30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

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**

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.

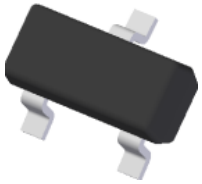
Mechanical Data

- 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 e3
- Weight: 0.008 grams (Approximate)

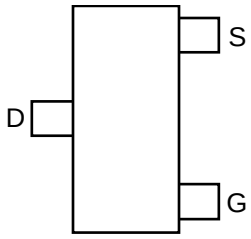
Applications

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

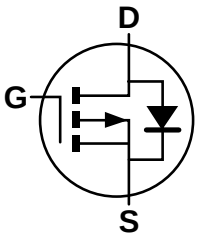
SOT23



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.

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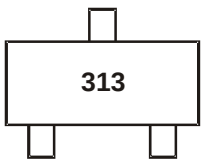

313 = Product Type Marking Code

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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	T_A = +70°C	(Note 6) (Note 6) (Note 5)	I_D	-1.6 -1.3 -1.4	A
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) Linear Derating Factor	P_D	625 5	mW mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	806 6.4	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	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.

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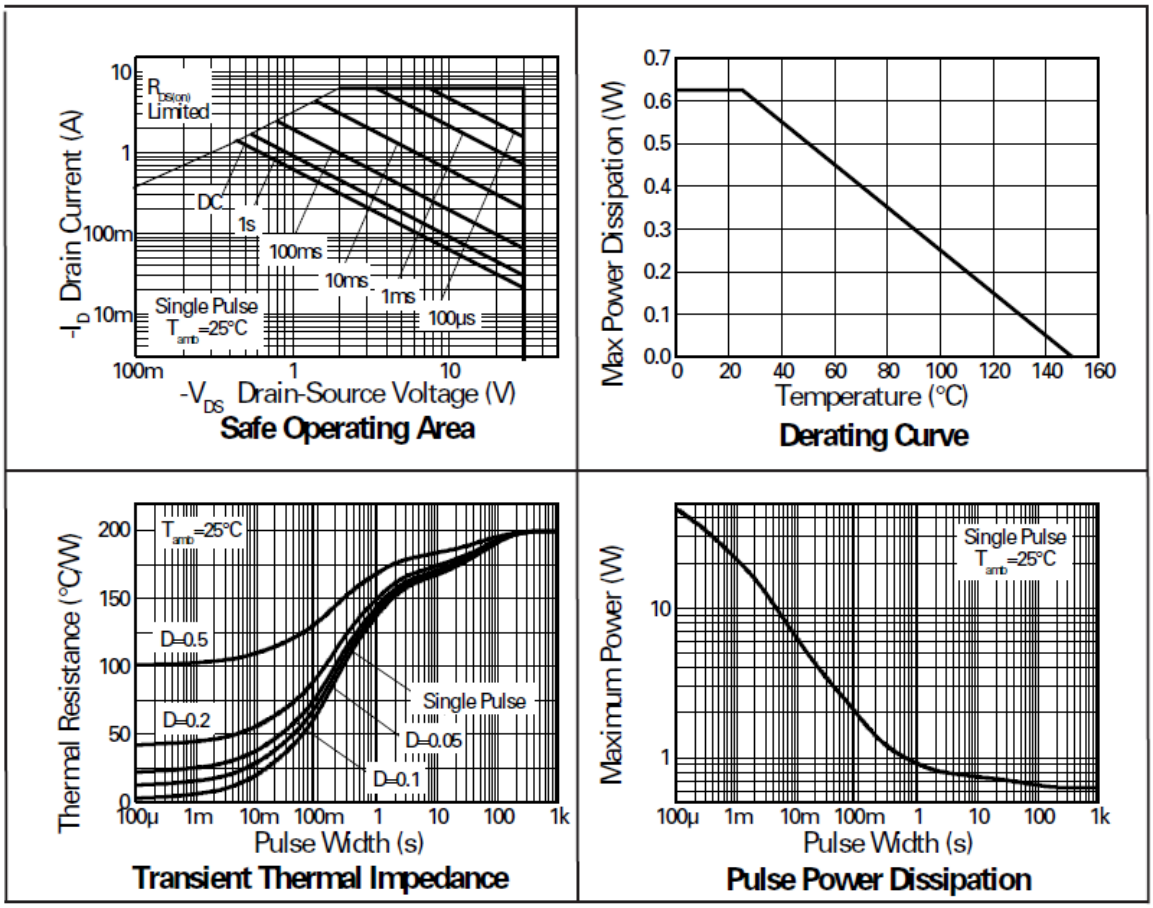
Thermal Characteristics



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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, $R_G \cong 6.0\Omega$, 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, di/dt = 100A/µs
Reverse Recovery Charge (Note 10)	Q_{RR}	—	9.6	—	nC	

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.

