

Product Summary

BV_{DSS}	$R_{DS(on)}$ Max (Ω)	I_D Max (A) $T_A = +25^\circ\text{C}$
60V	0.08 @ $V_{GS} = 10\text{V}$	5.3
	0.15 @ $V_{GS} = 4.5\text{V}$	2.8

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

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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

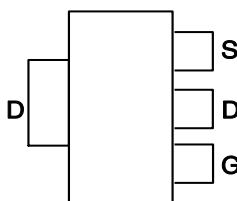
Mechanical Data

- 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 
- Weight: 0.112 grams (Approximate)

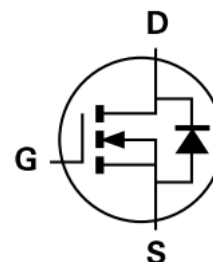
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

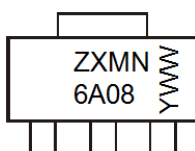
Ordering Information (Note 5)

Part Number	Case	Packaging
ZXMN6A08GQTA	SOT223	1000/Tape & Reel
ZXMN6A08GQTC	SOT223	4000/Tape & Reel

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/product-compliance-definitions/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT223



ZXMN6A08 = Product Type Marking Code
 YWW = Date Code Marking
 Y or Y = Last Digit of Year (ex: 7 = 2017)
 WW or WW = Week Code (01 to 53)

Absolute 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	T _A = +25°C (Note 7)	I _D	5.3	A
	T _A = +70°C (Note 7)		4.2	A
	T _A = +25°C (Note 6)		3.8	A
Pulsed Drain Current (Note 8)		I _{DM}	20	A
Continuous Source Current (body diode)(Note 7)		I _S	2.1	A
Pulsed Source Current (body diode)(Note 8)		I _{SM}	20	A
Power Dissipation at T _A = +25°C (Note 6)		P _D	2	W
Linear Derating Factor			16	mW/°C
Power Dissipation at T _A = +25°C (Note 7)		P _D	3.9	W
Linear Derating Factor			31	mW/°C
Linear Derating Factor		T _J , T _{STG}	-55 to +150	°C

