N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A)	Q_g (Typ.)
20	0.420 at V_{GS} = 4.5 V	0.5	1 nC
	0.492 at V_{GS} = 2.5 V	0.2	
	0.597 at V_{GS} = 1.8 V	0.2	
	0.762 at V_{GS} = 1.5 V	0.05	

FEATURES

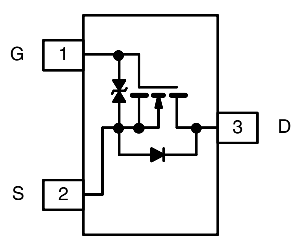
- TrenchFET® Power MOSFET
- Gate-Source ESD Protected: 1000 V
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

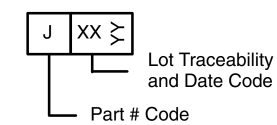
- Load/Power Switching for Portable Devices
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits

SC-89 (3-LEADS)



Top View

Marking Code



Ordering Information: Si1062X-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	0.53[a, b]	A
	T_A = 70 °C		0.43[a, b]	
Pulsed Drain Current (t = 300 µs)		I_{DM}	2	
Continuous Source-Drain Diode Current	T_A = 25 °C	I_S	0.18[a, b]	A
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	0.22[a, b]	W
	T_A = 70 °C		0.14[a, b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typ.	Max.	Unit
Maximum Junction-to-Ambient[b]	t ≤ 5 s	R_{thJA}	440	530	°C/W
	Steady State		540	650	

Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. t = 5 s.

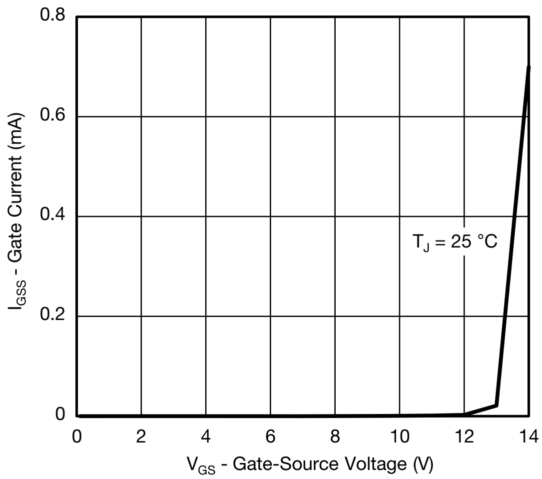
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		11		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 1.8		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.4		1	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 30	µA
		V_{DS} = 0 V, V_{GS} = ± 4.5 V			± 1	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 85 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = ≥ 5 V, V_{GS} = 4.5 V	2			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.5 A		0.350	0.420	Ω
		V_{GS} = 2.5 V, I_D = 0.2 A		0.410	0.492	
		V_{GS} = 1.8 V, I_D = 0.2 A		0.459	0.597	
		V_{GS} = 1.5 V, I_D = 0.05 A		0.510	0.762	
Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 0.5 A		7.5		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz		43		pF
Output Capacitance	C_{oss}			14		
Reverse Transfer Capacitance	C_{rss}			8		
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 8 V, I_D = 0.5 A		1.8	2.7	nC
		V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 0.5 A		1	2	
Gate-Source Charge	Q_{gs}			0.16		
Gate-Drain Charge	Q_{gd}			0.13		
Gate Resistance	R_g	f = 1 MHz		12.2		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 20 Ω I_D ≅ 0.4 A, V_{GEN} = 4.5 V, R_g = 1 Ω		2	4	ns
Rise Time	t_r			14	24	
Turn-Off Delay Time	$t_{d(off)}$			16	30	
Fall Time	t_f			11	20	
Drain-Source Body Diode Characteristics						
Pulse Diode Forward Current[a]	I_{SM}				2	A
Body Diode Voltage	V_{SD}	I_S = 0.4 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 0.4 A, dI/dt = 100 A/µs		10	15	ns
Body Diode Reverse Recovery Charge	Q_{rr}			2	4	nC
Reverse Recovery Fall Time	t_a			5		ns
Reverse Recovery Rise Time	t_b			5		

