

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ C$
-250V	14Ω @ $V_{GS} = -10V$	-197mA
	18Ω @ $V_{GS} = -3.5V$	-175mA

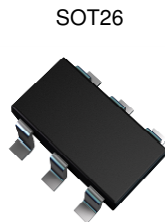
## Description

This 250V enhancement mode P-channel MOSFET provides users with a competitive specification. It offers efficient power handling capability, high impedance and is free from thermal runaway and thermally induced secondary breakdown. Applications benefiting from this device include a variety of Telecom and general high voltage circuits.

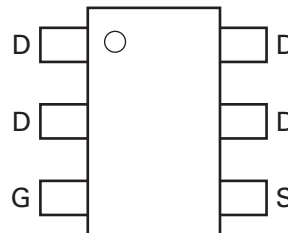
SOT89 and SOT223 versions are also available.

## Applications

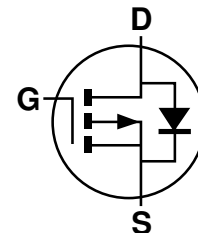
- Earth Recall and Dialing Switches
- Electronic Hook Switches
- High Voltage Power MOSFET Drivers
- Telecom Call Routers
- Solid State Relays



Top View



Top View  
Pin-Out



Equivalent Circuit

## Features and Benefits

- High voltage
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- Complementary N-channel Type ZVN4525E6
- SOT23-6 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

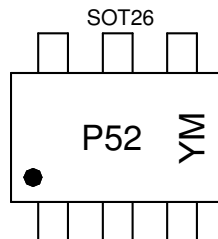
- Case: SOT26
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208
- Weight 0.018 grams (Approximate)

## Ordering Information (Note 4)

Part Number	Case	Quantity per reel
ZVP4525E6TA	SOT26	3,000
ZVP4525E6TC	SOT26	3,000

- 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



P52 = 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>	-250	V
Gate-Source Voltage			V <sub>GS</sub>	±40	V
Continuous Drain Current	V <sub>GS</sub> = 10V	(Note 5)	I <sub>D</sub>	-197	mA
		T <sub>A</sub> = +70°C (Note 5)		-157	
Pulsed Drain Current	V <sub>GS</sub> = 10V	(Note 7)	I <sub>DM</sub>	-1	A
Continuous Source Current (Body Diode)			I <sub>S</sub>	-0.75	A
Pulsed Source Current (Body Diode)			I <sub>SM</sub>	-1	A

