

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D$ $T_A = +25^\circ\text{C}$ (Note 6)
-100V	150m $\Omega$ @ $V_{GS} = -10\text{V}$	-5.9A
	190m $\Omega$ @ $V_{GS} = -6\text{V}$	-5.1A

## Description

This new generation trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

## Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

## Features and Benefits

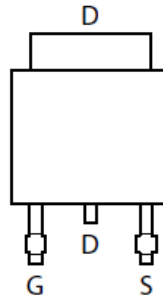
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- DPAK Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

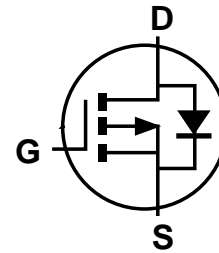
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.315 grams (Approximate)



Top View



Top View  
Pin Out



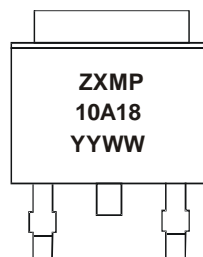
Equivalent circuit

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
ZXMP10A18KTC	Standard	TO252	2,500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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



ZXMP10A18 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 10 = 2010)  
 WW = Week (01 - 53)

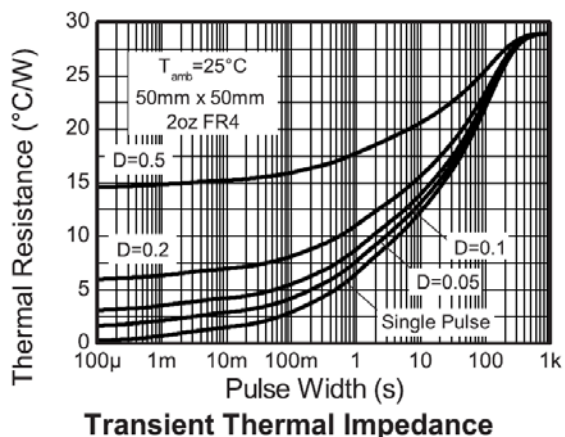
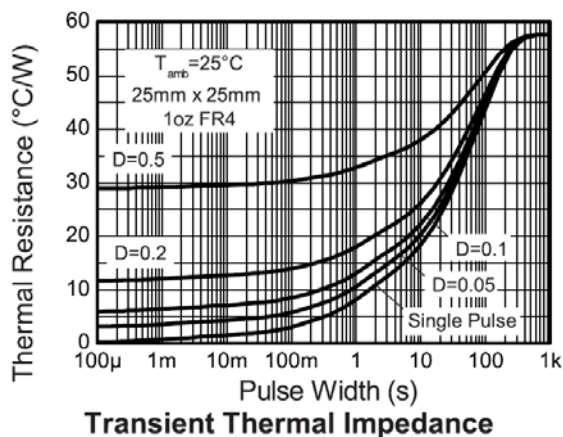
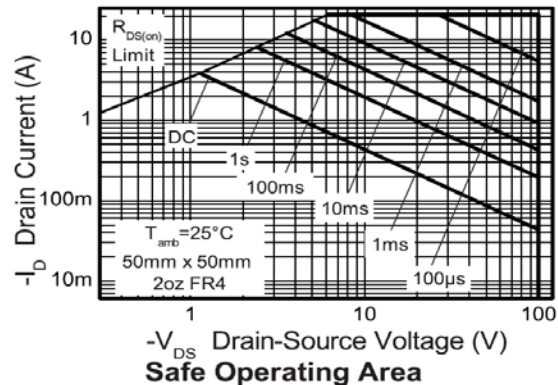
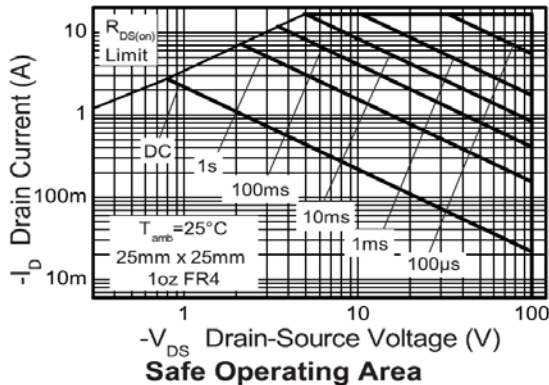
**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

