

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)**

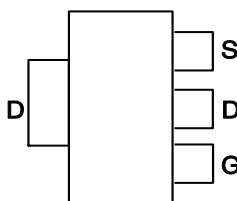
Mechanical Data

- 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)

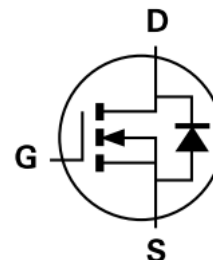
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

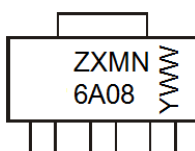
Ordering Information (Note 5)

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.)

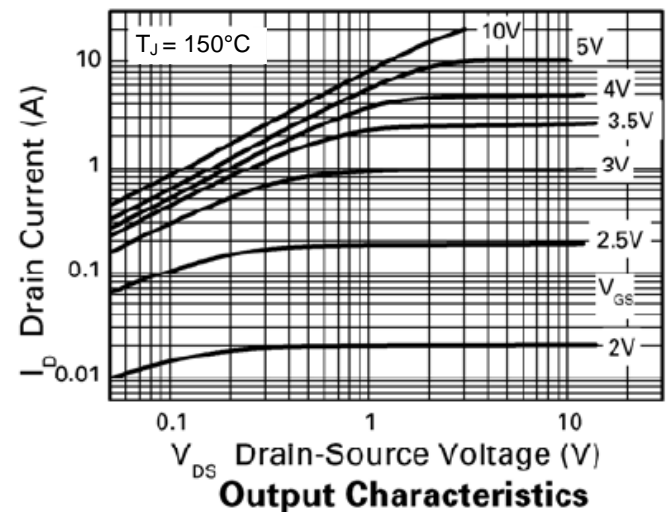
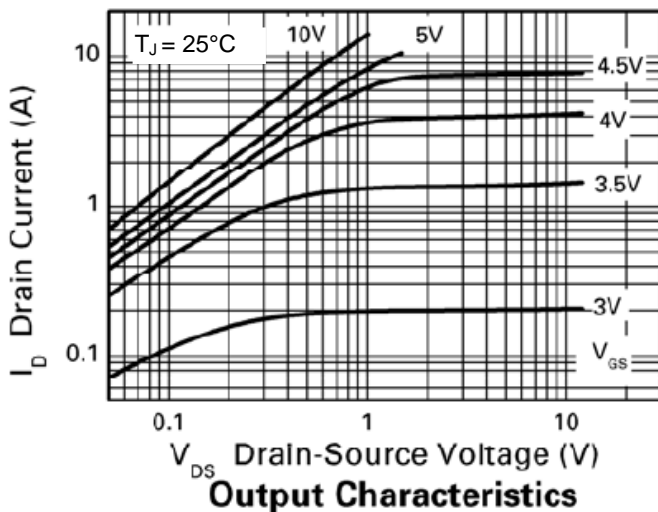
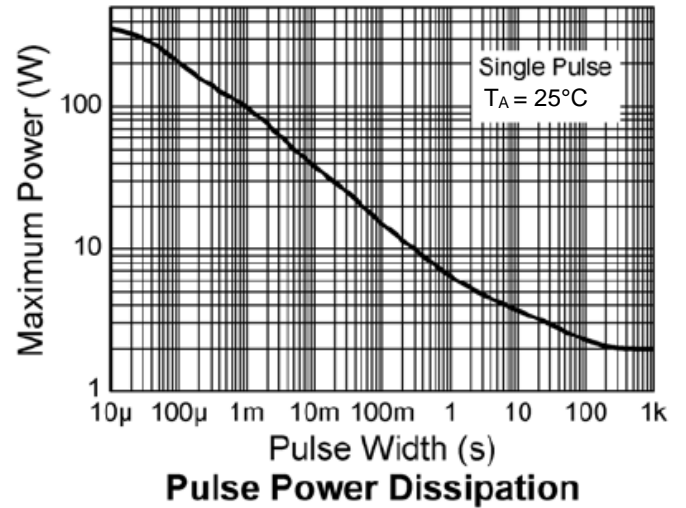
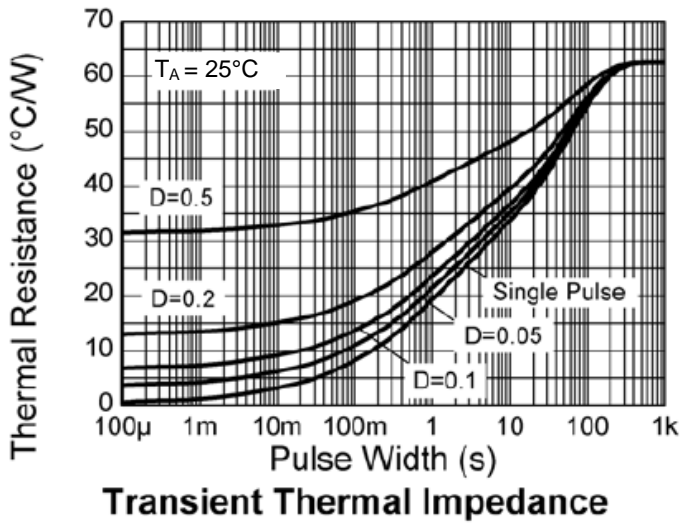
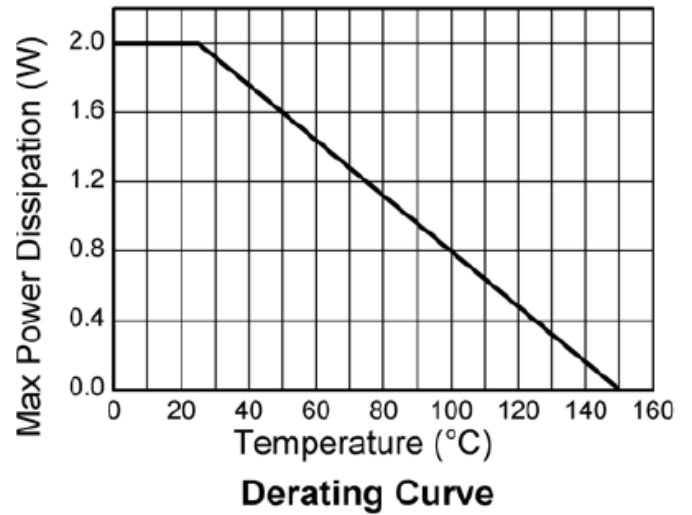
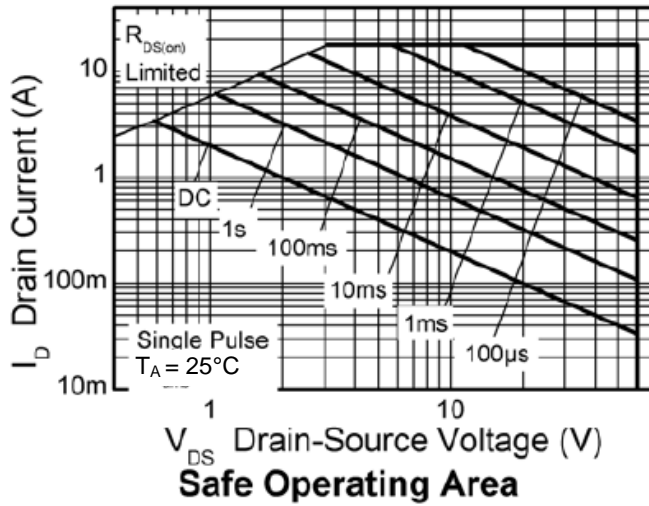
Characteristic	Symbol	Value	Units
Junction to Ambient (Note 6)	$R_{\theta JA}$	62.5	$^\circ C/W$
Junction to Ambient (Note 7)	$R_{\theta JA}$	32	$^\circ C/W$

