

250V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D $T_A = +25^\circ C$
250V	8.5Ω @ $V_{GS} = 10V$	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.

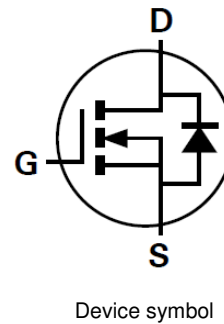
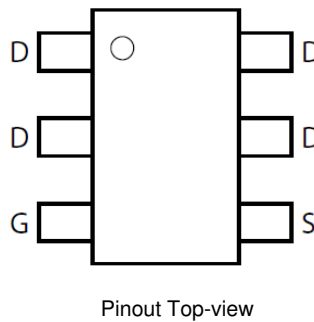
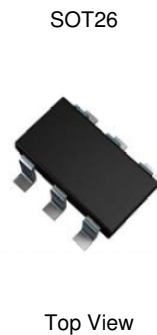
- Earth Recall and Dialing Switches
- Electronic Hook Switches
- High Voltage Power MOSFET Drivers
- Telecom Call Routers
- Solid State Relays

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)

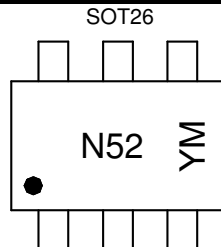


Ordering Information (Note 4)

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 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_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V _{DSS}	250	V	
Gate-Source Voltage		V _{GS}	±40	V	
Continuous Drain Current	V _{GS} = 10V	I _D	T _A =+25°C (Note 4)	230	mA
			T _A =+70°C (Note 4)	183	
Pulsed Drain Current (Note 6)		I _{DM}	1.44	A	
Continuous Source Current (Body Diode)		I _S	1.1	A	
Pulsed Source Current (Body Diode)		I _{SM}	1.44	A	

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

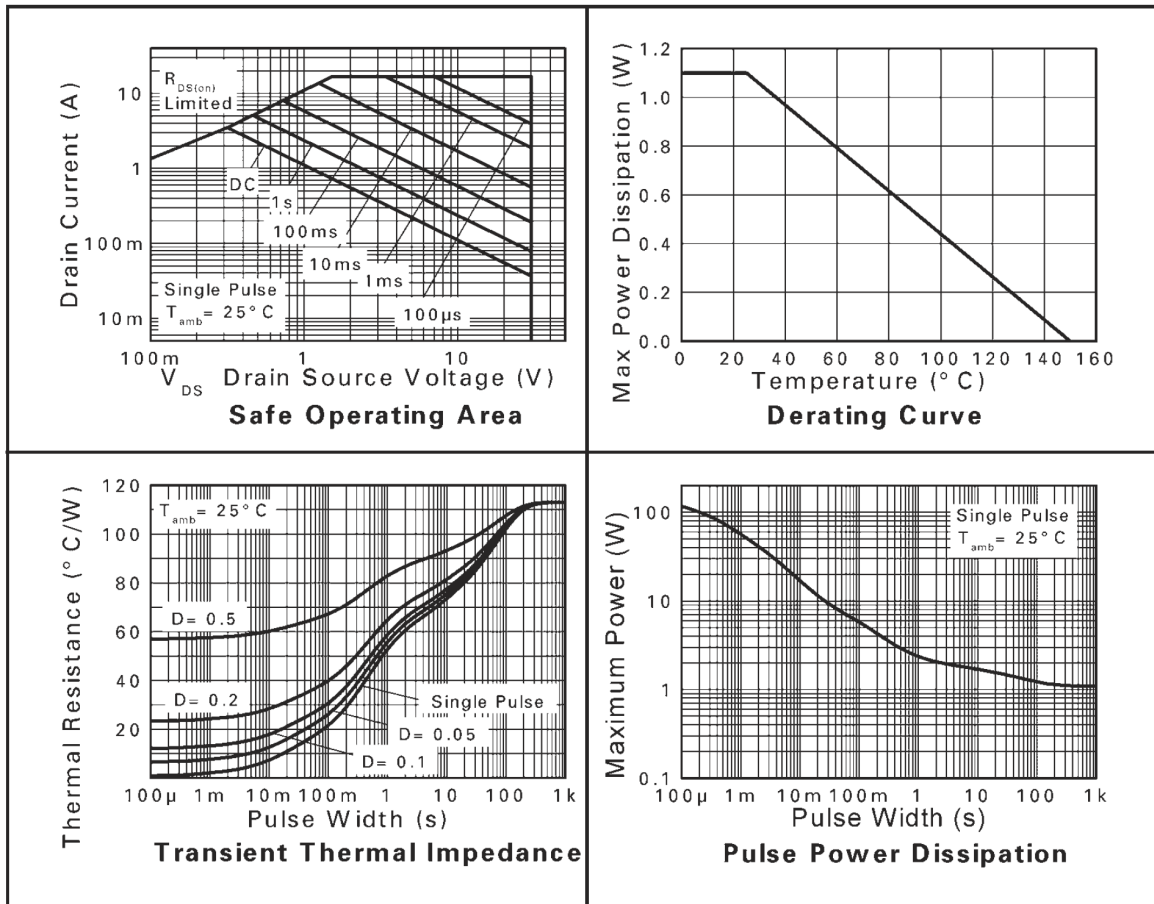
Characteristic	Symbol	Value	Unit
Power Dissipation at T _A =+25°C (Note 4)	P _D	1.1	W
Linear Derating Factor		8.8	mW/°C
Junction to Ambient (Note 4)	R _{θJA}	113	°C/W
Junction to Ambient (Note 5)	R _{θJA}	65	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- 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

