

Product Summary

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

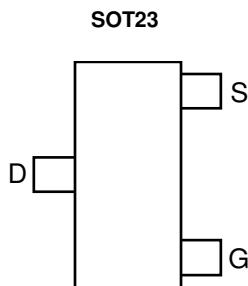
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

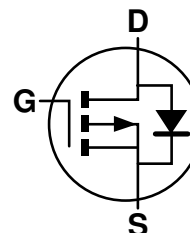
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.008 grams (Approximate)



Top View



Top View
Pin Out



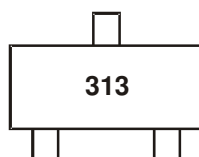
Equivalent Circuit

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

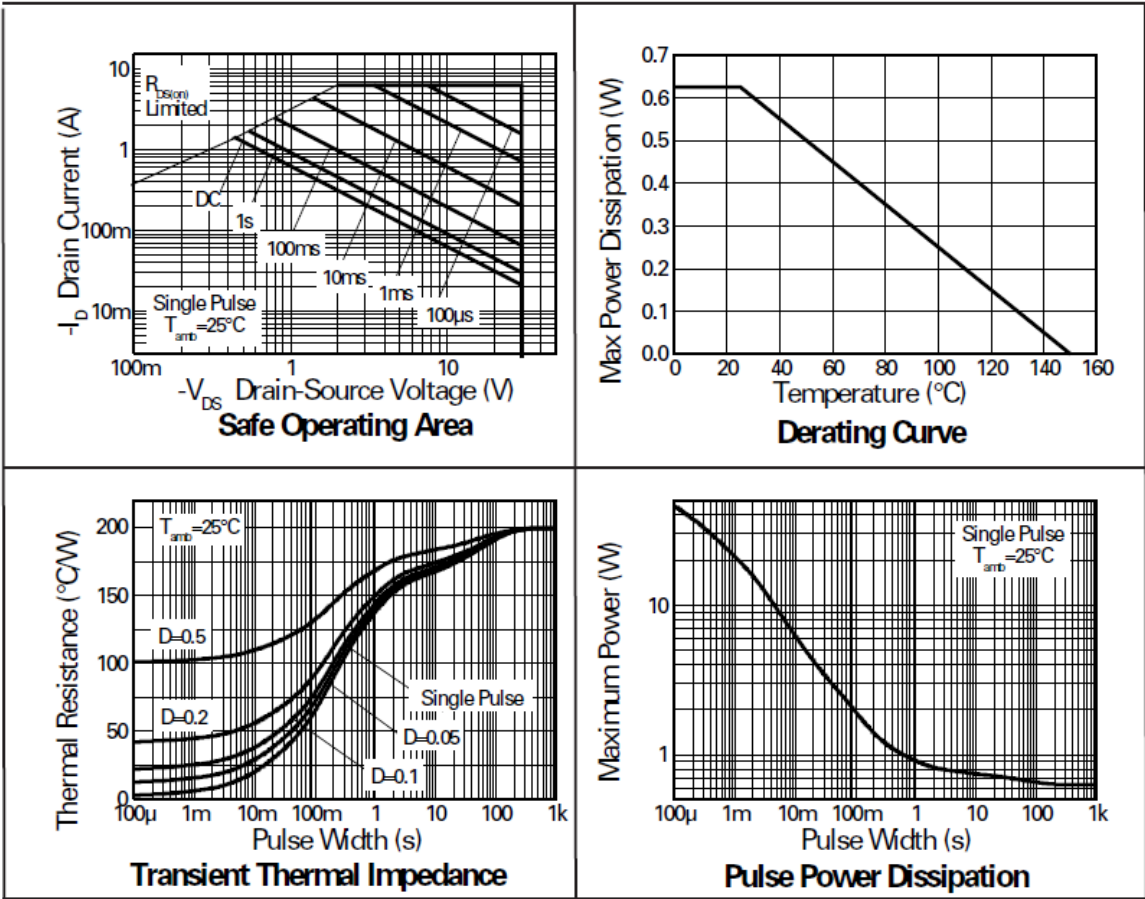
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	(Note 6)	I _D	-1.6	A
		(Note 6)		-1.3	
		(Note 5)		-1.4	
Pulsed Drain Current (Note 7)			I _{DM}	-6	A
Continuous Source Current (Body Diode) (Note 6)			I _S	-1.2	A
Pulsed Source Current (Body Diode) (Note 7)			I _{SM}	-6	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		P _D	625	mW
Linear Derating Factor			5	mW/°C
Power Dissipation (Note 6)		P _D	806	mW
Linear Derating Factor			6.4	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)		R _{θJA}	155	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-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

