



**THE DATASHEET OF  
ZXMN2088DE6TA**



## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ\text{C}$
20V	0.200 $\Omega$ @ $V_{GS}=4.5\text{V}$	2.1A
	0.240 $\Omega$ @ $V_{GS}=2.5\text{V}$	1.9A
	0.310 $\Omega$ @ $V_{GS}=1.8\text{V}$	1.7A

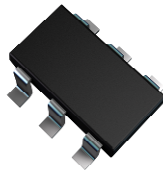
## Description

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

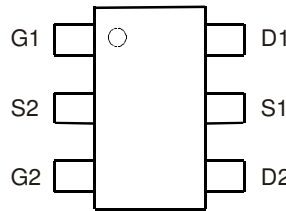
## Applications

- Power Management Functions
- Disconnect Switches
- Relay Driving and Load Switching

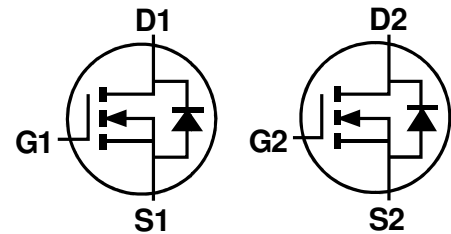
SOT26



Top View



Pin Out - Top View



Equivalent Circuit

## Features and Benefits

- Low On-Resistance
- Low Gate Drive Capability
- SOT26 (dual) 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: SOT26
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.018 grams (Approximate)

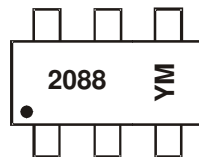
## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
ZXMN2088DE6TA	Standard	SOT26	3,000 / Tape & Reel
ZXMN2088DE6TC	Standard	SOT26	10,000 / 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

SOT26



2088 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: C = 2015)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022
Code	C	D	E	F	G	H	I	J