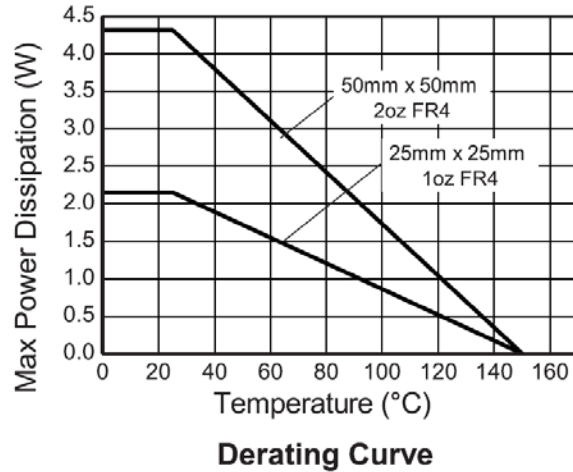
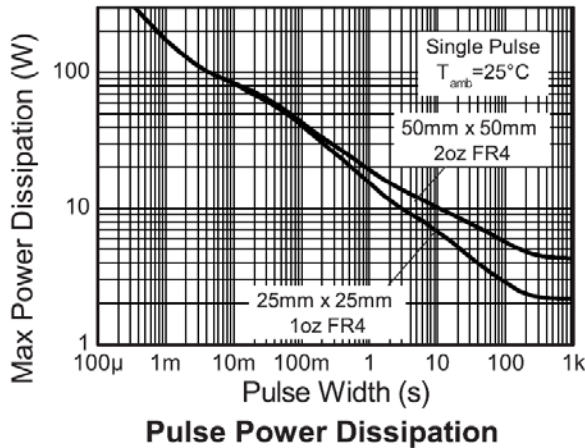
Characteristic	Symbol	Value	Units
Drain-Source Voltage	$V_{DS}$	-100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A = +25^\circ\text{C}$ (Note 6)	-5.9
		$T_A = +70^\circ\text{C}$ (Note 6)	-4.7
		$T_A = +25^\circ\text{C}$ (Note 5)	-3.8
Pulsed Drain Current (Note 7)	$I_{DM}$	-21.1	A
Continuous Source Current (Body Diode) (Note 6)	$I_S$	-10	A
Pulsed Source Current (Body Diode) (Note 7)	$I_{SM}$	-21.1	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5) Linear Derating Factor	$P_D$	$T_A = +25^\circ\text{C}$ (Note 5)	4.3
		$T_A = +25^\circ\text{C}$ (Note 6)	34.4
		$T_A = +25^\circ\text{C}$ (Note 8)	10.2
		$T_A = +25^\circ\text{C}$ (Note 8)	81.3
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	2.17
		(Note 6)	17.4
		(Note 8)	29
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.  
6. For a device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.  
7. Repetitive rating on 50mm x 50mm x 1.6mm FR4 PCB,  $D=0.02$ , pulse width=300 $\mu\text{s}$  – pulse width limited by maximum junction temperature.  
8. 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.