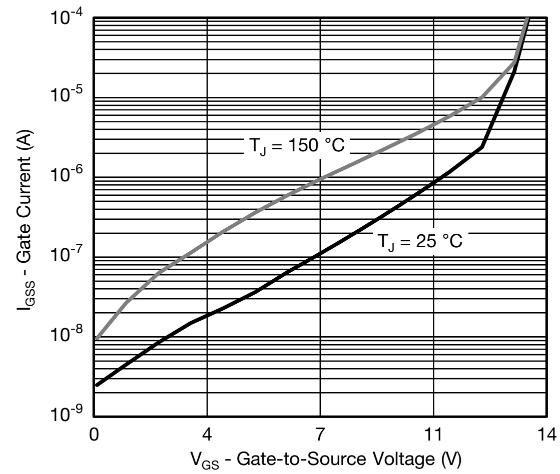
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

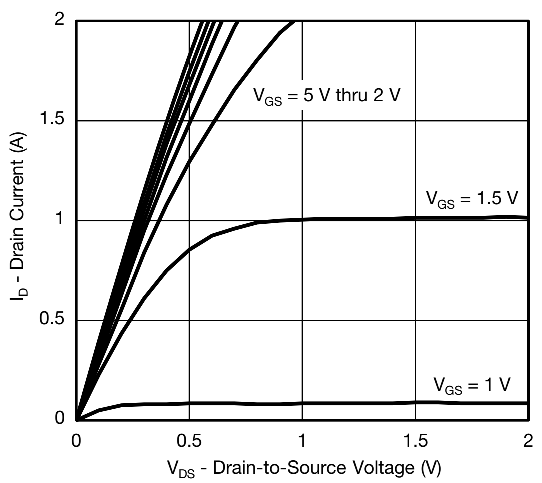
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



