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[Vishay/Siliconix](#)
[SI1023X-T1-E3](#)

For any questions, you can email us directly:

sales@integrated-circuit.com



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

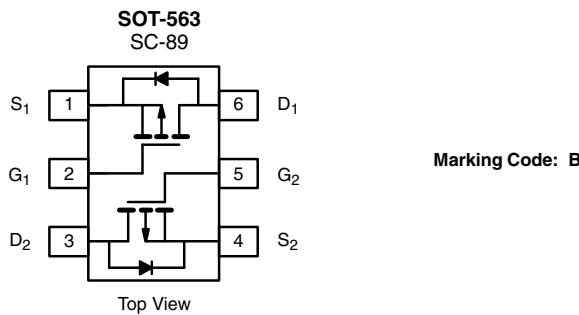
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
- 20	1.2 at $V_{GS} = - 4.5$ V	- 350
	1.6 at $V_{GS} = - 2.5$ V	- 300
	2.7 at $V_{GS} = - 1.8$ V	- 150

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET: 1.8 V Rated
- Very Small Footprint
- High-Side Switching
- Low On-Resistance: 1.2 Ω
- Low Threshold: 0.8 V (typ.)
- Fast Switching Speed: 14 ns
- 1.8 V Operation
- Gate-Source ESD Protected: 2000 V
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE



Ordering Information: Si1023X-T1-GE3 (Lead (Pb)-free and Halogen-free)

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)					
Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V_{DS}		- 20	V
Gate-Source Voltage		V_{GS}		± 6	
Continuous Drain Current ($T_J = 150$ °C) ^a	$T_A = 25$ °C	I_D	- 390	- 370	mA
	$T_A = 85$ °C		- 280	- 265	
Pulsed Drain Current ^b		I_{DM}		- 650	
Continuous Source Current (Diode Conduction) ^a		I_S	- 450	- 380	
Maximum Power Dissipation ^a	$T_A = 25$ °C	P_D	280	250	mW
	$T_A = 85$ °C		145	130	
Operating Junction and Storage Temperature Range	T_J, T_{stg}		- 55 to 150		°C
Gate-Source ESD Rating (HBM, Method 3015)	ESD		2000		V

Notes:

a. Surface mounted on FR4 board.

b. Pulse width limited by maximum junction temperature.

Si1023X

Vishay Siliconix



SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	-0.45			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 4.5 \text{ V}$		± 1	± 2	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16 \text{ V}$, $V_{GS} = 0 \text{ V}$	-0.3	-100	-5	nA
		$V_{DS} = -16 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 85^\circ\text{C}$				μA
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$, $V_{GS} = -4.5 \text{ V}$	-700			mA
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -4.5 \text{ V}$, $I_D = -350 \text{ mA}$		0.8	1.2	Ω
		$V_{GS} = -2.5 \text{ V}$, $I_D = -300 \text{ mA}$		1.2	1.6	
		$V_{GS} = -1.8 \text{ V}$, $I_D = -150 \text{ mA}$		1.8	2.7	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10 \text{ V}$, $I_D = -250 \text{ mA}$		0.4		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -150 \text{ mA}$, $V_{GS} = 0 \text{ V}$		-0.8	-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -10 \text{ V}$, $V_{GS} = -4.5 \text{ V}$, $I_D = -250 \text{ mA}$		1500		pC
Gate-Source Charge	Q_{gs}			150		
Gate-Drain Charge	Q_{gd}			450		
Turn-On Time	$t_{d(\text{on})}$	$V_{DD} = -10 \text{ V}$, $R_L = 47 \Omega$ $I_D \approx -200 \text{ mA}$, $V_{GEN} = -4.5 \text{ V}$, $R_g = 10 \Omega$		14		ns
Turn-Off Time	$t_{d(\text{off})}$			46		

