

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
60V	0.08Ω @ V _{GS} = 10V	5.3A
	0.15Ω @ V _{GS} = 4.5V	2.8A

Features and Benefits

- 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)**
- **The ZXMN6A08GQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- BLDC Motors
- DC-DC Converters
- Load Switch

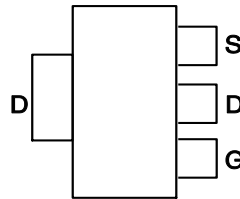
Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.112 grams (Approximate)

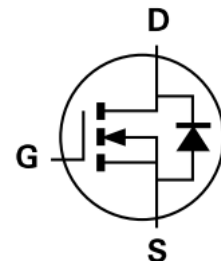
SOT223 (Type ZN)



Top View



Pin Out - Top View



Equivalent Circuit

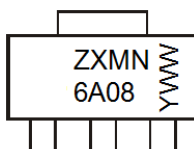
Ordering Information (Note 4)

Part Number	Case	Packaging
ZXMN6A08GQTA	SOT223 (Type ZN)	1000/Tape & Reel
ZXMN6A08GQTC	SOT223 (Type ZN)	4000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT223 (Type ZN)



ZXMN6A08 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 0 = 2020)
 WW = Week Code (01 to 53)

Maximum Ratings

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current @ $V_{GS} = 10V$	I_D	$T_A = +25^\circ C$ (Note 6)	5.3
		$T_A = +70^\circ C$ (Note 6)	4.2
		$T_A = +25^\circ C$ (Note 5)	3.8
Pulsed Drain Current (Note 7)	I_{DM}	20	A
Continuous Source Current (Body Diode) (Note 6)	I_S	2.1	A
Pulsed Source Current (Body Diode) (Note 7)	I_{SM}	20	A
Power Dissipation at $T_A = +25^\circ C$ (Note 5)	P_D	2	W
Linear Derating Factor		16	mW/ $^\circ C$
Power Dissipation at $T_A = +25^\circ C$ (Note 6)	P_D	3.9	W
Linear Derating Factor		31	mW/ $^\circ C$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

