

## Product Summary

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

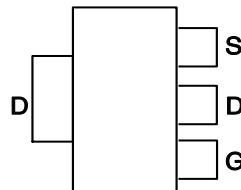
## Mechanical Data

- 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 (E3)
- Weight: 0.112 grams (Approximate)

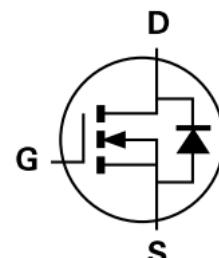
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

## Ordering Information (Note 5)

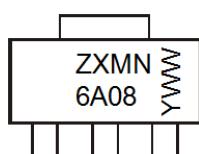
Part Number	Case	Packaging
ZXMN6A08GQTA	SOT223	1000/Tape & Reel
ZXMN6A08GQTC	SOT223	4000/Tape & Reel

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](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 <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current @ V <sub>GS</sub> = 10V	I <sub>D</sub>	5.3	A
		4.2	A
		3.8	A
Pulsed Drain Current (Note 8)	I <sub>DM</sub>	20	A
Continuous Source Current (body diode)( Note 7)	I <sub>S</sub>	2.1	A
Pulsed Source Current (body diode)( Note 8)	I <sub>SM</sub>	20	A
Power Dissipation at T <sub>A</sub> = +25°C (Note 6)	P <sub>D</sub>	2	W
Linear Derating Factor		16	mW/°C
Power Dissipation at T <sub>A</sub> = +25°C (Note 7)	P <sub>D</sub>	3.9	W
Linear Derating Factor		31	mW/°C
Linear Derating Factor	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Junction to Ambient (Note 6)	R <sub>θJA</sub>	62.5	°C/W
Junction to Ambient (Note 7)	R <sub>θJA</sub>	32	°C/W

