100V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = +25°C
-100V	350mΩ @ V_{GS}= -10V	-3.9A
	450mΩ @ 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

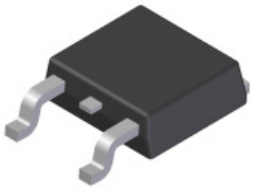
Features and Benefits

- 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**

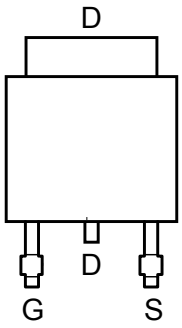
Mechanical Data

- 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)

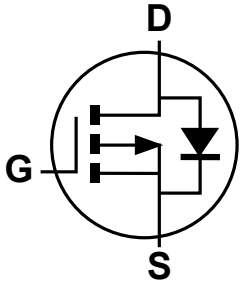
TO252



Top View



Pin Out – Top View



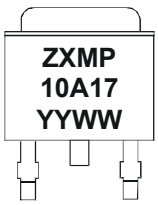
Equivalent Circuit

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)

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Maximum Ratings (@T_A = +25°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} = 10V	(Note 6)	I_D	-3.9	A
		T_A = +70°C (Note 6)		-3.1	
		(Note 5)		-2.4	
Pulsed Drain current	V_{GS}= 10V	(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°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 5)	P_D	4.0 32.0	W mW/°C
	(Note 6)		10.2 80.8	
	(Note 9)		2.0 16.1	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	31	°C/W
	(Note 6)		12.3	
	(Note 9)		62	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JL}$	2.4	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°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 ≤ 10 sec.
7. Same as note (1), except the device is pulsed with D= 0.02 and pulse width 300µs. 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.

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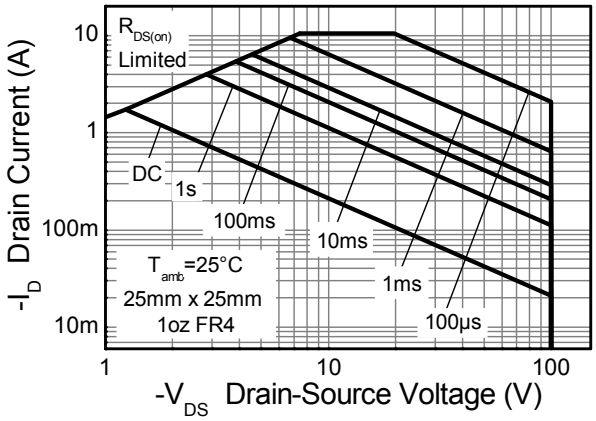
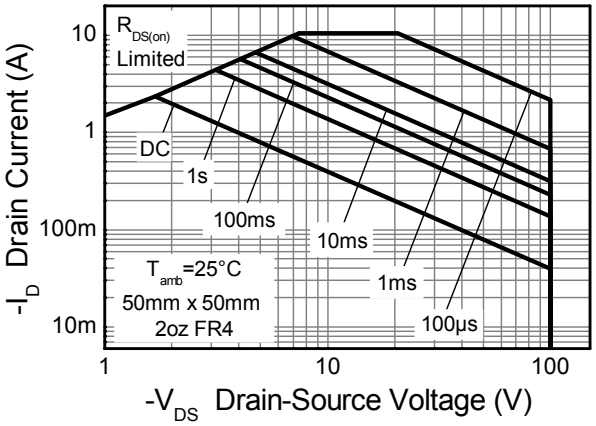
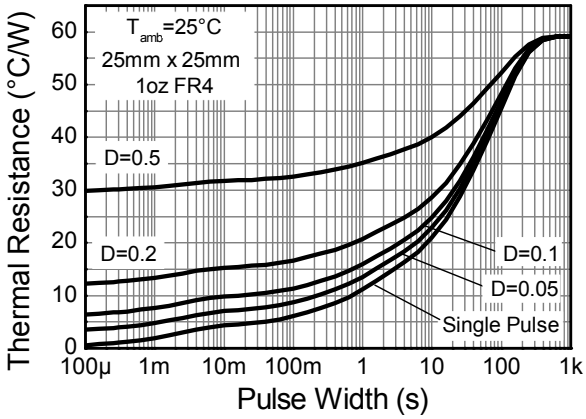
Thermal Characteristics