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

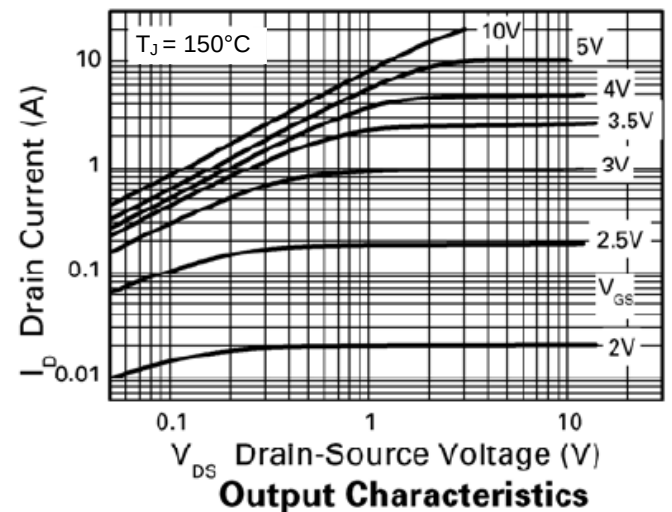
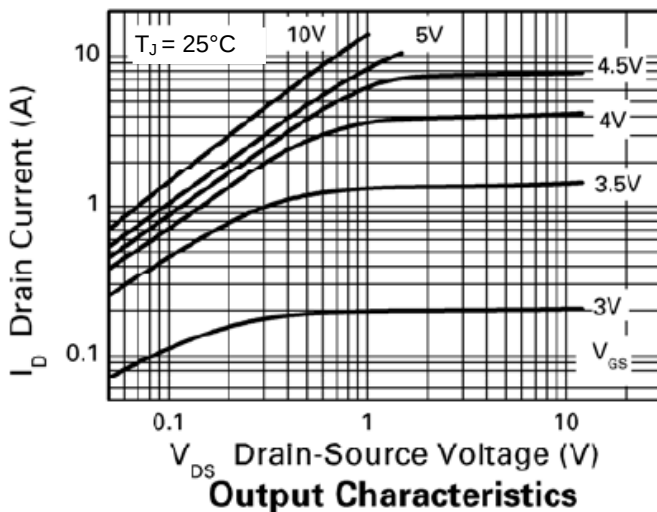
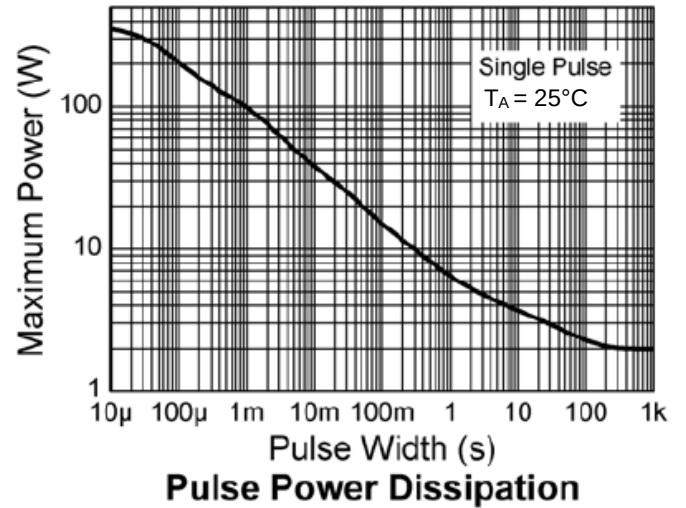
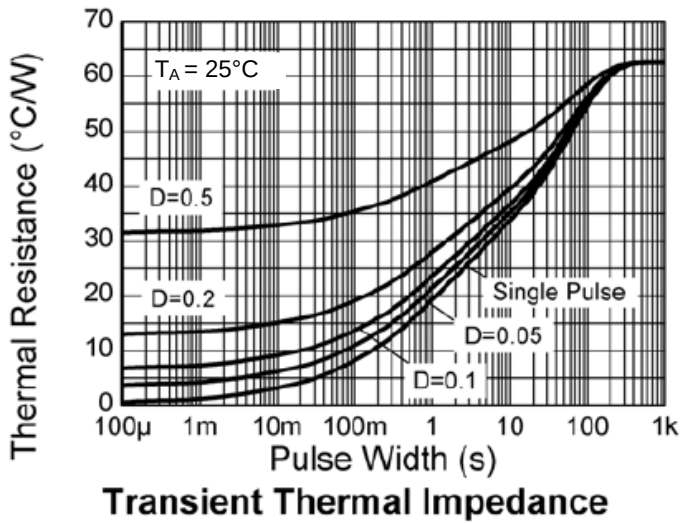
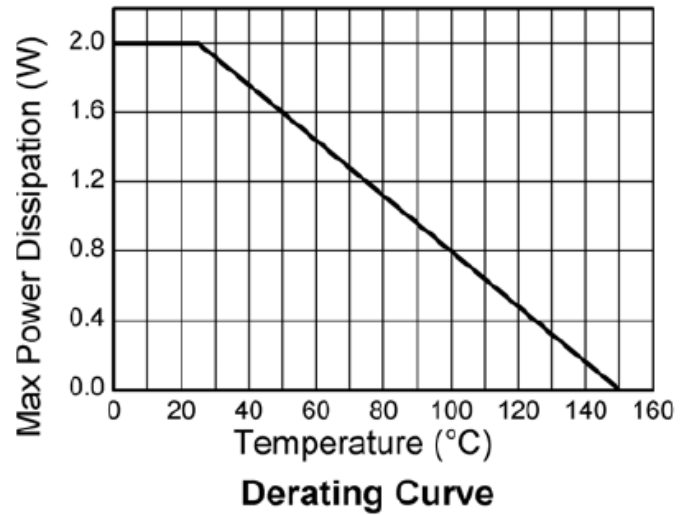
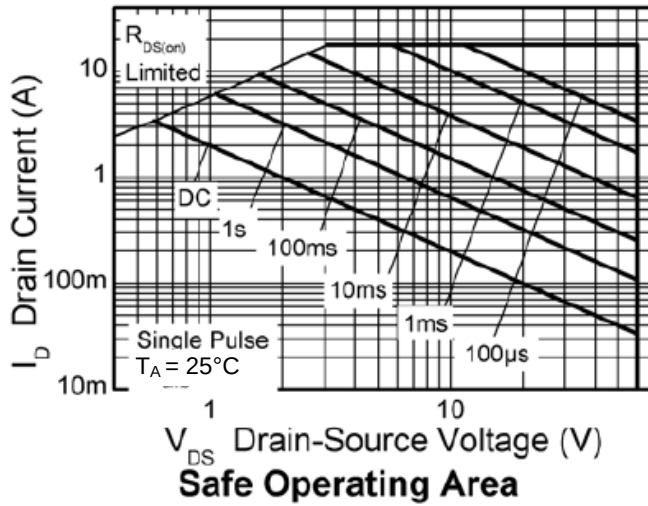
Characteristic	Symbol	Value	Units
Junction to Ambient (Note 6)	$R_{\theta JA}$	62.5	$^\circ C/W$
Junction to Ambient (Note 7)	$R_{\theta JA}$	32	$^\circ C/W$

