

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
-100V	350m Ω @ $V_{GS} = -10V$	-3.9A
	450m Ω @ $V_{GS} = -6.0V$	-3.4A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

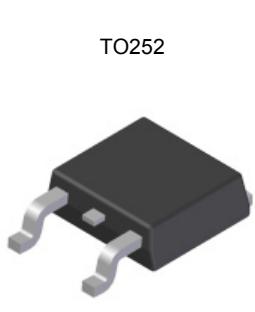
- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features and Benefits

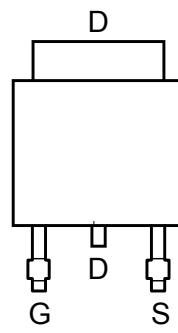
- Fast Switching Speed
- Low Gate Drive
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

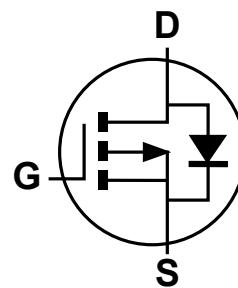
- Case: TO252
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 **(e3)**
- Weight: 0.33 grams (approximate)



Top View



Pin Out – Top View



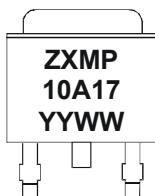
Equivalent Circuit

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP10A17KTC	See below	13	16	2,500

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



ZXMP = Product Type Marking Code, Line 1
 10A17 = Product Type Marking Code, Line 2
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01-52)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

