

**250V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

<b>V<sub>(BR)DSS</sub></b>	<b>Max R<sub>DS(on)</sub></b>	<b>Max I<sub>D</sub></b> <b>T<sub>A</sub> = +25°C</b>
250V	8.5Ω @ V <sub>GS</sub> = 10V	230mA

**Description and Applications**

This 250V enhancement mode N-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 breakdowns. Applications benefiting from this device include a variety of Telecom and general high-voltage circuits.

SOT89 and SOT223 versions are also available.

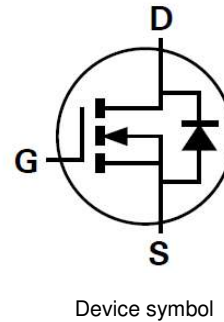
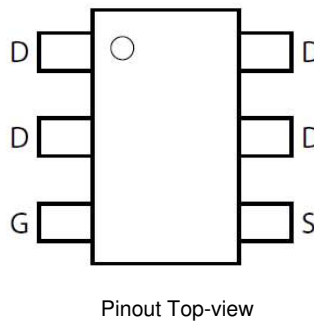
- Earth Recall and Dialing Switches
- Electronic Hook Switches
- High Voltage Power MOSFET Drivers
- Telecom Call Routers
- Solid State Relays

**Features and Benefits**

- High voltage
- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Complementary P-channel Type ZVP4525E6
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. 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: 0.015 grams (Approximate)

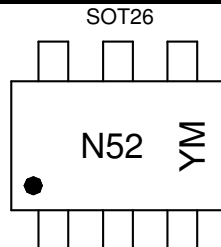


**Ordering Information** (Note 4)

Part Number	Reel Size (inch)	Tape Width (mm)	Quantity Per Reel
ZVN4525E6TA	7	8	3,000
ZVN4525E6TC	13	8	10,000

- 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>.

**Marking Information**



N52 = 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	2023	2024	2025	
Code	C	D	E	F	G	H	I	J	K	L	M	
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	I <sub>D</sub>	T <sub>A</sub> =+25°C (Note 4)	230
			T <sub>A</sub> =+70°C (Note 4)	183
Pulsed Drain Current (Note 6)		I <sub>DM</sub>	1.44	A
Continuous Source Current (Body Diode)		I <sub>S</sub>	1.1	A
Pulsed Source Current (Body Diode)		I <sub>SM</sub>	1.44	A

