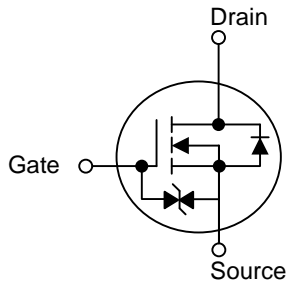
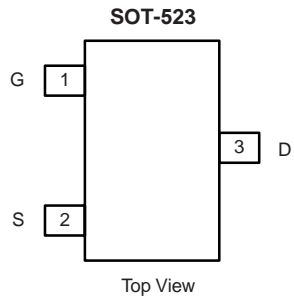


## N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (mA)
60	2.5 at $V_{GS} = 10$ V	200



### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Low On-Resistance: 2.5  $\Omega$
- Low Threshold: 2 V (typ.)
- Low Input Capacitance: 25 pF
- Fast Switching Speed: 25 ns
- Low Input and Output Leakage
- TrenchFET II Power MOSFET
- 1200V ESD Protection



### BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

### APPLICATIONS

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C) <sup>b</sup>	$I_D$	$T_A = 25$ °C	200
		$T_A = 100$ °C	150
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	700	mA
Power Dissipation <sup>b</sup>	$P_D$	$T_A = 25$ °C	0.15
		$T_A = 100$ °C	0.07
Maximum Junction-to-Ambient <sup>b</sup>	$R_{thJA}$	390	°C/W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	°C

Notes:

- Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 board.

<b>SPECIFICATIONS</b> $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ. <sup>a</sup>	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 10\text{ }\mu\text{A}$	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		2.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 10$	$\mu\text{A}$
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 15\text{ V}$			1	
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			$\pm 150$	nA
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}, T_J = 85\text{ }^\circ\text{C}$			$\pm 1000$	
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			$\pm 100$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			500	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 7.5\text{ V}$	700			mA
		$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}$	300			
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 100\text{ mA}$			2.5	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 100\text{ mA}$			4	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = 100\text{ mA}$	100			mS
Diode Forward Voltage	$V_{SD}$	$I_S = 100\text{ mA}, V_{GS} = 0\text{ V}$			1.3	V
<b>Dynamic<sup>a</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$ $I_D \cong 100\text{ mA}$		0.4	0.6	nC
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		30		pF
Output Capacitance	$C_{oss}$			6		
Reverse Transfer Capacitance	$C_{rss}$			2.5		
<b>Switching<sup>a, b, c</sup></b>						
Turn-On Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 150\text{ }\Omega$ $I_D \cong 100\text{ mA}, V_{GEN} = 10\text{ V}, R_G = 10\text{ }\Omega$			25	ns
Turn-Off Time	$t_{d(off)}$				35	

Notes:

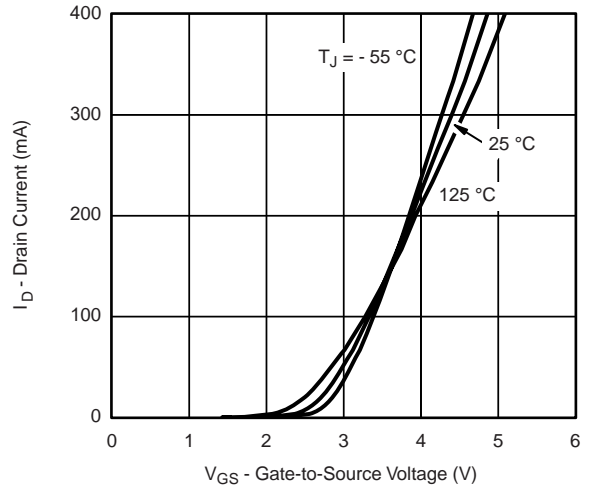
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test:  $PW \leq 300\text{ }\mu\text{s}$  duty cycle  $\leq 2\%$ .
- Switching time is essentially independent of operating temperature.

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.