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

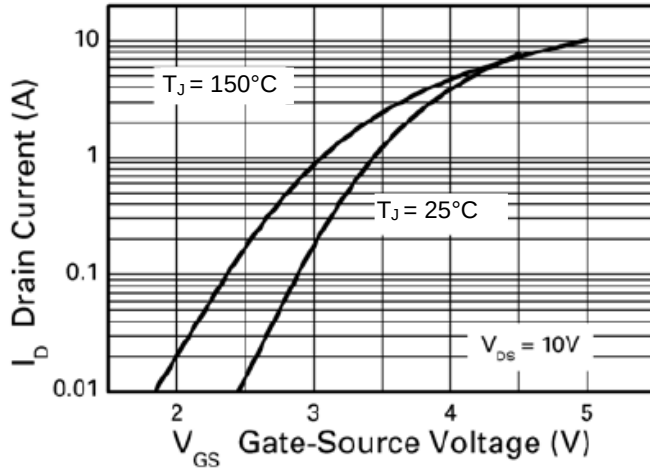
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	–	–	V	V _{GS} = 0V, I _D =250μA
Zero Gate Voltage Drain Current	I _{DSS}	–	–	0.5	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	–	–	100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	1	–	-	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-State Resistance (Note 9)	R _{DS(on)}	–	–	0.08	Ω	V _{GS} = 10V, I _D = 4.8A
		–	–	0.15	Ω	V _{GS} = 4.5V, I _D = 4.2A
Forward Transconductance (Notes 9 & 11)	g _{fs}	–	6.6	–	S	V _{DS} =15V,I _D =4.8A
DYNAMIC CHARACTERISTICS (Note 11)						
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 10)	t _{d(on)}	–	2.6	–	ns	V _{DD} = 30V, I _D =1.5A R _G ≅ 6.0Ω, V _{GS} = 10V
Turn-On Rise Time (Note 10)	t _r	–	2.1	–	ns	
Turn-Off Delay Time (Note 10)	t _{d(off)}	–	12.3	–	ns	
Turn-Off Fall Time (Note 10)	t _f	–	4.6	–	ns	
Gate Charge (Note 10)	Q _G	–	4.0	–	nC	V _{DS} = 30V, V _{GS} = 5V I _D = 1.4A
Total Gate Charge (Note 10)	Q _G	–	5.8	–	nC	V _{DS} = 30V, V _{GS} = 10V I _D = 1.4A
Gate-Source Charge (Note 10)	Q _{GS}	–	1.4	–	nC	
Gate Drain Charge (Note 10)	Q _{GD}	–	1.9	–	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (Note 9)	V _{SD}	–	0.88	1.2	V	T _J =+25°C, I _S = 4A, V _{GS} =0V
Reverse Recovery Time (Note 11)	trr	–	19.2	–	ns	T _J =+25°C, I _S = 1.4A, di/dt=100A/μs
Reverse Recovery Charge (Note 11)	Qrr	–	30.3	–	nC	

