

## Product Summary

$V_{(BR)DSS}$	Max $R_{DS(ON)}$	Package	Max $I_D$ $T_A = +25^\circ C$
-30V	0.21 $\Omega$ @ $V_{GS} = -10V$	SOT23	-1.6A
	0.33 $\Omega$ @ $V_{GS} = -4.5V$		-1.1A

## Description

This new generation of trench MOSFETs utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, and power management applications.

## Applications

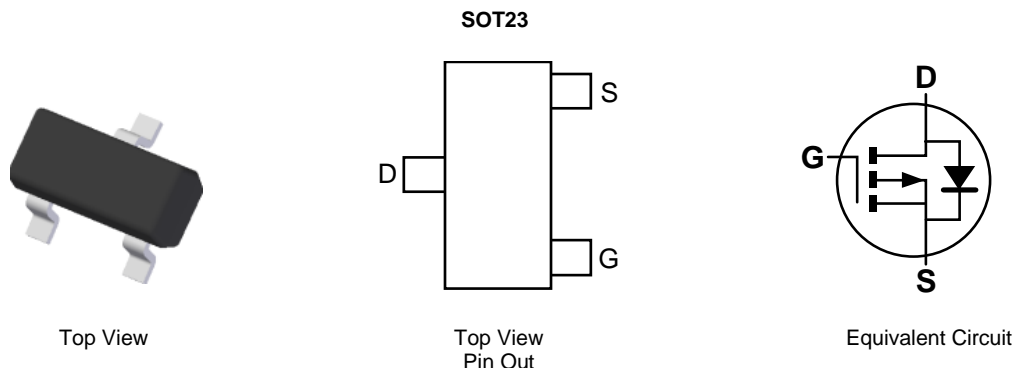
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

## Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **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: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.008 grams (Approximate)

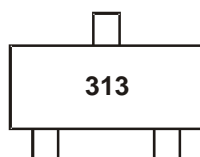


## Ordering Information (Note 4)

Part Number	Compliance	Case	Quantity per Reel
ZXMP3A13FTA	Standard	SOT23	3,000
ZXMP3A13FTC	Standard	SOT23	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/products/packages.html>.

## Marking Information



313 = Product Type Marking Code

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

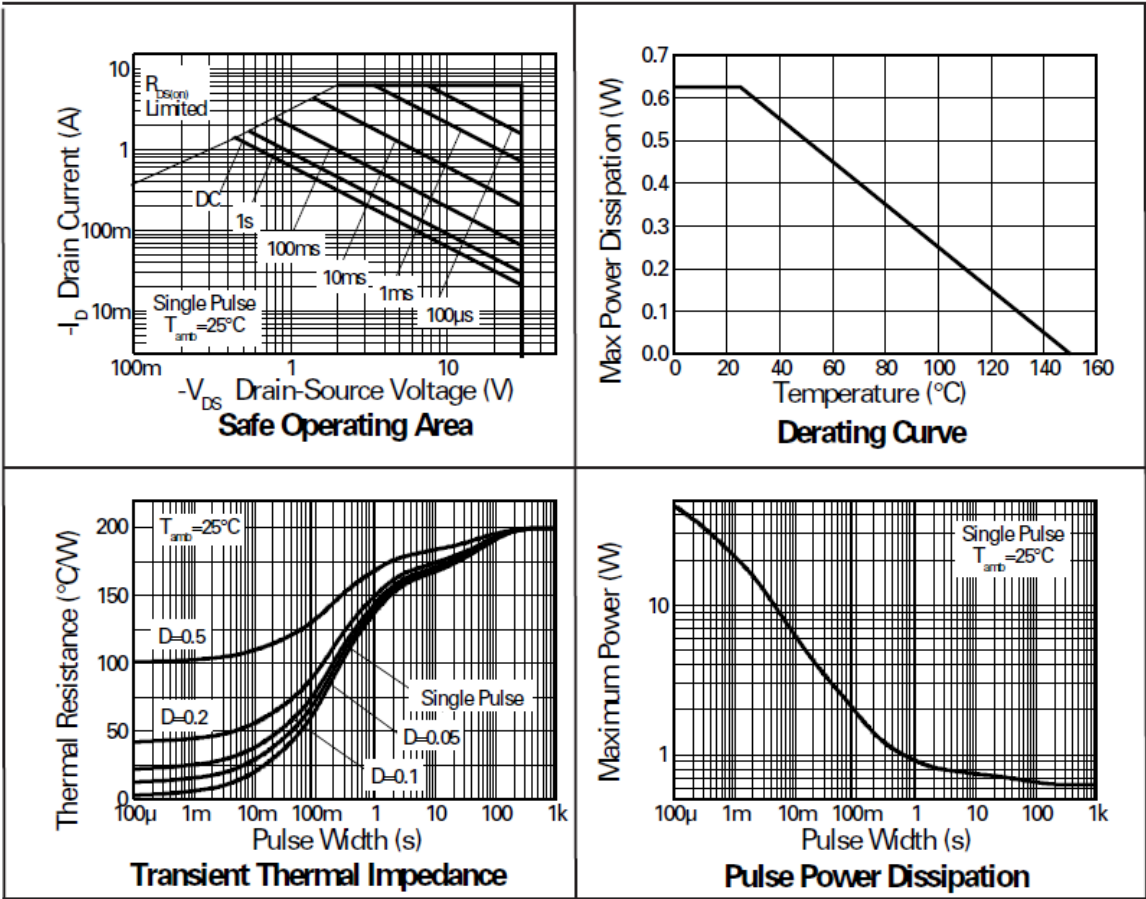
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 10V	(Note 6)	I <sub>D</sub>	-1.6	A
		(Note 6)		-1.3	
		(Note 5)		-1.4	
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	-6	A
Continuous Source Current (Body Diode) (Note 6)			I <sub>S</sub>	-1.2	A
Pulsed Source Current (Body Diode) (Note 7)			I <sub>SM</sub>	-6	A

### Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		P <sub>D</sub>	625	mW
Linear Derating Factor			5	mW/°C
Power Dissipation (Note 6)		P <sub>D</sub>	806	mW
Linear Derating Factor			6.4	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)		R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)		R <sub>θJA</sub>	155	°C/W
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 FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
  6. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
  7. Repetitive rating 25mm x 25mm FR4 PCB, D=0.05 pulse width=10μs - pulse current limited by maximum junction temperature.

**Thermal Characteristics**

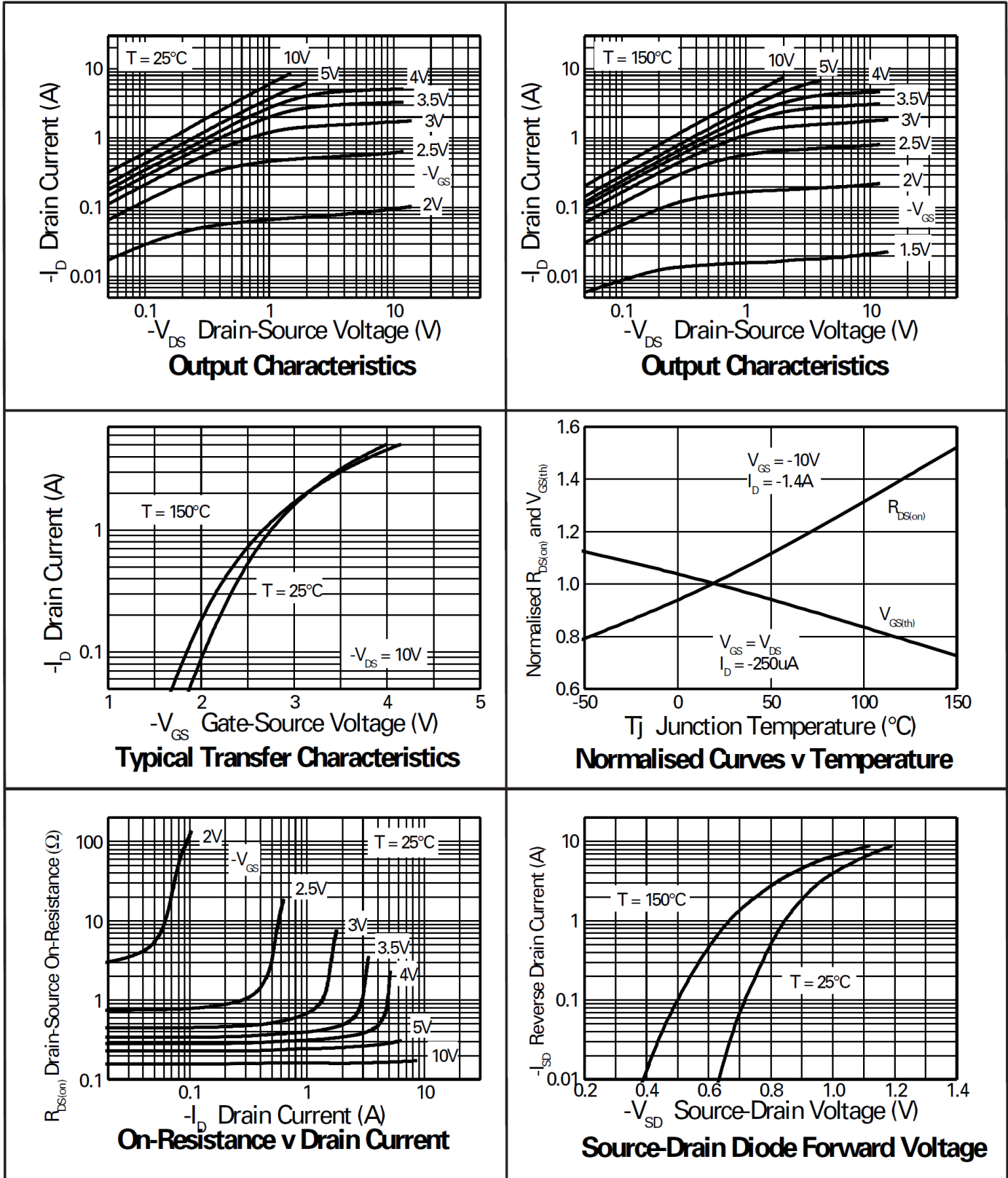


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

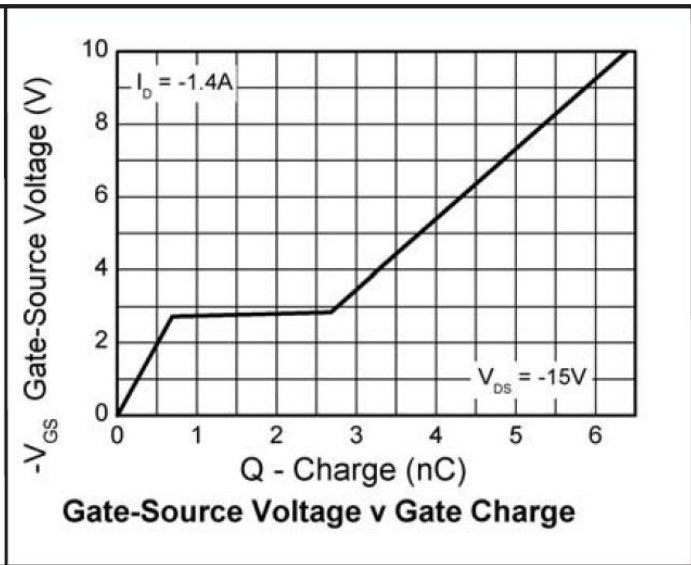
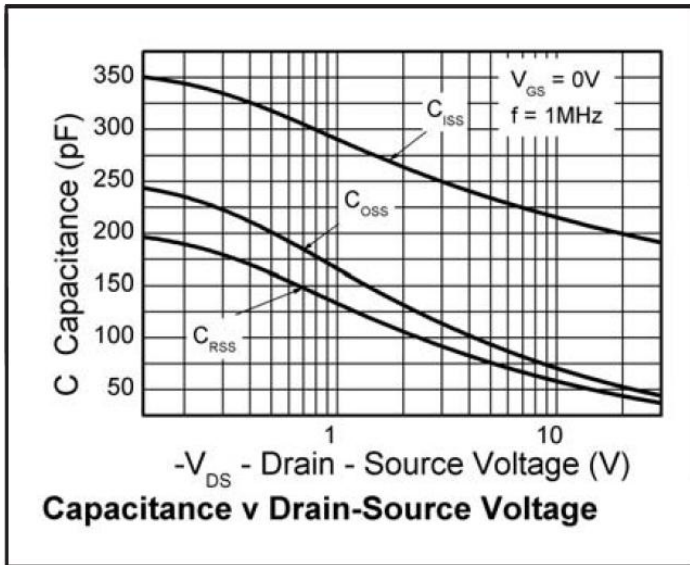
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	—	—	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(ON)</sub>	—	—	0.21	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.4A
				0.33		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.1A
Forward Transconductance (Notes 8 & 10)	g <sub>fs</sub>	—	2.4	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -1.4A
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	C <sub>iSS</sub>	—	206	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	59.3	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	49.2	—		
<b>SWITCHING</b> (Notes 9 & 10)						
Turn-On Delay Time	t <sub>d(ON)</sub>	—	1.5	—	nS	V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.0A, R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = -10V
Rise Time	t <sub>R</sub>	—	3.0	—		
Turn-Off Delay Time	t <sub>d(OFF)</sub>	—	11.1	—		
Fall Time	t <sub>f</sub>	—	7.6	—		
Gate Charge	Q <sub>g</sub>	—	3.8	—	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -5.0V, I <sub>D</sub> = -1.4A
Total Gate Charge	Q <sub>g</sub>	—	6.4	—	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.4A
Gate-Source Charge	Q <sub>gs</sub>	—	0.69	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	2.0	—		
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	-0.85	-0.95	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = -1.1A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 10)	t <sub>RR</sub>	—	15.6	—	nS	T <sub>J</sub> = +25°C, I <sub>F</sub> = -0.95A,
Reverse Recovery Charge (Note 10)	Q <sub>RR</sub>	—	9.6	—	nC	di/dt = 100A/μs