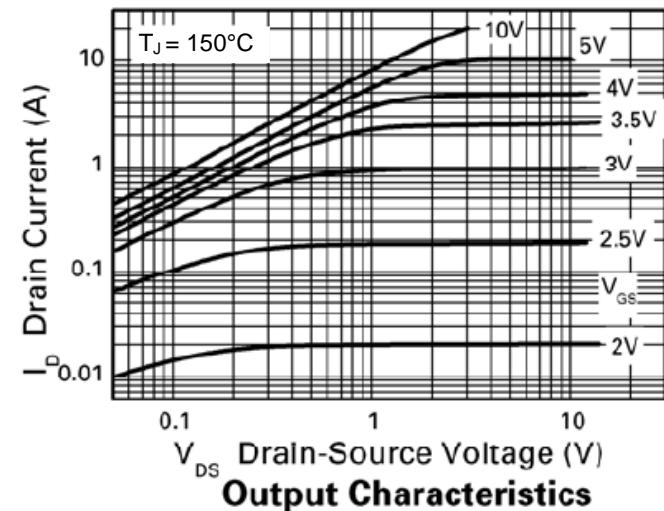
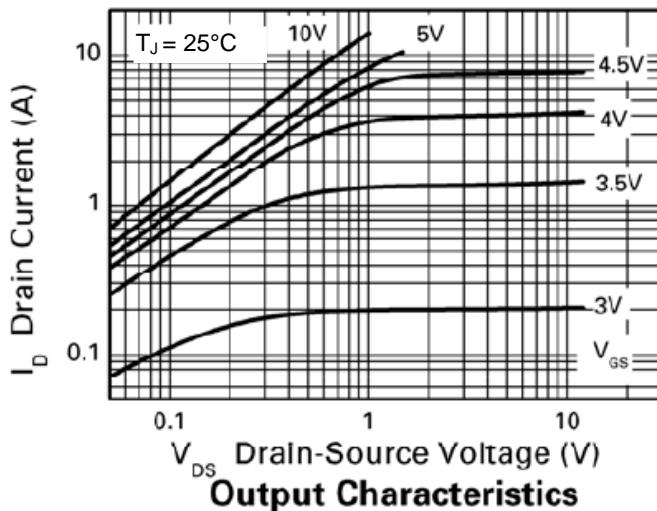
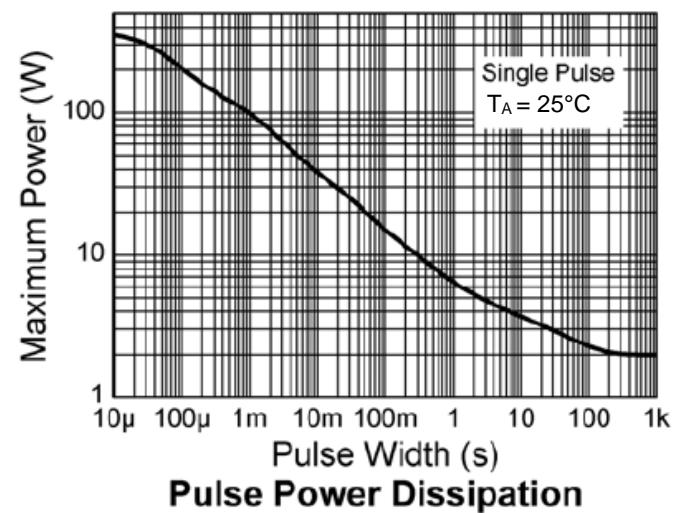
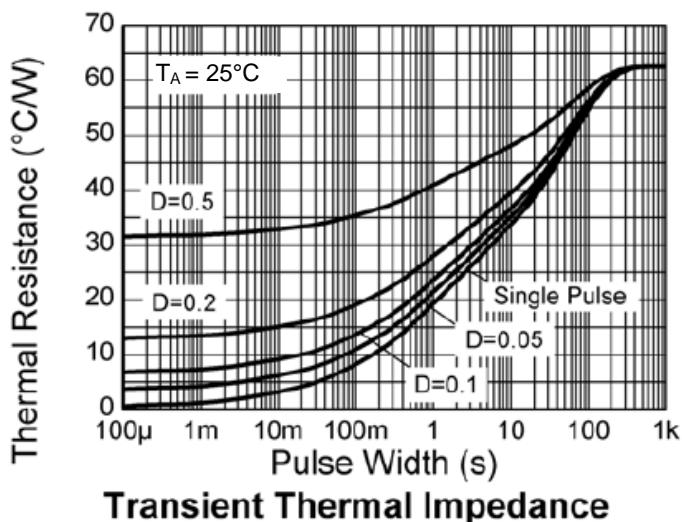
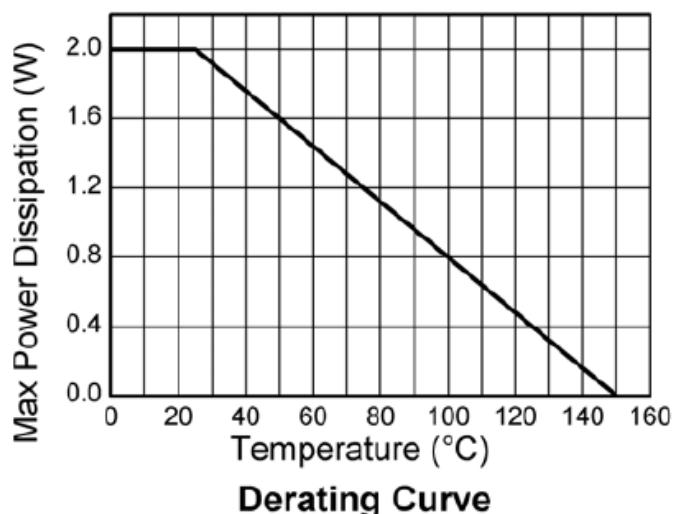
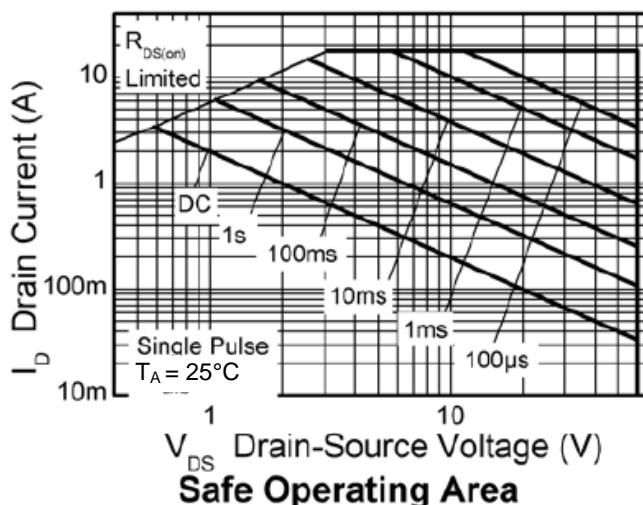
## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	0.5	µA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-State Resistance (Note 9)	R <sub>D(on)</sub>	—	—	0.08	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.8A
		—	—	0.15	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.2A
Forward Transconductance (Notes 9 &11)	g <sub>fs</sub>	—	6.6	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.8A
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>iss</sub>	—	459	—	pF	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	44.2	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	24.1	—	pF	
Turn-On Delay Time (Note 10)	t <sub>d(on)</sub>	—	2.6	—	ns	V <sub>DD</sub> = 30V, I <sub>D</sub> = 1.5A R <sub>G</sub> ≈ 6.0Ω, V <sub>GS</sub> = 10V
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	2.1	—	ns	
Turn-Off Delay Time (Note 10)	t <sub>d(off)</sub>	—	12.3	—	ns	
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	4.6	—	ns	
Gate Charge (Note 10)	Q <sub>G</sub>	—	4.0	—	nC	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 5V I <sub>D</sub> = 1.4A
Total Gate Charge (Note 10)	Q <sub>G</sub>	—	5.8	—	nC	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1.4A
Gate-Source Charge (Note 10)	Q <sub>GS</sub>	—	1.4	—	nC	
Gate Drain Charge (Note 10)	Q <sub>GD</sub>	—	1.9	—	nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	0.88	1.2	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 11)	trr	—	19.2	—	ns	T <sub>J</sub> = +25°C, I <sub>S</sub> = 1.4A, dI/dt = 100A/µs
Reverse Recovery Charge (Note 11)	Qrr	—	30.3	—	nC	