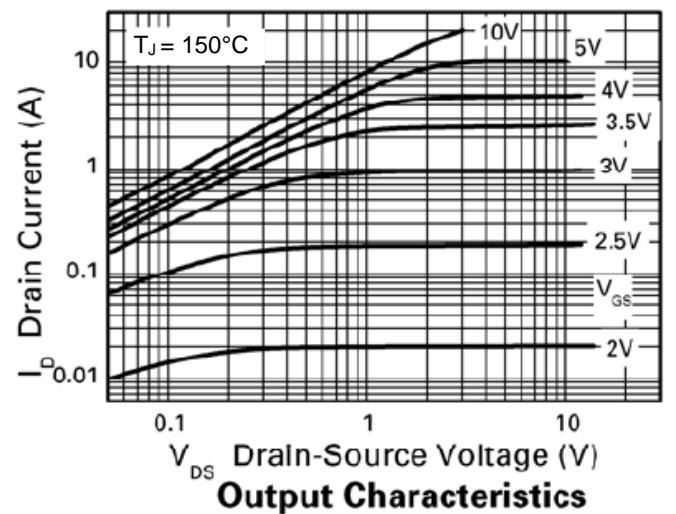
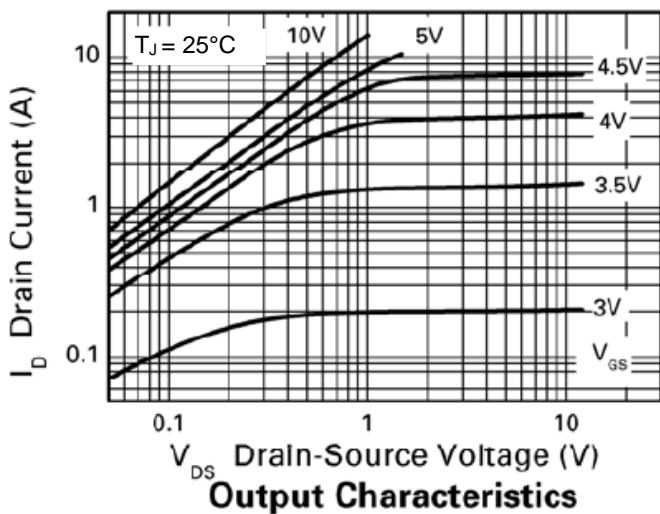
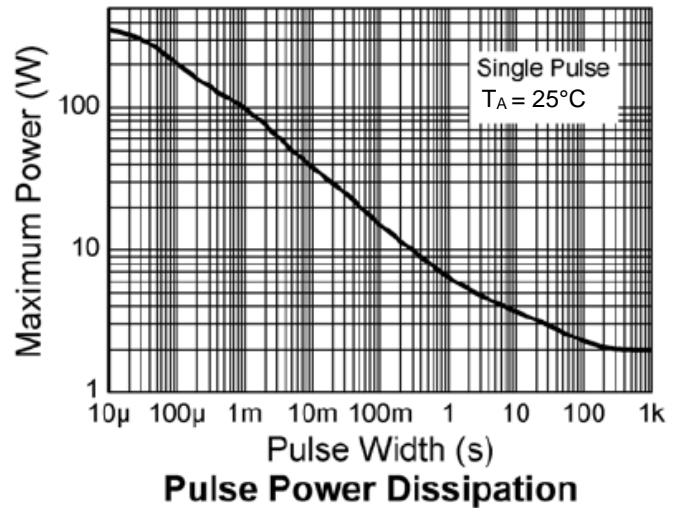
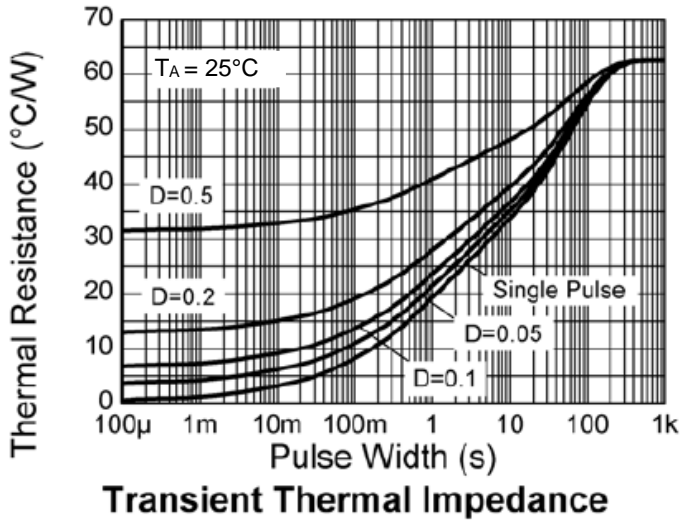