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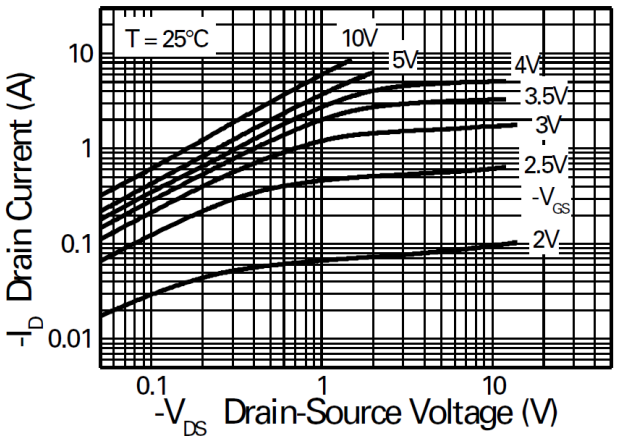
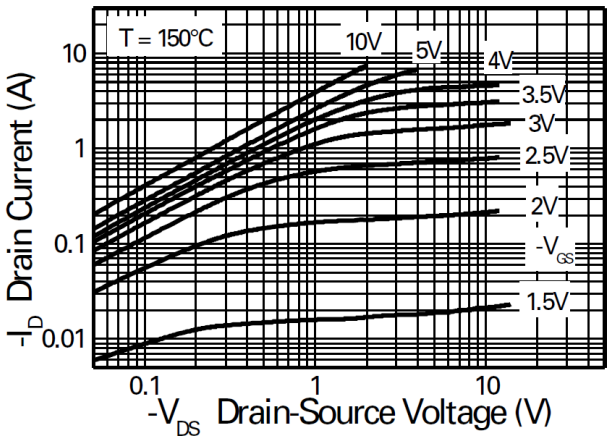
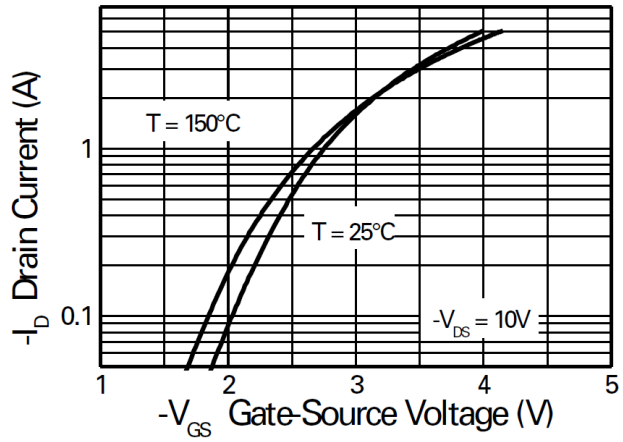
Typical Characteristics