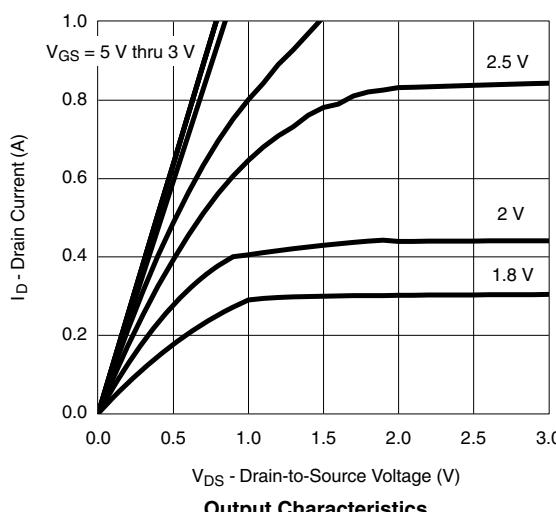
Notes:

a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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

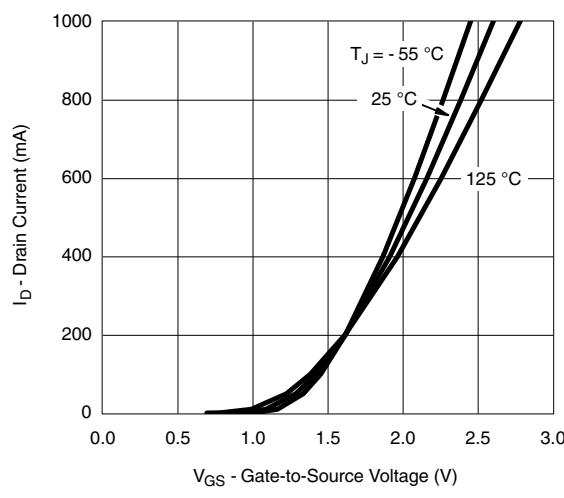
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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



V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics

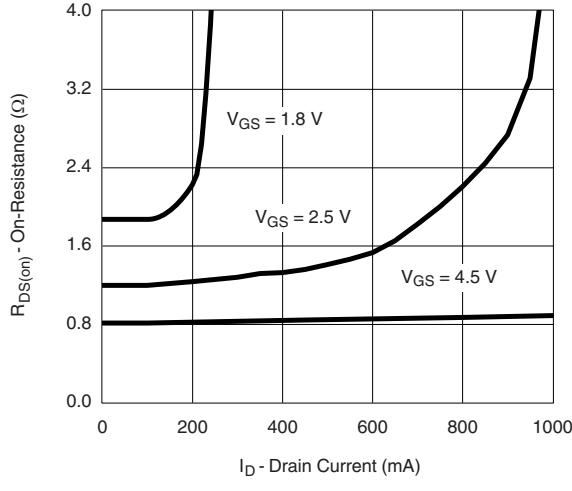


V_{GS} - Gate-to-Source Voltage (V)

