

**ZXMN10A09K**

**100V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
100V	85mΩ @ $V_{GS} = 10V$	7.7A
	100mΩ @ $V_{GS} = 6V$	7.1A

**Description and Applications**

This MOSFET features low on-resistance, fast switching and a high avalanche withstand capability, making it ideal for high efficiency power management applications.

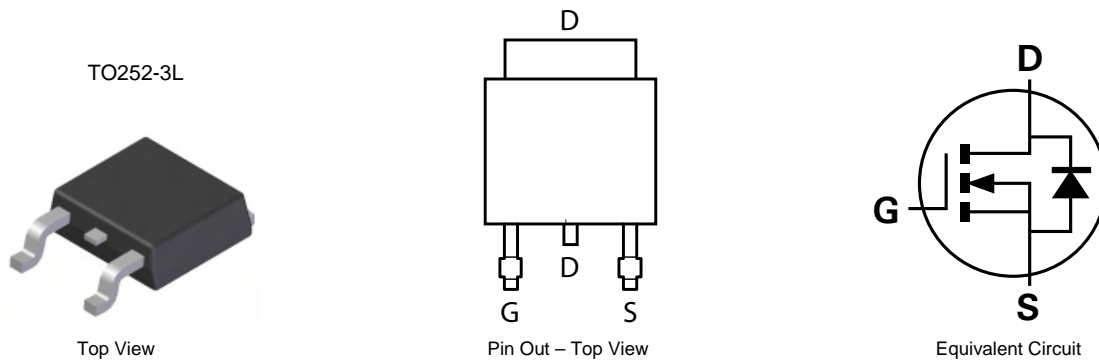
- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control
- Uninterrupted power supply

**Features and Benefits**

- Low input capacitance
- Low on-resistance
- Fast switching speed
- “Green” Component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

**Mechanical Data**

- Case: TO252-3L
- Case Material: Molded Plastic “Green” Molding Compound, UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)

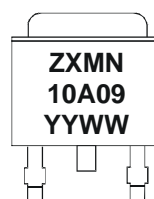


**Ordering Information** (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN10A09KTC	ZXMN10A09	13	16	2,500

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

**Marking Information**



ZXMN = Product Type Marking Code, Line 1  
 10A09 = Product Type Marking Code, Line 2  
 YYWW = Date Code Marking  
 YY = Year (ex: 09 = 2009)  
 WW = Week (01-52)