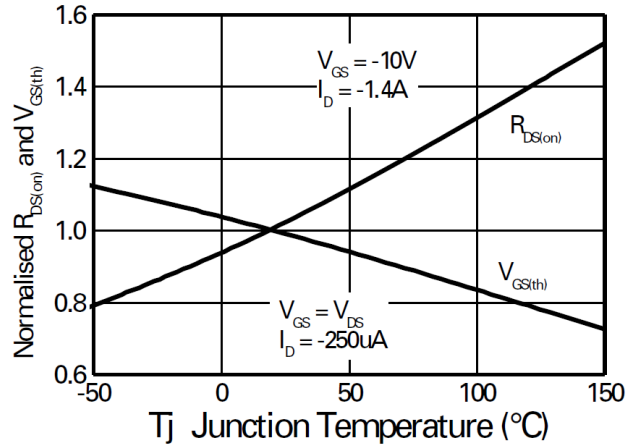
Output Characteristics



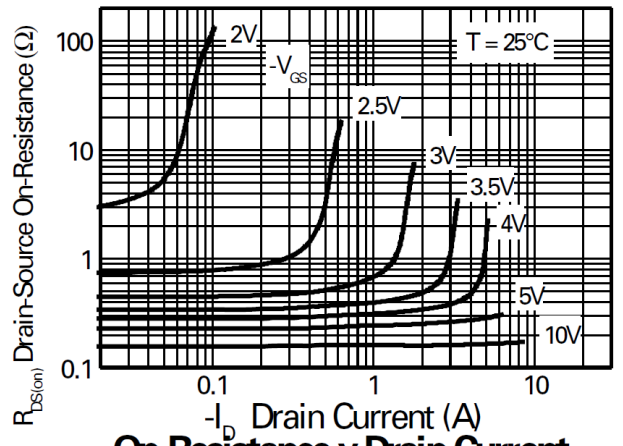
Output Characteristics



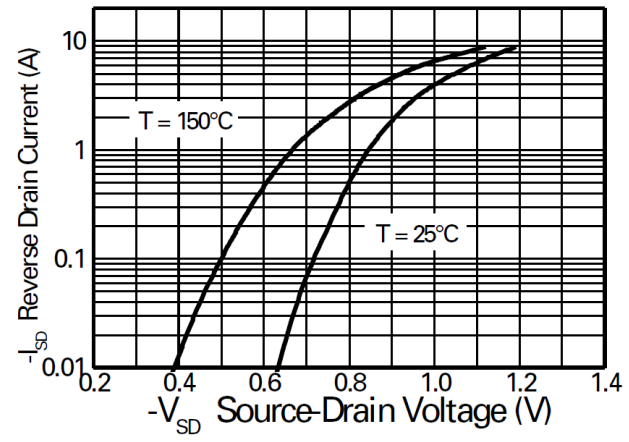
Typical Transfer Characteristics



Normalised Curves v Temperature



On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

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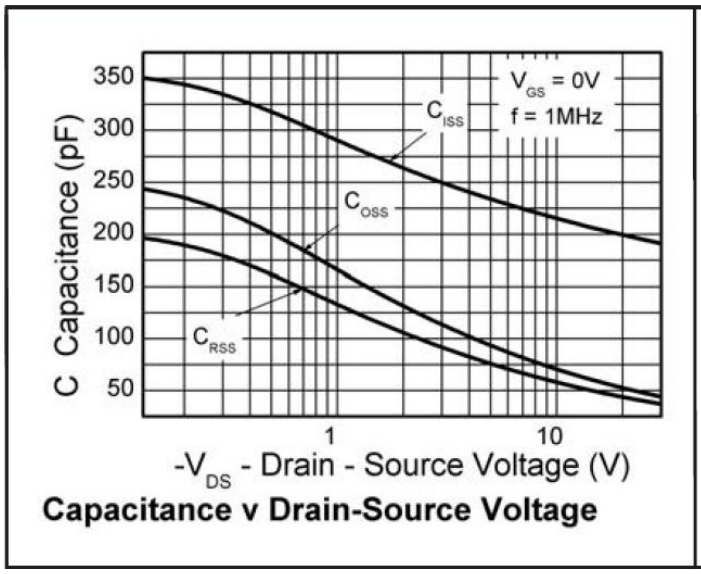
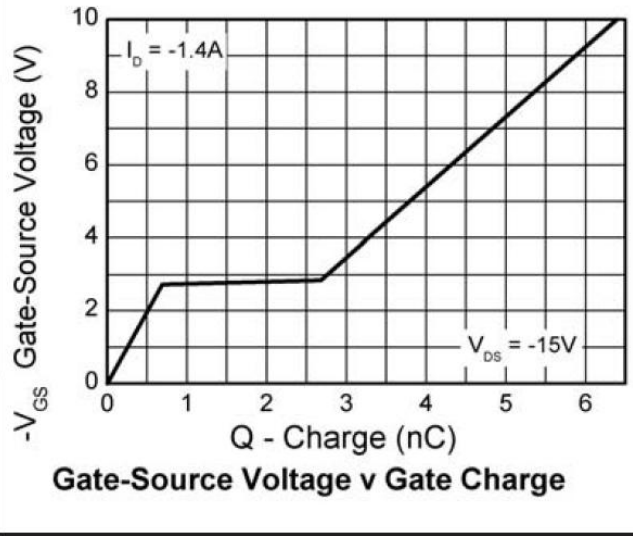
Typical Characteristics (Continued)