- Notes:
6. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 7. For a device surface mounted on FR-4 PCB measured at $t \leq 10s$.
 8. Repetitive rating - 25mm x 25mm FR-4 PCB, $D=0.02$, pulse width 300 μs - pulse width limited by maximum junction temperature.
 9. Measured under pulsed conditions. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
 10. Switching characteristics are independent of operating junction temperature.
 11. For design aid only, not subject to production testing.

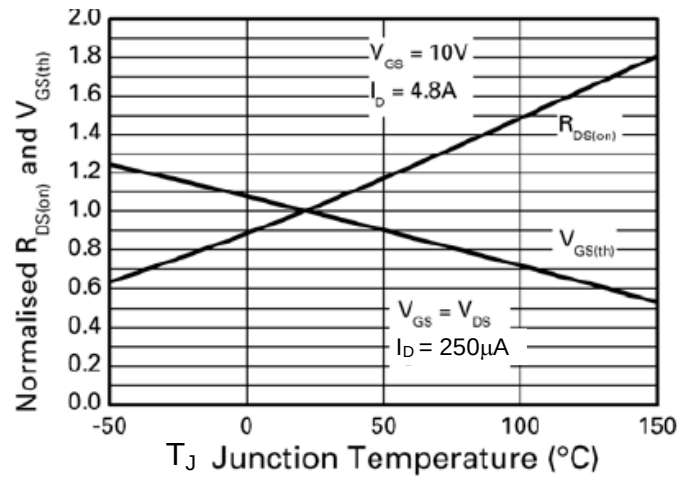
Typical Characteristics



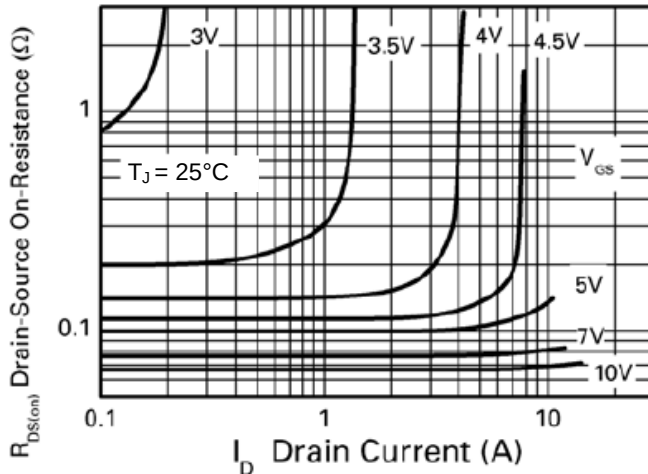
Typical Characteristics (Cont.)