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

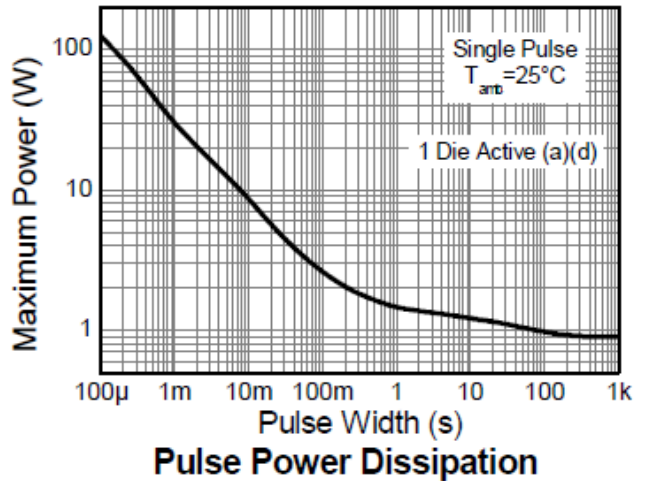
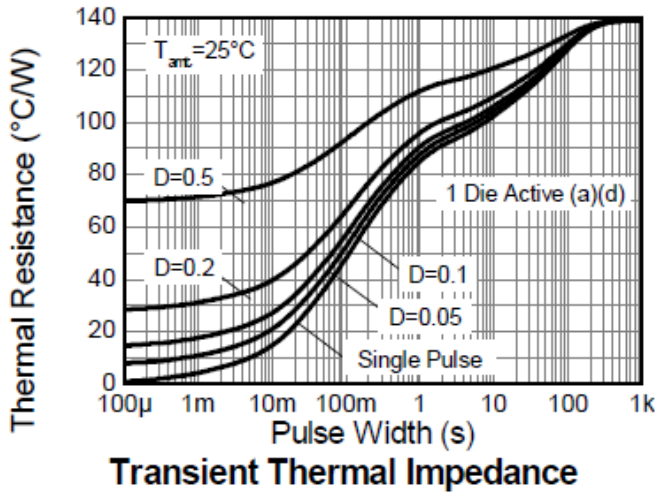
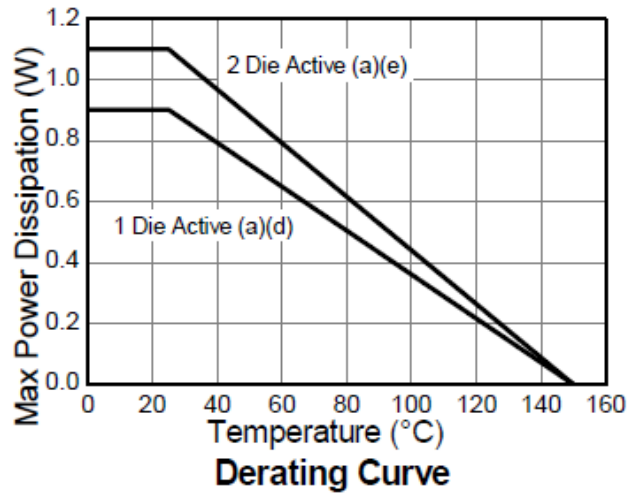
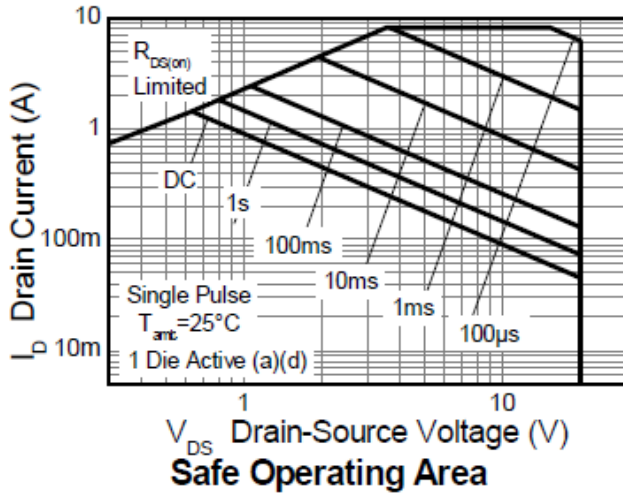
Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V <sub>DSS</sub>	20	V	
Gate-Source Voltage		V <sub>GS</sub>	±8	V	
Continuous Drain Current	V <sub>GS</sub> = 4.5V	I <sub>D</sub>	T <sub>A</sub> = +25°C (Notes 6 & 8)	2.1	A
			T <sub>A</sub> = +70°C (Notes 6 & 8)	1.7	
			T <sub>A</sub> = +25°C (Notes 5 & 8)	1.7	
Pulsed Drain Current		I <sub>DM</sub>	8	A	

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

Characteristic		Symbol	Value	Unit
Power Dissipation at T <sub>A</sub> = +25°C Linear Derating Factor	(Notes 5 & 8)	P <sub>D</sub>	0.9 7.2	W mW/°C
	(Notes 5 & 9)	P <sub>D</sub>	1.1 8.8	W mW/°C
	(Notes 6 & 8)	P <sub>D</sub>	1.3 10.4	W mW/°C
Thermal Resistance, Junction to Ambient	(Notes 5 & 8)	R <sub>θJA</sub>	139	°C/W
	(Notes 5 & 9)		113	
	(Notes 6 & 8)		96	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
5. 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.
  6. Same as Note (5), except the device is measured at t ≤ 5 sec.
  7. Same as Note (5), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse width is limited by the maximum junction temperature.
  8. For device with one active die.
  9. For device with two active die running at equal power.