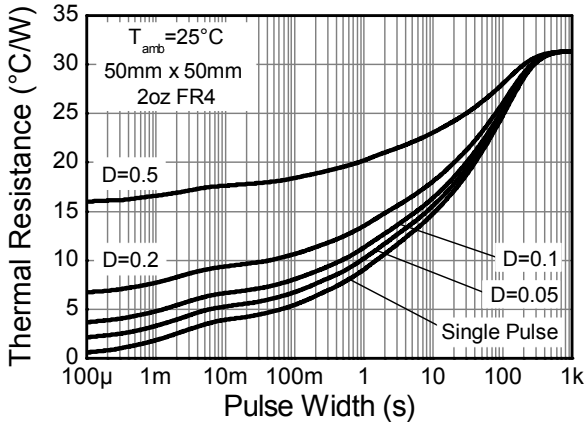
Safe Operating Area



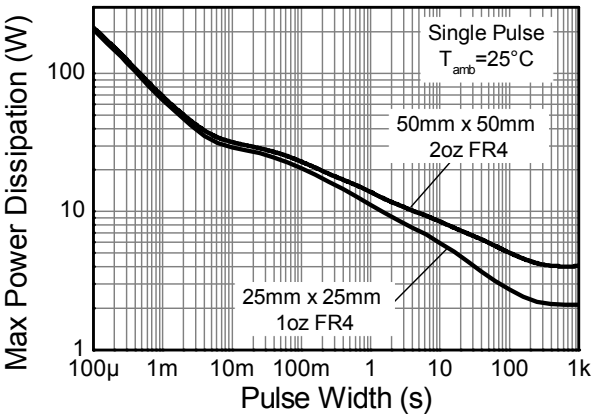
Safe Operating Area



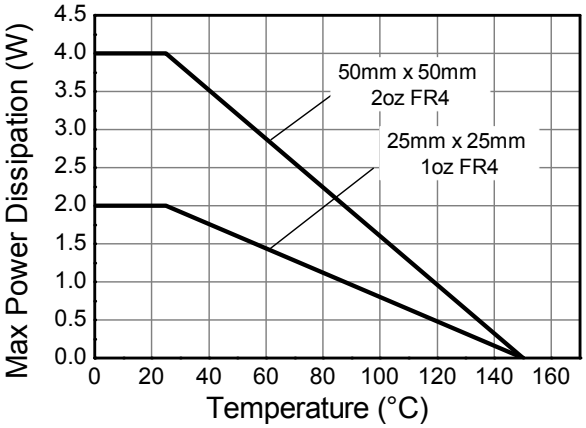
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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

Notes:
10. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%
11. For design aid only, not subject to production testing.
12. Switching characteristics are independent of operating junction temperatures.

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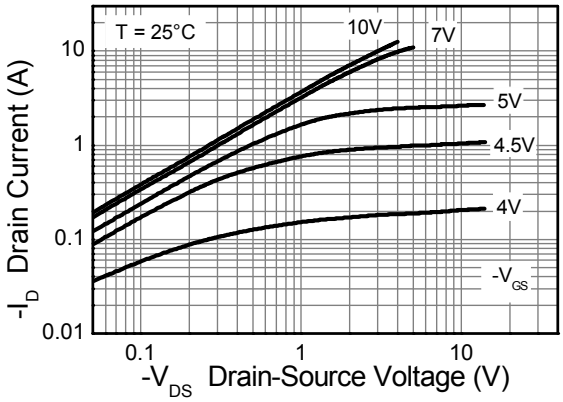
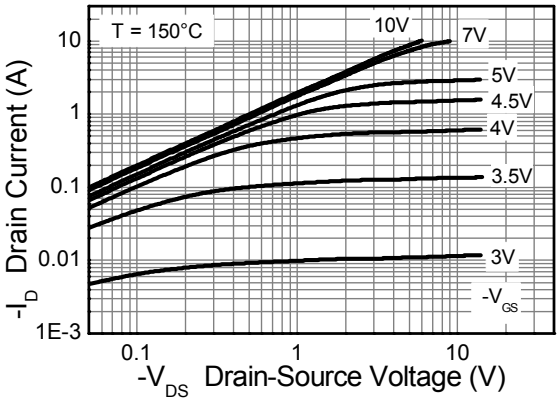
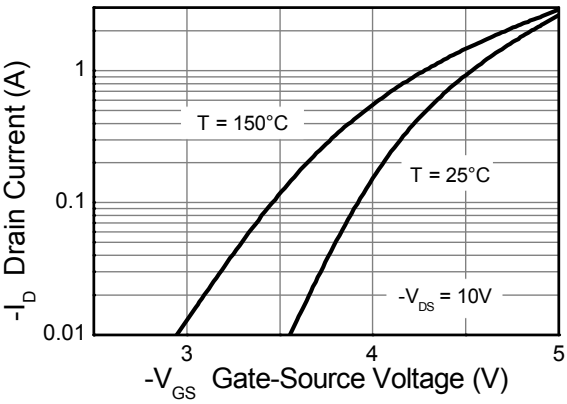
Typical Characteristics