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

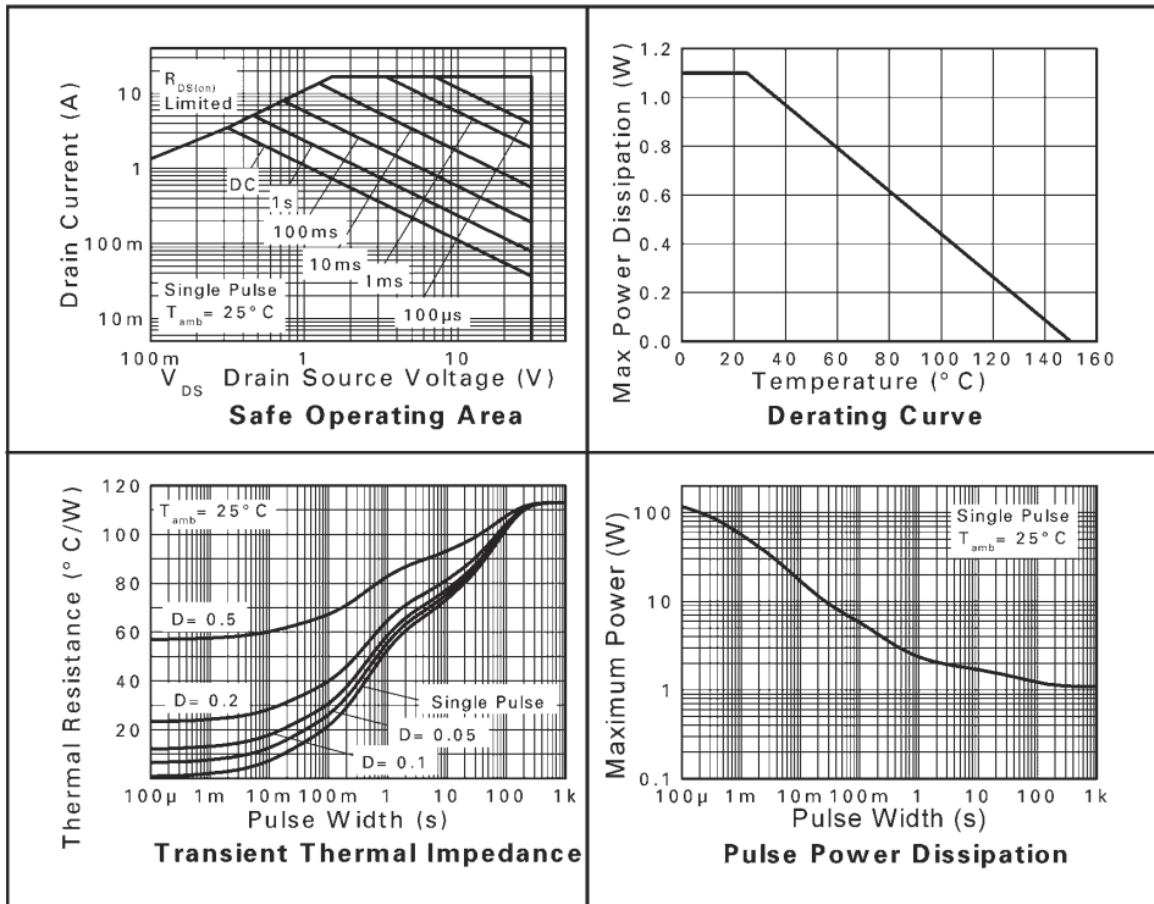
Characteristic	Symbol	Value	Unit
Power Dissipation at T <sub>A</sub> =+25°C (Note 4)	P <sub>D</sub>	1.1	W
Linear Derating Factor		8.8	mW/°C
Junction to Ambient (Note 4)	R <sub>θJA</sub>	113	°C/W
Junction to Ambient (Note 5)	R <sub>θJA</sub>	65	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
4. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  5. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
  6. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal.