**Thermal Characteristics**

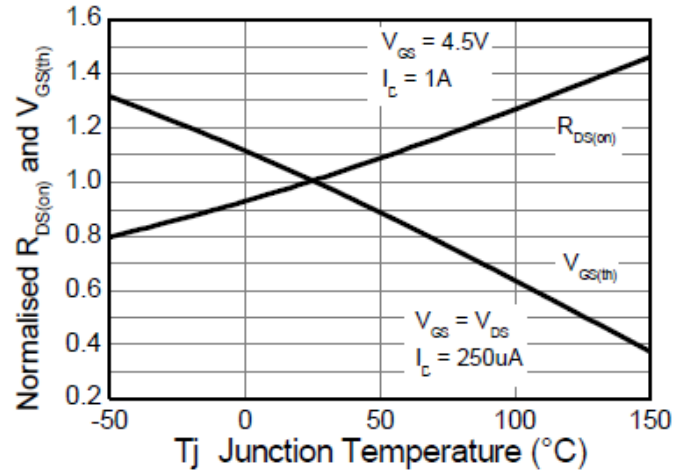
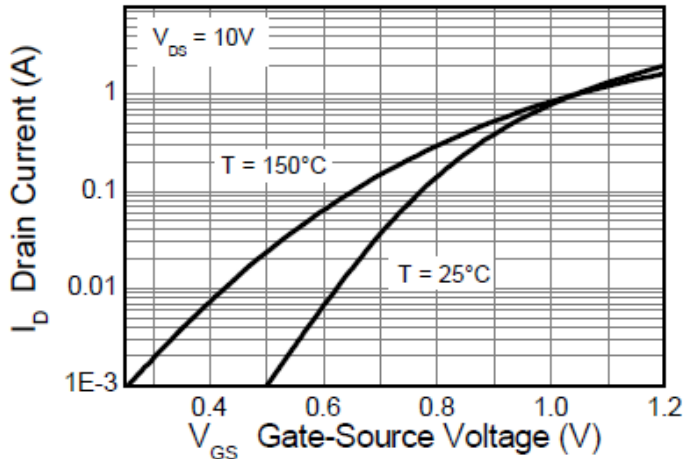
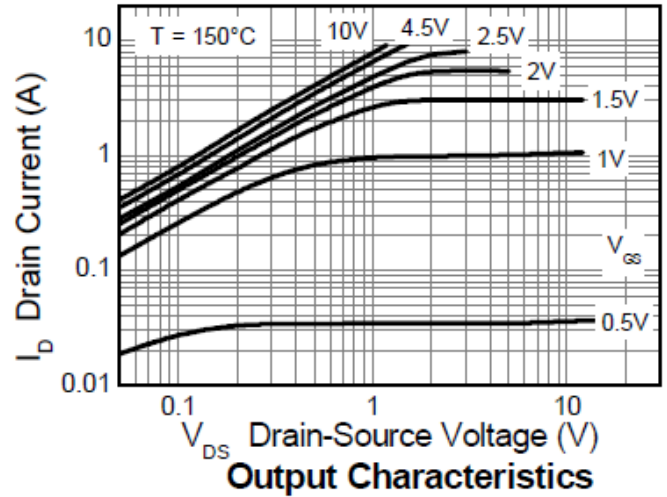
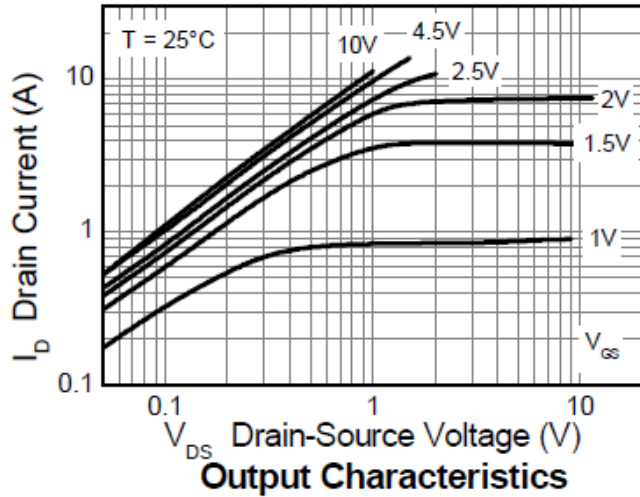