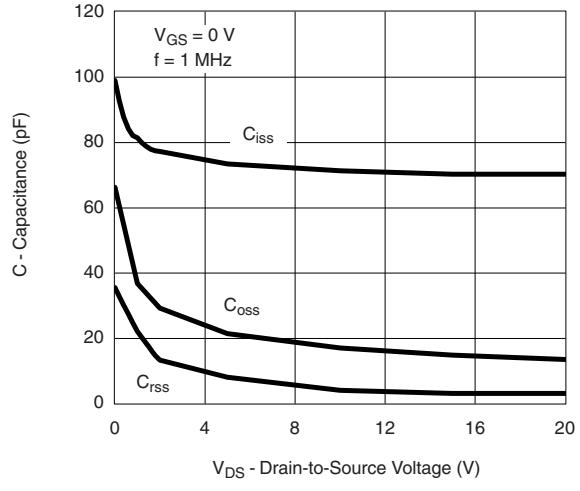
Transfer Characteristics



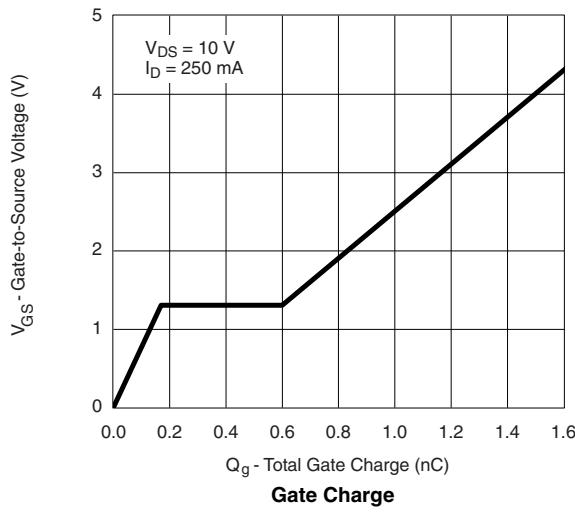
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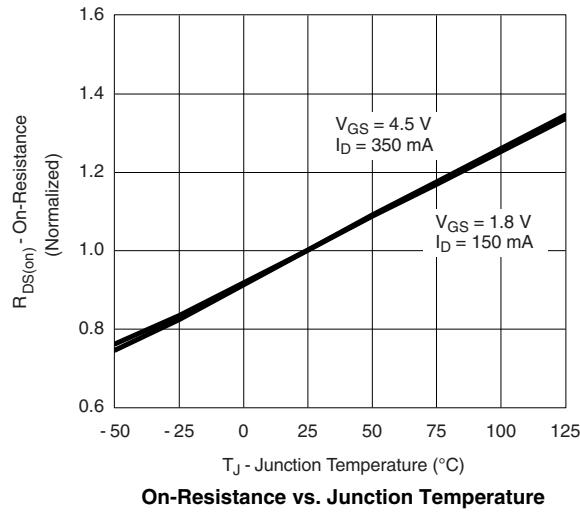
On-Resistance vs. Drain Current



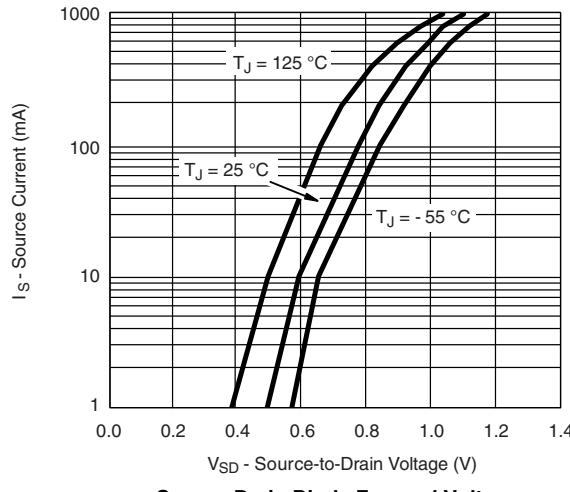
Capacitance



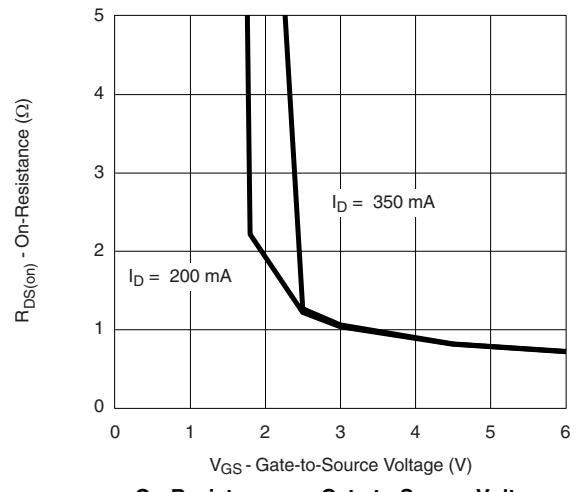
Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