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

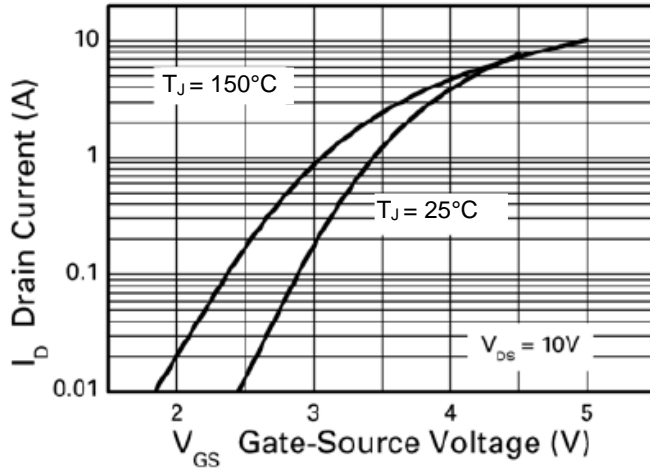
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
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 (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	$V_{DD} = 30V, I_D = 1.5A, R_G \cong 6.0\Omega, V_{GS} = 10V$
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	$T_J = +25^\circ C, I_S = 4A, V_{GS} = 0V$
Reverse Recovery Time (Note 11)	t_{rr}	—	19.2	—	ns	$T_J = +25^\circ C, I_S = 1.4A, di/dt = 100A/\mu s$
Reverse Recovery Charge (Note 11)	Q_{rr}	—	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 $\leq 300s$; duty cycle $\leq 2\%$.
 10. Switching characteristics are independent of operating junction temperature.
 11. For design aid only, not subject to production testing.

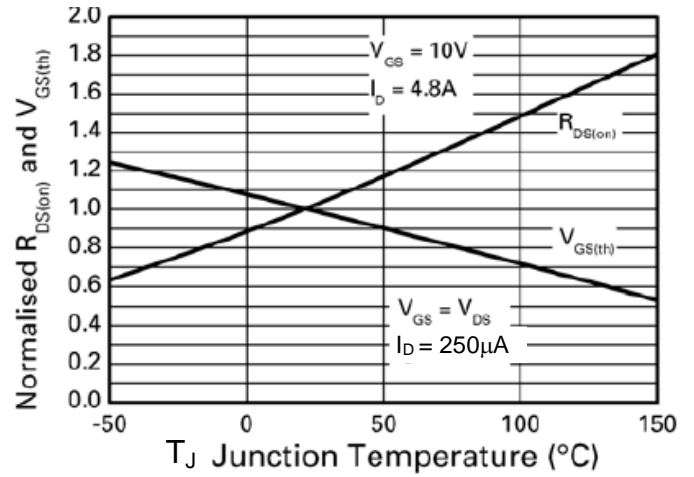
Typical Characteristics



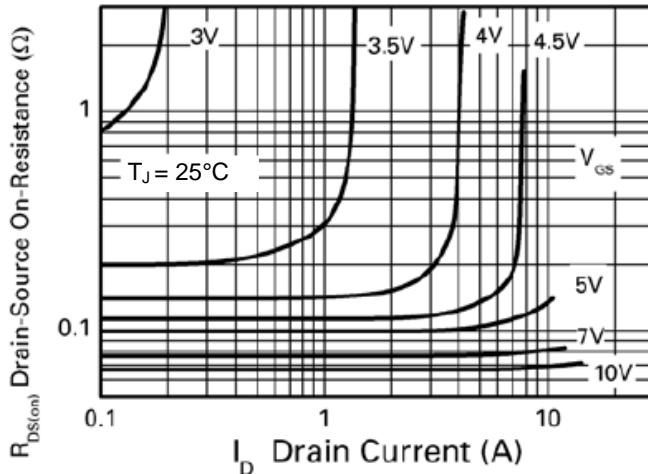
Typical Characteristics (Cont.)