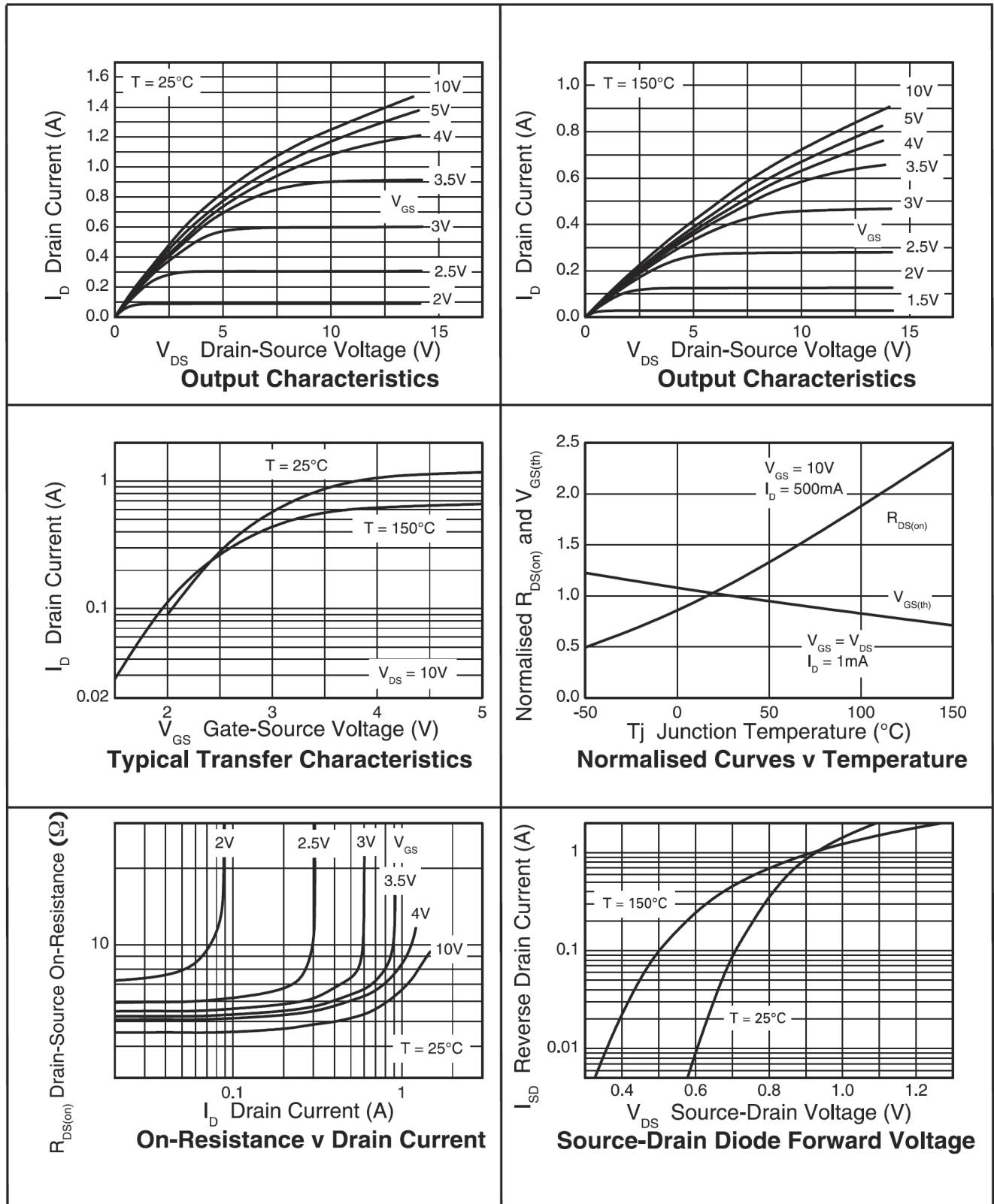


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

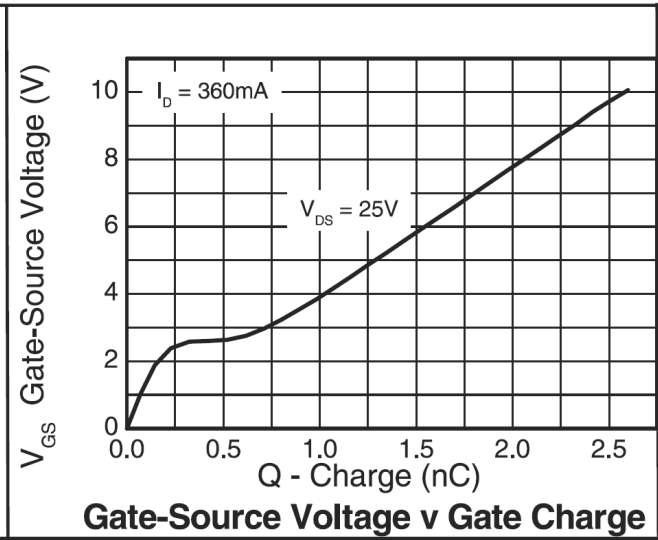
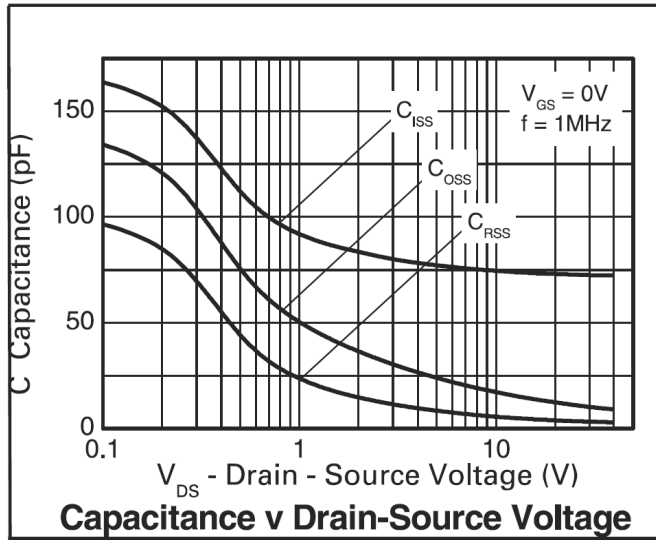
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	250	285	-	V	$I_D = 1\text{mA}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	35	500	μA	$V_{DS} = 250\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}		± 1	100	nA	$V_{GS} = \pm 40\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
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	Ω	$V_{GS} = 10\text{V}, I_D = 500\text{mA}$
			5.9	9.0	Ω	$V_{GS} = 4.5\text{V}, I_D = 360\text{mA}$
			6.4	9.5	Ω	$V_{GS} = 2.4\text{V}, I_D = 20\text{mA}$
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	$T_J = +25^\circ\text{C}, I_S = 360\text{mA}, V_{GS} = 0\text{V}$
DYNAMIC CHARACTERISTICS (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 μs . Duty cycle $\leq 2\%$.
 8. Switching characteristics are independent of operating junction temperature.
 9. For design aid only, not subject to production testing.