**NB High Voltage Applications**

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

**Thermal Characteristics**

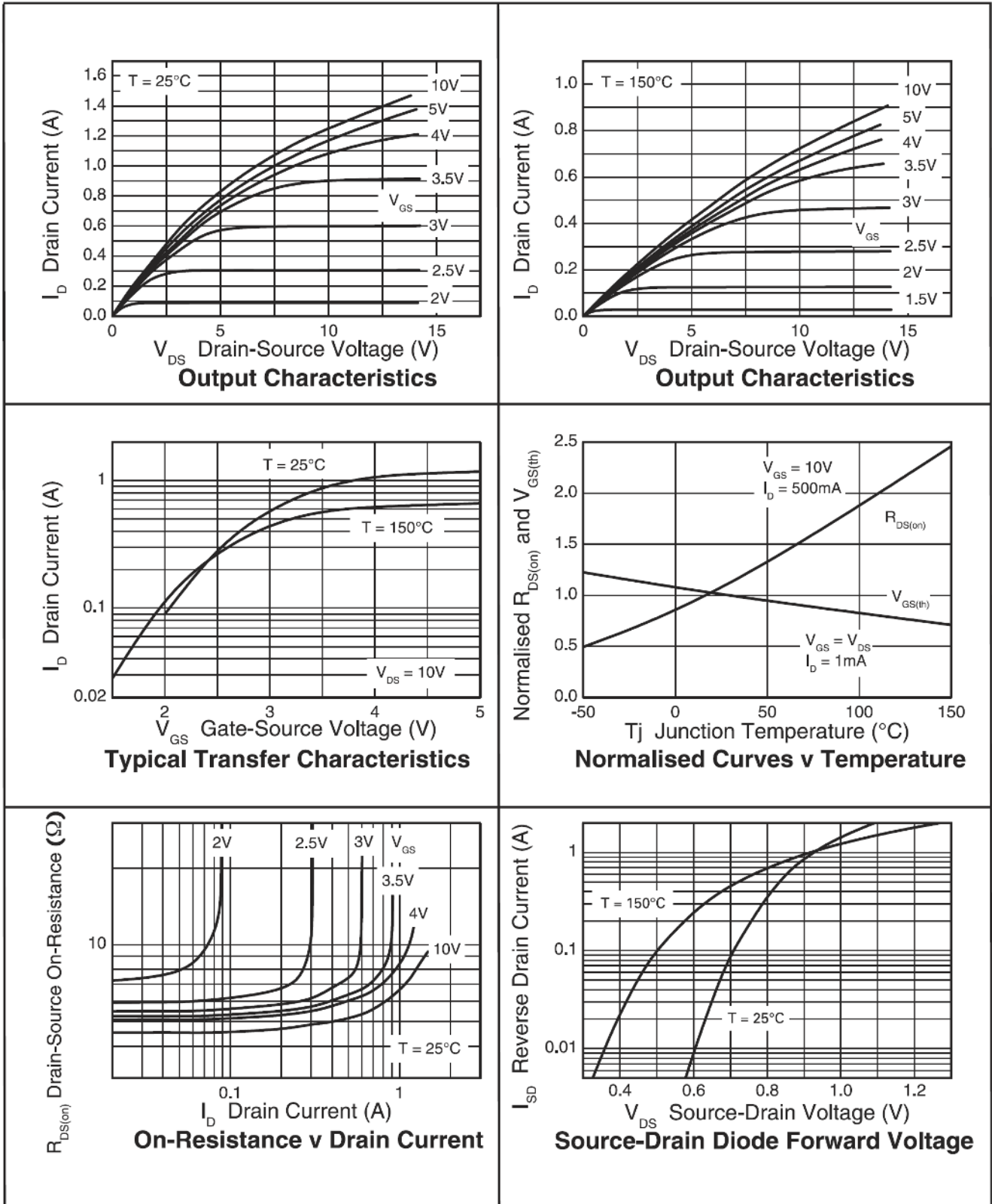


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

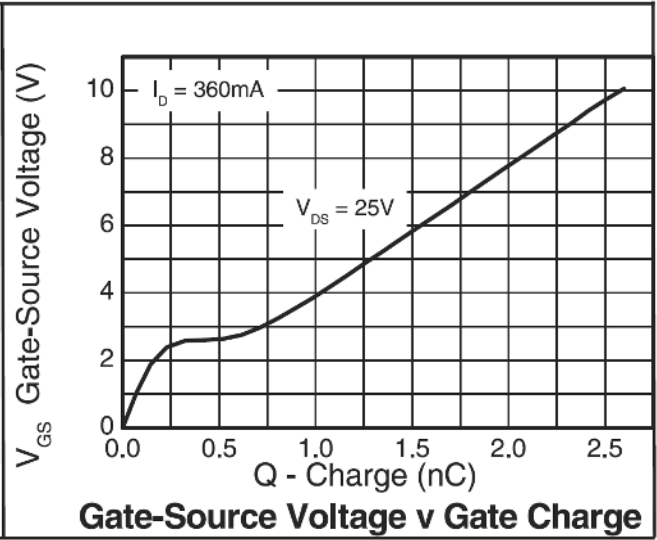
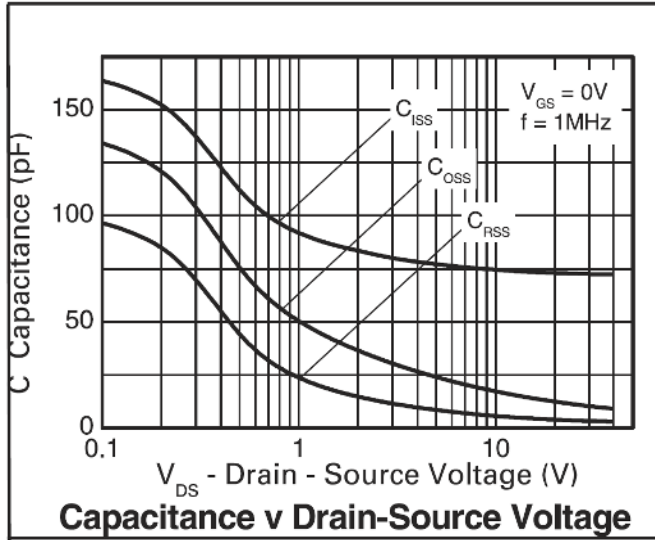
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	250	285	-	V	$I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	35	500	$\mu\text{A}$	$V_{DS} = 250\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$		$\pm 1$	100	nA	$V_{GS} = \pm 40\text{V}$ , $V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.8	1.4	1.8	V	$I_D = 1\text{mA}$ , $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance (Note 7)	$R_{DS(on)}$	-	5.6	8.5	$\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 500\text{mA}$
			5.9	9.0	$\Omega$	$V_{GS} = 4.5\text{V}$ , $I_D = 360\text{mA}$
			6.4	9.5	$\Omega$	$V_{GS} = 2.4\text{V}$ , $I_D = 20\text{mA}$
Forward Transconductance (Note 9)	$g_{fs}$	0.3	0.475	-	S	$V_{DS} = 10\text{V}$ , $I_D = 0.3\text{A}$
Diode Forward Voltage (Note 7)	$V_{SD}$			0.97	V	$T_J = +25^\circ\text{C}$ , $I_S = 360\text{mA}$ , $V_{GS} = 0\text{V}$