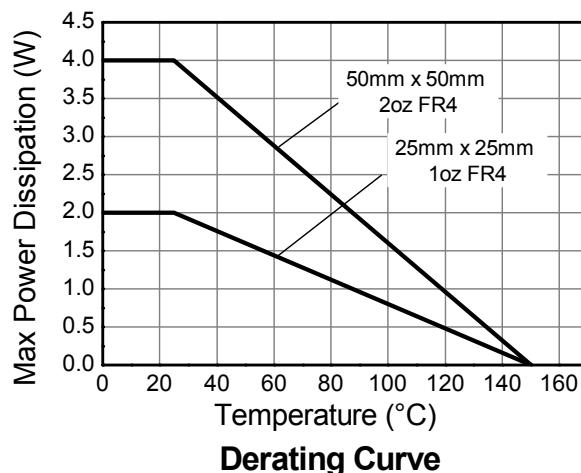
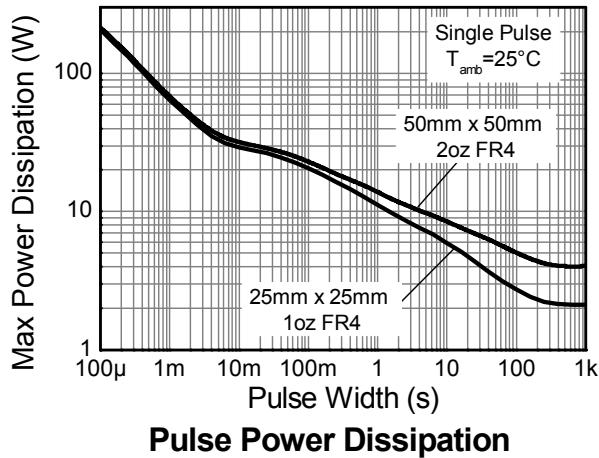
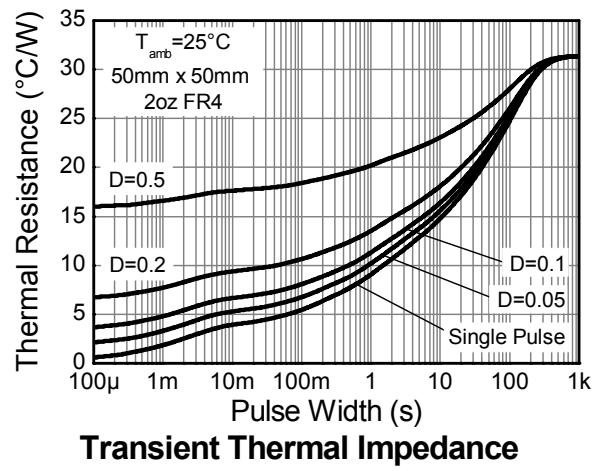
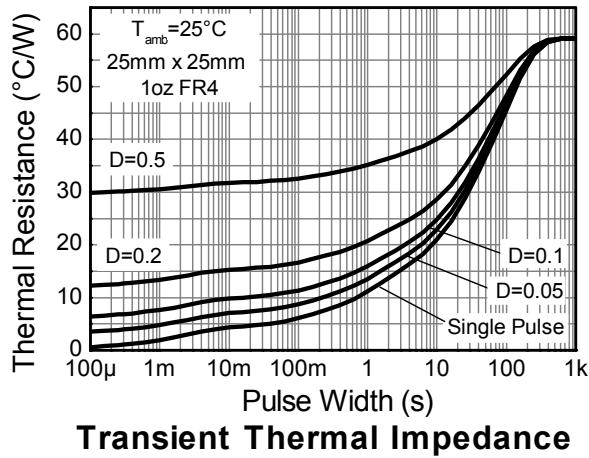
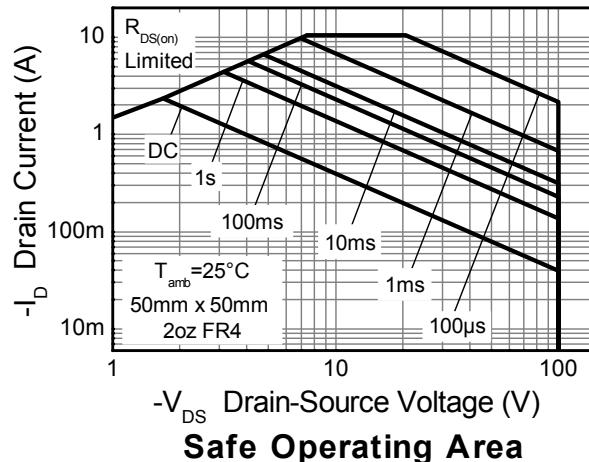
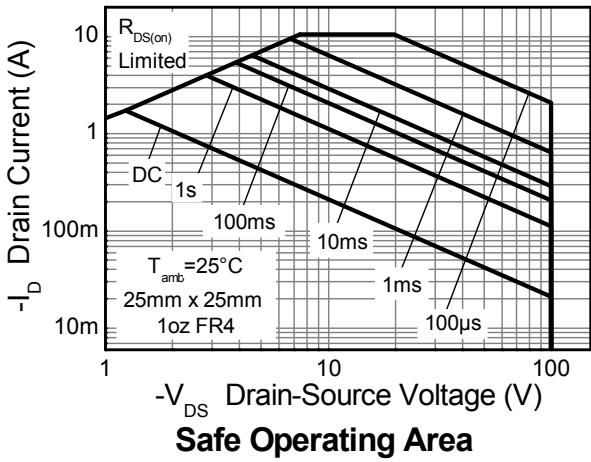
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GS}	± 20	V
Continuous Drain current	$V_{GS} = 10\text{V}$	(Note 6)	I_D	-3.9	A
		$T_A = +70^\circ\text{C}$ (Note 6)		-3.1	
		(Note 5)		-2.4	
Pulsed Drain current	$V_{GS} = 10\text{V}$	(Note 7)	I_{DM}	-11.3	A
Continuous Source Current (Body diode)		(Note 6)	I_S	-8.7	A
Pulsed Source Current (Body diode)		(Note 7)	I_{SM}	-11.3	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 5)	P_D	4.0 32.0	W mW/ $^\circ\text{C}$
	(Note 6)		10.2 80.8	
	(Note 9)		2.0 16.1	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	31	$^\circ\text{C/W}$
	(Note 6)		12.3	
	(Note 9)		62	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JL}$	2.4	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

- Notes:
5. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 6. Same as note (1), except the device is measured at $t \leq 10$ sec.
 7. Same as note (1), except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
 8. Thermal resistance from junction to solder-point (at the end of the drain lead).
 9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