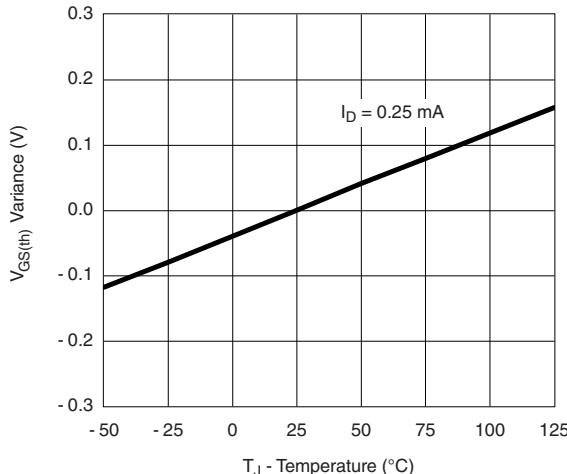
On-Resistance vs. Gate-to-Source Voltage

Si1023X

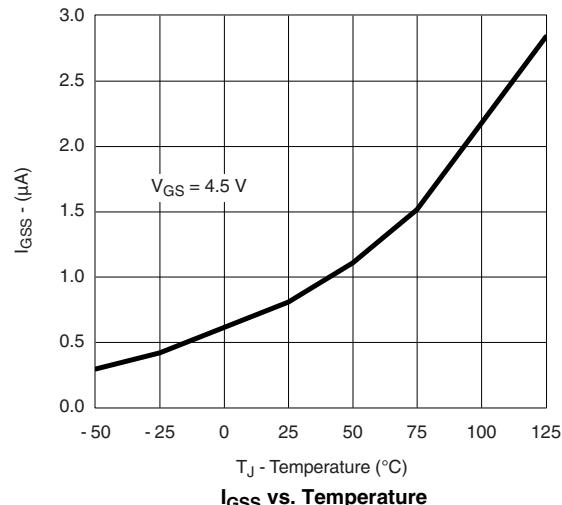
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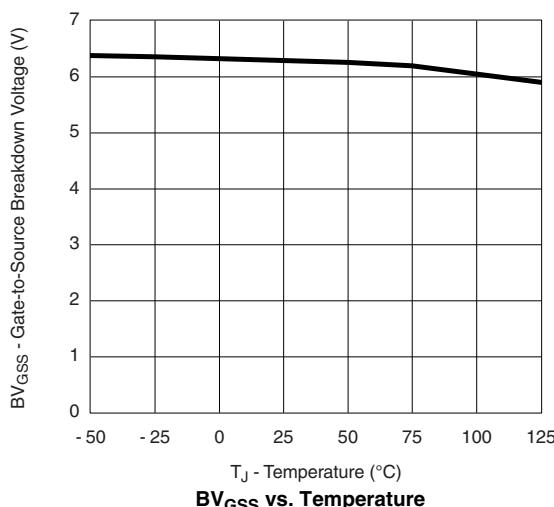
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)