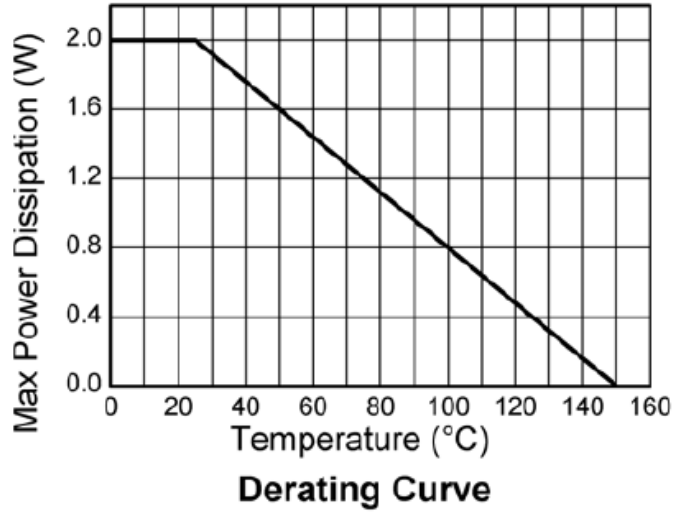
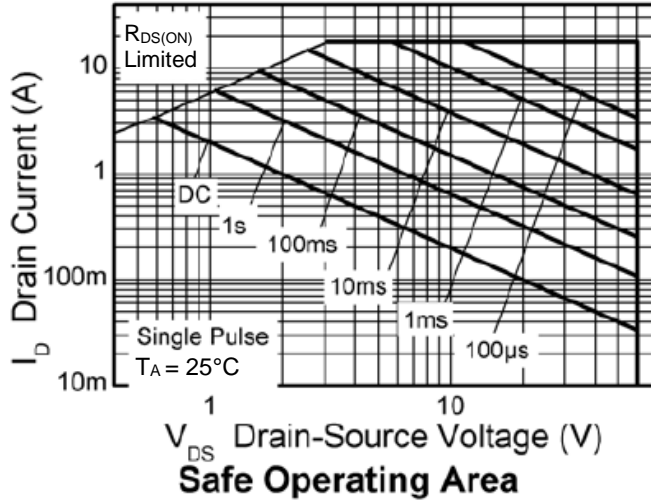
Thermal Characteristics (@ $T_A = +25^\circ C$, unless otherwise specified.)