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

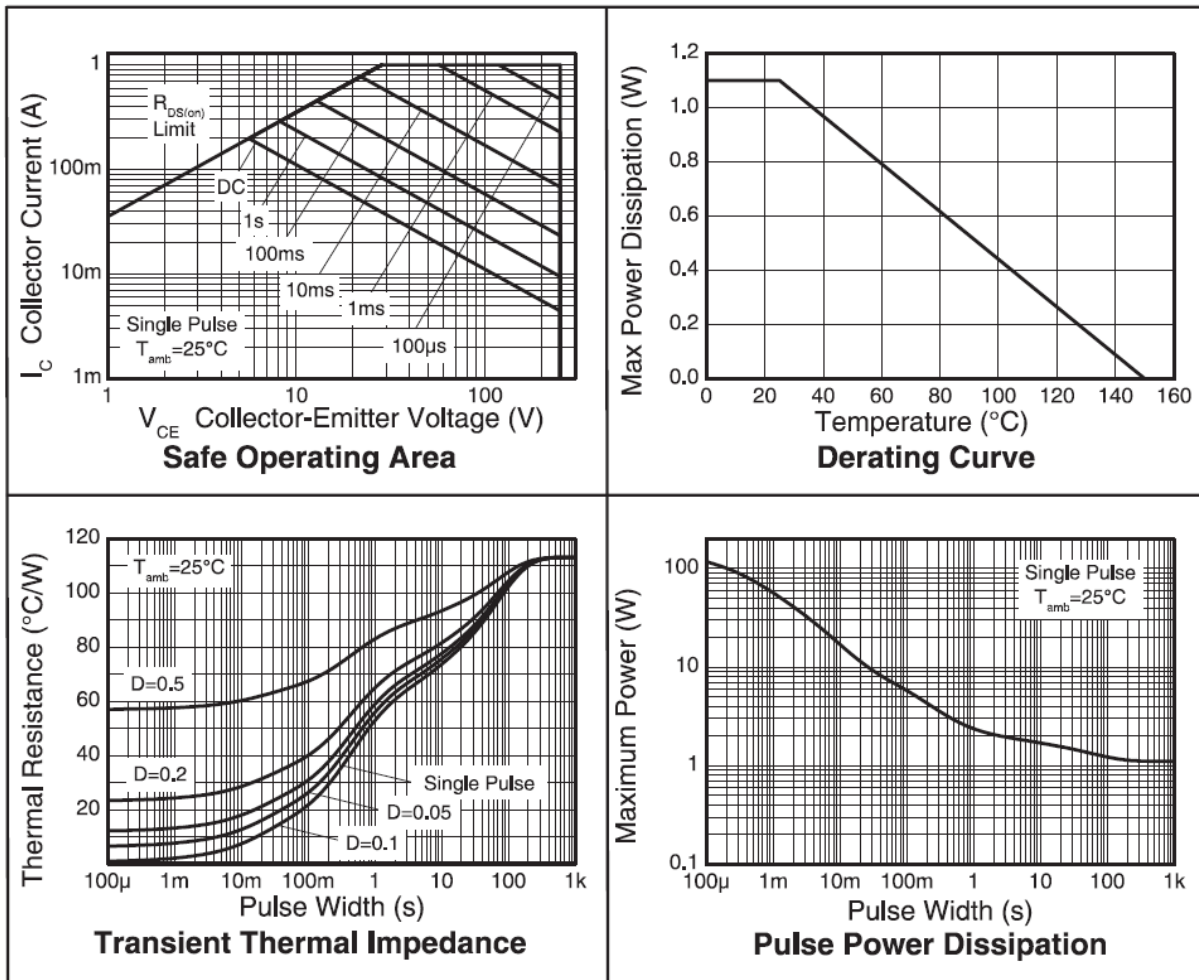
Characteristic			Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	8.8	1.1	W
Linear Derating Factor	(Note 5)				
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	68	113	°C/W
	(Note 6)				
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
- 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.
  - For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
  - Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

**NB High Voltage Applications**

For high voltage applications, the appropriate industry sector guidelines should be considered with regard to voltage spacing between conductors.