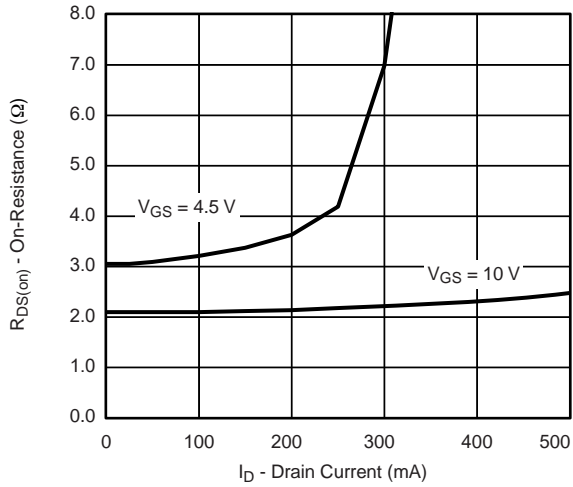
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



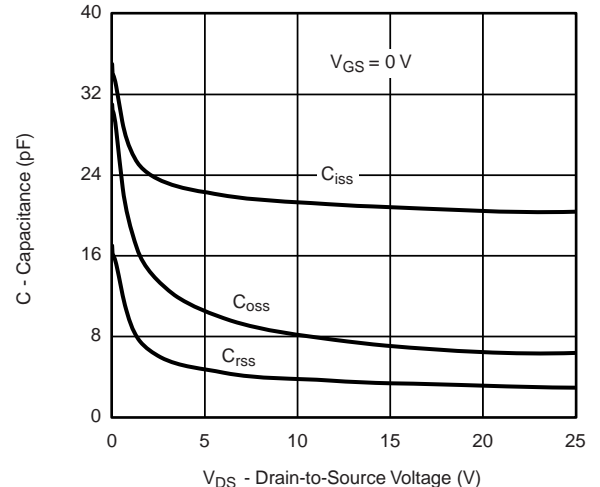
**Output Characteristics**



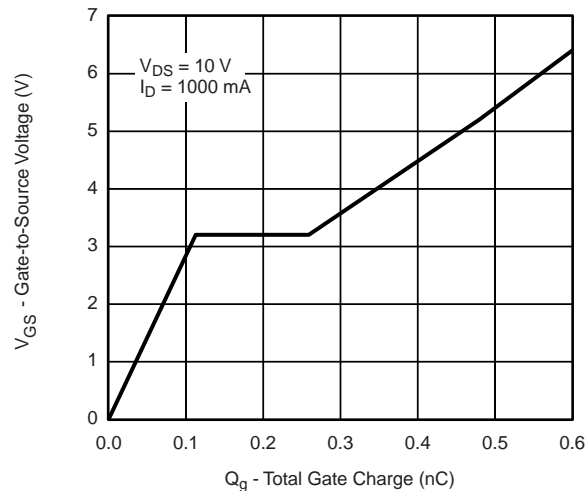
**Transfer Characteristics**



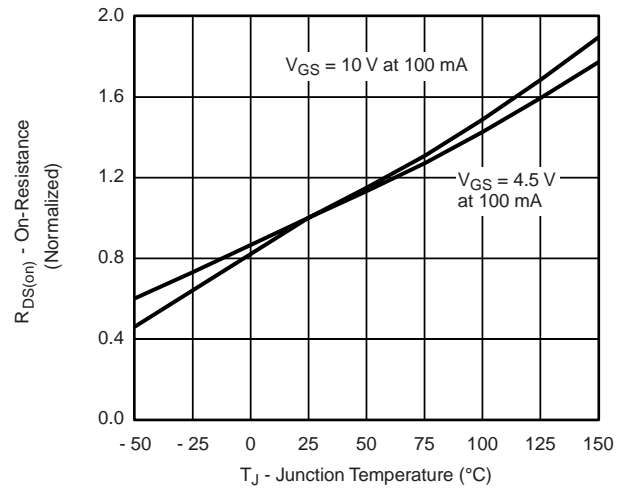
**On-Resistance vs. Drain Current**



**Capacitance**

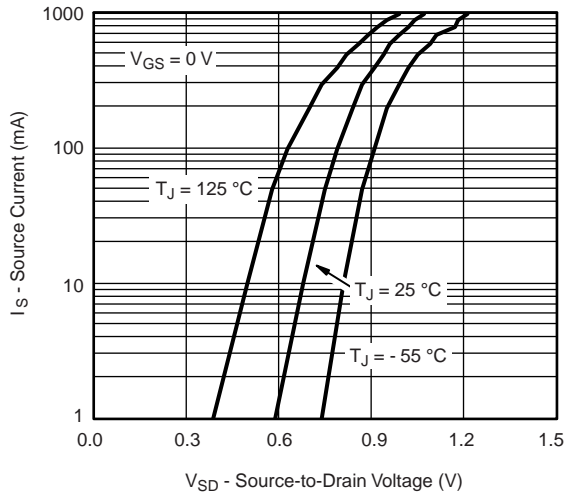