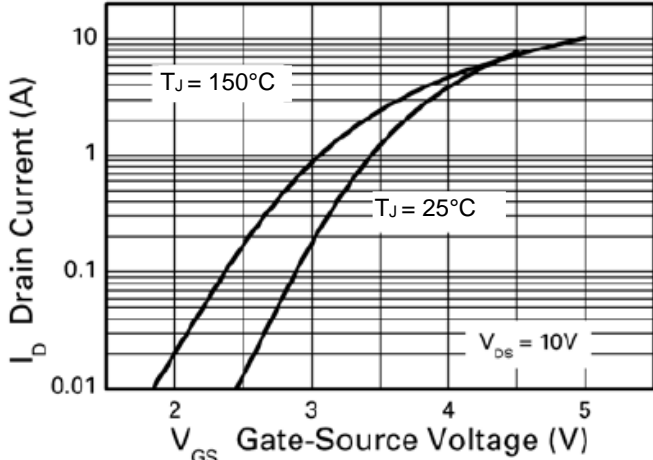
Characteristic	Symbol	Value	Unit
Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	$^\circ C/W$
Junction to Ambient (Note 6)	$R_{\theta JA}$	32	$^\circ C/W$

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

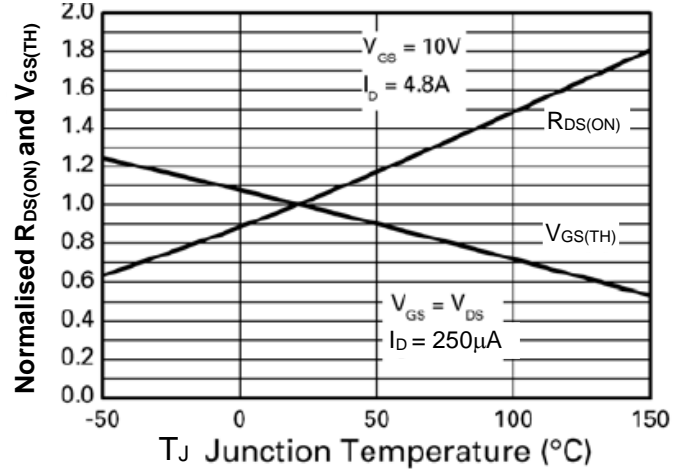
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	—	0.06	0.08	Ω	$V_{GS} = 10V, I_D = 4.8A$
		—	0.08	0.15	Ω	$V_{GS} = 4.5V, I_D = 4.2A$
Forward Transconductance (Note 9)	g_{fs}	—	6.6	—	S	$V_{DS} = 15V, I_D = 4.8A$
Diode Forward Voltage	V_{SD}	—	0.88	1.2	V	$T_J = +25^\circ C, I_S = 4A, V_{GS} = 0V$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	459	—	pF	$V_{DS} = 40V, V_{GS} = 0V, f = 1MHz$
Output Capacitance	C_{oss}	—	44.2	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	24.1	—	pF	
Turn-On Delay Time (Note 8)	$t_{D(ON)}$	—	2.6	—	ns	$V_{DD} = 30V, I_D = 1.5A, R_G \approx 6.0\Omega, V_{GS} = 10V$
Turn-On Rise Time (Note 8)	t_R	—	2.1	—	ns	
Turn-Off Delay Time (Note 8)	$t_{D(OFF)}$	—	12.3	—	ns	
Turn-Off Fall Time (Note 8)	t_F	—	4.6	—	ns	
Gate Charge (Note 8)	Q_G	—	4.0	—	nC	
Total Gate Charge (Note 8)	Q_G	—	5.8	—	nC	$V_{DS} = 30V, V_{GS} = 10V, I_D = 1.4A$
Gate-Source Charge (Note 8)	Q_{GS}	—	1.4	—	nC	
Gate Drain Charge (Note 8)	Q_{GD}	—	1.9	—	nC	
SOURCE-DRAIN DIODE						
Reverse Recovery Time (Note 9)	t_{RR}	—	19.2	—	ns	$T_J = +25^\circ C, I_S = 1.4A, di/dt = 100A/\mu s$
Reverse Recovery Charge (Note 9)	Q_{RR}	—	30.3	—	nC	

- Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 6. For a device surface mounted on FR-4 PCB measured at $t < 10s$.
 7. Repetitive rating - 25mm x 25mm FR-4 PCB, $D = 0.02$, pulse width 300 μs - pulse width limited by maximum junction temperature.
 8. Switching characteristics are independent of operating junction temperature.
 9. For design aid only, not subject to production testing.

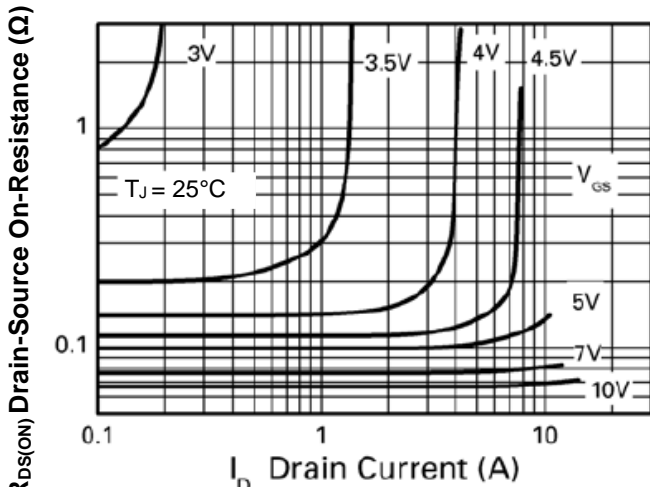




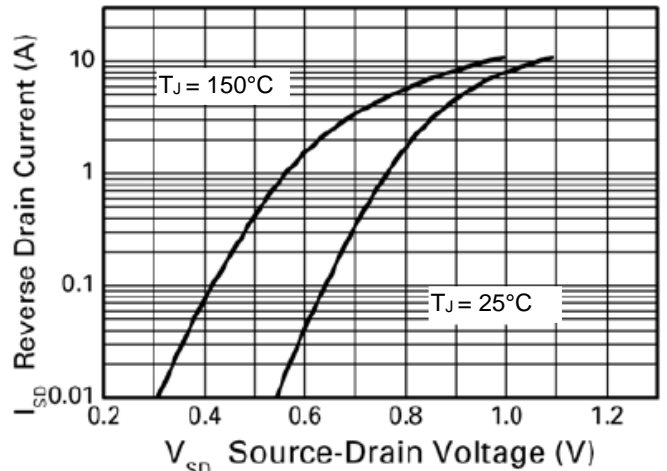
Typical Transfer Characteristics



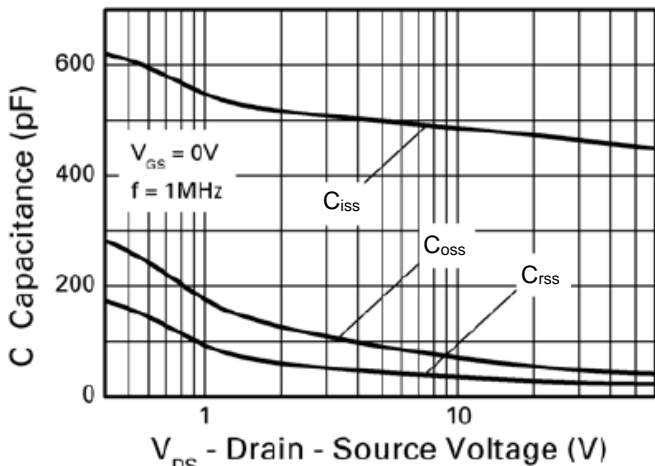
Normalised Curves v Temperature



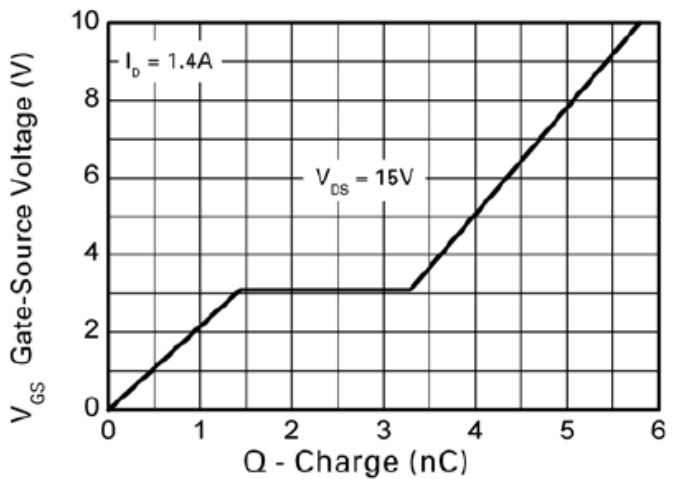
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