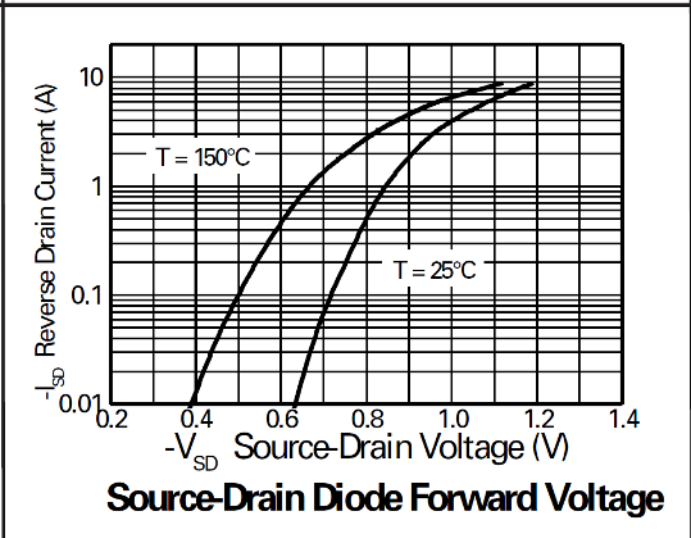
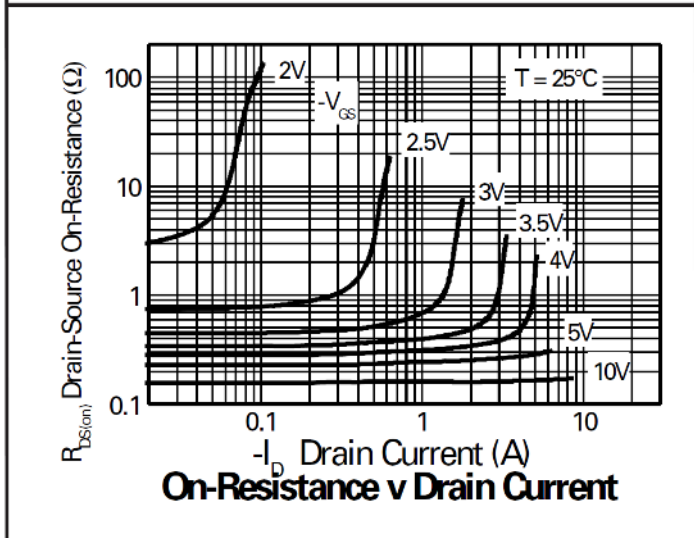
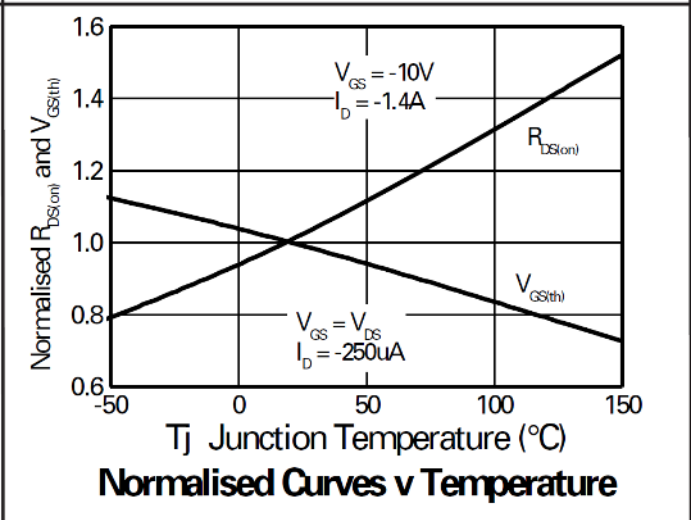