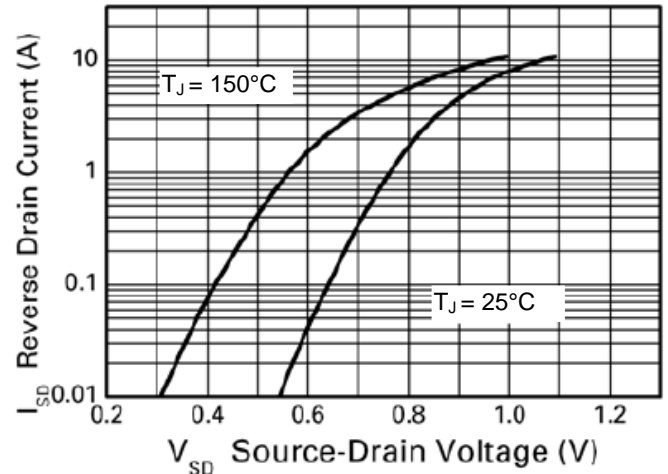
Typical Transfer Characteristics



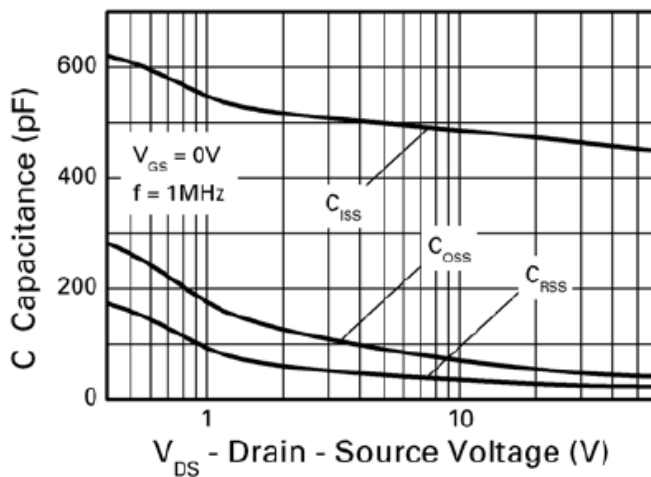
Normalised Curves v Temperature



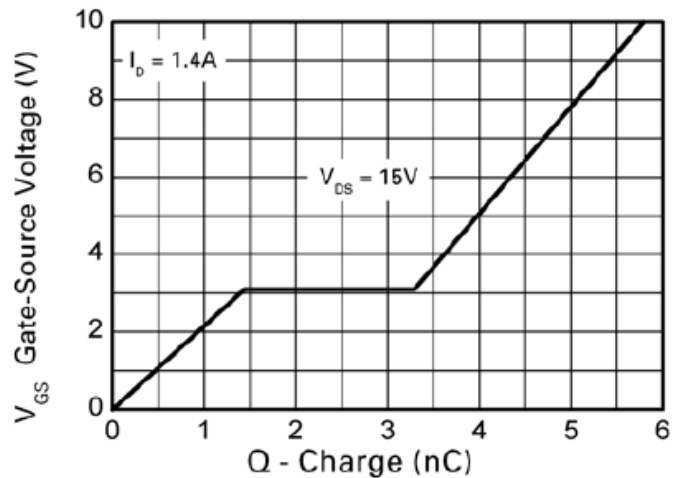
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

