

## Product Summary

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

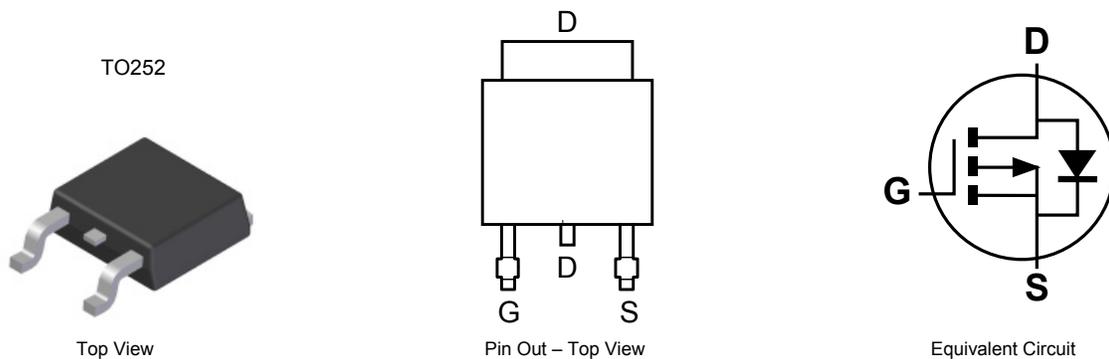
- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

## 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
- Weight: 0.33 grams (approximate)

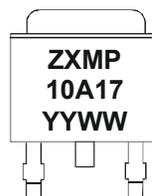


## Ordering Information (Note 4)

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](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<sub>A</sub> = +25°C, unless otherwise specified.)