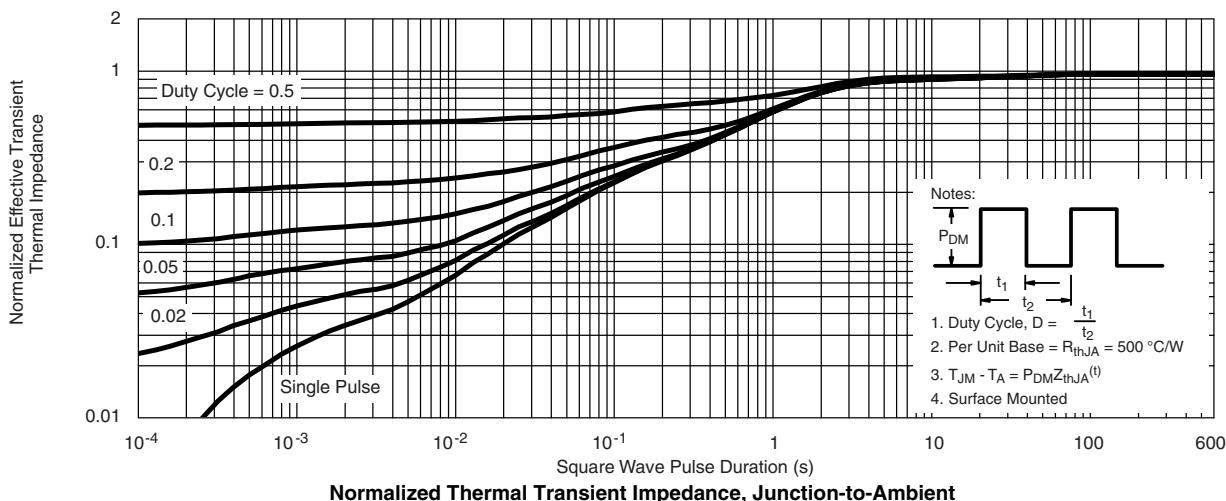
Threshold Voltage Variance vs. Temperature