**Thermal Characteristics**

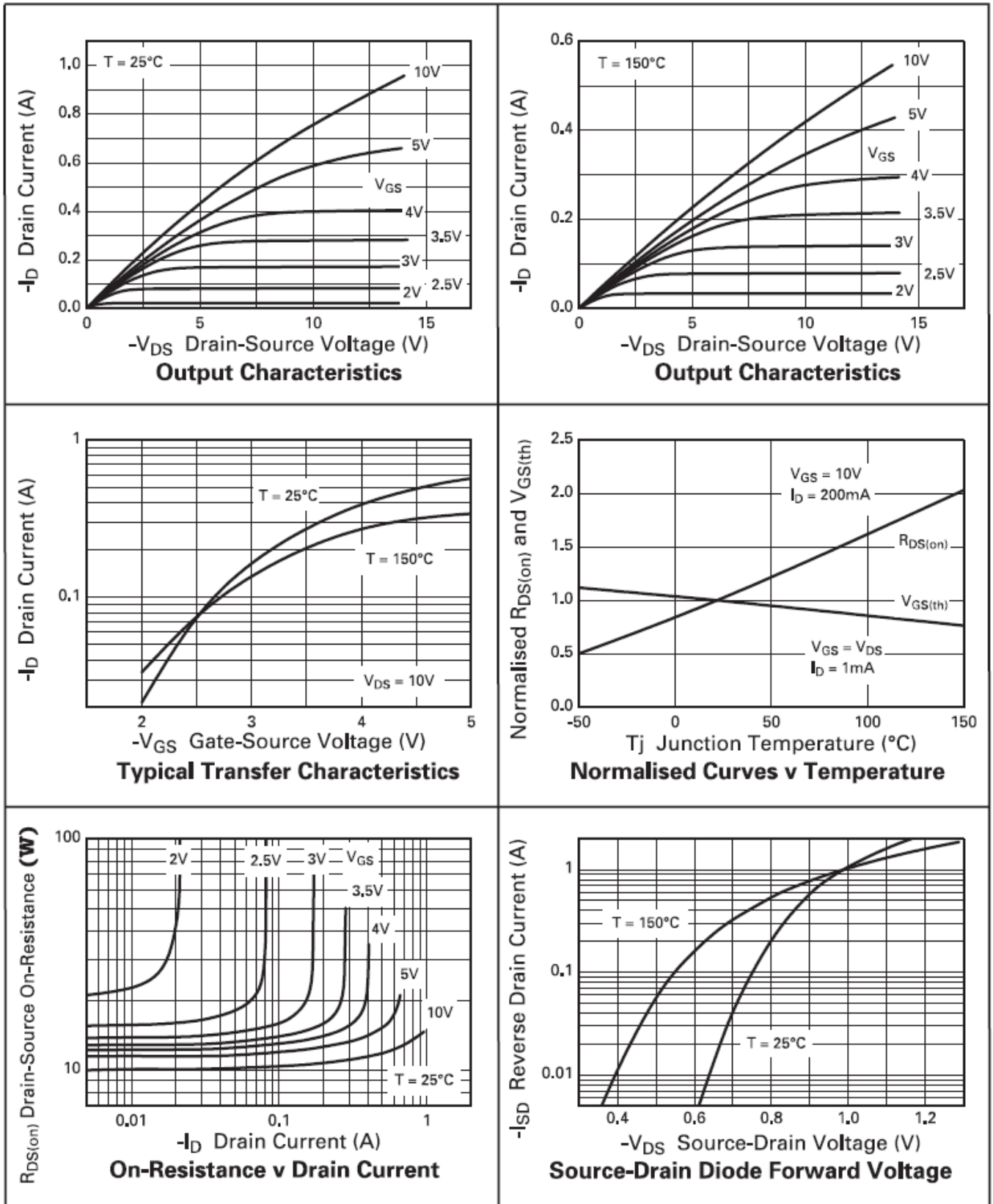


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

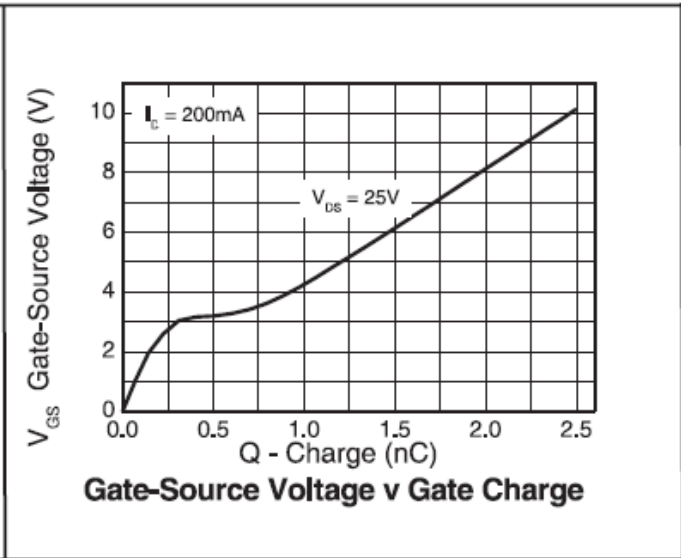
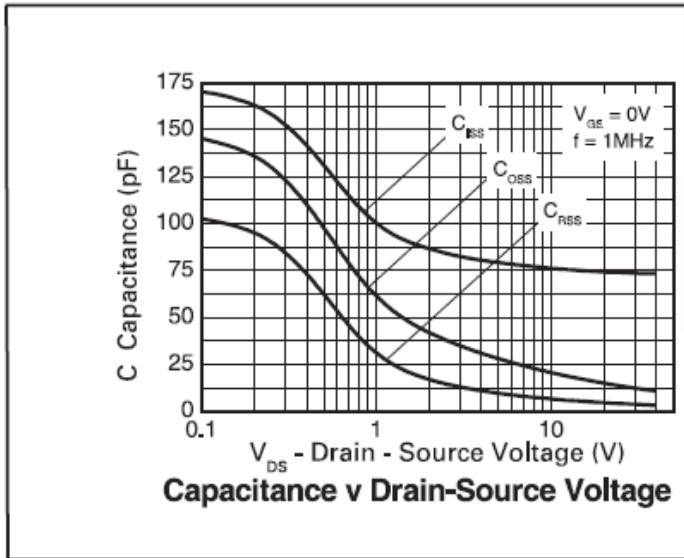
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-250	-285	—	V	I <sub>D</sub> = -1mA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	-30	-500	nA	V <sub>DS</sub> = -250V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	±1	±100	nA	V <sub>GS</sub> = ±40V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.8	-1.5	-2.0	V	I <sub>D</sub> = -1mA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>	—	10	14	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -200mA
		—	13	18		V <sub>GS</sub> = -3.5V, I <sub>D</sub> = -100mA
Forward Transconductance (Notes 10)	g <sub>fs</sub>	80	200	—	mS	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.15A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	-0.86	-0.97	V	I <sub>S</sub> = -200mA, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	C <sub>iss</sub>	—	73	—	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	12.8	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	3.91	—		
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	2.45	2.45	nC	V <sub>DS</sub> = -25V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -200mA (refer to test circuit)
Gate-Source Charge (Note 9)	Q <sub>gs</sub>	—	0.22	0.31		
Gate-Drain Charge (Note 9)	Q <sub>gd</sub>	—	0.45	0.63		
Turn-On Delay Time (Note 9)	t <sub>D(on)</sub>	—	1.53	—	ns	V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V I <sub>D</sub> = -200mA, R <sub>G</sub> = 50Ω (refer to test circuit)
Turn-On Rise Time (Note 9)	t <sub>r</sub>	—	3.78	—		
Turn-Off Delay Time (Note 9)	t <sub>D(off)</sub>	—	17.5	—		
Turn-Off Fall Time (Note 9)	t <sub>f</sub>	—	7.85	—		
Reverse Recovery Time	t <sub>rr</sub>	—	205	290	ns	I <sub>F</sub> = -200mA, di/dt = 100A/μs,
Reverse Recovery Charge	Q <sub>rr</sub>	—	21	29	nC	T <sub>J</sub> = +25°C