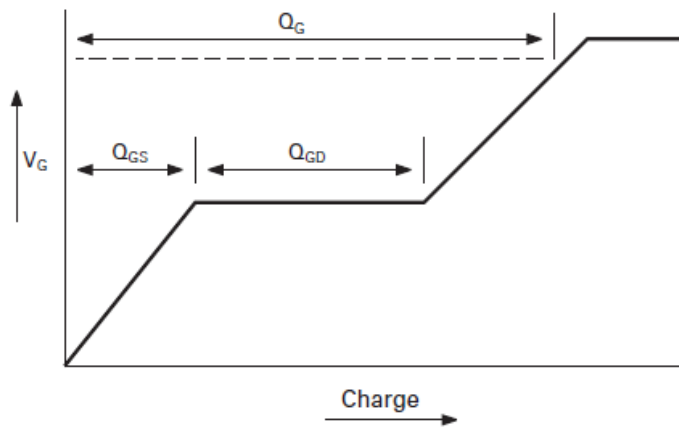


Capacitance v Drain-Source Voltage

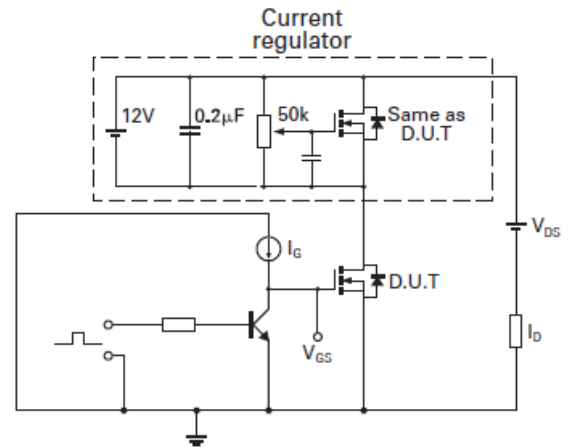


Gate-Source Voltage v Gate Charge

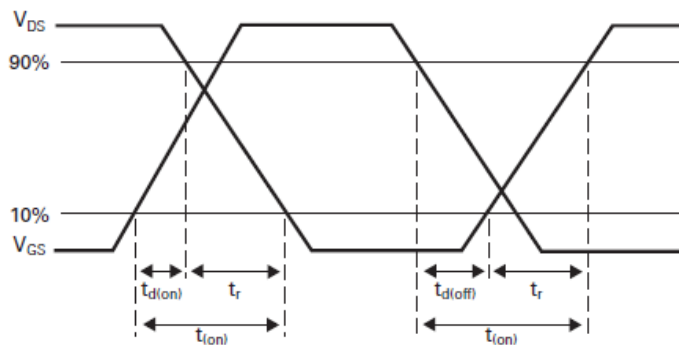
Test Circuits



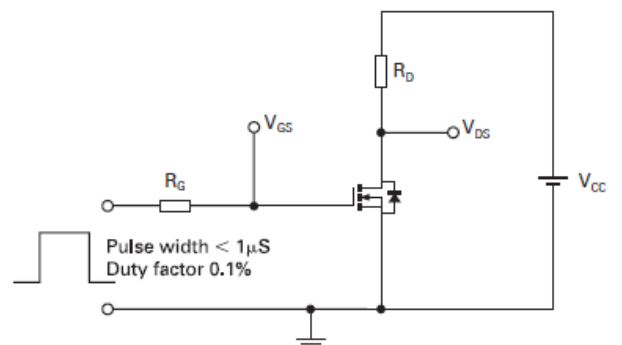
Basic gate charge waveform



Gate charge test circuit



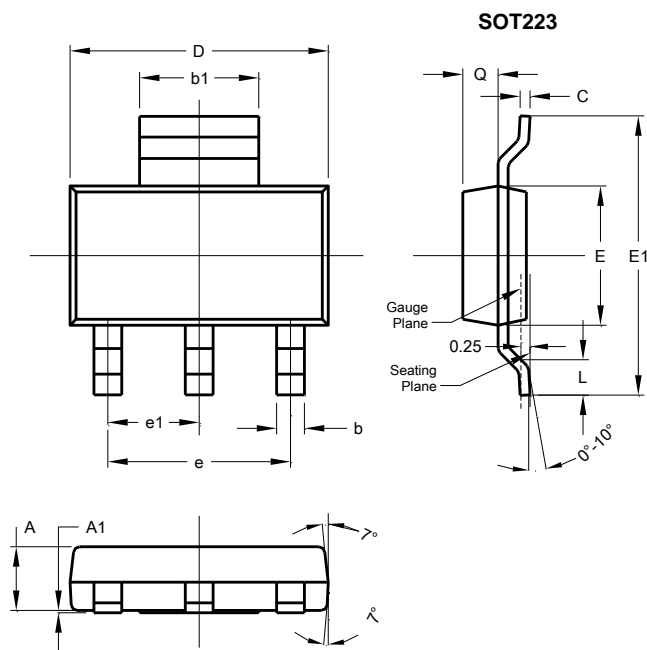
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

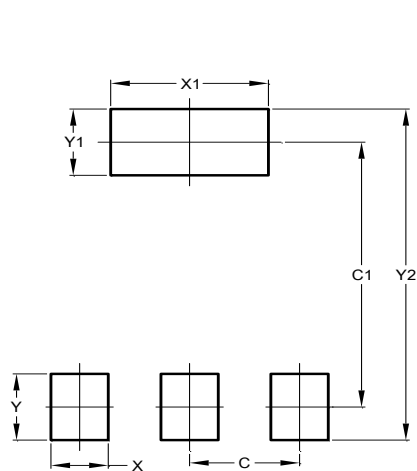
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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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