**Gate Charge**



**On-Resistance vs. Junction Temperature**

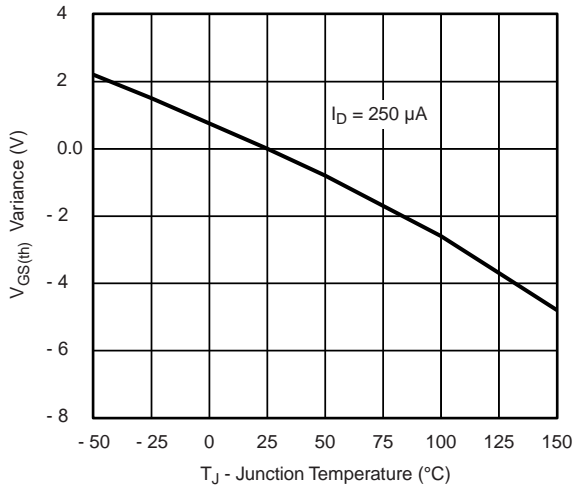
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



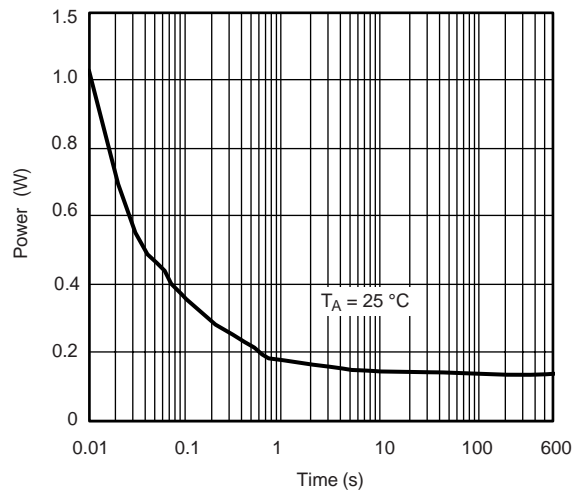
**Source-Drain Diode Forward Voltage**



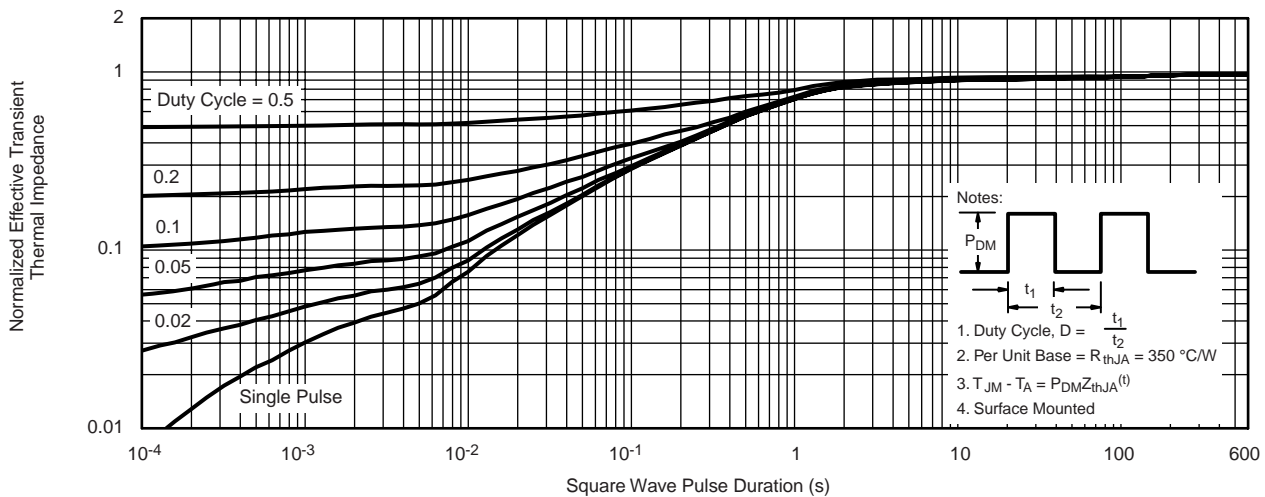
**On-Resistance vs. Gate-Source Voltage**