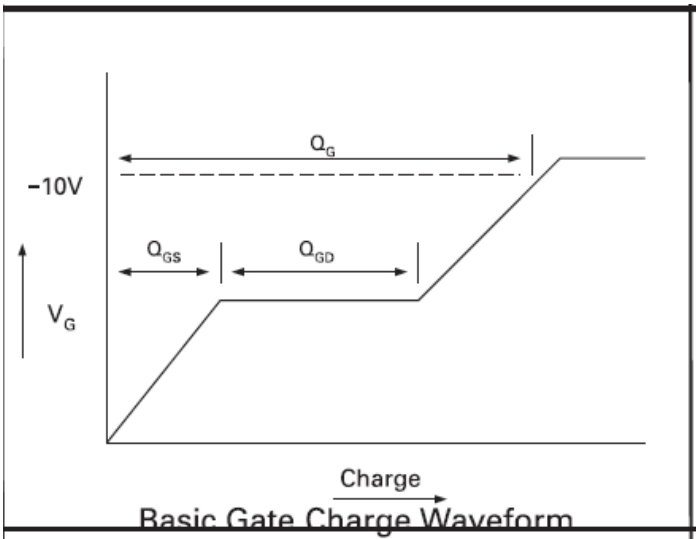


Capacitance v Drain-Source Voltage

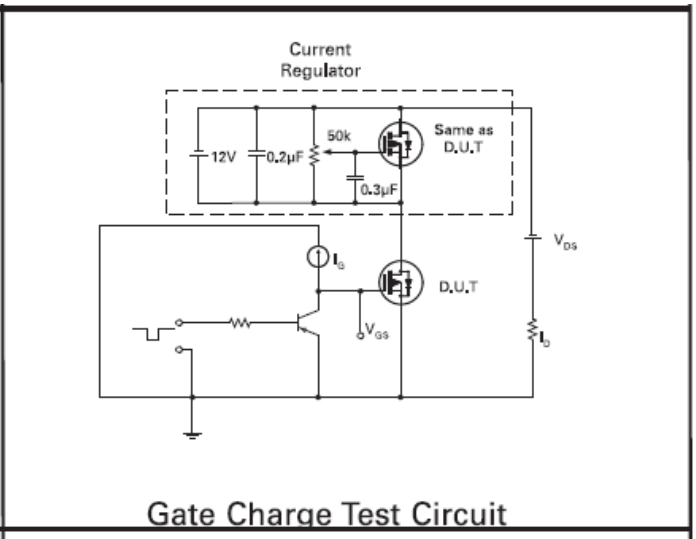


Gate-Source Voltage v Gate Charge

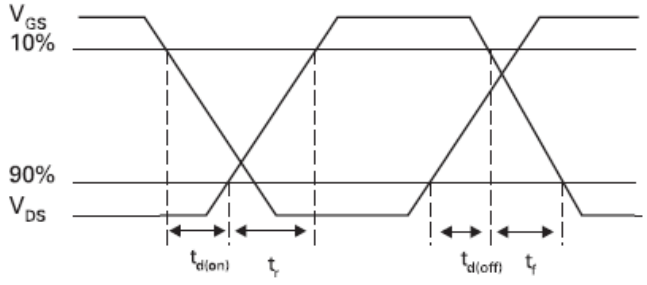
Test Circuits



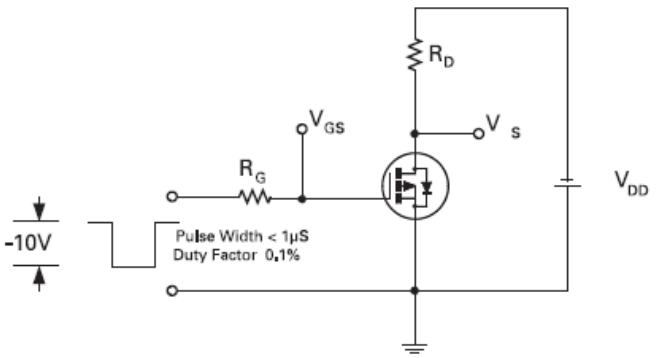
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



Switching Time Test Circuit

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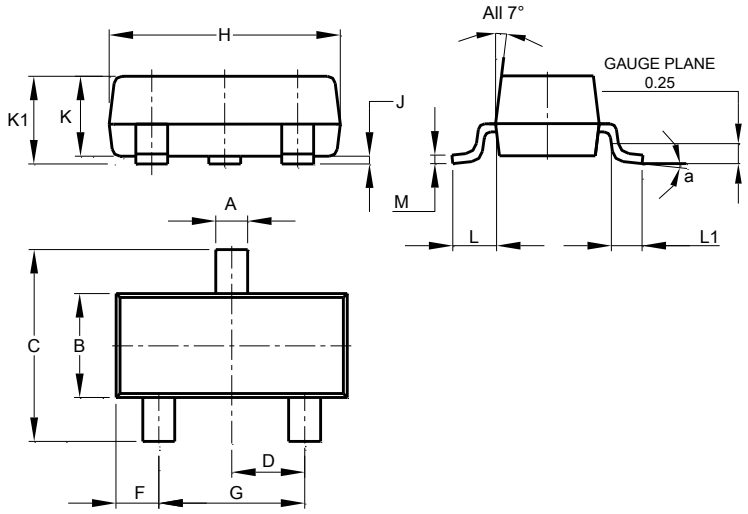
Package Outline Dimensions

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

SOT23

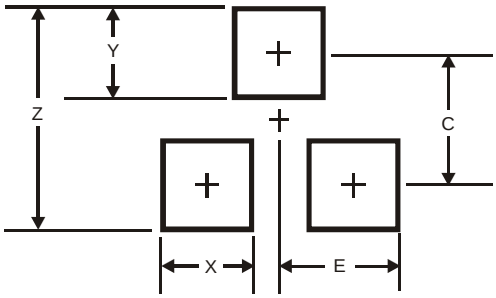


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

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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