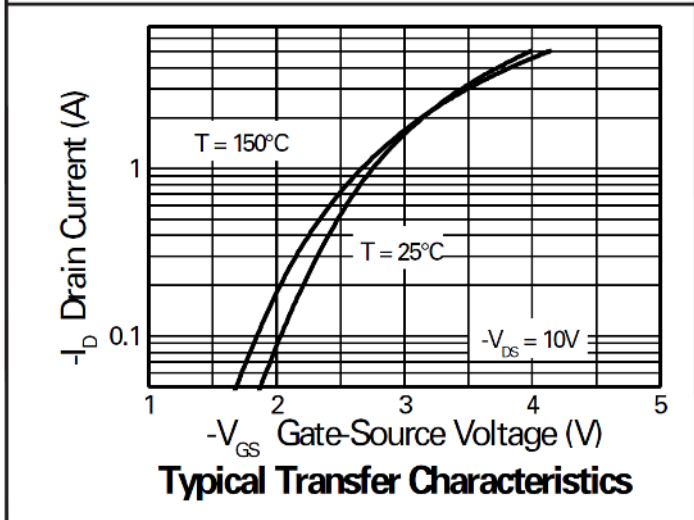
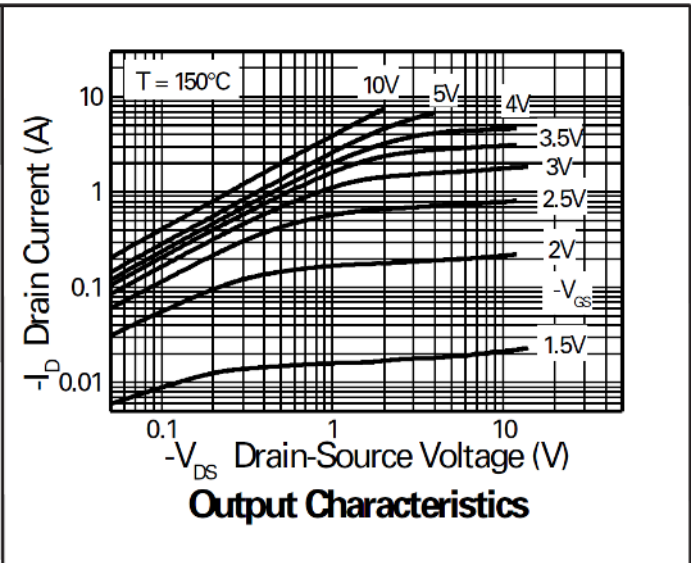
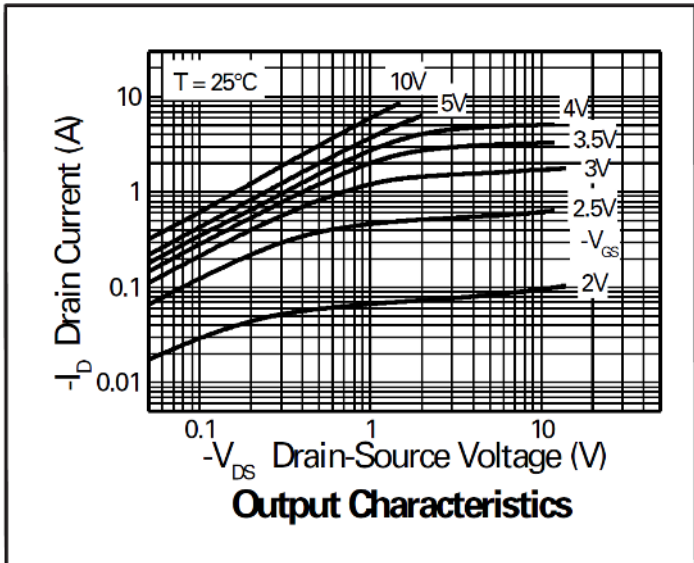