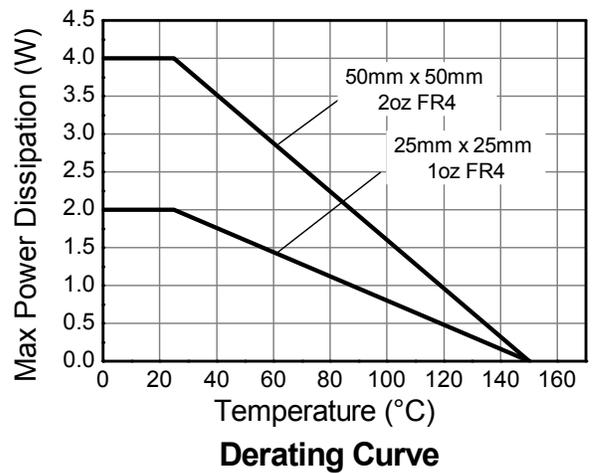
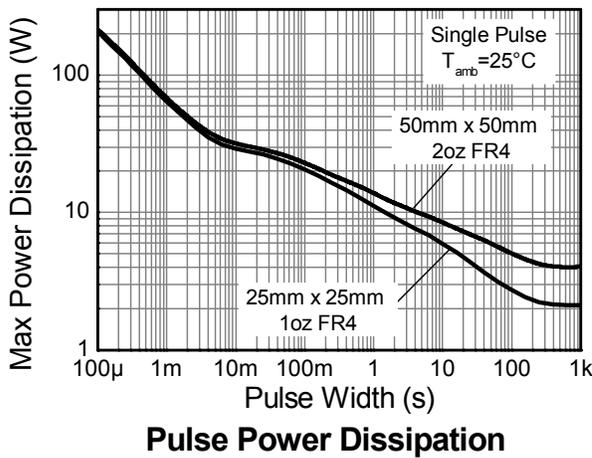
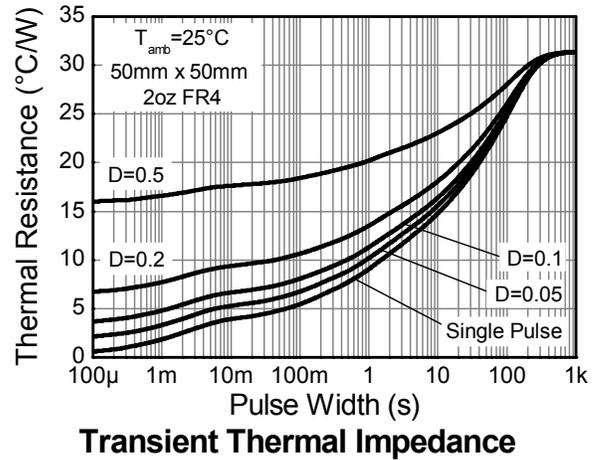
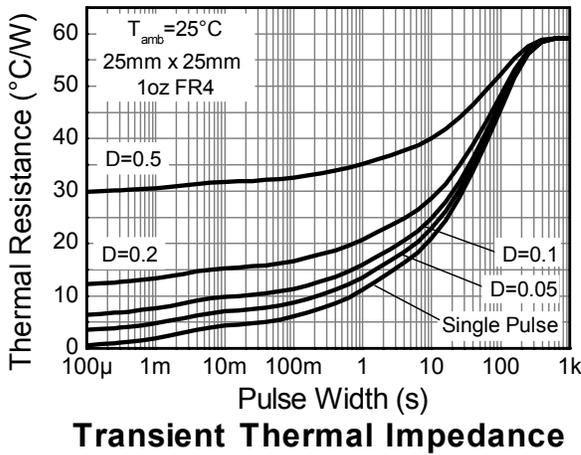
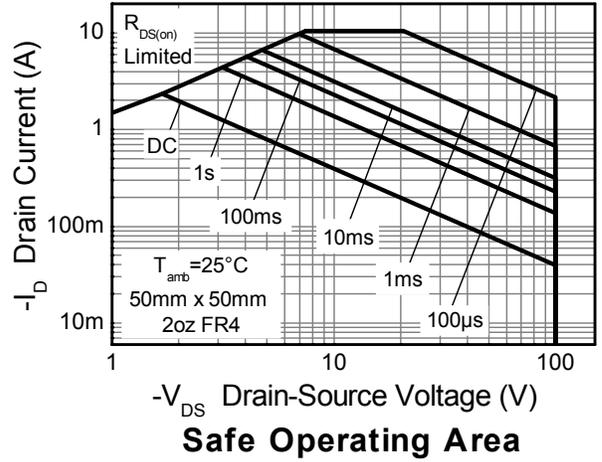
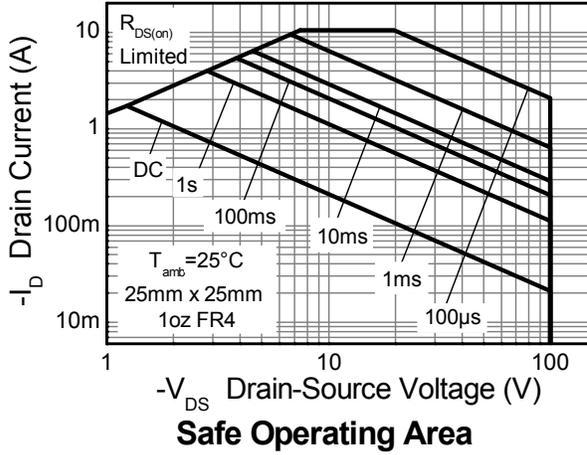
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-100	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain current	V <sub>GS</sub> = 10V	(Note 6)	-3.9	A
		T <sub>A</sub> = +70°C (Note 6)	-3.1	
		(Note 5)	-2.4	
Pulsed Drain current	V <sub>GS</sub> = 10V	I <sub>DM</sub>	-11.3	A
Continuous Source Current (Body diode)		I <sub>S</sub>	-8.7	A
Pulsed Source Current (Body diode)		I <sub>SM</sub>	-11.3	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 5)	P <sub>D</sub>	4.0	W mW/°C
			32.0	
	(Note 6)		10.2	
	(Note 9)		80.8	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	2.0	°C/W
	(Note 6)		16.1	
	(Note 9)		31	
Thermal Resistance, Junction to Case	(Note 8)	R <sub>θJL</sub>	12.3	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	62	°C/W
			2.4	°C
			-55 to 150	

- 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.