Thermal Characteristics

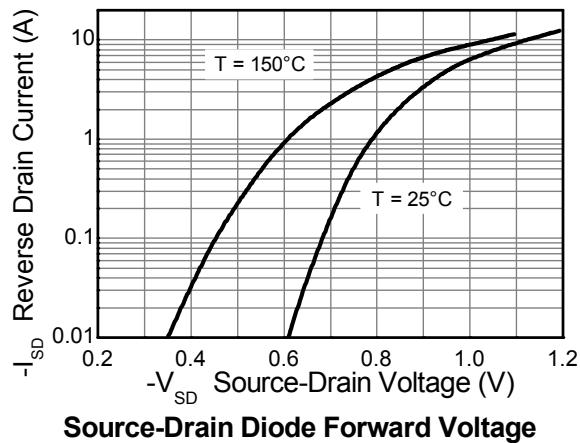
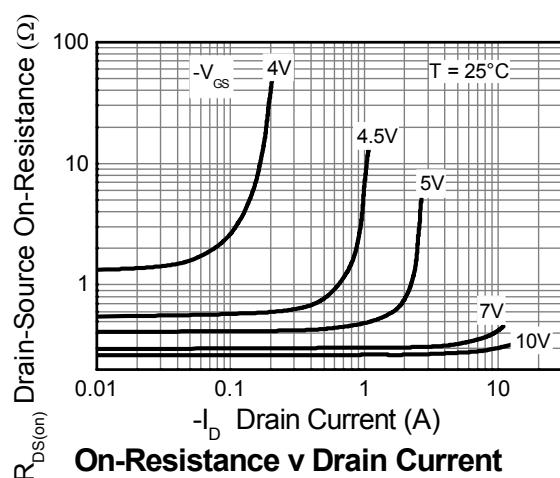
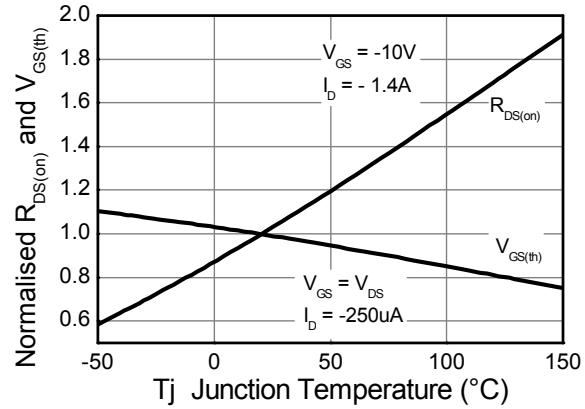
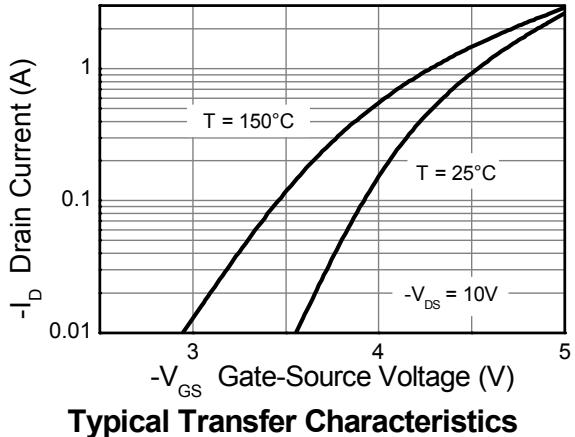
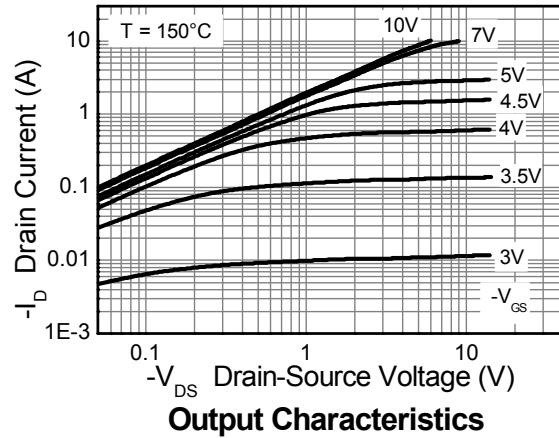
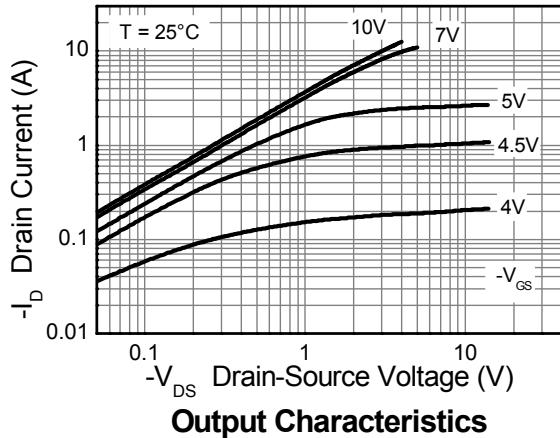