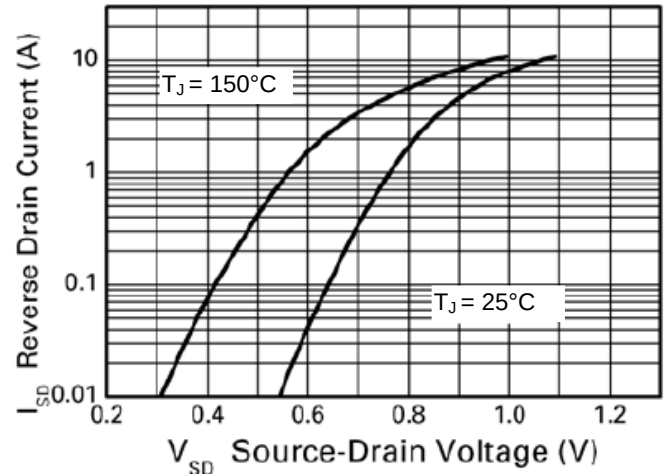
Typical Transfer Characteristics



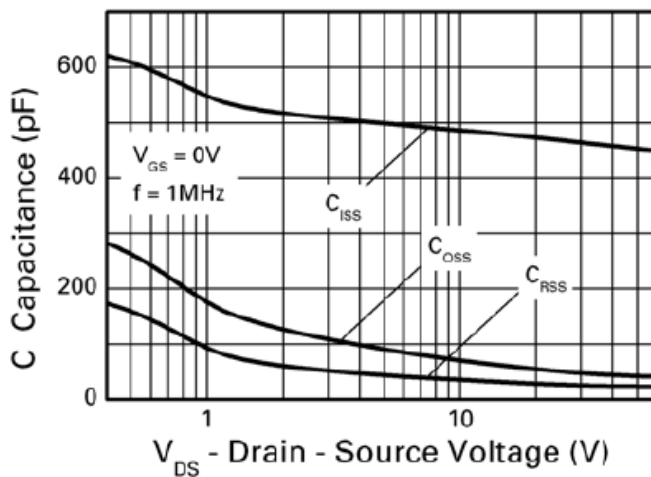
Normalised Curves v Temperature



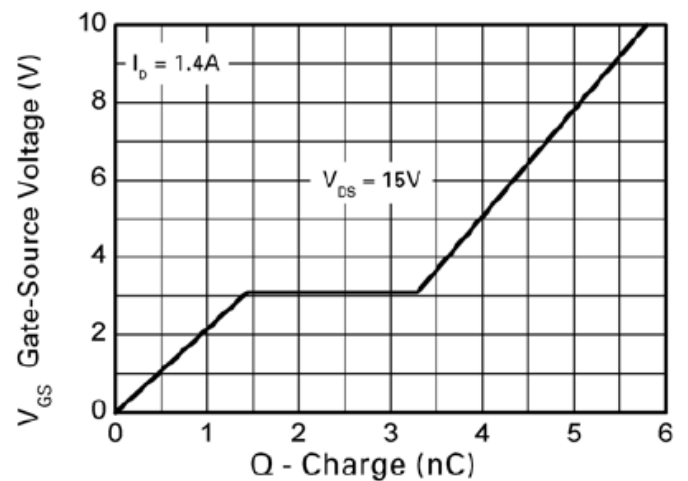
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