**Threshold Voltage Variance Over Temperature**

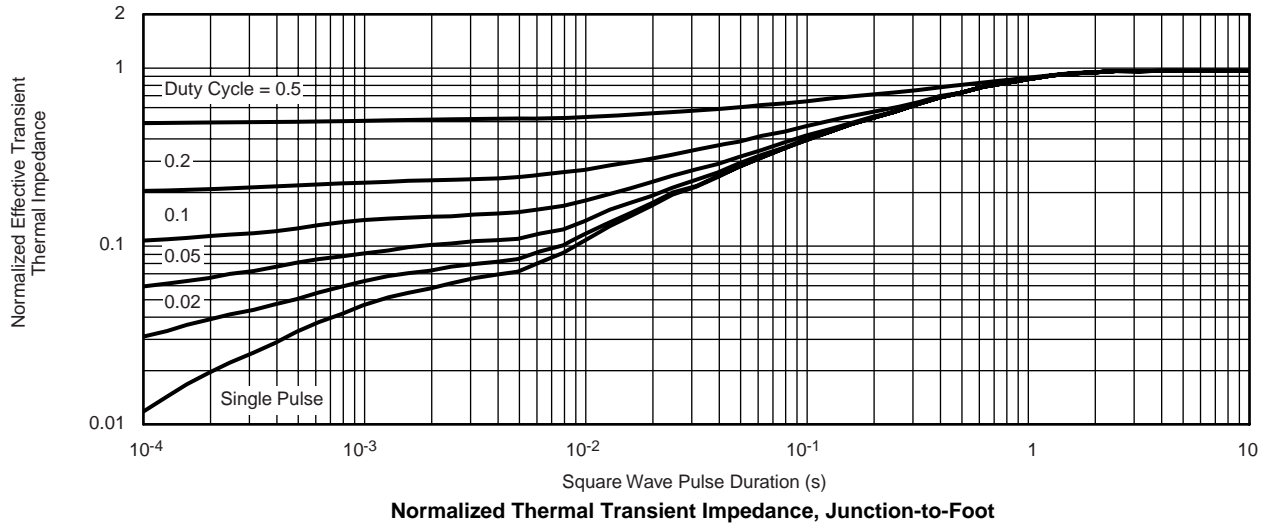


**Single Pulse Power, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

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

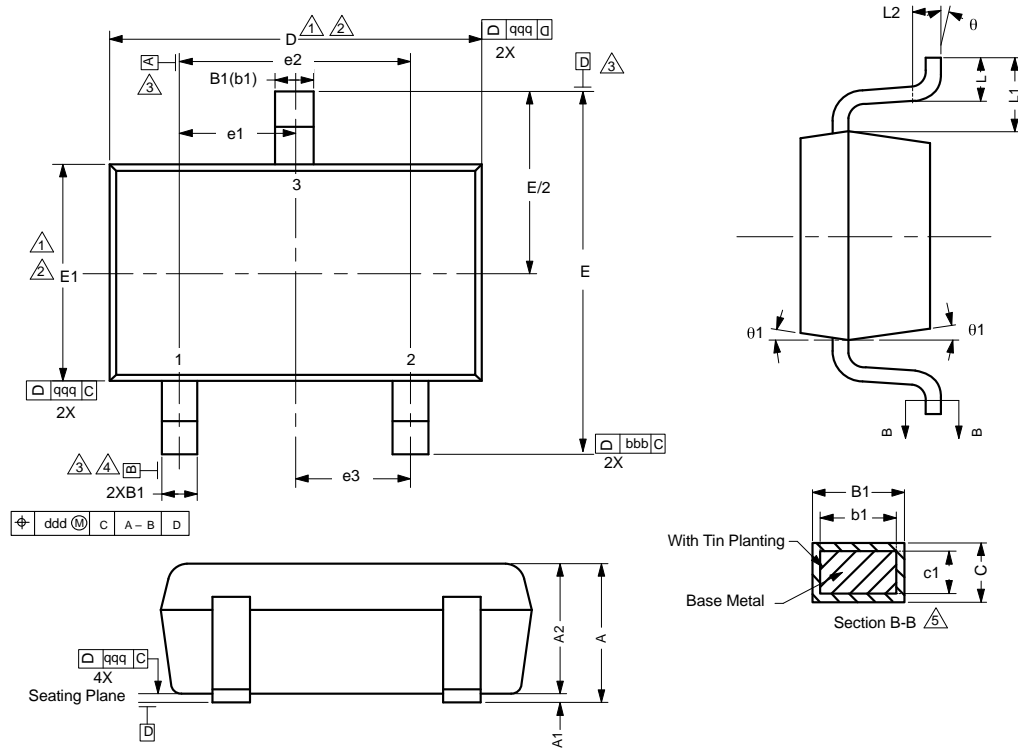


**Normalized Thermal Transient Impedance, Junction-to-Foot**

**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient ( $25\text{ }^\circ\text{C}$ )
  - Normalized Transient Thermal Impedance Junction-to-Foot ( $25\text{ }^\circ\text{C}$ )
 are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

### SOT-523: 3 Leads



**Notes**

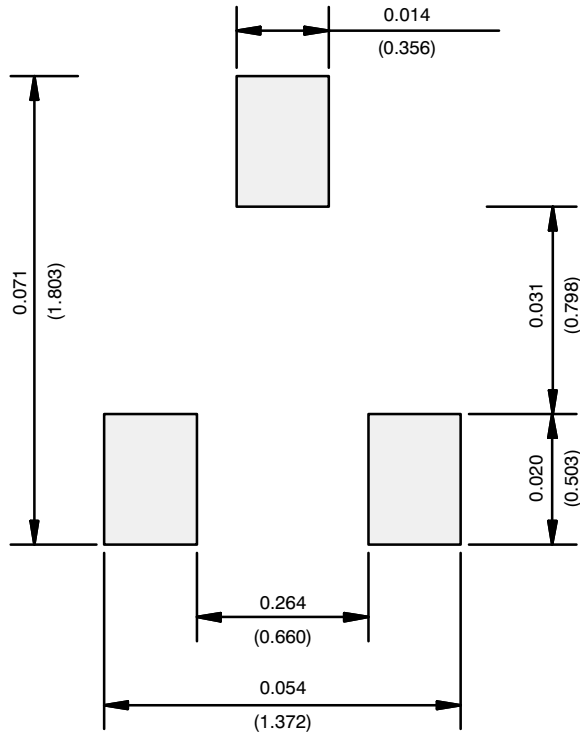
Dimensions in millimeters will govern.

1. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash protrusions or gate burrs shall not exceed 0.10 mm per end. Dimension E1 does not include Interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.10 mm per side.
2. Dimensions D and E1 are determined at the outmost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