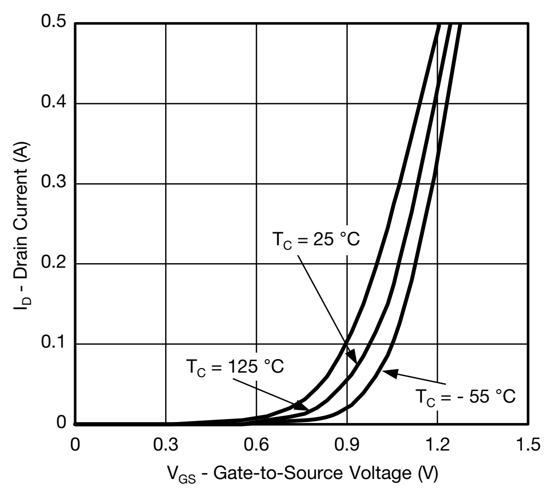
Gate Current vs. Gate-Source Voltage



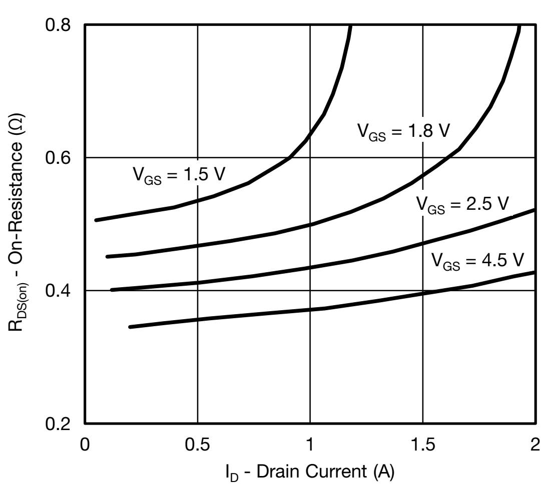
Gate Current vs. Gate-Source Voltage



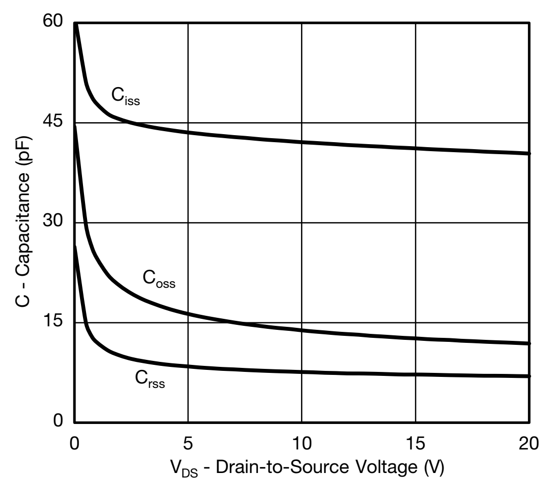
Output Characteristics



Transfer Characteristics

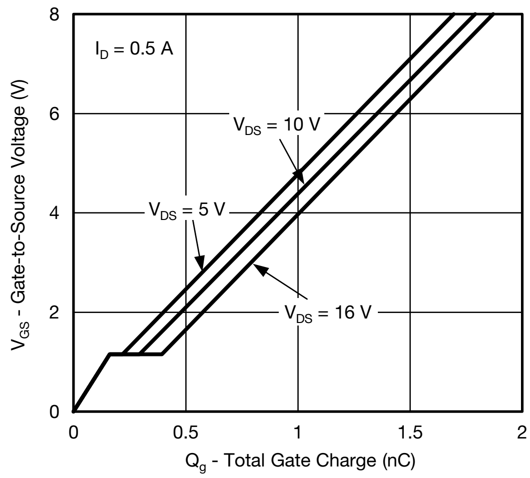


On-Resistance vs. Drain Current

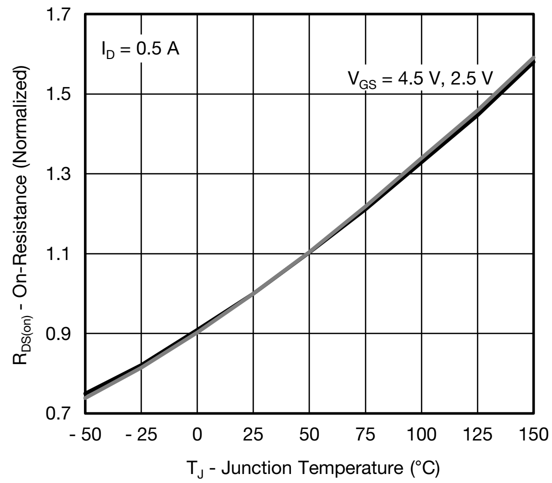


Capacitance

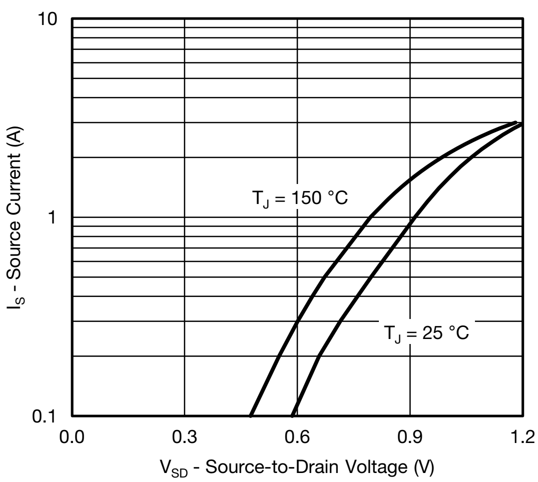
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