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20	—	—	V	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	100	nA	$V_{DS} = 3\text{V}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 8\text{V}$ , $V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	—	1.0	V	$I_D = 250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 10)	$R_{DS(on)}$	—	0.112	0.200	$\Omega$	$V_{GS} = 4.5\text{V}$ , $I_D = 1.0\text{A}$
			0.137	0.240		$V_{GS} = 2.5\text{V}$ , $I_D = 0.6\text{A}$
			0.165	0.310		$V_{GS} = 1.8\text{V}$ , $I_D = 0.3\text{A}$
Forward Transconductance (Notes 10 & 12)	$g_{fs}$	—	4.6	—	S	$V_{DS} = 10\text{V}$ , $I_D = 1.0\text{A}$
Diode Forward Voltage (Note 12)	$V_{SD}$	—	0.75	0.95	V	$I_S = 1.0\text{A}$ , $V_{GS} = 0\text{V}$ , $T_J = +25^\circ\text{C}$
<b>DYNAMIC CHARACTERISTICS (Note 12)</b>						
Input Capacitance	$C_{iss}$	—	279	—	pF	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	52	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	29	—	pF	
Total Gate Charge	$Q_g$	—	3.8	—	nC	$V_{GS} = 4.5\text{V}$ $V_{DS} = 10\text{V}$ $I_D = 2.4\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.41	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.56	—	nC	
Turn-On Delay Time (Note 11)	$t_{D(on)}$	—	2.0	—	ns	$V_{DD} = 10\text{V}$ , $V_{GS} = 4.5\text{V}$ $I_D = 1.0\text{A}$ , $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 11)	$t_r$	—	3.2	—	ns	
Turn-Off Delay Time (Note 11)	$t_{D(off)}$	—	12.7	—	ns	
Turn-Off Fall Time (Note 11)	$t_f$	—	6.2	—	ns	
Reverse Recovery Time	$t_{rr}$	—	6.6	—	ns	
Reverse Recovery Charge	$Q_{rr}$	—	1.6	—	nC	$I_F = 1.24\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$ , $T_J = +25^\circ\text{C}$

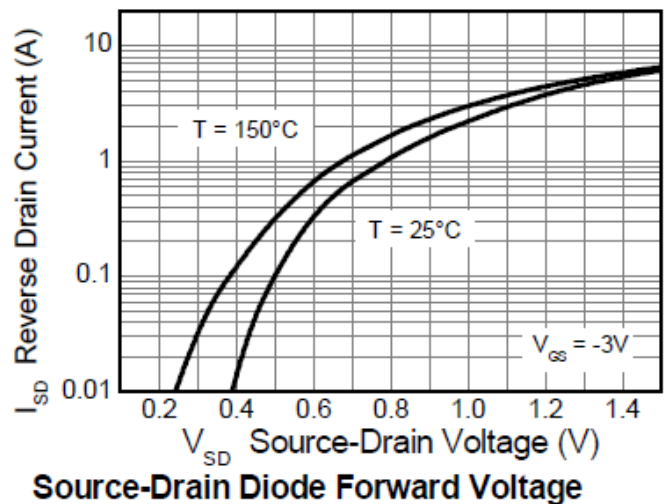
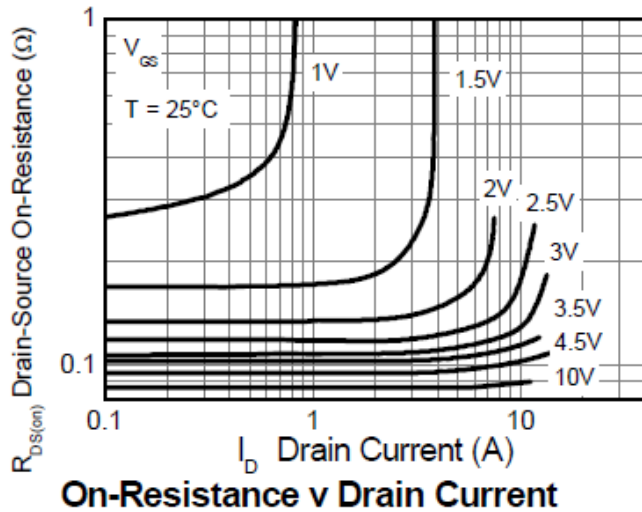
Notes: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .  
11. Switching characteristics are independent of operating junction temperature.  
12. For design aid only, not subject to production testing.