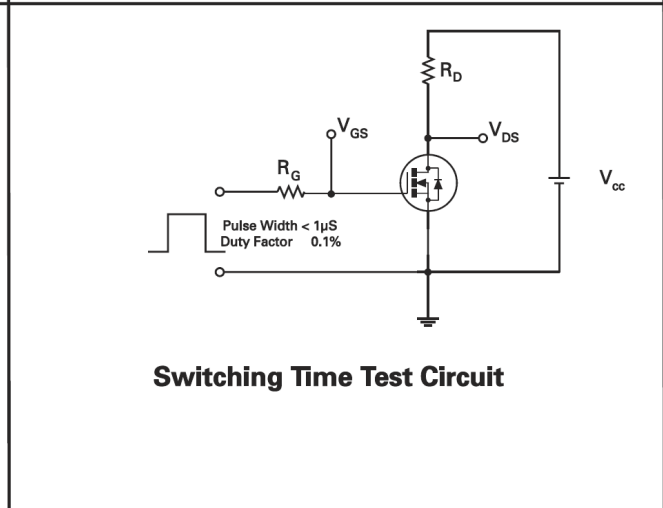
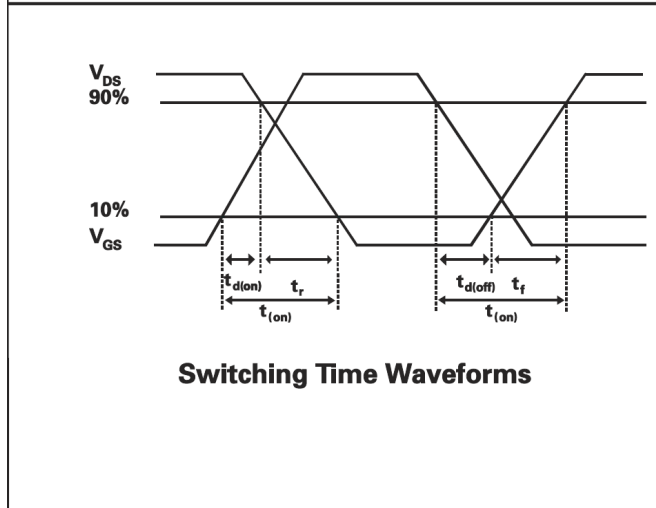
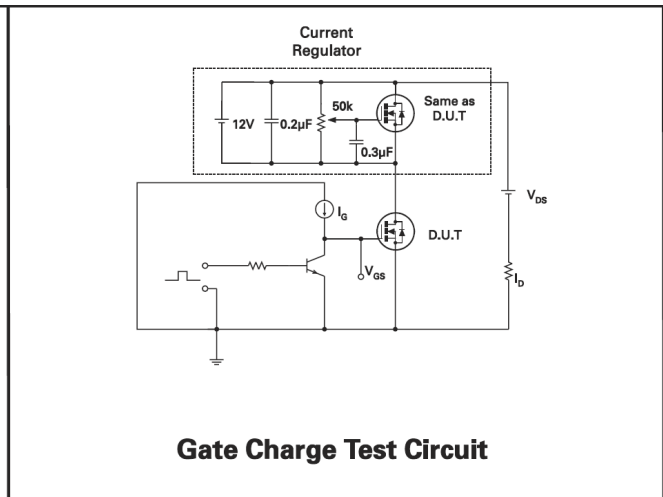
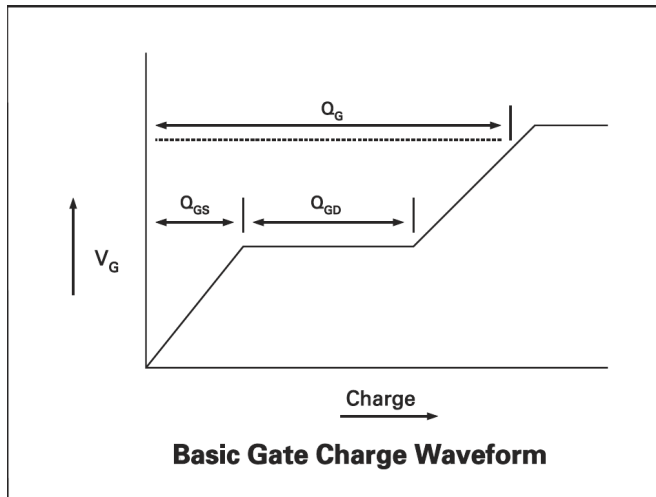
Typical Characteristics



Typical Characteristics (continued)

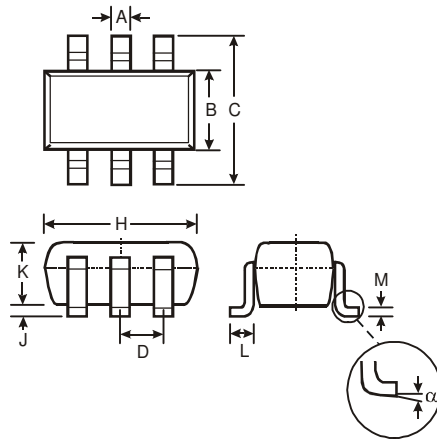


Test Circuits



Package Outline Dimensions

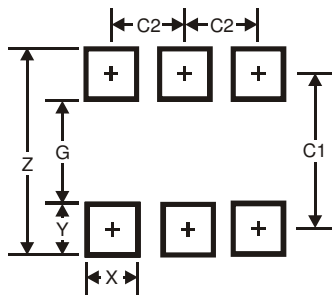
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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