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

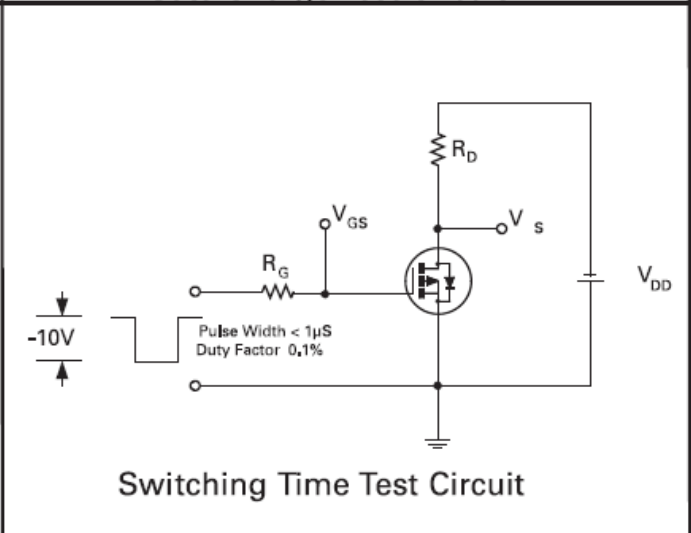
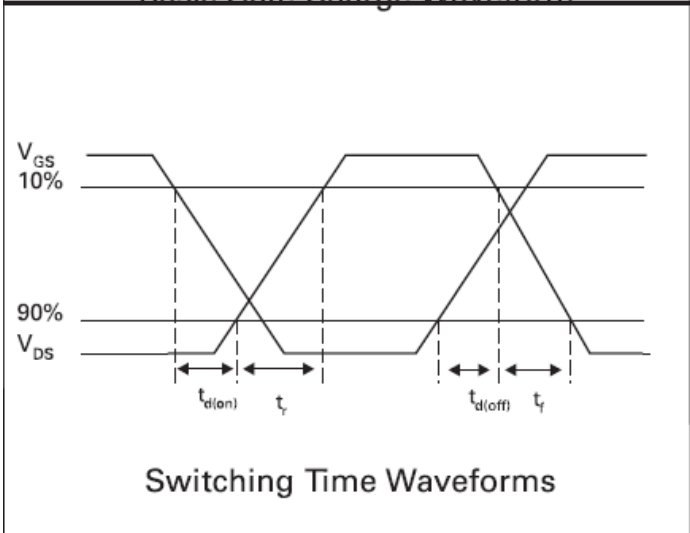
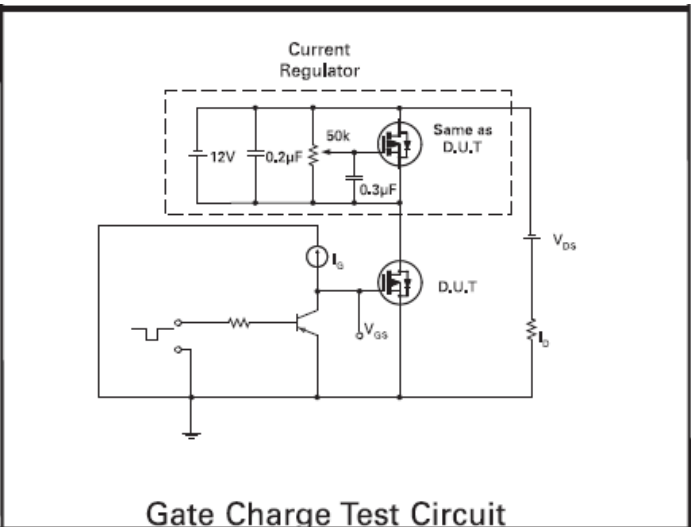
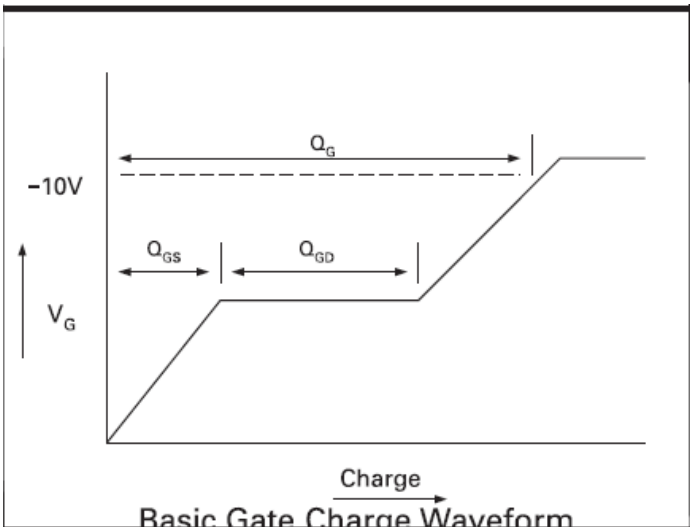
**Typical Characteristics**