Igss vs. Temperature



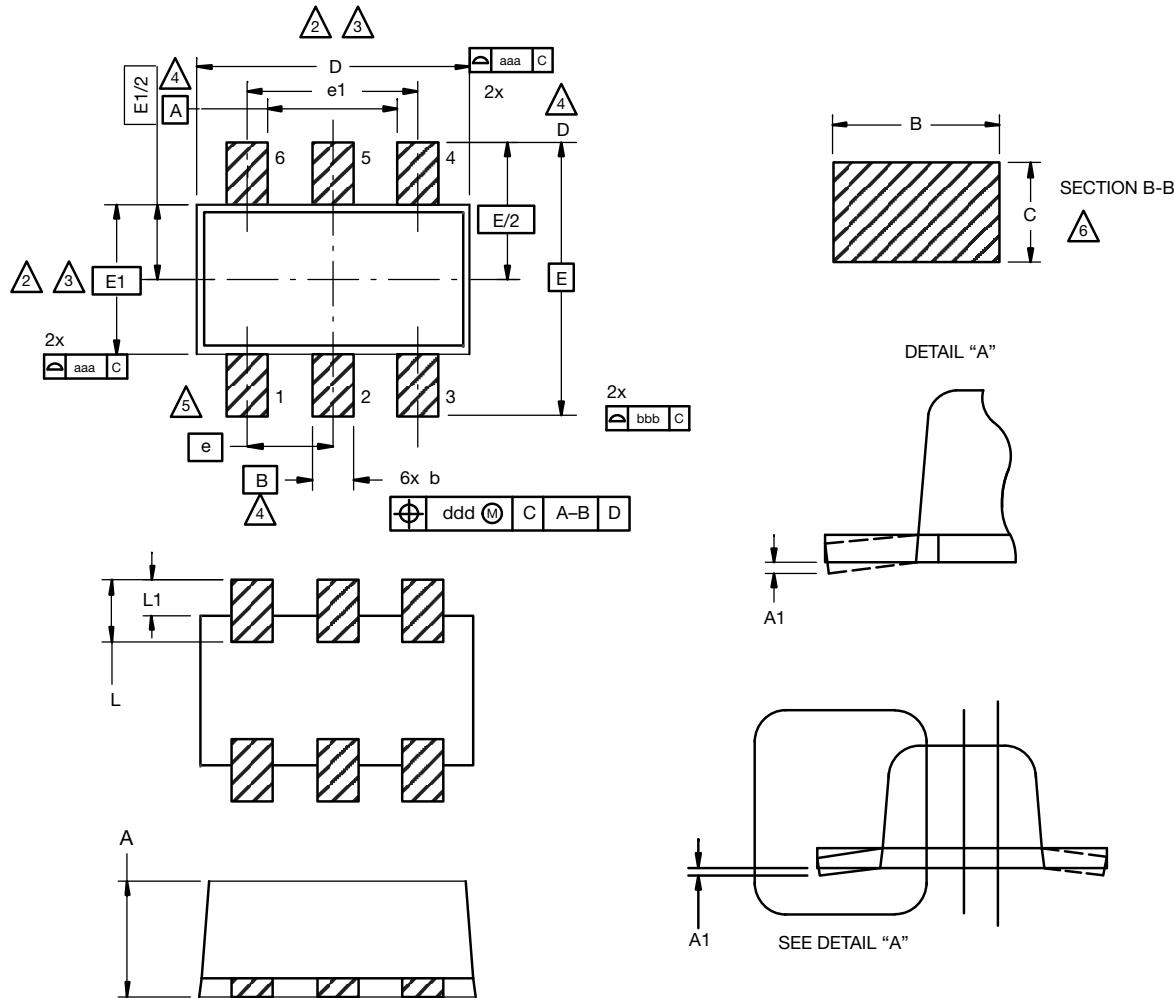
BVGSS vs. Temperature



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/ppg771169.

SC-89 6-Leads (SOT-563F)



Notes

- Dimensions in millimeters.

⚠ Dimension D does not include mold flash, protrusions or gate burrs. Mold flush, protrusions or gate burrs shall not exceed 0.15 mm per dimension E1 does not include interlead flash or protrusion, interlead flash or protrusion shall not exceed 0.15 mm per side.

⚠ Dimensions D and E1 are determined at the outmost extremes of the plastic body exclusive of mold flash, the bar burrs, gate burrs and interlead flash, but including any mismatch between the top and the bottom of the plastic body.

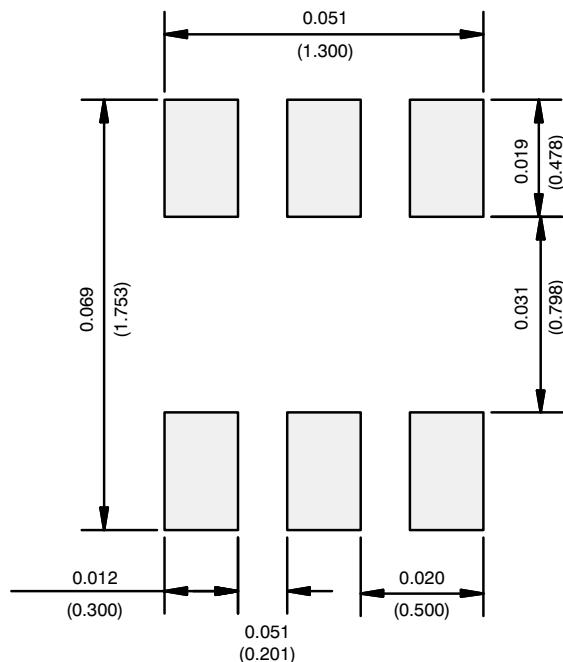
⚠ Datums A, B and D to be determined 0.10 mm from the lead tip.

⚠ Terminal numbers are shown for reference only.

⚠ These dimensions apply to the flat section of the lead between 0.08 mm and 0.15 mm from the lead tip.

DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.56	0.58	0.60
A1	0	0.02	0.10
b	0.15	0.22	0.30
c	0.10	0.14	0.18
D	1.50	1.60	1.70
E	1.50	1.60	1.70
E1	1.15	1.20	1.25
e	0.45	0.50	0.55
e1	0.95	1.00	1.05
L	0.25	0.35	0.50
L1	0.10	0.20	0.30

C14-0439-Rev. C, 11-Aug-14
DWG: 5880

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

Recommended Minimum Pads
Dimensions in Inches/(mm)

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