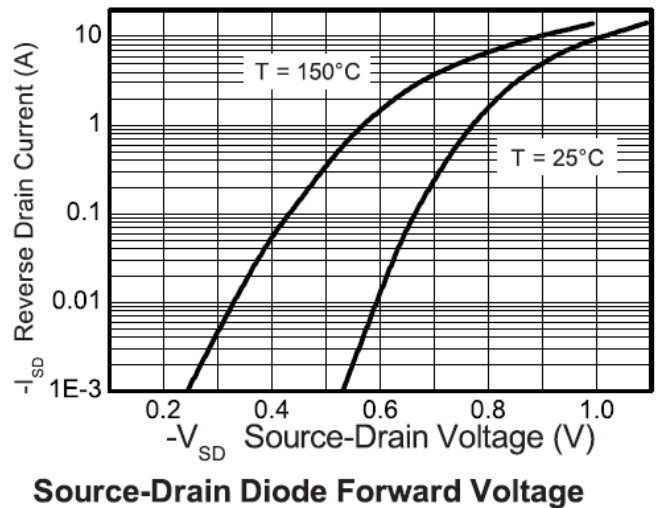
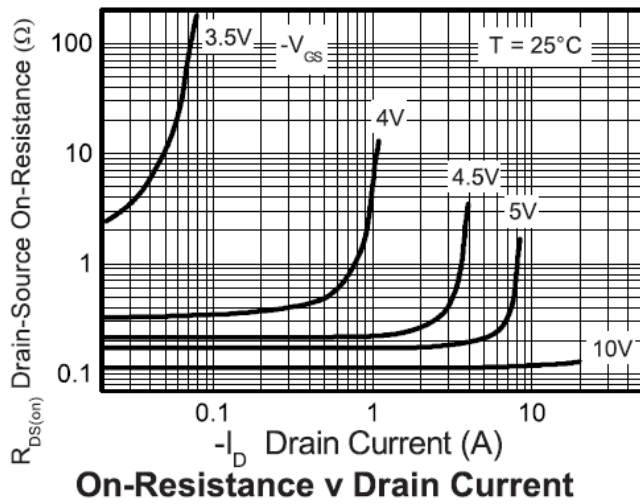
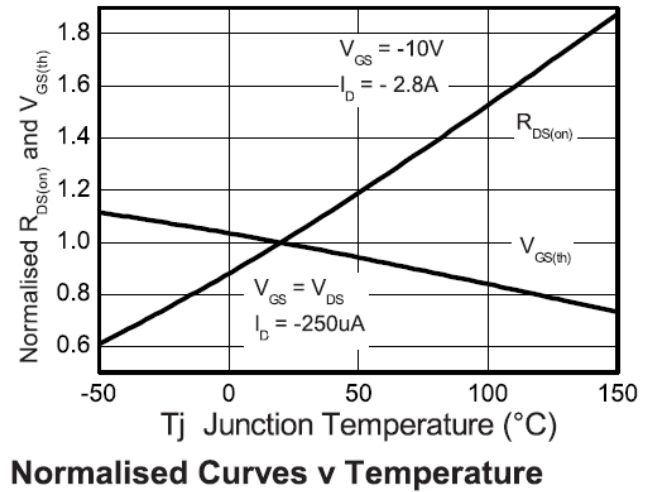
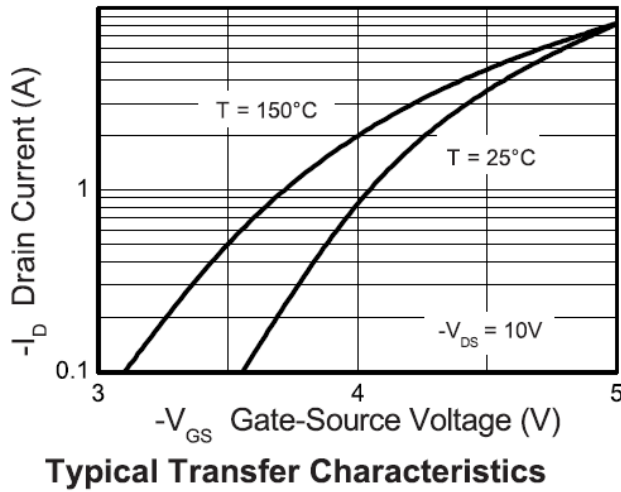
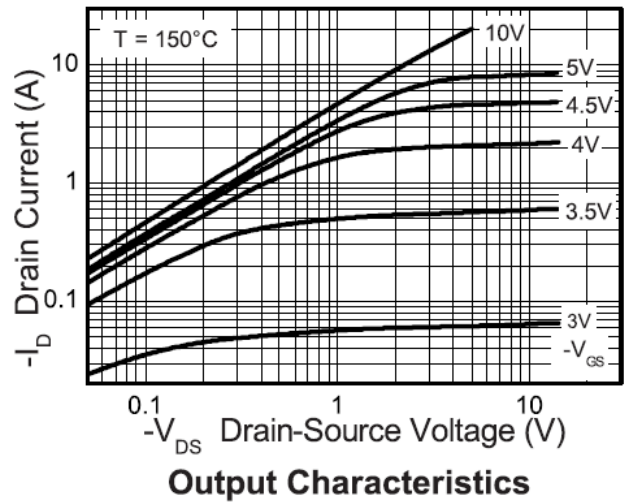
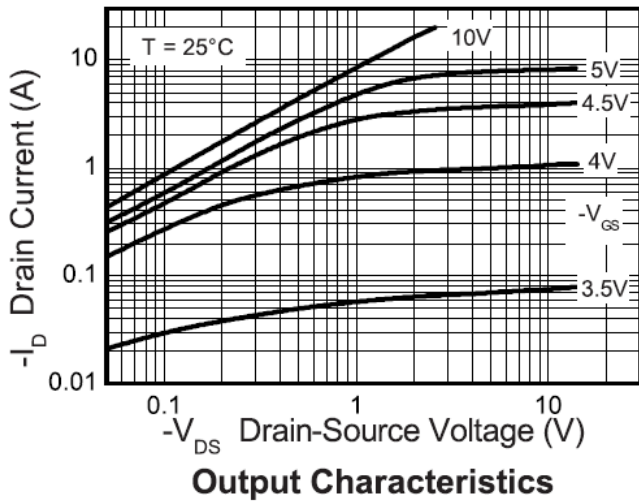
**Thermal characteristics**