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

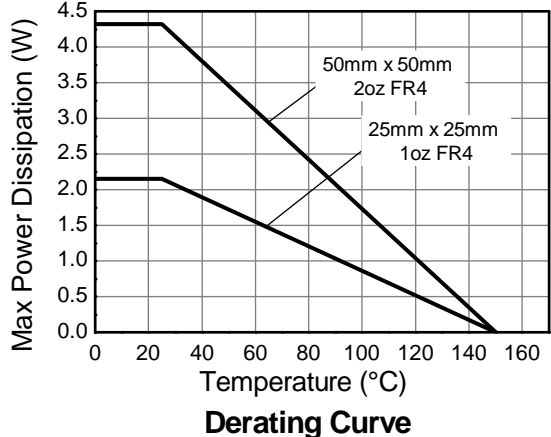
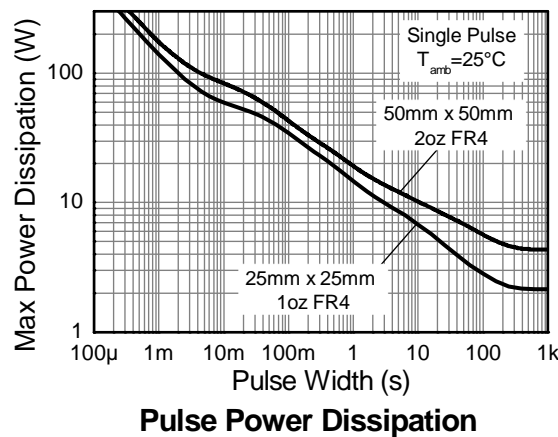
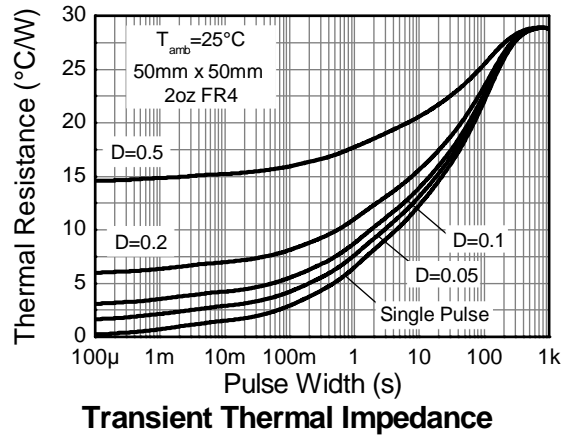
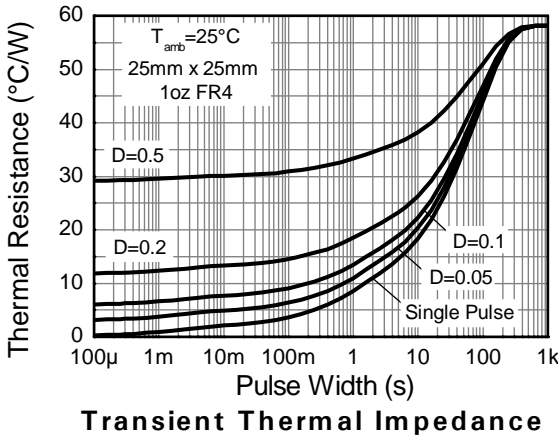
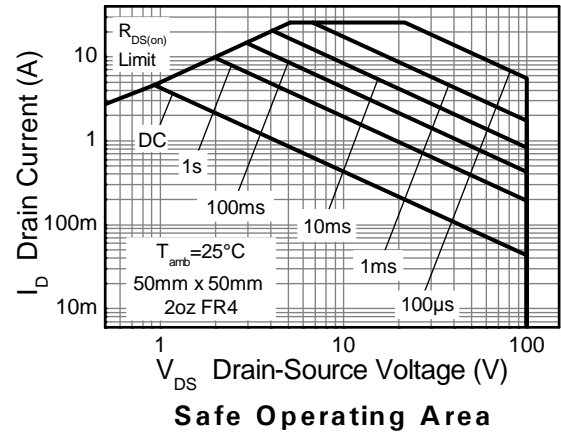
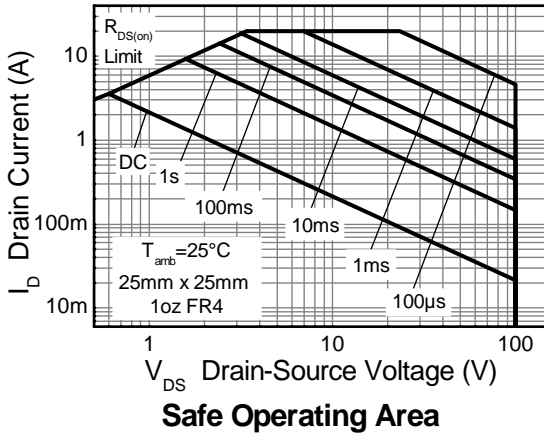
Characteristic			Symbol	Value	Unit	
Drain-Source voltage			V <sub>DSS</sub>	100	V	
Gate-Source voltage			V <sub>GS</sub>	±20	V	
Continuous Drain current	V <sub>GS</sub> = 10V	(Note 3)	I <sub>D</sub>	7.7	A	
		T <sub>A</sub> = 70°C (Note 3)		6.2		
		(Note 2)		5.0		
Pulsed Drain current	V <sub>GS</sub> = 10V	(Note 4)	I <sub>DM</sub>	27	A	
Continuous Source current (Body diode)			(Note 3)	I <sub>S</sub>	11	A
Pulsed Source current (Body diode)			(Note 4)	I <sub>SM</sub>	27	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	P <sub>D</sub>	4.31	W mW/°C
			34.4	
	(Note 3)		10.1	
	(Note 6)		80.8	
Thermal Resistance, Junction to Ambient	(Note 2)	R <sub>θJA</sub>	2.15	°C/W
	(Note 3)		17.2	
	(Note 6)		29	
Thermal Resistance, Junction to Lead	(Note 2)	R <sub>θJA</sub>	12.3	°C/W
	(Note 3)		58	
	(Note 6)		1.14	
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