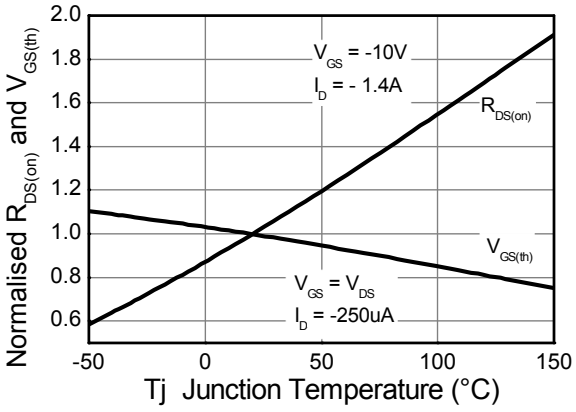
Output Characteristics



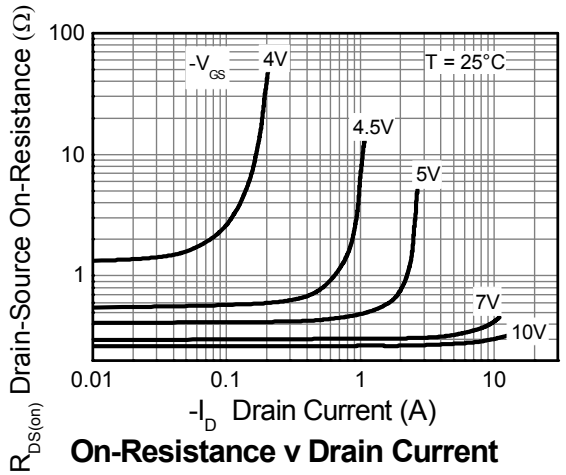
Output Characteristics



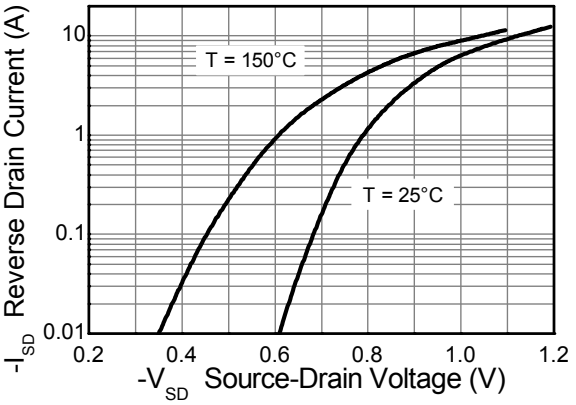
Typical Transfer Characteristics



Normalised Curves v Temperature



On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

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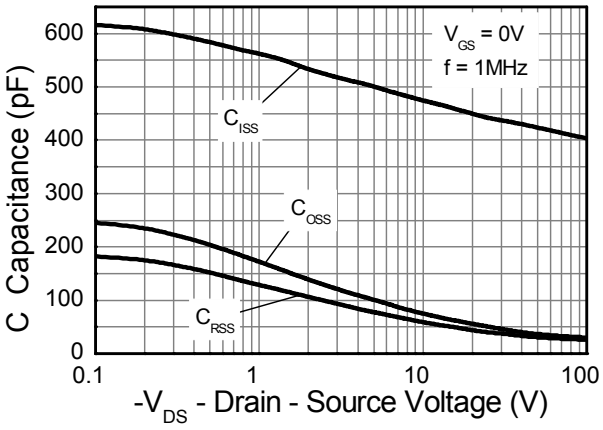
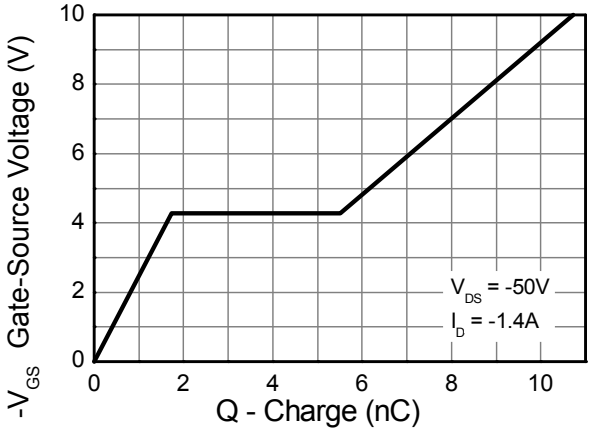
Typical Characteristics (cont.)