**Thermal Characteristics**

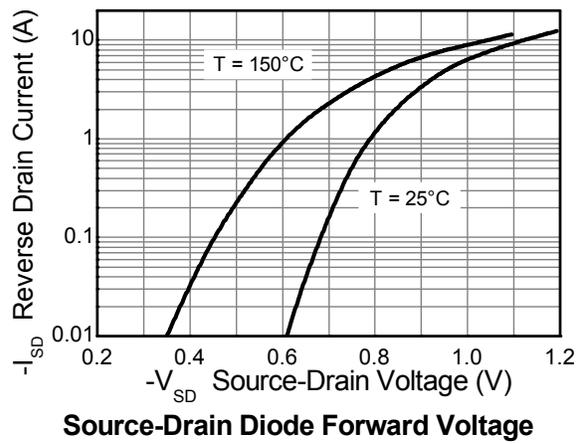
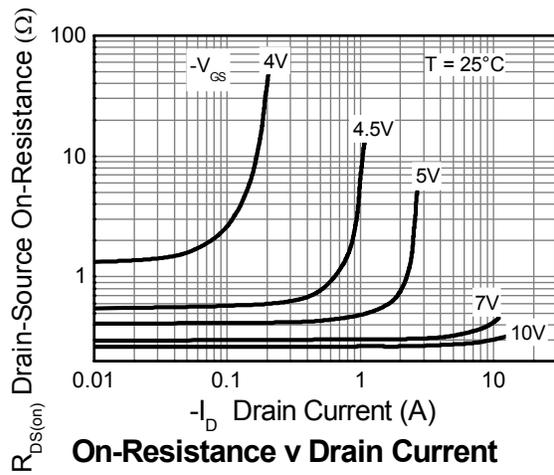
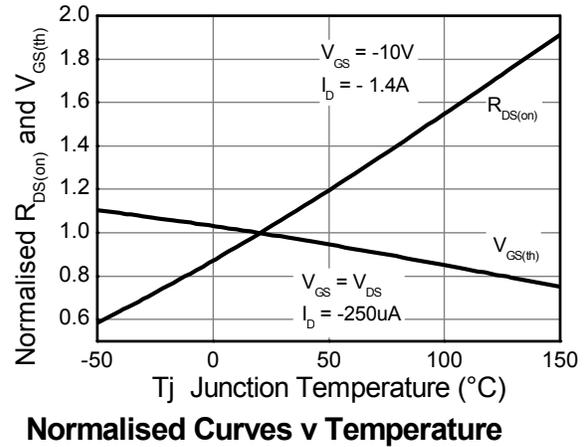
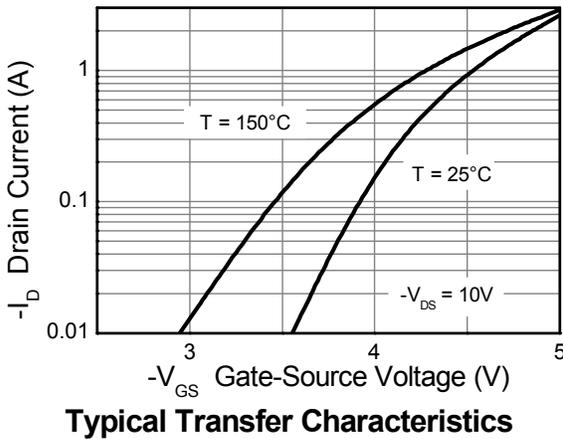
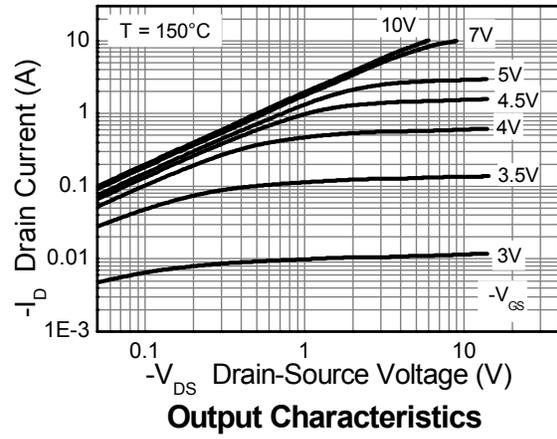
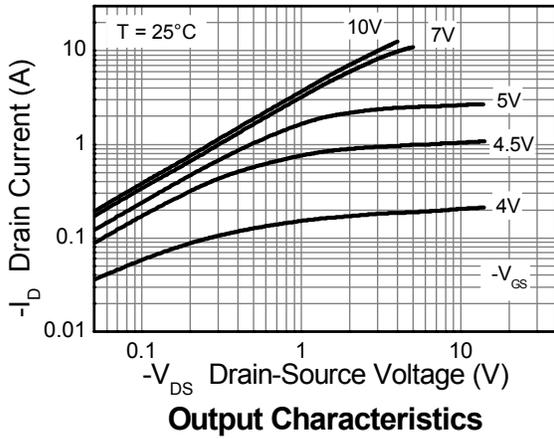