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

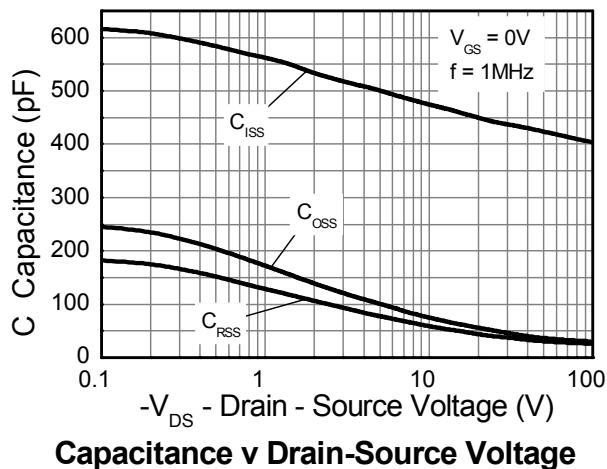
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-100	—	—	V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	$V_{DS} = -100\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(\text{th})}$	-2.0	—	-4.0	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 10)	$R_{DS(\text{ON})}$	—	—	0.350	Ω	$V_{GS} = -10\text{V}$, $I_D = -1.4\text{A}$
				0.450		$V_{GS} = -6\text{V}$, $I_D = -1.2\text{A}$
Forward Transconductance (Notes 10 & 11)	g_{fs}	—	2.8	—	S	$V_{DS} = -15\text{V}$, $I_D = -1.4\text{A}$
Diode Forward Voltage (Note 10)	V_{SD}	—	-0.85	-0.95	V	$I_S = -1.7\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time (Note 11)	t_{rr}		33	—	ns	$I_S = -1.5\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 11)	Q_{rr}	—	48	—	nC	
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	424	—	pF	$V_{DS} = -50\text{V}$, $V_{GS} = 0\text{V}$ $F = 1\text{MHz}$
Output Capacitance	C_{oss}	—	36.6	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	29.8	—	pF	
Total Gate Charge (Note 12)	Q_g	—	7.1	—	nC	$V_{GS} = -6.0\text{V}$ $V_{GS} = -10\text{V}$ $I_D = -1.4\text{A}$
Total Gate Charge (Note 12)	Q_g	—	10.7	—	nC	
Gate-Source Charge (Note 12)	Q_{gs}	—	1.7	—	nC	
Gate-Drain Charge (Note 12)	Q_{gd}	—	3.8	—	nC	
Turn-On Delay Time (Note 12)	$t_{D(\text{on})}$	—	3.0	—	ns	$V_{DD} = -50\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$, $R_G \geq 6.0\Omega$
Turn-On Rise Time (Note 12)	t_r	—	3.5	—	ns	
Turn-Off Delay Time (Note 12)	$t_{D(\text{off})}$	—	13.4	—	ns	
Turn-Off Fall Time (Note 12)	t_f	—	7.2	—	ns	

- Notes:
10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
 11. For design aid only, not subject to production testing.
 12. Switching characteristics are independent of operating junction temperatures.

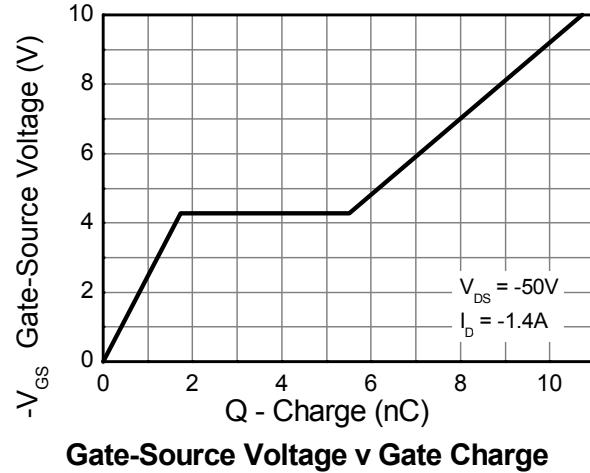
Typical Characteristics



Typical Characteristics (cont.)