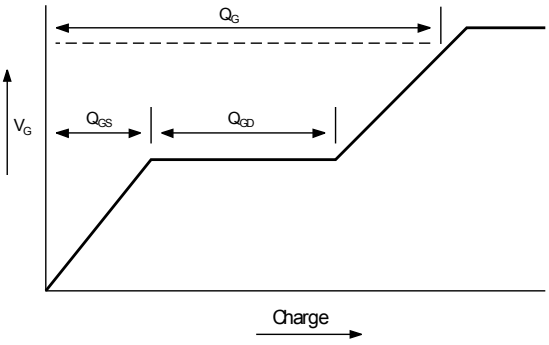


Capacitance v Drain-Source Voltage

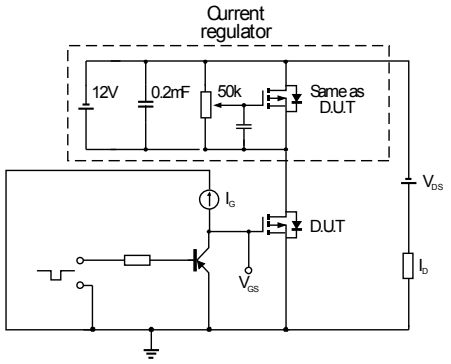


Gate-Source Voltage v Gate Charge

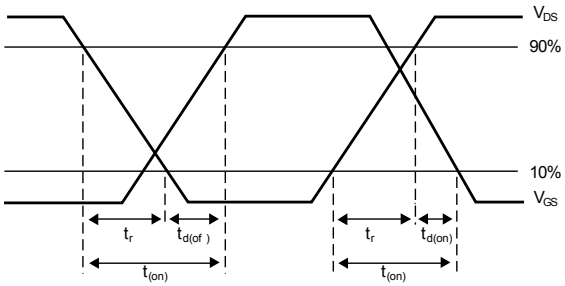
Test Circuits



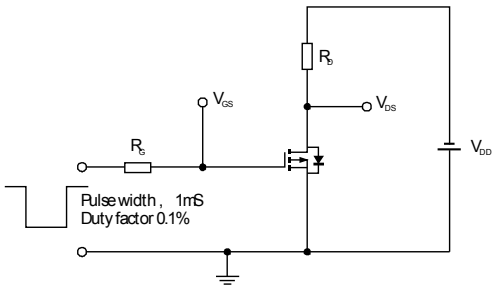
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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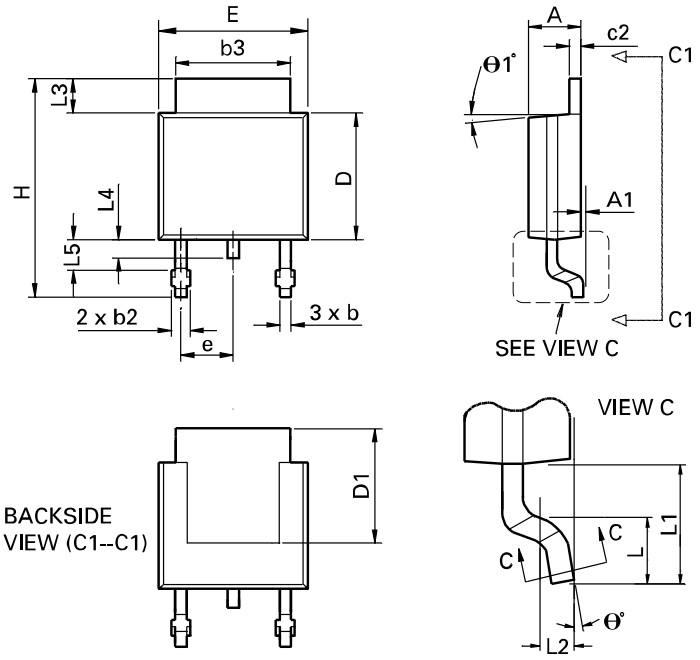
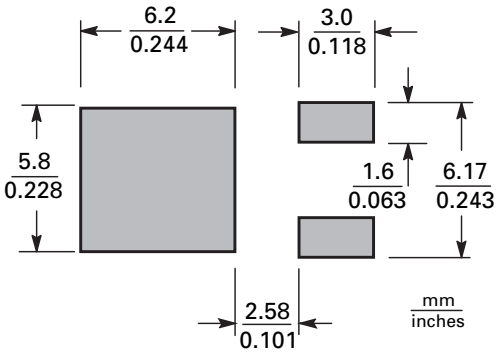
Package Outline Dimensions



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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