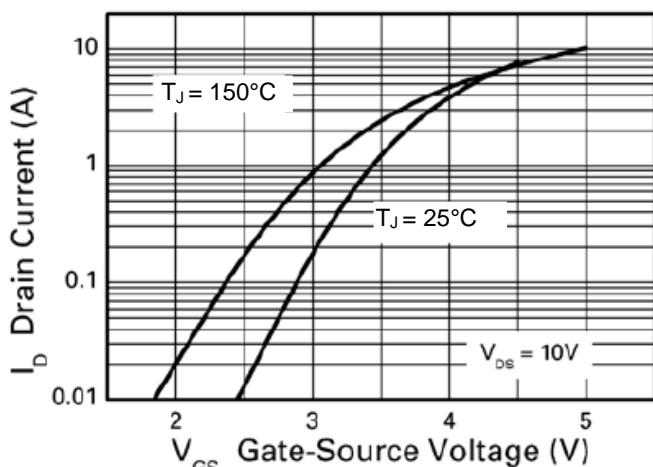
Notes:

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 <= 10s.
8. Repetitive rating - 25mm x 25mm FR-4 PCB, D=0.02, pulse width 300\_s - pulse width limited by maximum junction temperature.
9. Measured under pulsed conditions. Pulse width <= 300s; duty cycle <= 2%.
10. Switching characteristics are independent of operating junction temperature.
11. For design aid only, not subject to production testing.