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

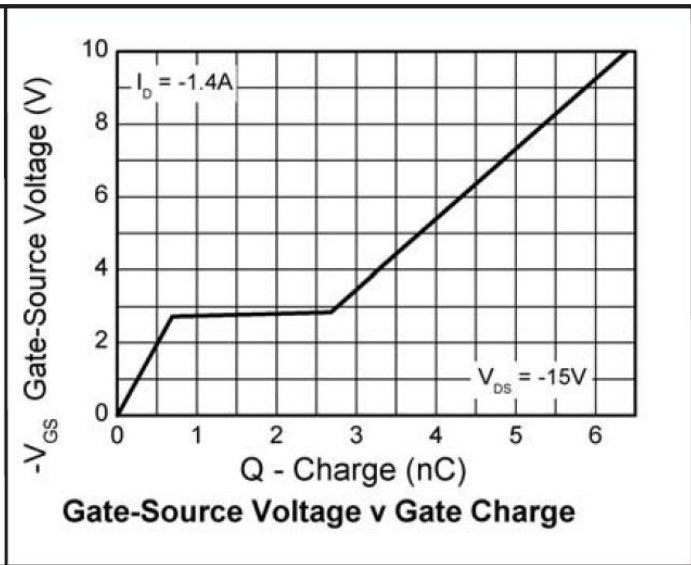
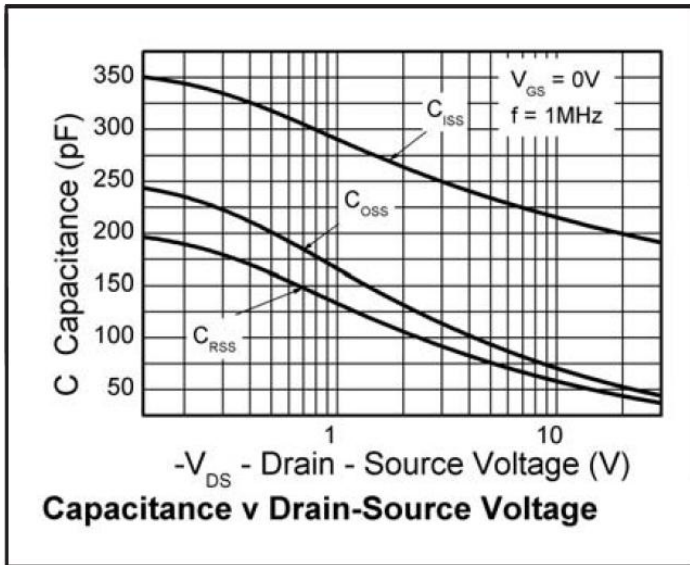
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-0.5	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS}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

