

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.

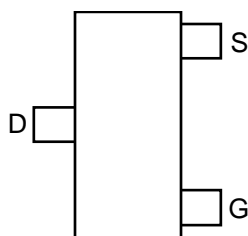
Applications

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

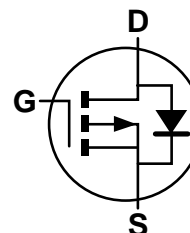


Top View

SOT23



Top View
Pin Out



Equivalent Circuit

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

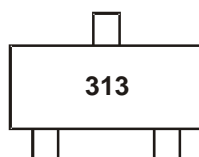
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.008 grams (Approximate)

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 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.)

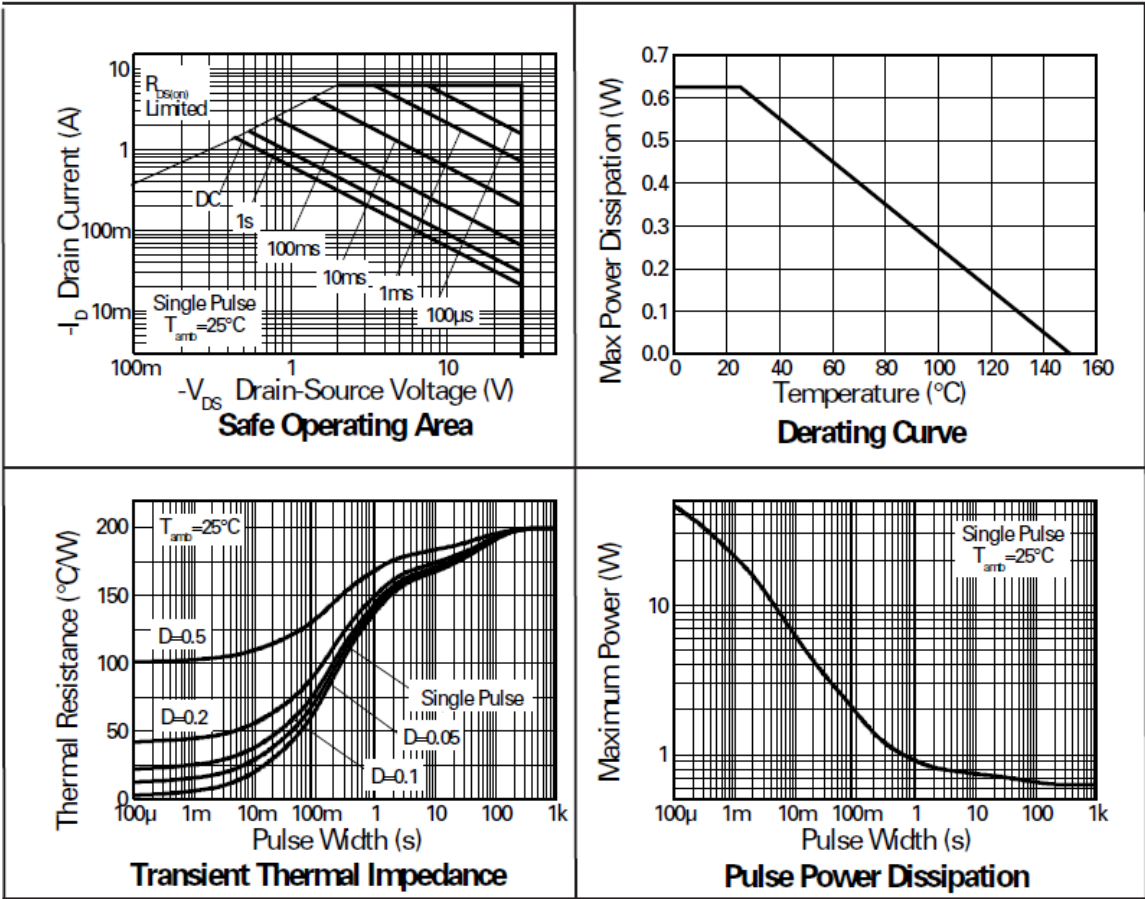
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	(Note 6)	I _D	-1.6	A
		(Note 6)		-1.3	
		(Note 5)		-1.4	
Pulsed Drain Current (Note 7)			I _{DM}	-6	A
Continuous Source Current (Body Diode) (Note 6)		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