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

**Thermal Characteristics**

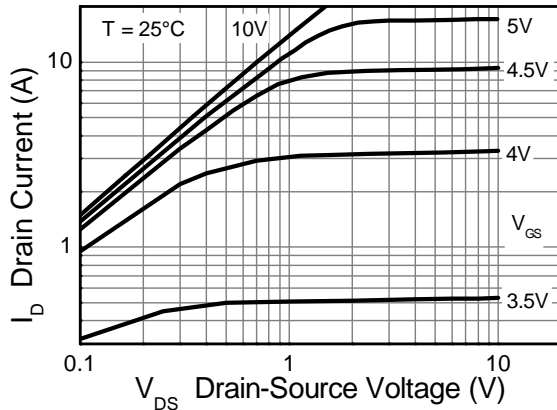


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

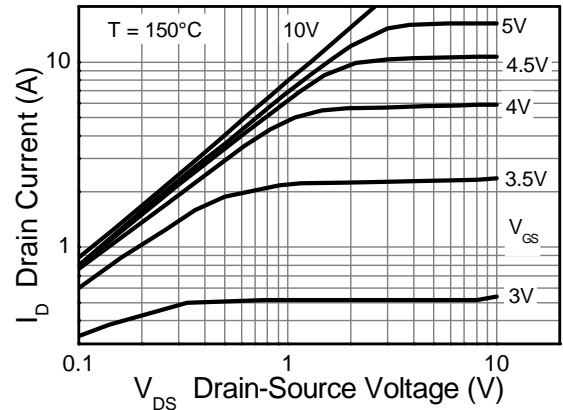
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage	V <sub>GS(th)</sub>	2	—	4	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-Resistance (Note 7)	R <sub>DS(on)</sub>	—	—	0.085	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.6A	
				0.100		V <sub>GS</sub> = 6V, I <sub>D</sub> = 4.2A	
Forward Transconductance (Notes 7 & 8)	g <sub>fs</sub>	—	10.7	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.6A	
Diode Forward Voltage (Note 7)	V <sub>SD</sub>	—	0.850	0.950	V	I <sub>S</sub> = 4.7A, V <sub>GS</sub> = 0V	
Reverse recovery time (Note 8)	t <sub>rr</sub>	—	40	—	ns	I <sub>S</sub> = 3.0A, di/dt = 100A/μs	
Reverse recovery charge (Note 8)	Q <sub>rr</sub>	—	62	—	nC		
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>							
Input Capacitance	C <sub>iss</sub>	—	1313	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz	
Output Capacitance	C <sub>oss</sub>	—	83	—	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	56	—	pF		
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	17.2	—	nC	V <sub>GS</sub> = 6V	V <sub>DS</sub> = 50V, I <sub>D</sub> = 4.6A
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	26.0	—	nC	V <sub>GS</sub> = 10V	
Gate-Source Charge (Note 9)	Q <sub>gs</sub>	—	5.6	—	nC		
Gate-Drain Charge (Note 9)	Q <sub>gd</sub>	—	7.6	—	nC		
Turn-On Delay Time (Note 9)	t <sub>D(on)</sub>	—	6.8	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1.0A, R <sub>G</sub> ≅ 25Ω	
Turn-On Rise Time (Note 9)	t <sub>r</sub>	—	5.3	—	ns		
Turn-Off Delay Time (Note 9)	t <sub>D(off)</sub>	—	27.5	—	ns		
Turn-Off Fall Time (Note 9)	t <sub>f</sub>	—	12.3	—	ns		

Notes: 7. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%  
8. For design aid only, not subject to production testing.  
9. Switching characteristics are independent of operating junction temperatures.