**Typical Characteristics**

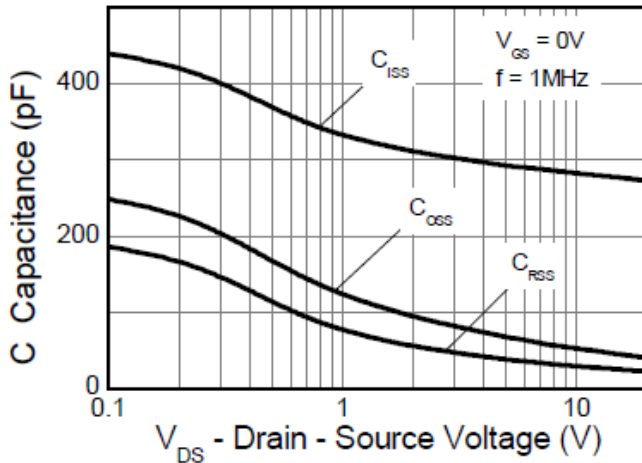


**Typical Transfer Characteristics**

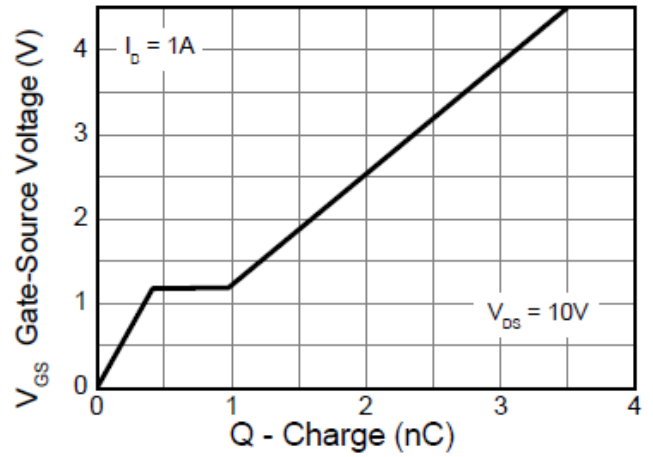
**Normalised Curves v Temperature**



**Typical Characteristics** (continued)

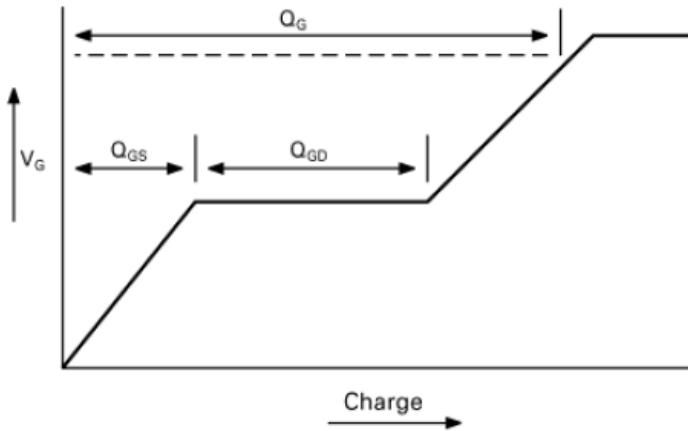


**Capacitance v Drain-Source Voltage**

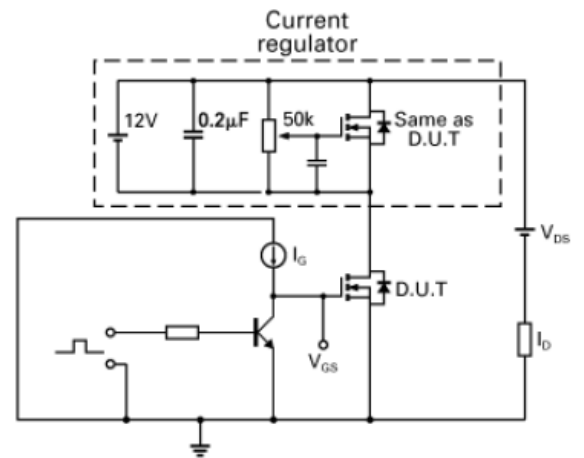


**Gate-Source Voltage v Gate Charge**

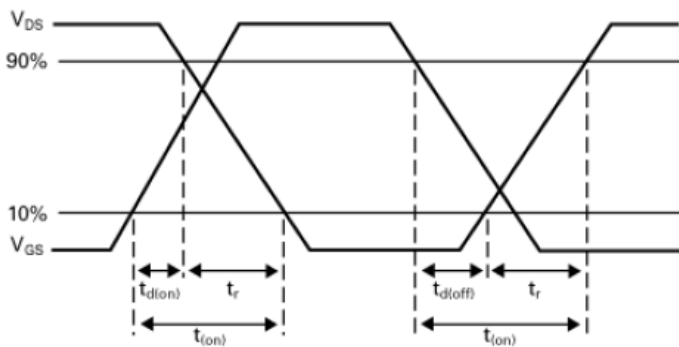
**Test Circuits**



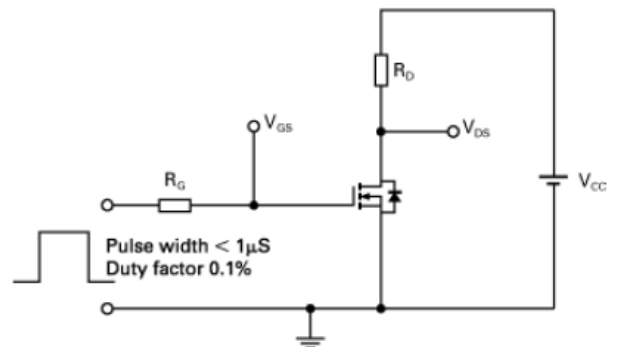