<b>DYNAMIC CHARACTERISTICS</b> (Notes 8 & 9)						
Input Capacitance	$C_{iss}$	-	72	-	pF	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	-	11	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	3.6	-	pF	
Total Gate Charge	$Q_g$	-	2.6	3.65	nC	$V_{GS} = 10\text{V}$ , $V_{DS} = 25\text{V}$ $I_D = 360\text{mA}$ (refer to test circuit)
Gate-Source Charge	$Q_{gs}$	-	0.2	0.28	nC	
Gate-Drain Charge	$Q_{gd}$	-	0.5	0.7	nC	
Reverse Recovery Time (Note 9)	$t_{rr}$	-	186	260	ns	$T_J = +25^\circ\text{C}$ , $I_F = 360\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (Note 9)	$Q_{rr}$	-	34	48	nC	
Turn-On Delay Time	$t_{d(on)}$	-	1.25	-	ns	$V_{DD} = 30\text{V}$ , $V_{GS} = 10\text{V}$ $I_D = 360\text{mA}$ , $R_G = 50\Omega$ (refer to test circuit)
Turn-On Rise Time	$t_r$	-	1.7	-	ns	
Turn-Off Delay Time	$t_{d(off)}$	-	11.40	-	ns	
Turn-Off Fall Time	$t_f$	-	3.5	-	ns	

- Notes:
7. Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
  8. Switching characteristics are independent of operating junction temperature.
  9. For design aid only, not subject to production testing.