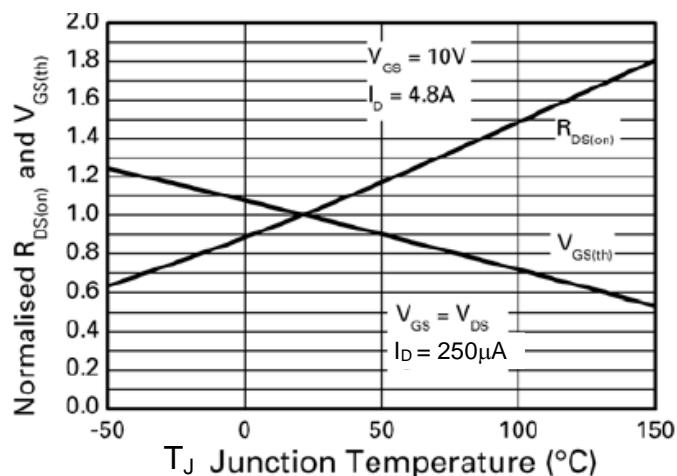
## Typical Characteristics



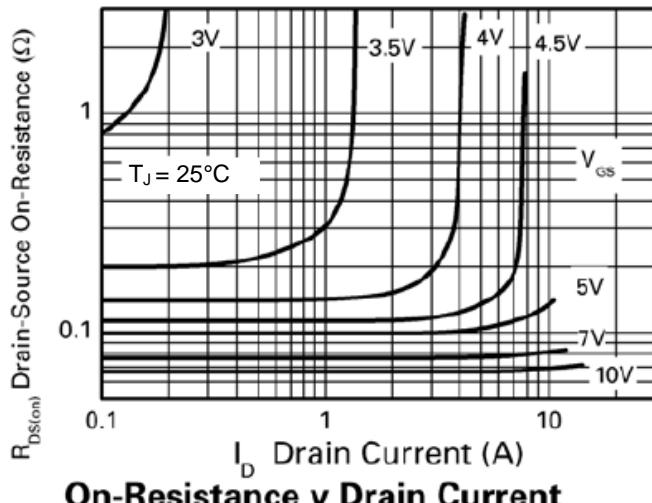
**Typical Characteristics (Cont.)**



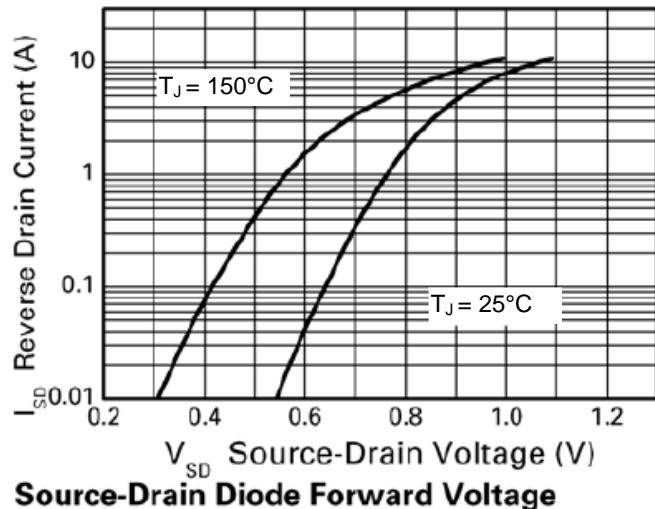
**Typical Transfer Characteristics**



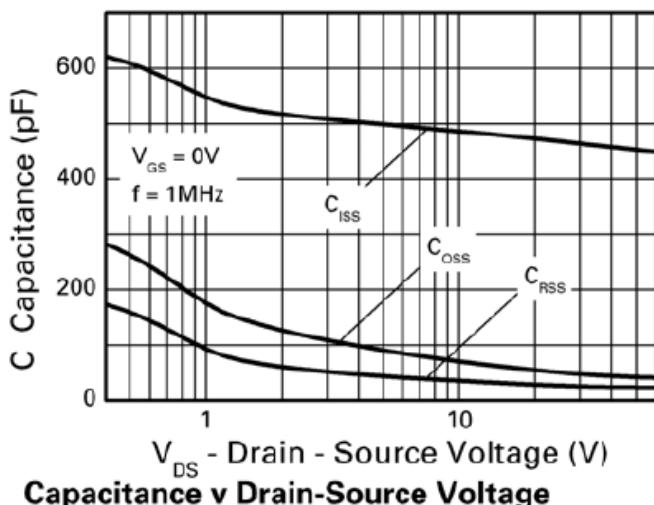
**Normalised Curves v Temperature**



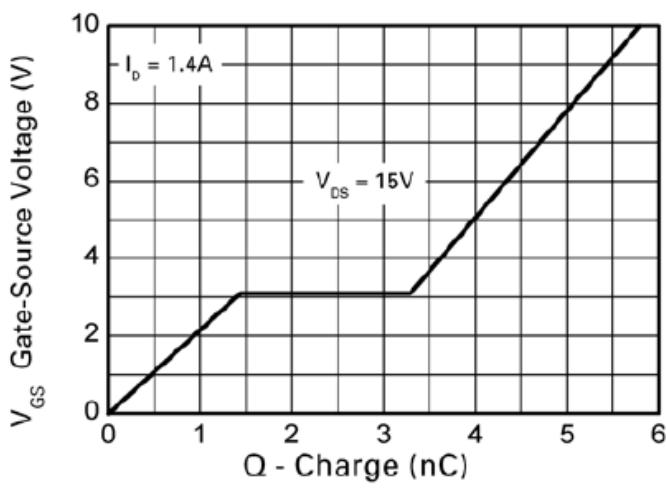