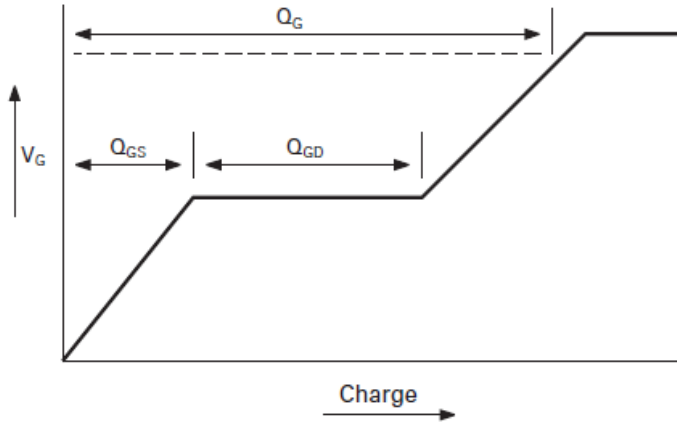


Capacitance v Drain-Source Voltage

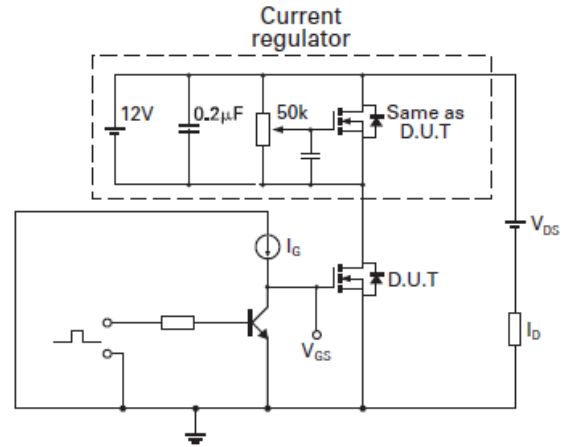


Gate-Source Voltage v Gate Charge

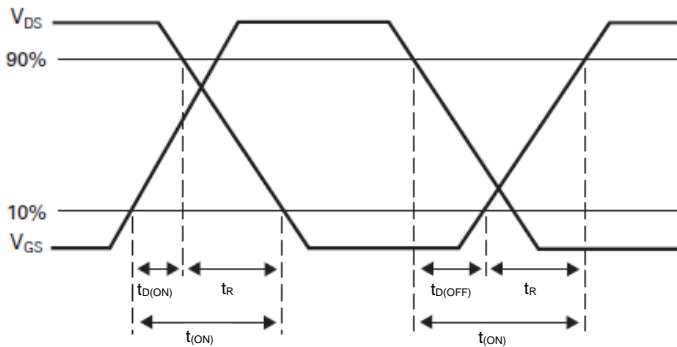
Test Circuits



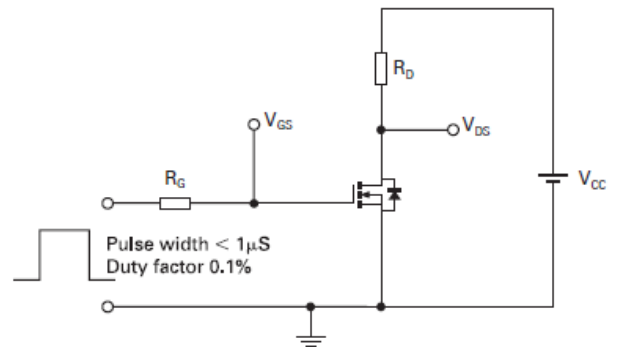
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

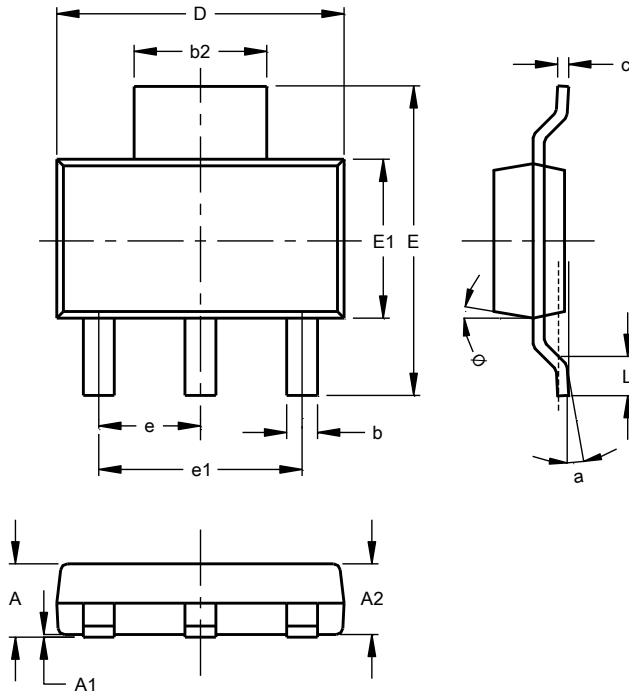


Switching time test circuit

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223 (Type ZN)

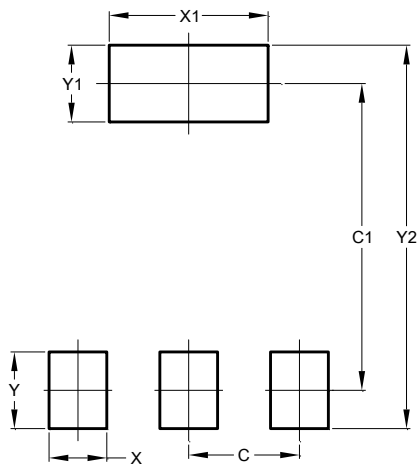


SOT223 (Type ZN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.02	0.10	--
A2	1.50	1.68	1.60
b	0.60	0.80	--
b2	2.90	3.10	--
c	0.24	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	2.30 NOM		
e1	4.60 NOM		
L	0.90	--	--
a	--	--	10°
θ	--	15°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223 (Type ZN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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