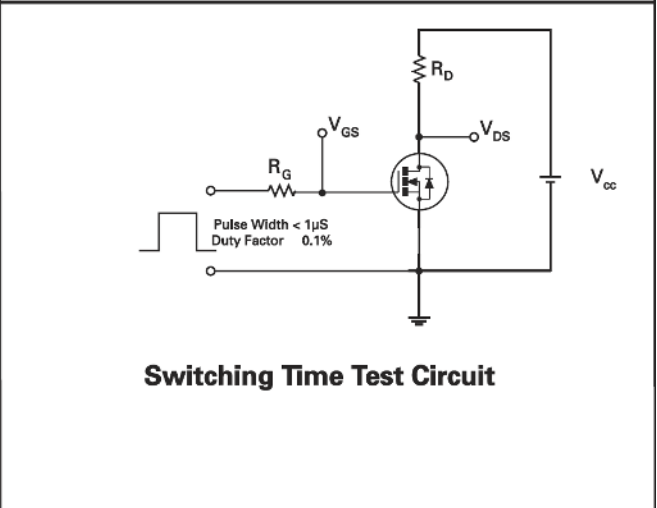
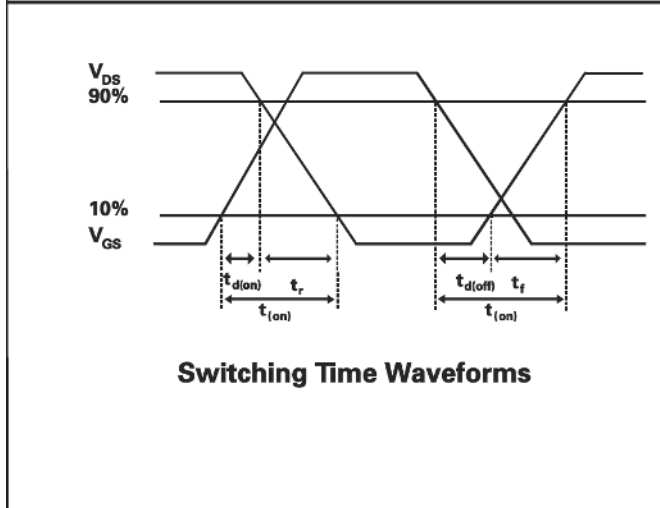
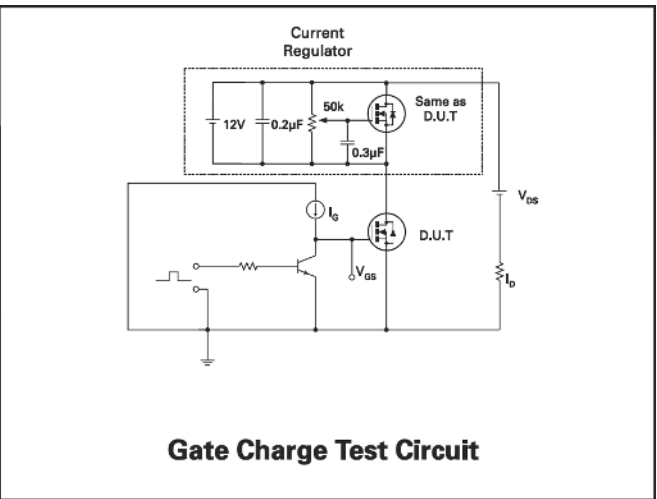
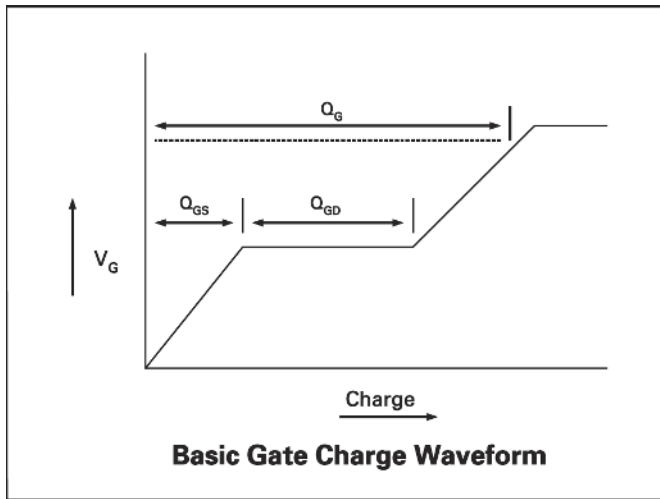
**Typical Characteristics**



**Typical Characteristics** (continued)

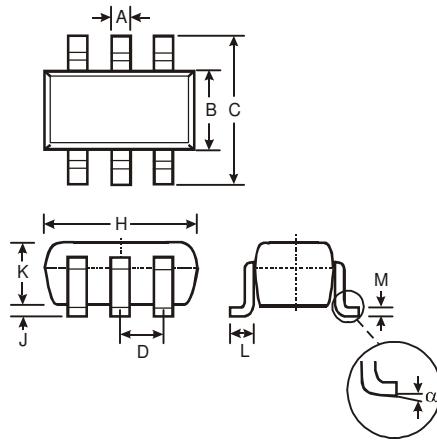


**Test Circuits**



**Package Outline Dimensions**

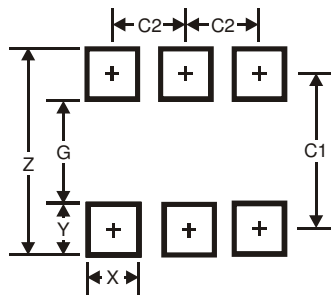
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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