**On-Resistance v Drain Current**



**Source-Drain Diode Forward Voltage**

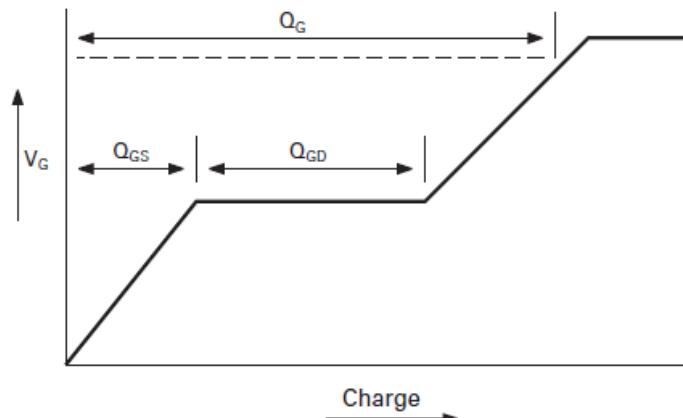


**Capacitance v Drain-Source Voltage**

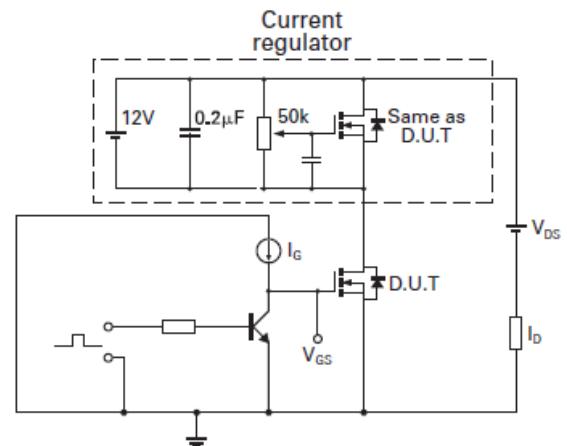


**Gate-Source Voltage v Gate Charge**

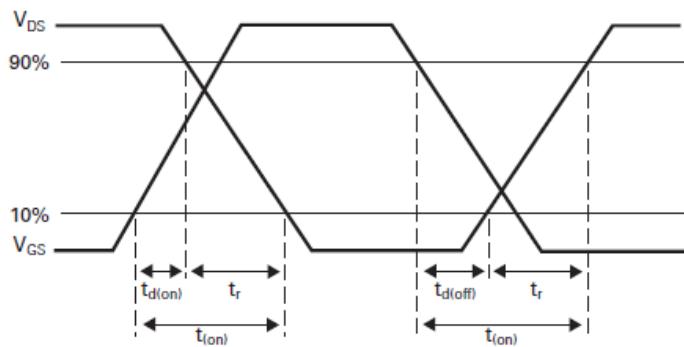
## Test Circuits



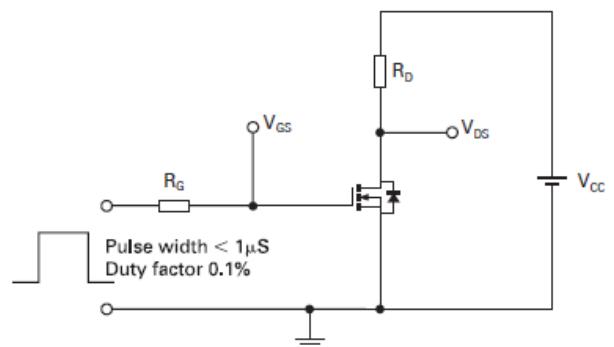
Basic gate charge waveform



Gate charge test circuit