3. Datums A, B and D to be determined 0.10 mm from the lead tip.
4. Terminal positions are shown for reference only.
5. These dimensions apply to the flat section of the lead between 0.08 mm and 0.15 mm from the lead tip.

DIMENSIONS	TOLERANCES
aaa	0.10
bbb	0.10
ccc	0.10
ddd	0.10

DIM.	MILLIMETERS			NOTE
	MIN.	NOM.	MAX.	
A	-	-	0.80	
A <sub>1</sub>	0.00	-	0.10	
A <sub>2</sub>	0.65	0.70	0.80	
B <sub>1</sub>	0.19	-	0.24	5
b <sub>1</sub>	0.17	-	0.21	
c	0.13	-	0.15	5
c <sub>1</sub>	0.10	-	0.12	5
D	1.48	1.575	1.68	1, 2
E	1.50	1.60	1.70	
E <sub>1</sub>	0.66	0.76	0.86	1, 2
e <sub>1</sub>	0.50 BSC			
e <sub>2</sub>	1.00 BSC			
e <sub>3</sub>	0.50 BSC			
L	0.15	0.205	0.30	
L <sub>1</sub>	0.40 ref.			
L <sub>2</sub>	0.15 BSC			
$\theta$	0°	-	8°	
$\theta_1$	4°	-	10°	

**RECOMMENDED MINIMUM PADS FOR SC-75A: 3-Lead**



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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