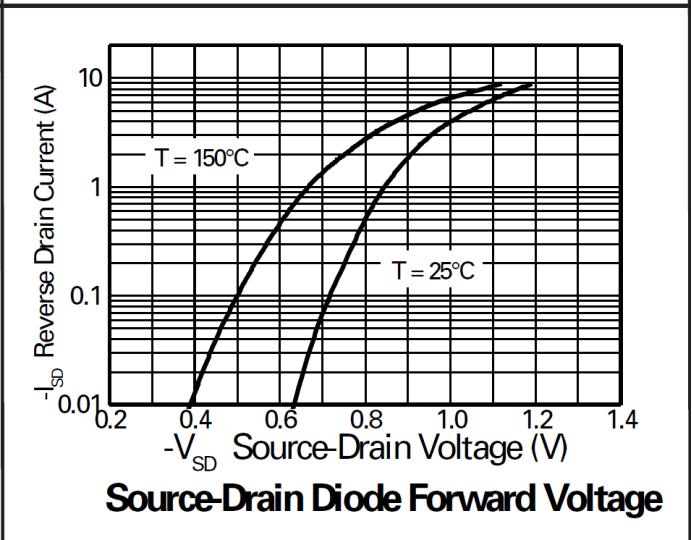
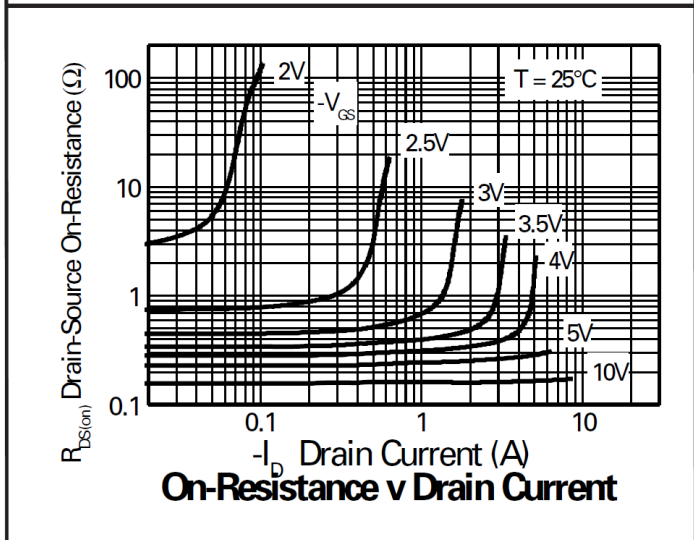
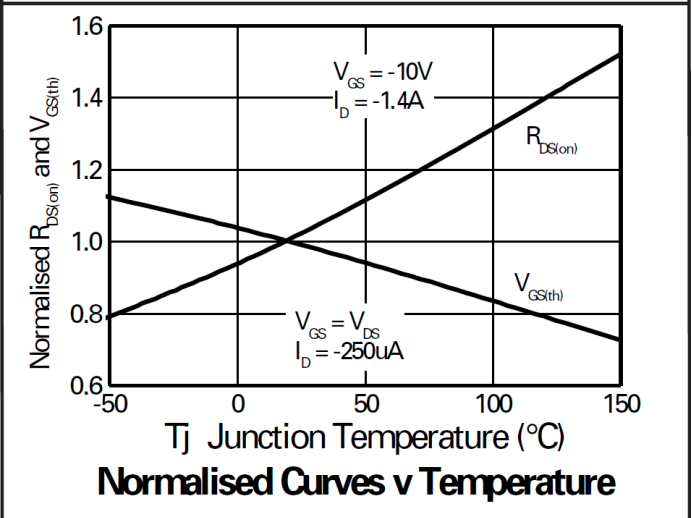
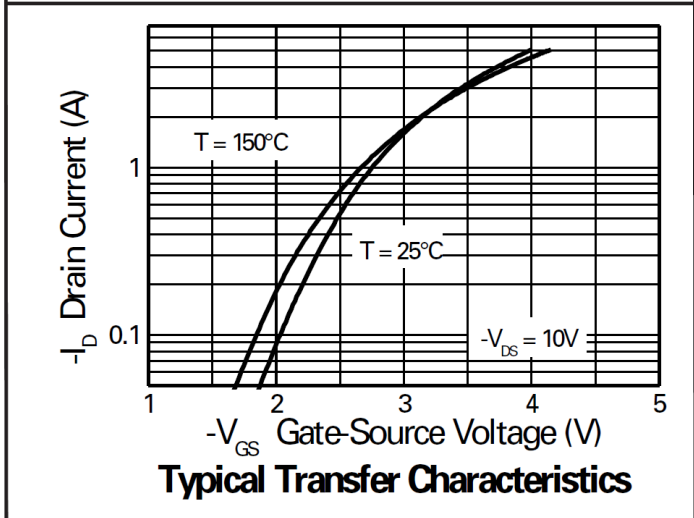
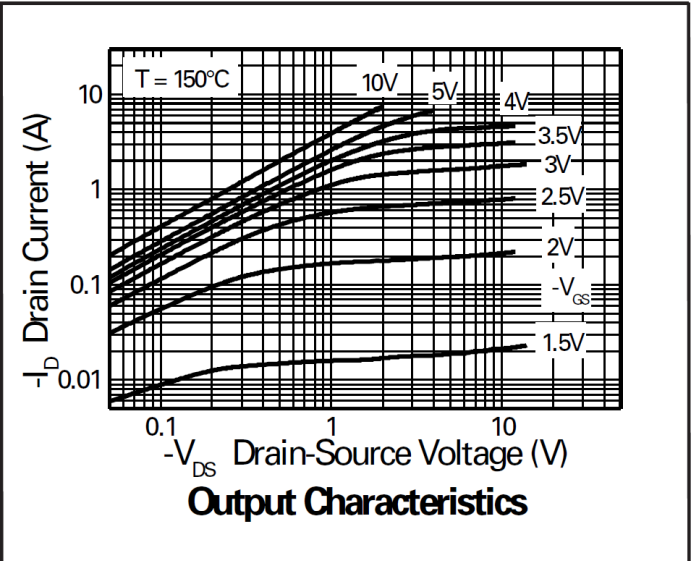
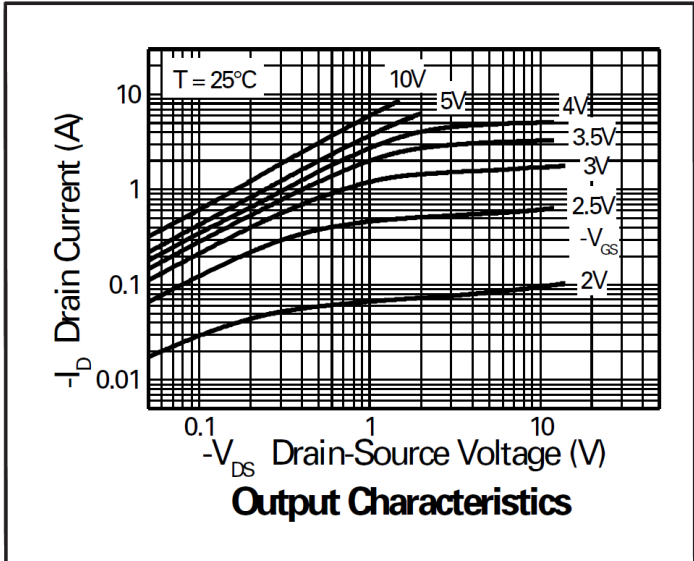