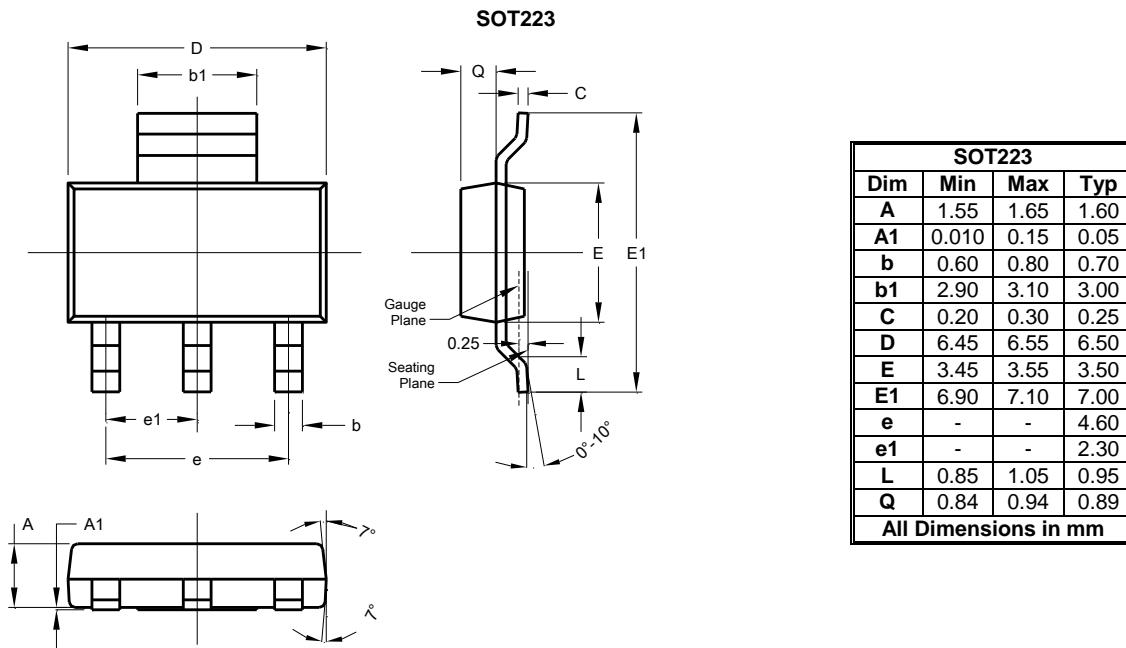
Switching time waveforms



Switching time test circuit

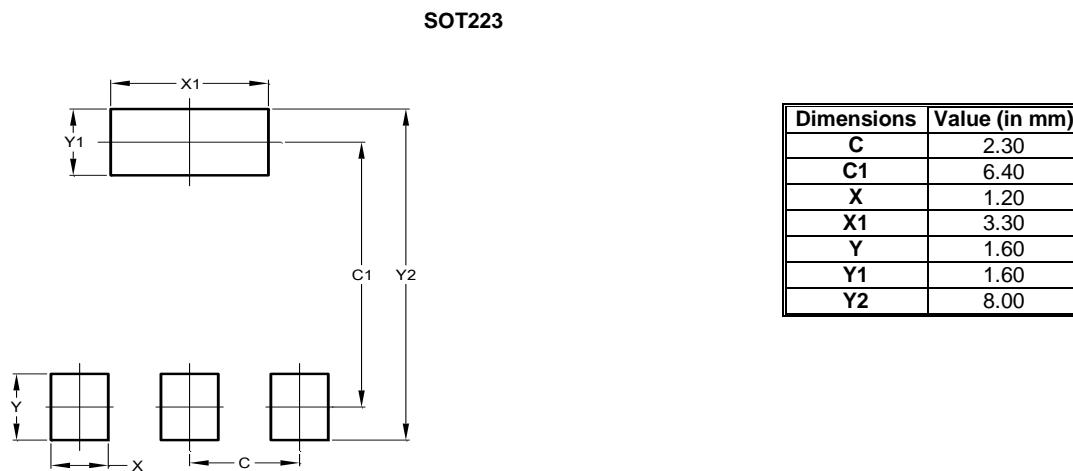
## Package Outline Dimensions

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



## Suggested Pad Layout

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



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