**Basic gate charge waveform**



**Gate charge test circuit**



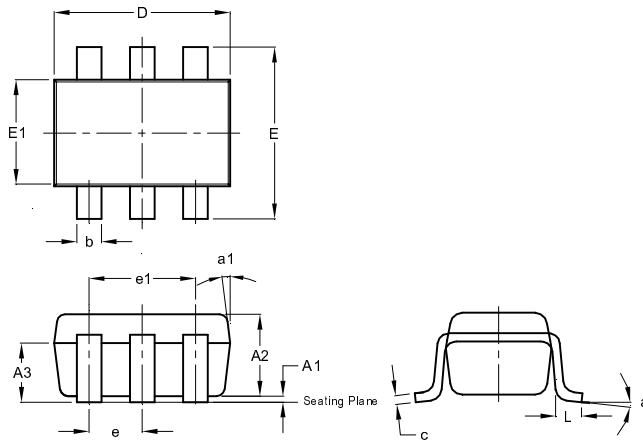
**Switching time waveforms**



**Switching time test circuit**

## Package Outline Dimensions

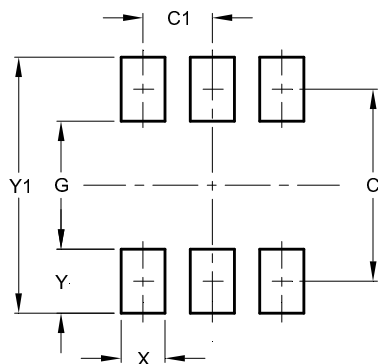
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
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	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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