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

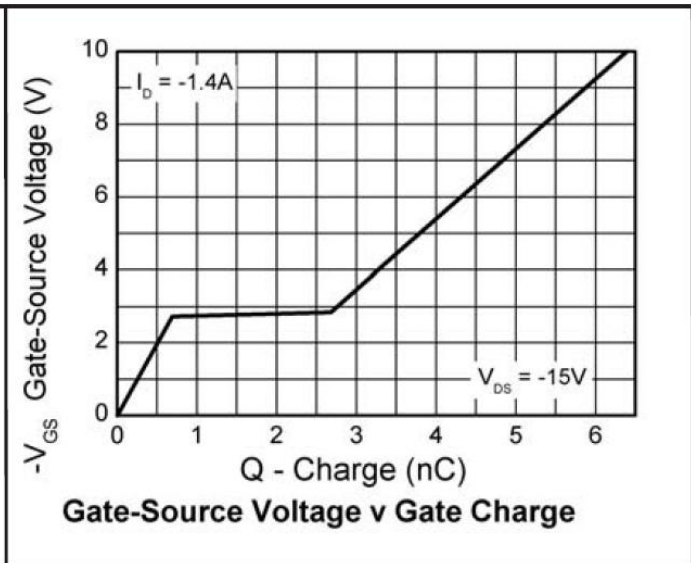
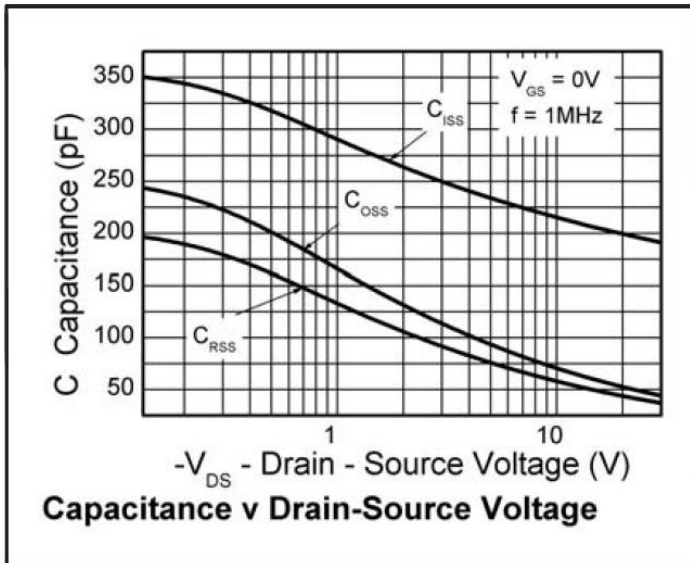
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-0.5	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 