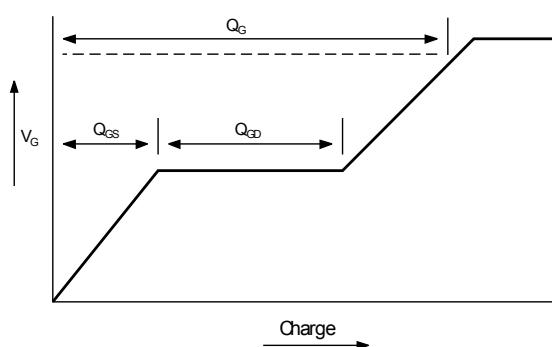


Capacitance v Drain-Source Voltage

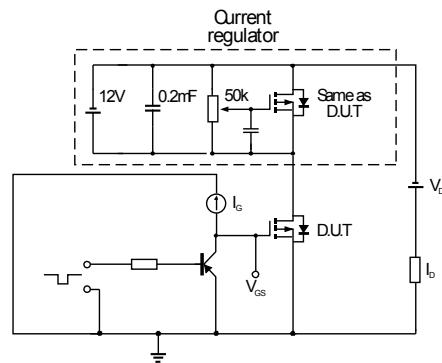


Gate-Source Voltage v Gate Charge

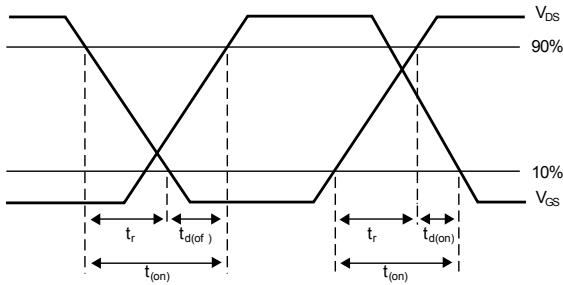
Test Circuits



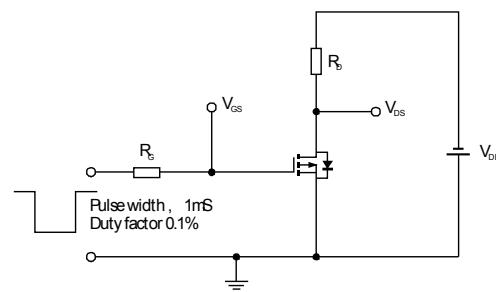
Basic gate charge waveform



Gate charge test circuit

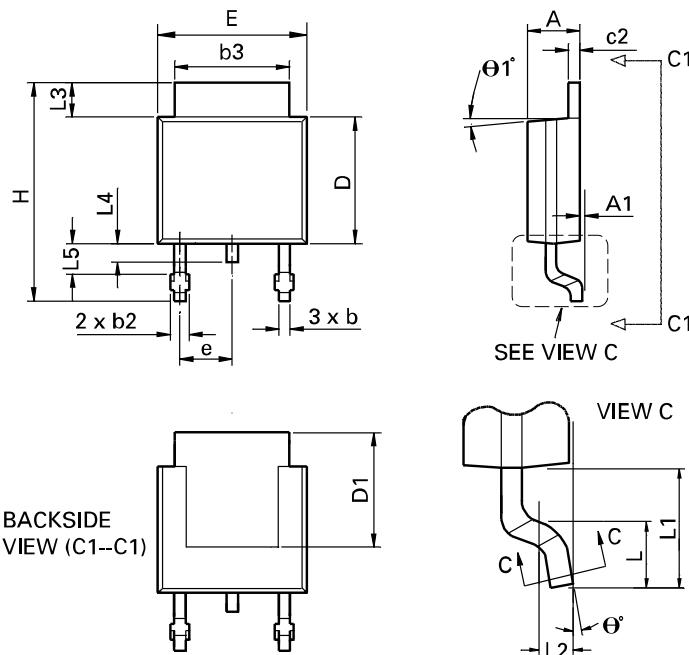


Switching time waveforms



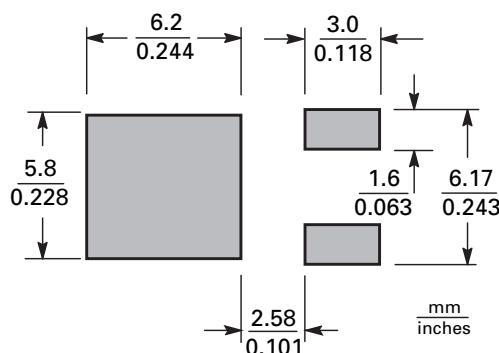
Switching time test circuit

Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090	BSC	2.29	BSC
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108	REF	2.74	REF
b3	0.205	0.215	5.21	5.46	L2	0.020	BSC	0.508	BSC
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	Θ1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	Θ°	0°	15°	0°	15°
E1	0.170	-	4.32	-		-	-	-	-

Suggested Pad Layout



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