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

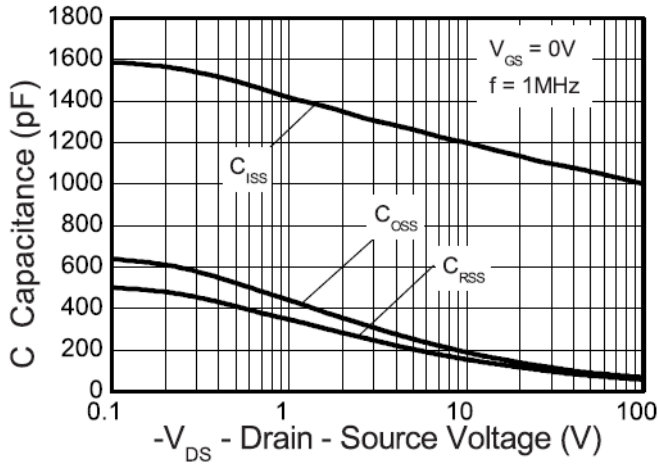
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-100	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-1	$\mu A$	$V_{DS} = -100V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-2	—	-4	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance (Note 9)	$R_{DS(on)}$	—	—	150 190	m $\Omega$	$V_{GS} = -10V, I_D = -2.8A$ $V_{GS} = -6V, I_D = -2.4A$
Forward Transconductance (Notes 9 & 11)	$g_{fs}$	—	6	—	S	$V_{DS} = -15V, I_D = -2.8A$
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	$C_{iss}$	—	1055	—	pF	$V_{DS} = -50V, V_{GS} = 0V,$ $f = 1MHz$
Output Capacitance	$C_{oss}$	—	90	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	76	—	pF	
<b>SWITCHING CHARACTERISTICS (Notes 10 &amp; 11)</b>						
Turn-On Delay Time	$t_{d(on)}$	—	4.9	—	ns	$V_{DS} = -50V, V_{GS} = -10V,$ $I_D = -1A, R_G = 6\Omega$
Rise Time	$t_r$	—	6.8	—		
Turn-Off Delay Time	$t_{d(off)}$	—	33.9	—		
Fall Time	$t_f$	—	17.9	—		
Total Gate Charge	$Q_g$	—	26.9	—	nC	$V_{DS} = -50V, V_{GS} = -10V,$ $I_D = -2.8A$
Gate-Source Charge	$Q_{gs}$	—	3.9	—		
Gate-Drain Charge	$Q_{gd}$	—	10.2	—		
<b>SOURCE-DRAIN DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 9)	$V_{SD}$	—	-0.85	-0.95	V	$T_J = +25^\circ\text{C}, V_{GS} = 0V, I_S = -3.5A$
Reverse Recovery Time (Note 11)	$t_{rr}$	—	49	—	ns	$T_J = +25^\circ\text{C}, I_S = -2.8A,$
Reverse Recovery Charge (Note 11)	$Q_{rr}$	—	107	—	nC	$di/dt = 100A/\mu s,$