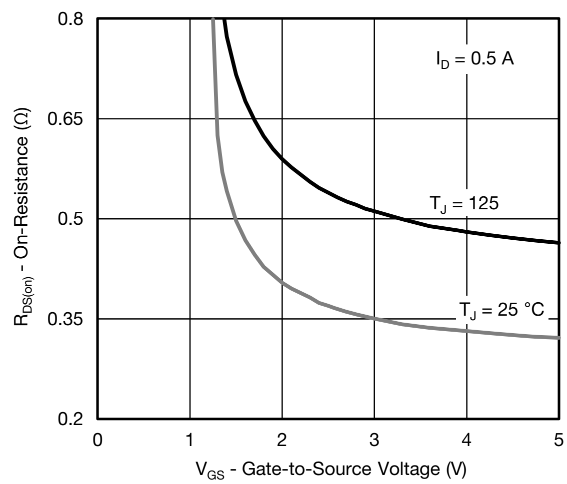
Gate Charge



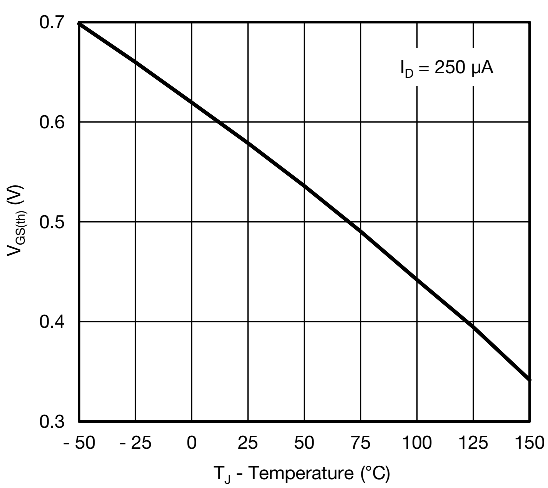
On-Resistance vs. Junction Temperature



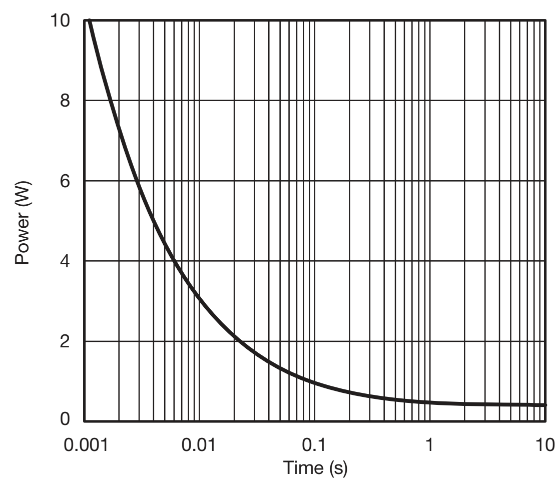
Soure-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