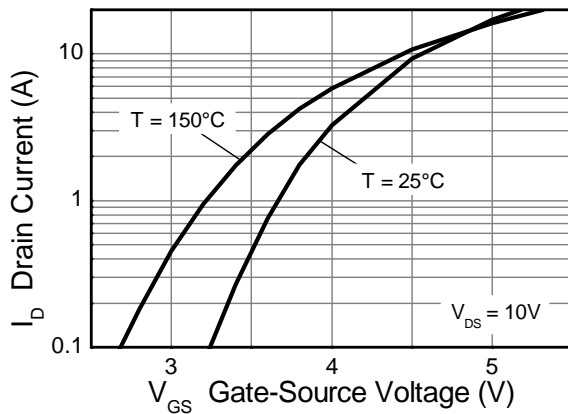
**Typical Characteristics**



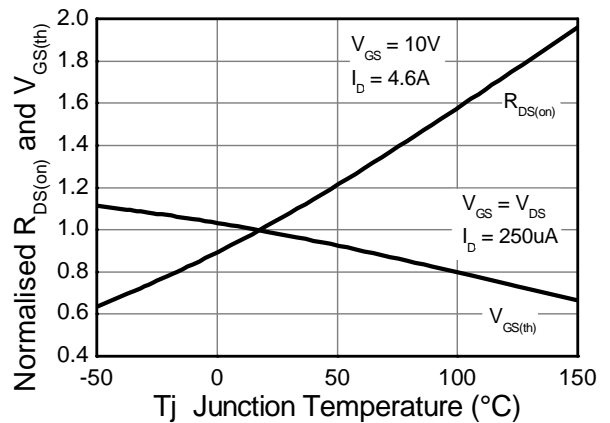
**Output Characteristics**



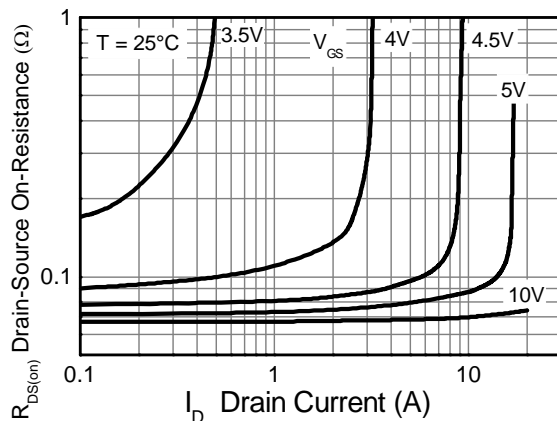
**Output Characteristics**



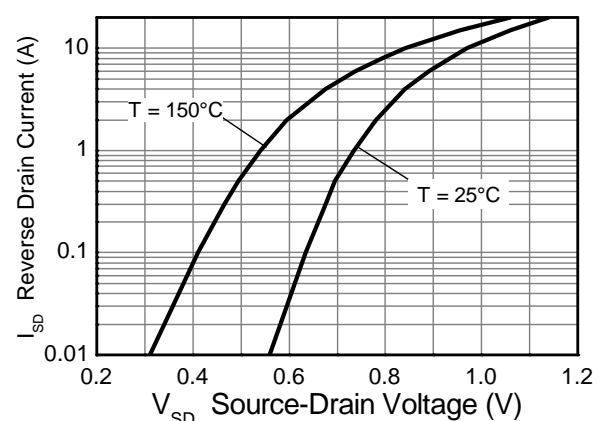
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

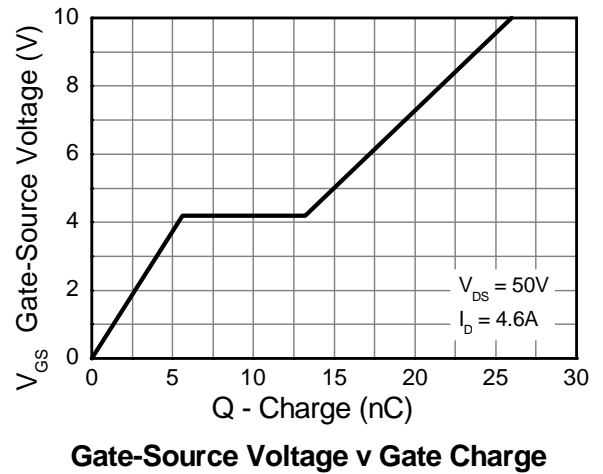
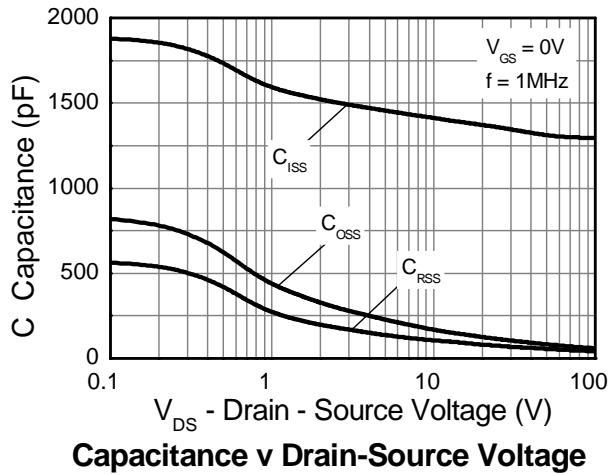