- Notes: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .  
 10. Switching characteristics are independent of operating junction temperature.  
 11. For design aid only, not subject to production testing.

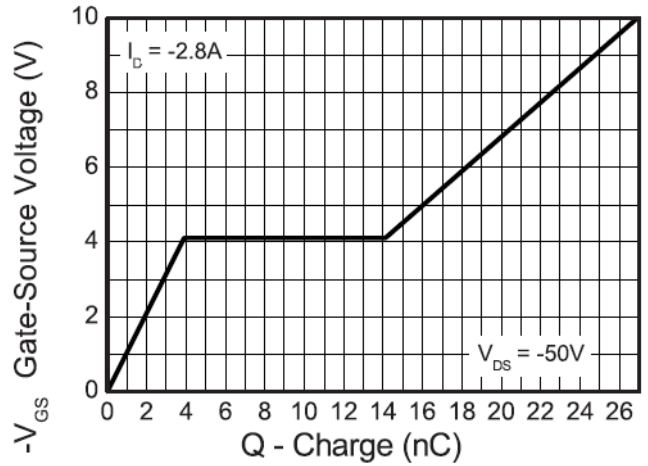
**Typical characteristics**



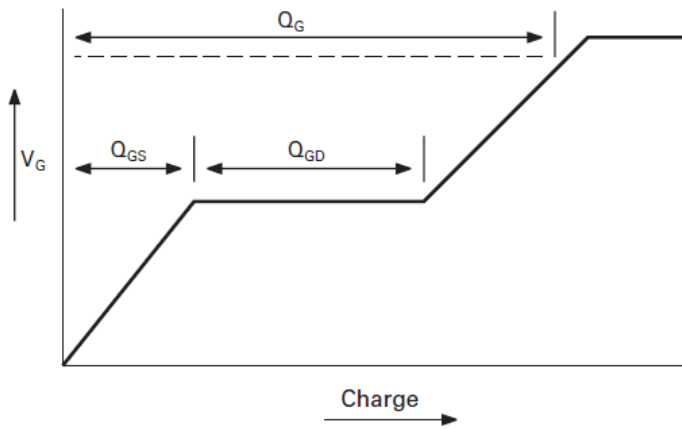
**Typical characteristics**



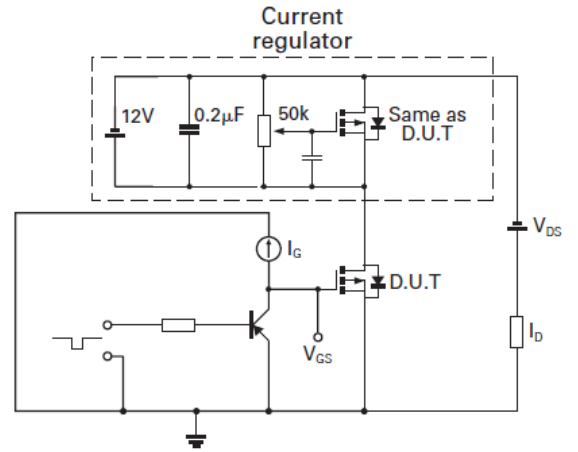
**Capacitance v Drain-Source Voltage**



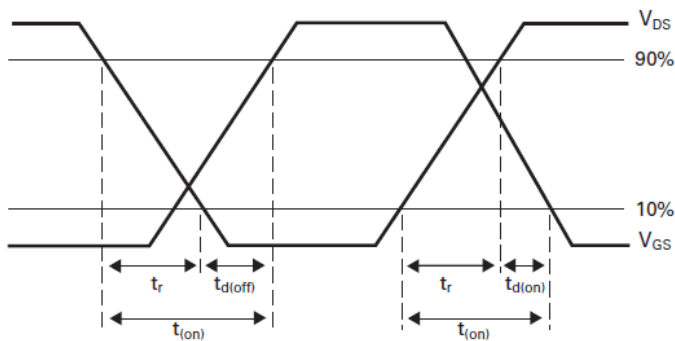