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

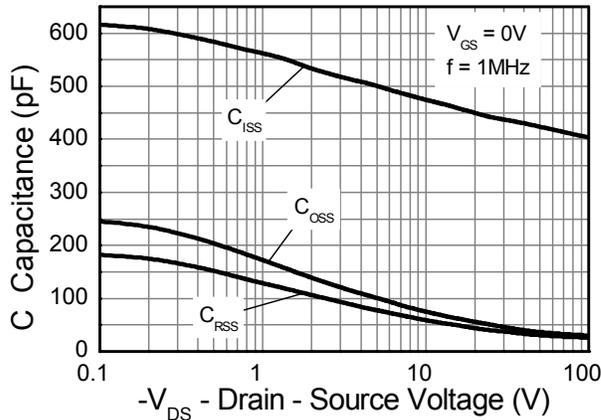
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-100	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -100V, V <sub>GS</sub> = 0V
Gate-Source 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>	-2.0	—	-4.0	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 10)	R <sub>DS(on)</sub>	—	—	0.350	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.4A
				0.450		V <sub>GS</sub> = -6V, I <sub>D</sub> = -1.2A
Forward Transconductance (Notes 10 & 11)	g <sub>fs</sub>	—	2.8	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -1.4A
Diode Forward Voltage (Note 10)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V
Reverse recovery time (Note 11)	t <sub>rr</sub>	—	33	—	ns	I <sub>S</sub> = -1.5A, di/dt = 100A/μs
Reverse recovery charge (Note 11)	Q <sub>rr</sub>	—	48	—	nC	
<b>DYNAMIC CHARACTERISTICS</b> (Note 11)						
Input Capacitance	C <sub>iSS</sub>	—	424	—	pF	V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V F = 1MHz
Output Capacitance	C <sub>oss</sub>	—	36.6	—	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	29.8	—	pF	
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	7.1	—	nC	V <sub>GS</sub> = -6.0V
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	10.7	—	nC	V <sub>GS</sub> = -10V
Gate-Source Charge (Note 12)	Q <sub>gs</sub>	—	1.7	—	nC	
Gate-Drain Charge (Note 12)	Q <sub>gd</sub>	—	3.8	—	nC	
Turn-On Delay Time (Note 12)	t <sub>D(on)</sub>	—	3.0	—	ns	V <sub>DD</sub> = -50V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A, R <sub>G</sub> ≅ 6.0Ω
Turn-On Rise Time (Note 12)	t <sub>r</sub>	—	3.5	—	ns	
Turn-Off Delay Time (Note 12)	t <sub>D(off)</sub>	—	13.4	—	ns	
Turn-Off Fall Time (Note 12)	t <sub>f</sub>	—	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.