**Typical Characteristics** (Continued)



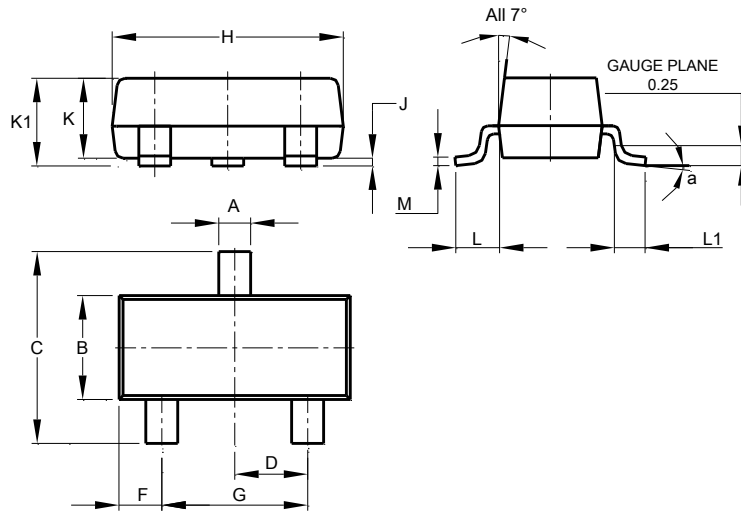
**Test Circuits**



**Package Outline Dimensions**

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

**SOT23**

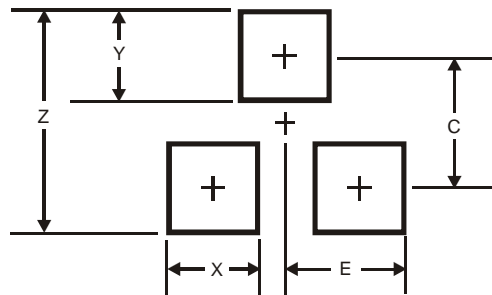


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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