**Gate-Source Voltage v Gate Charge**



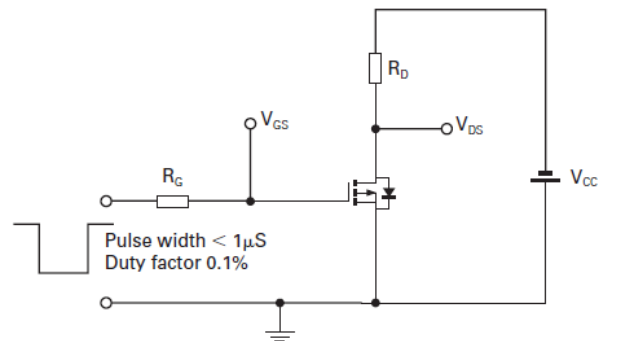
**Basic gate charge waveform**



**Gate charge test circuit**



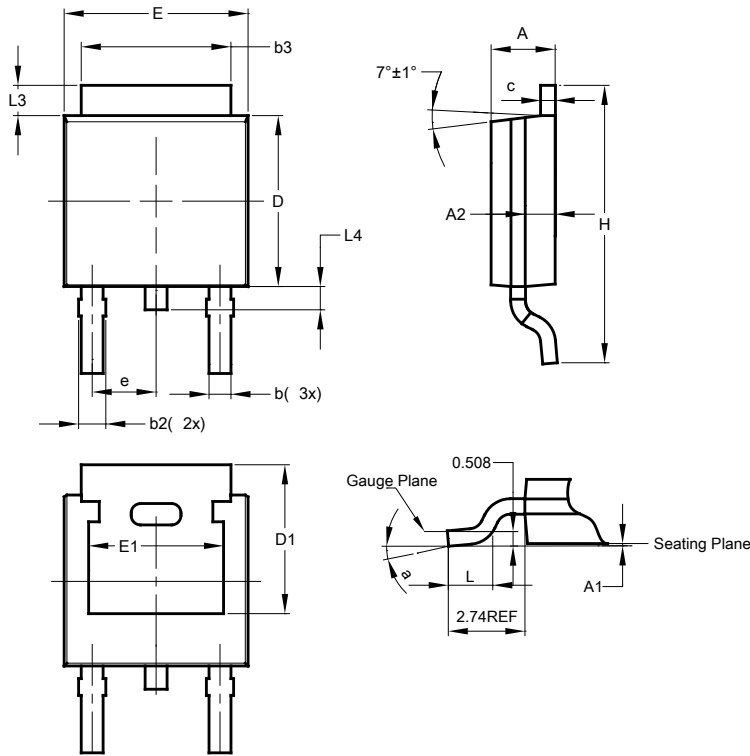
**Switching time waveforms**



**Switching time test circuit**

**Package Outline Dimensions**

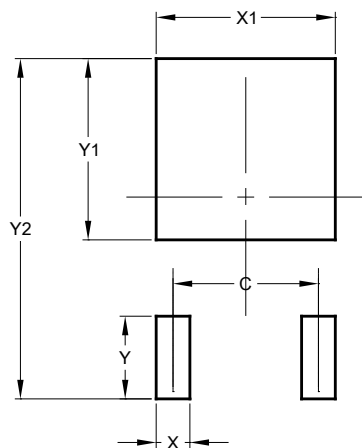
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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