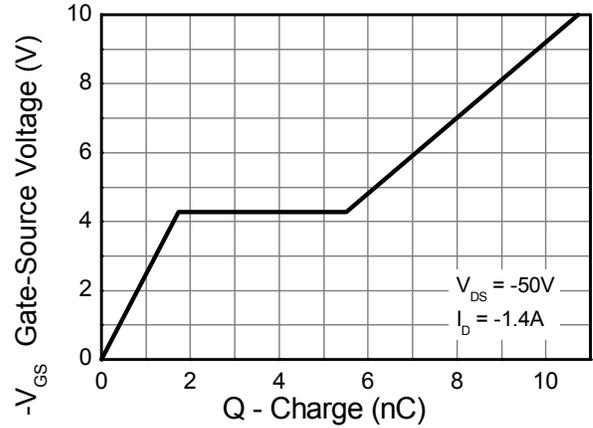
**Typical Characteristics**



**Typical Characteristics (cont.)**

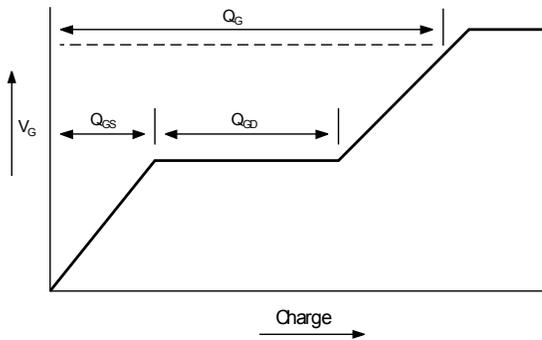


**Capacitance v Drain-Source Voltage**

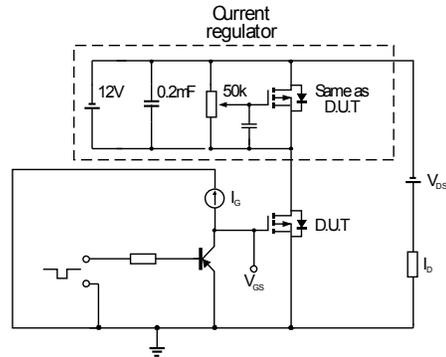


**Gate-Source Voltage v Gate Charge**

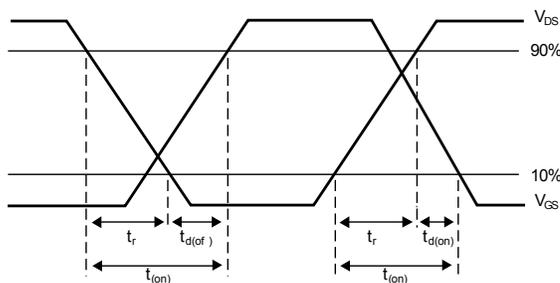
**Test Circuits**



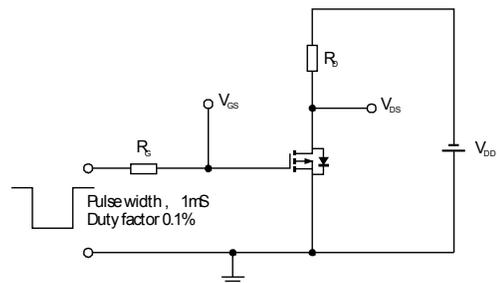
**Basic gate charge waveform**



**Gate charge test circuit**

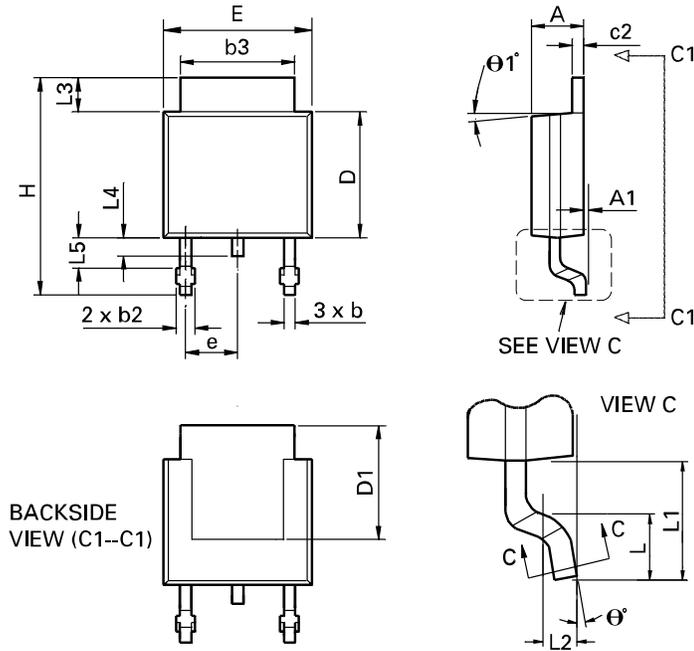


**Switching time waveforms**



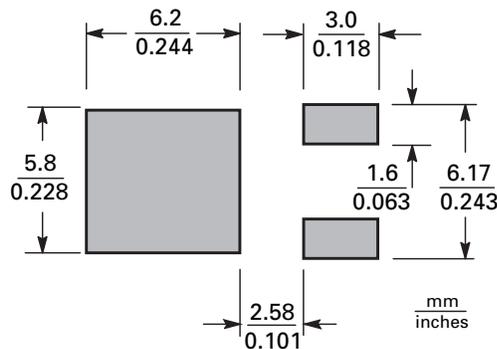
**Switching time test circuit**

**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	-	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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