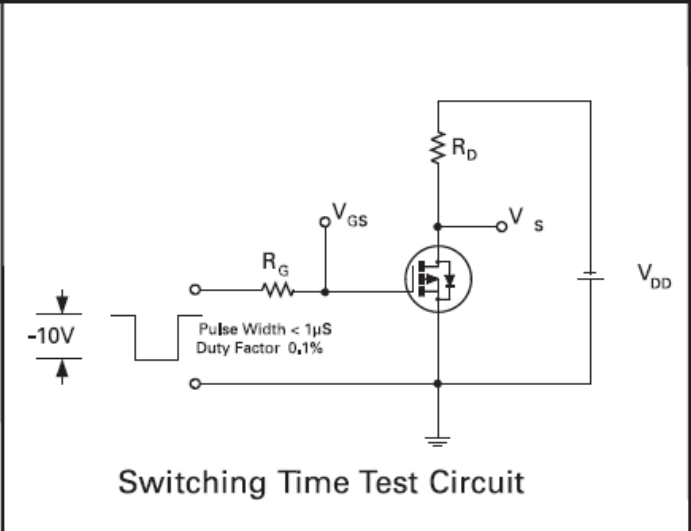
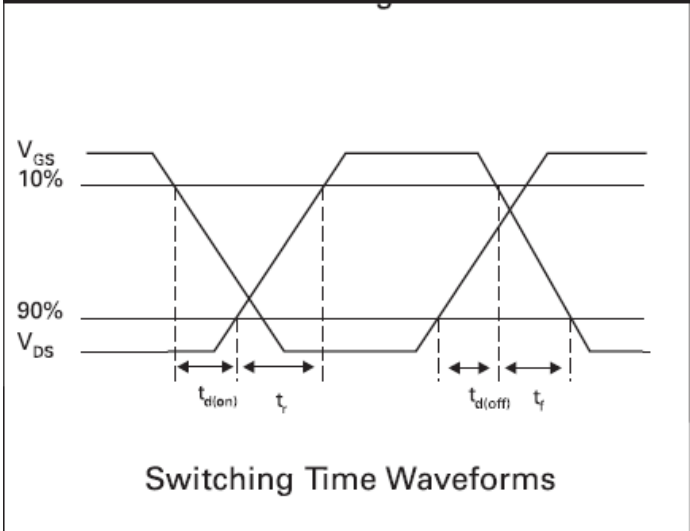
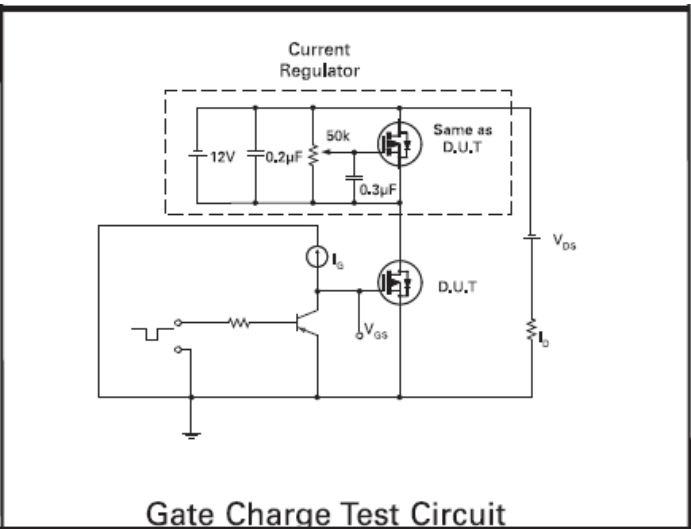
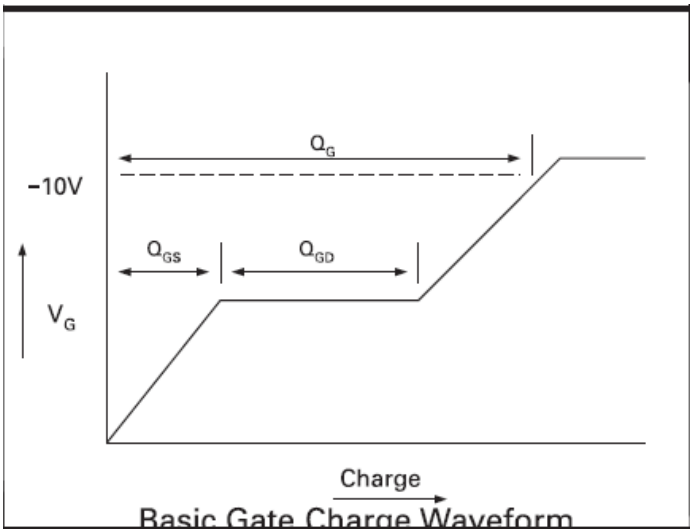
Typical Characteristics



Typical Characteristics (Continued)



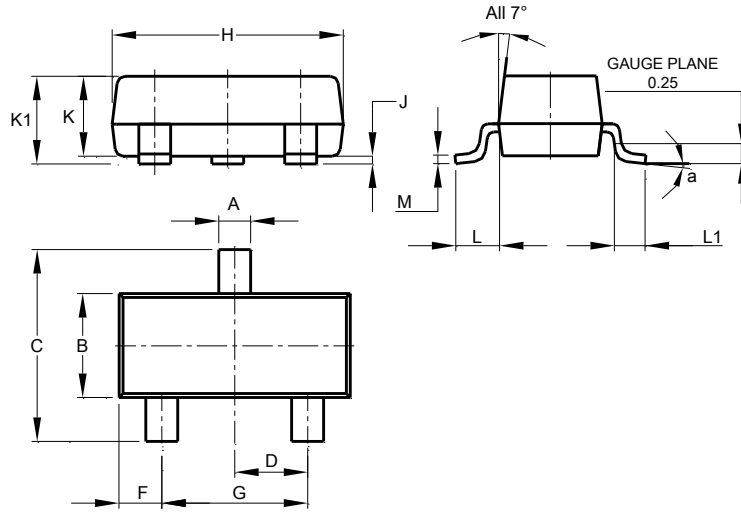
Test Circuits



Package Outline Dimensions

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

SOT23

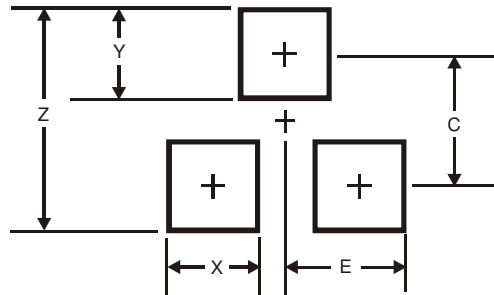


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

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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