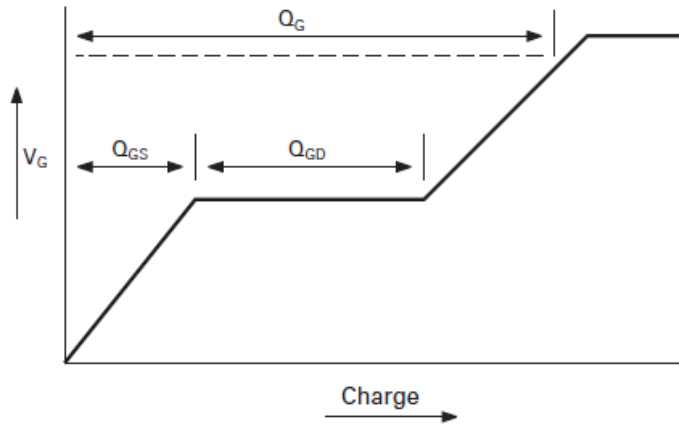


Capacitance v Drain-Source Voltage

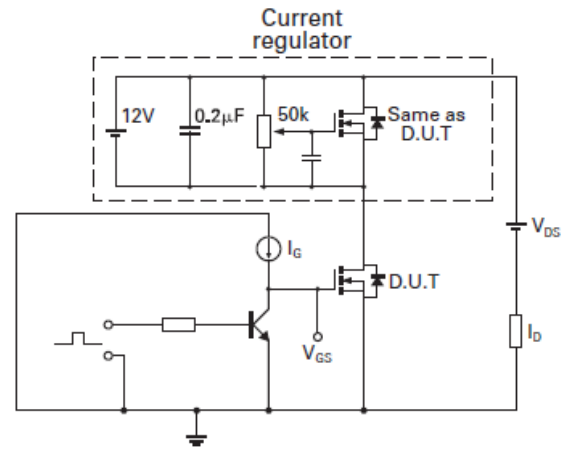


Gate-Source Voltage v Gate Charge

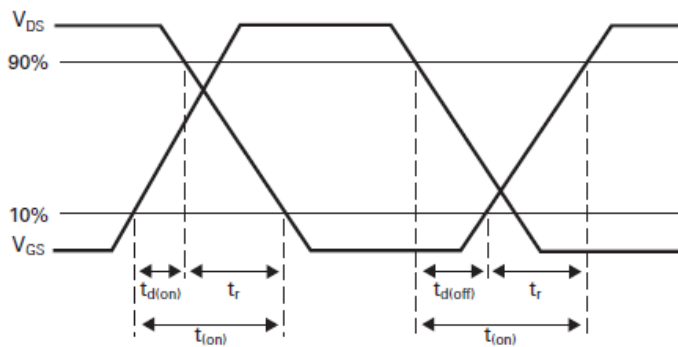
Test Circuits



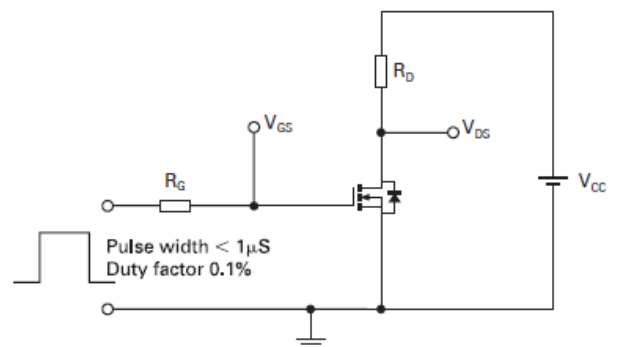
Basic gate charge waveform



Gate charge test circuit



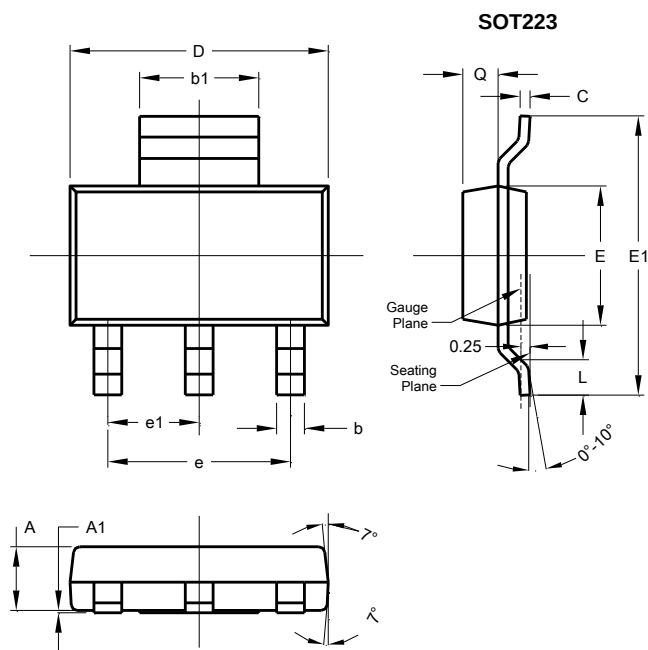
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

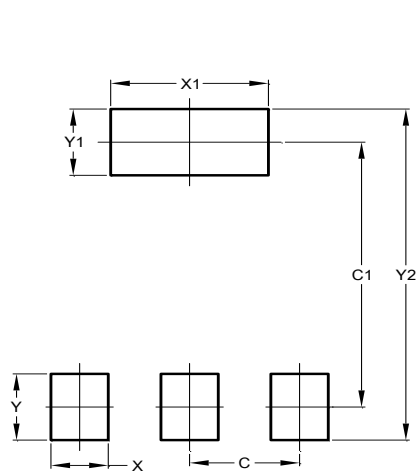
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

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



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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