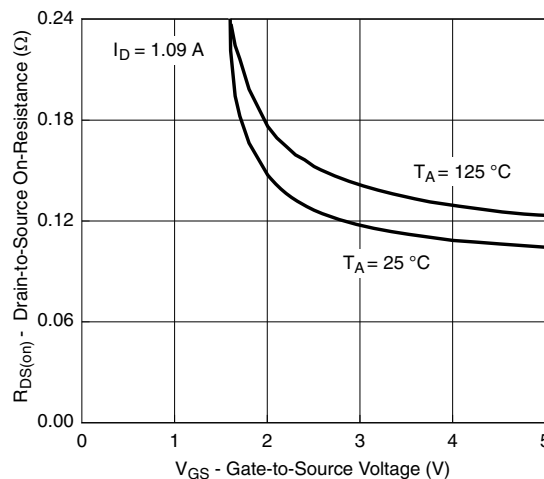
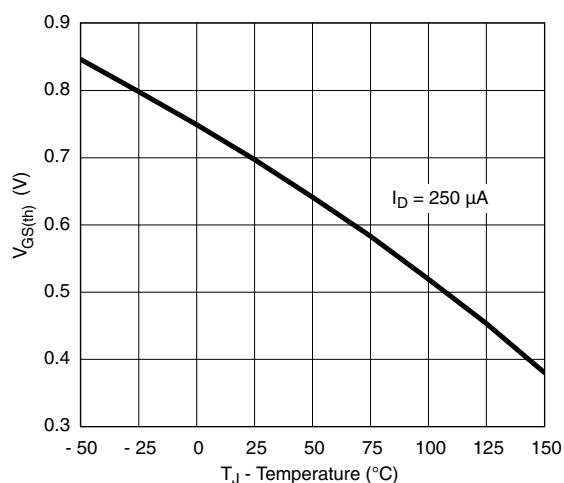
Gate Charge



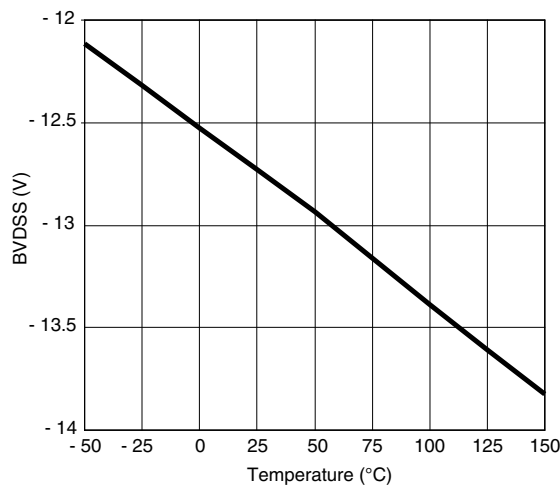
On-Resistance vs. Junction Temperature

**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)


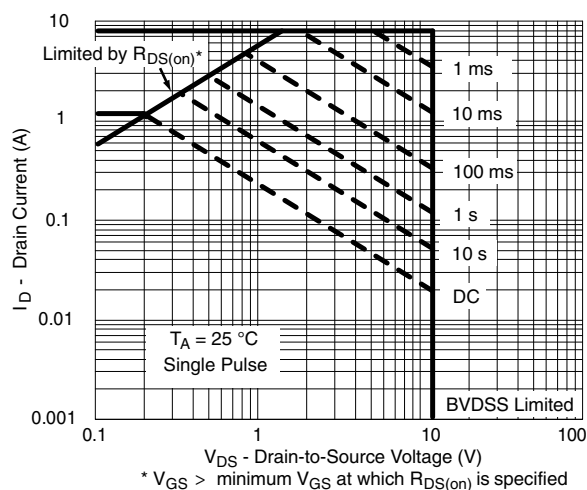
Source-Drain Diode Forward Voltage

 $R_{DS(on)}$  vs.  $V_{GS}$  vs. Temperature

Threshold Voltage

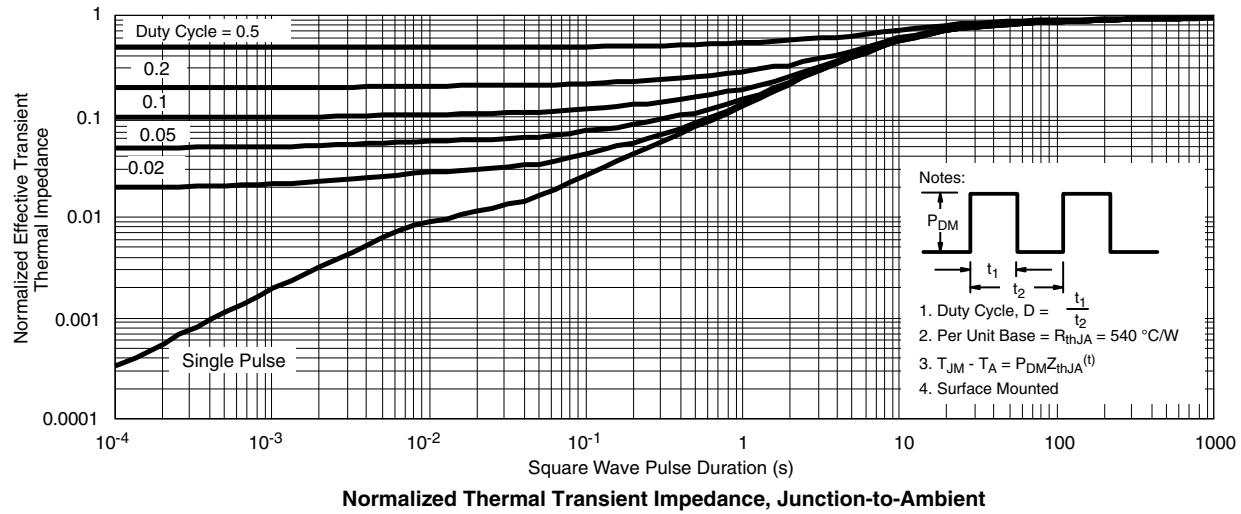


BVDSS vs. Temperature



Safe Operating Area, Junction-to-Ambient

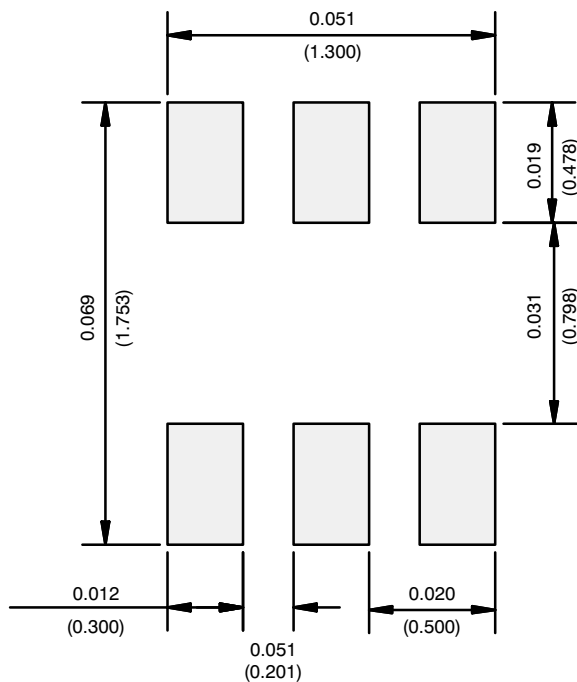
## TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



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## RECOMMENDED MINIMUM PADS FOR SC-89: 6-Lead



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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