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.

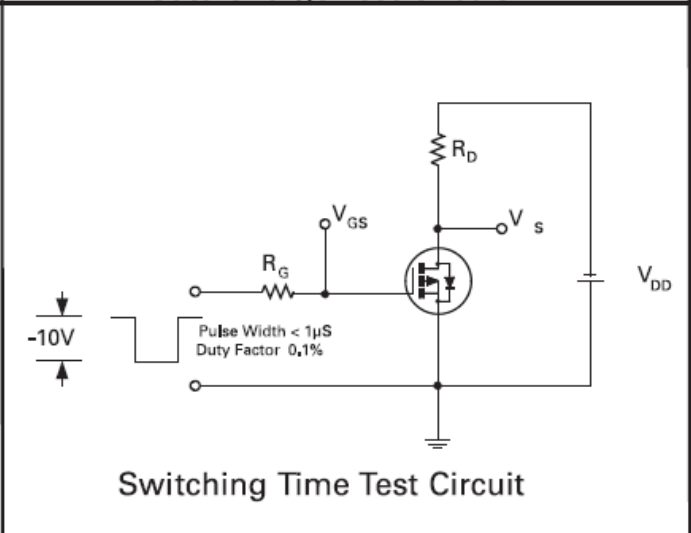
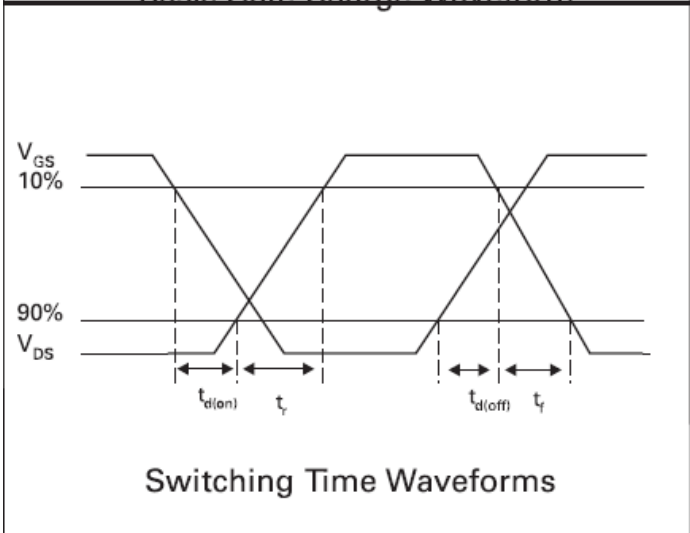
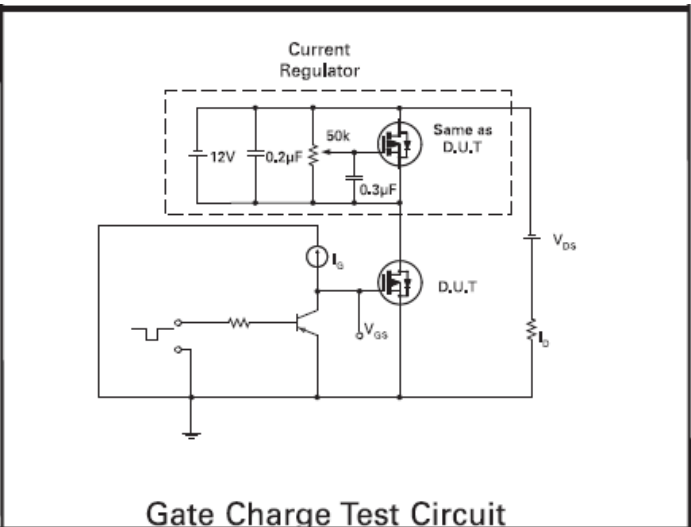
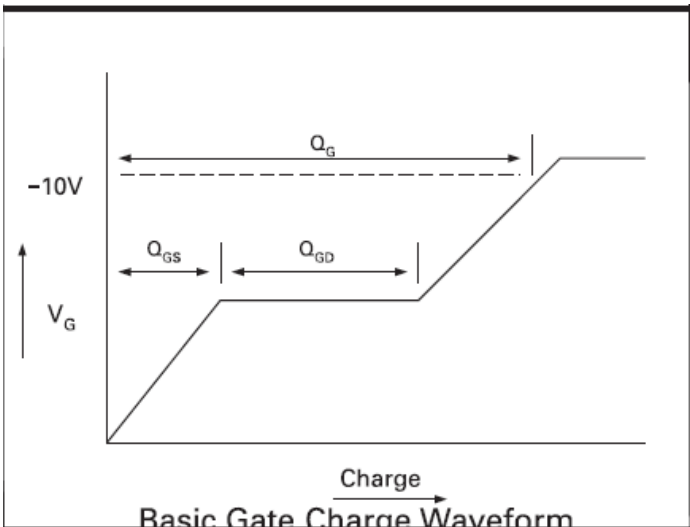
Typical Characteristics