**On-Resistance v Drain Current**

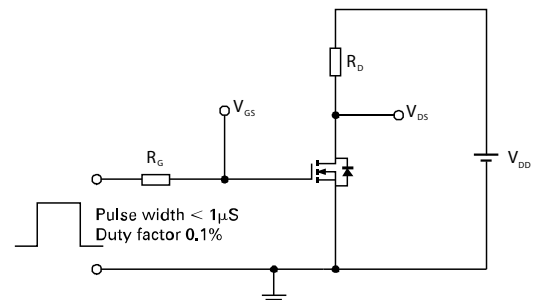
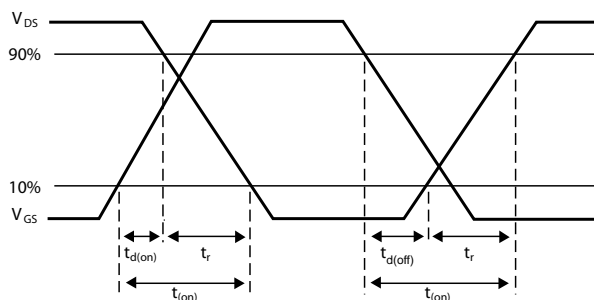
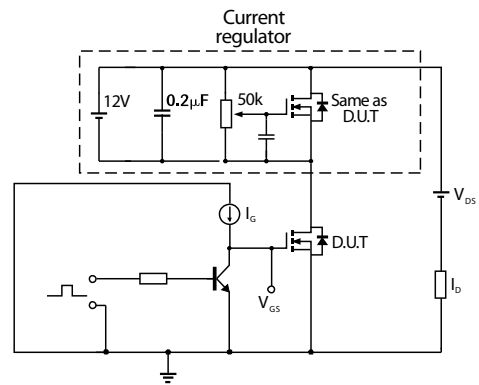
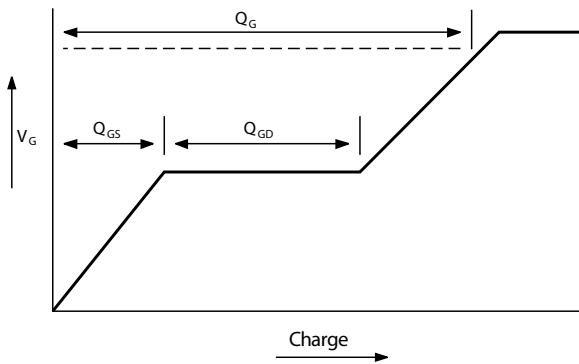


**Source-Drain Diode Forward Voltage**

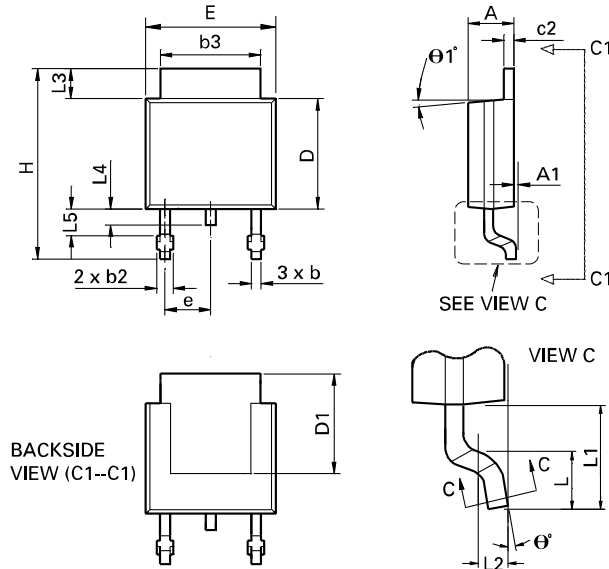
**Typical Characteristics - continued**



**Test Circuits**

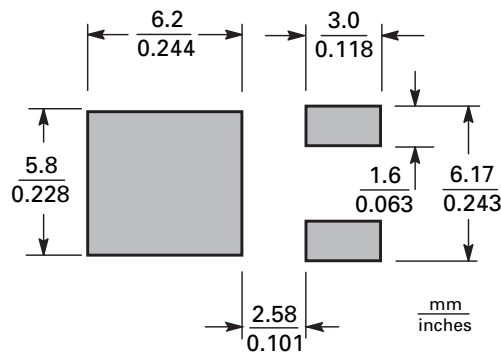


**Package Outline Dimensions**



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	-	theta 1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	theta°	0°	15°	0°	15°
E1	0.170	-	4.32	-	-	-	-	-	-

**Suggested Pad Layout**



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