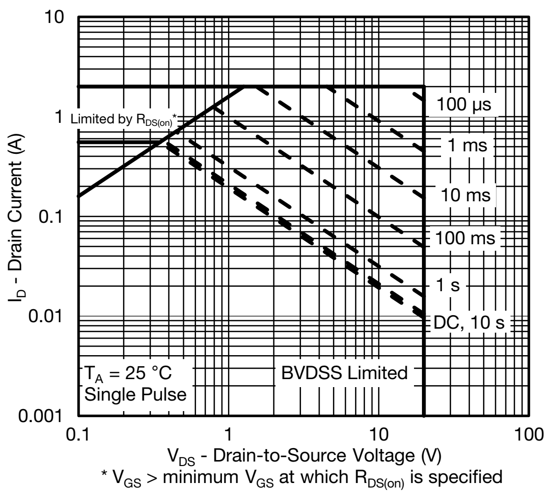


Threshold Voltage

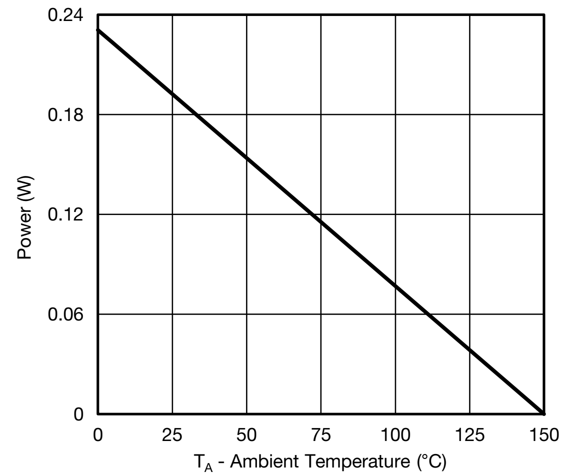


Single Pulse Power, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

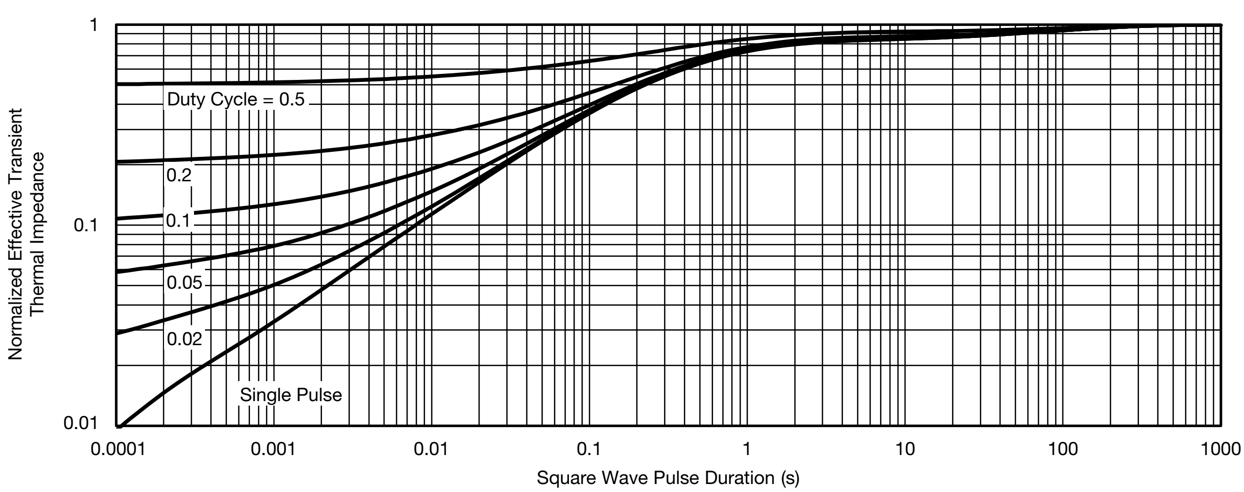


Safe Operating Area, Junction-to-Ambient



Power Derating, Junction-to-Ambient

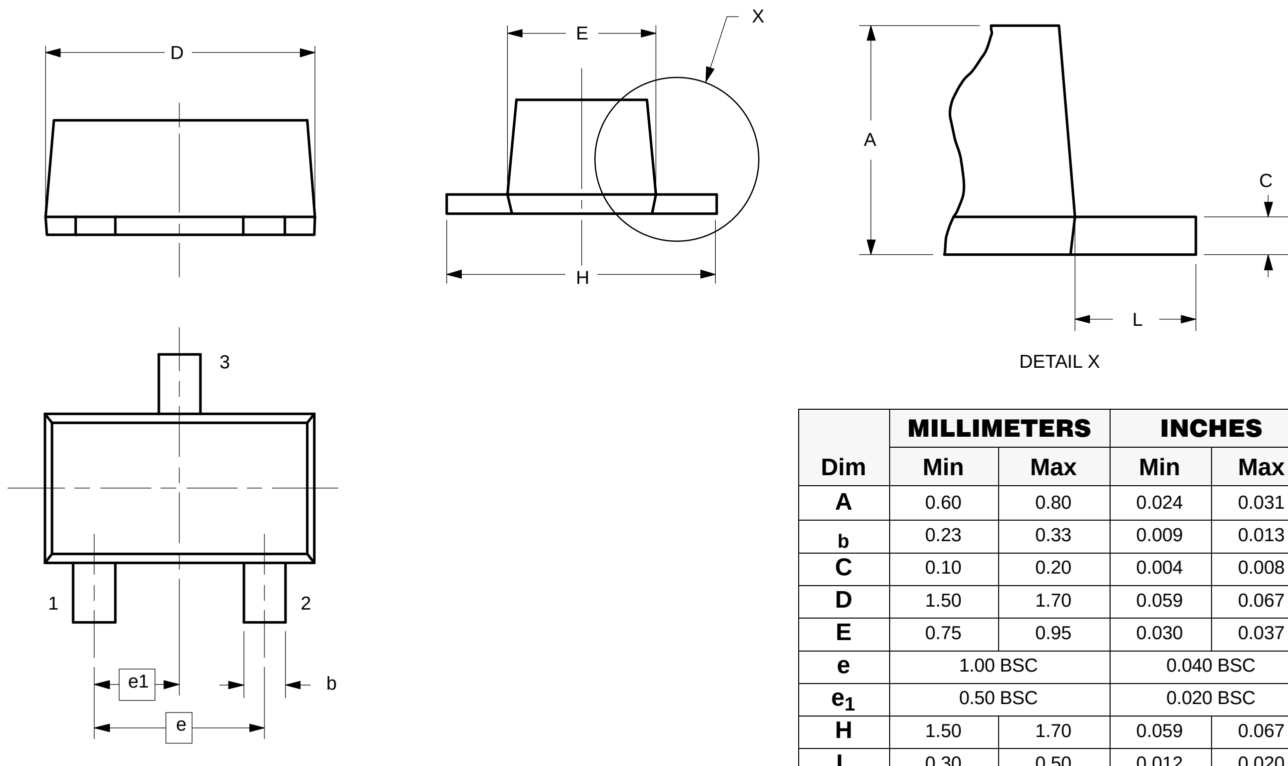
* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



Normalized Thermal Transient Impedance, Junction-to-Ambient

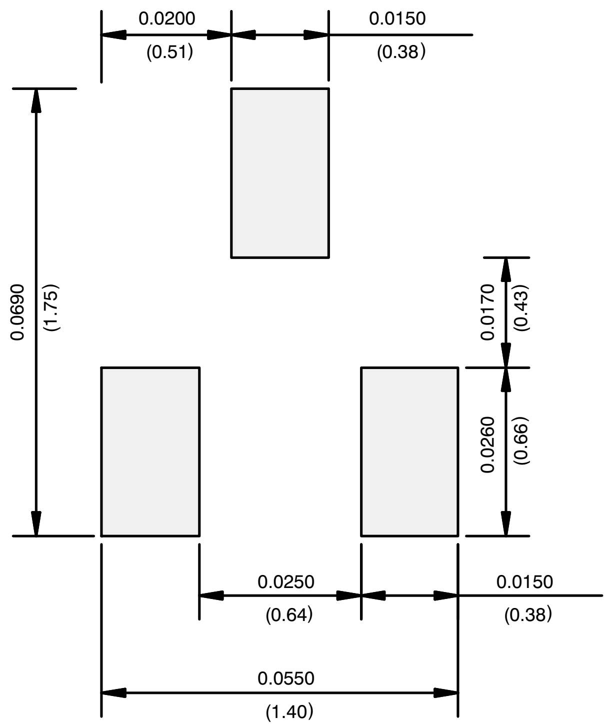
Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?62661.

SC89-3



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.60	0.80	0.024	0.031
b	0.23	0.33	0.009	0.013
C	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.75	0.95	0.030	0.037
e	1.00 BSC		0.040 BSC	
e_1	0.50 BSC		0.020 BSC	
H	1.50	1.70	0.059	0.067
L	0.30	0.50	0.012	0.020
ECN: S-03946—Rev. B, 09-Jul-01 DWG: 5869				

RECOMMENDED MINIMUM PADS FOR SC-89: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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