Typical Characteristics (Continued)



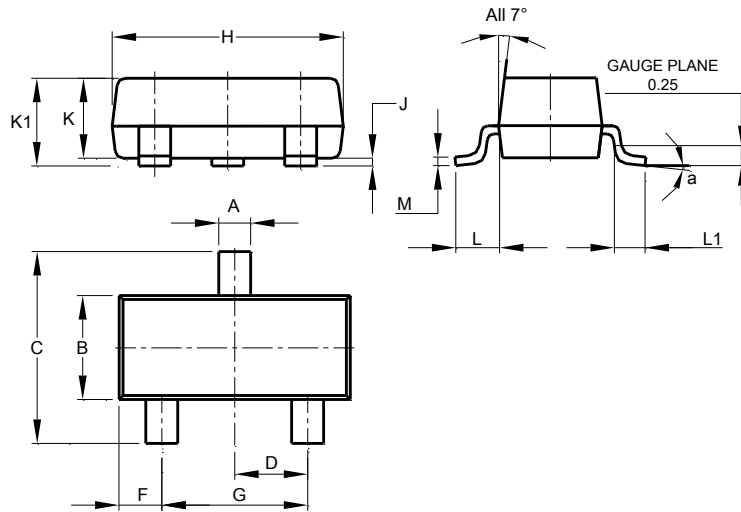
Test Circuits



Package Outline Dimensions

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

SOT23

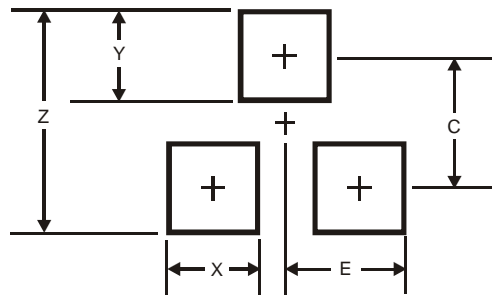


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

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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