- Notes:
8. Measured under pulsed conditions. Width ≤ 300μs. Duty cycle ≤ 2%.
  9. Switching characteristics are independent of operating junction temperatures.
  10. For design aid only, not subject to production testing.

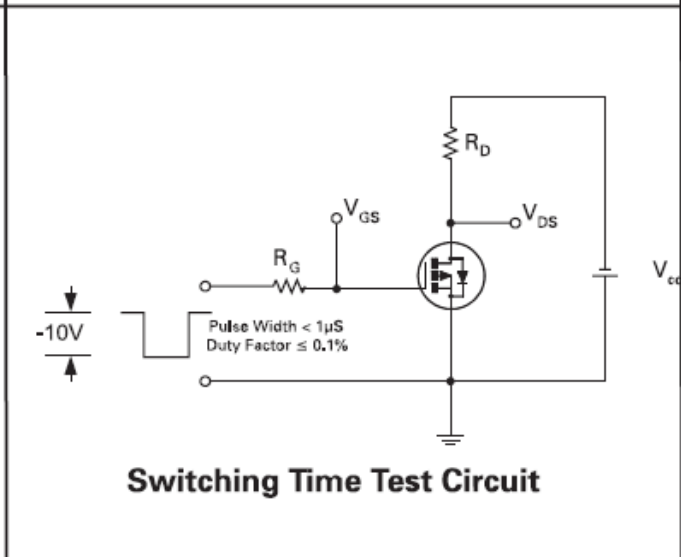
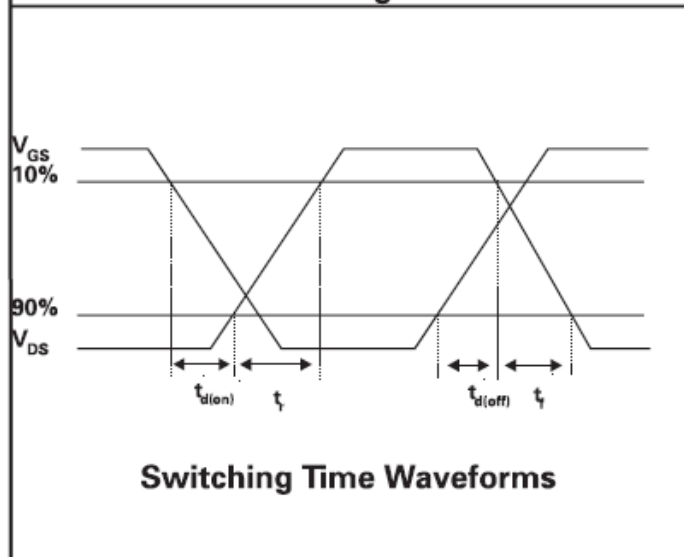
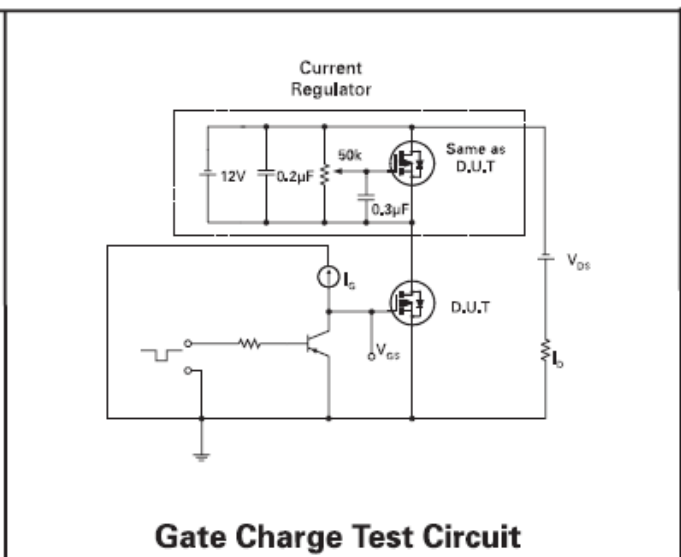
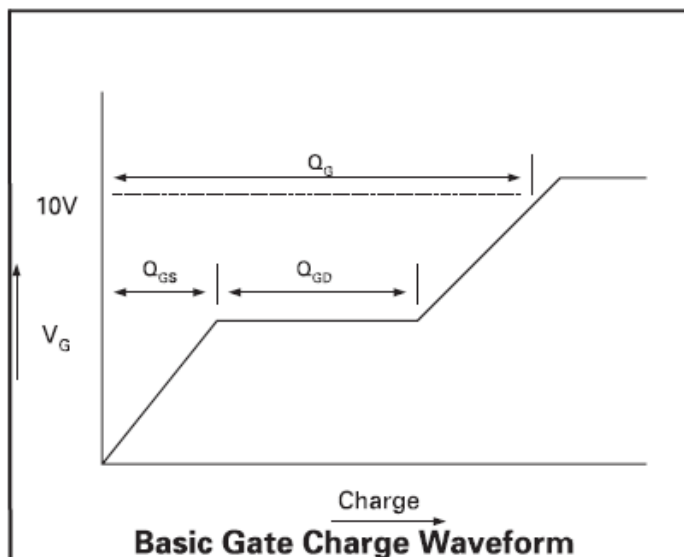
**Typical Characteristics**



**Typical Characteristics** (continued)

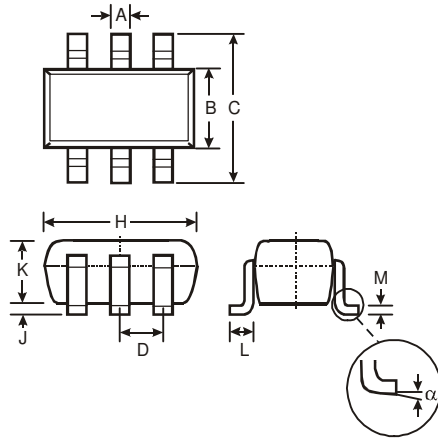


**Test Circuits**



**Package Outline Dimensions**

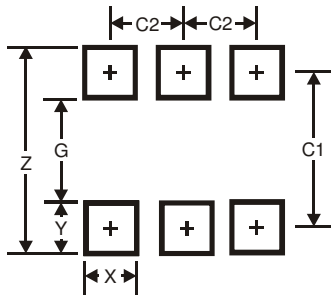
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
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)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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