

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D$ $T_A = +25^\circ\text{C}$
70V	0.13Ω @ $V_{GS} = 10\text{V}$	3.8A

## Description

This new generation of trench MOSFETs from Zetex 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 power management applications.

## Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control
- Class D Audio Output Stages

## Features and Benefits

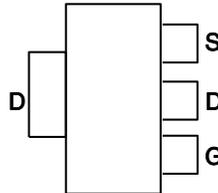
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

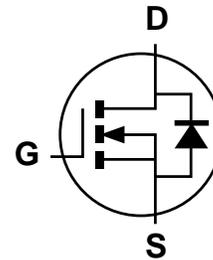
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (Ⓔ3)
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top View



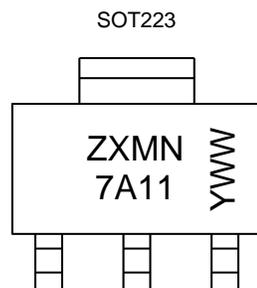
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
ZXMN7A11GTA	Standard	SOT223	1,000 / Tape & Reel
ZXMN7A11GTC	Standard	SOT223	4,000 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



ZXMN 7A11 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 5= 2015)  
 WW or  $\bar{W}W$  = Week Code (01-53)

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

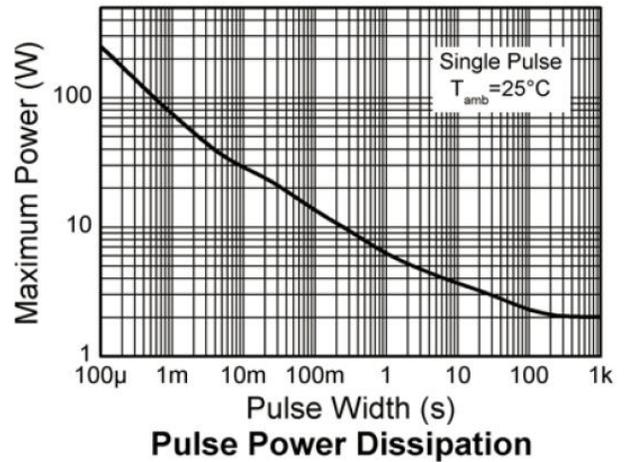
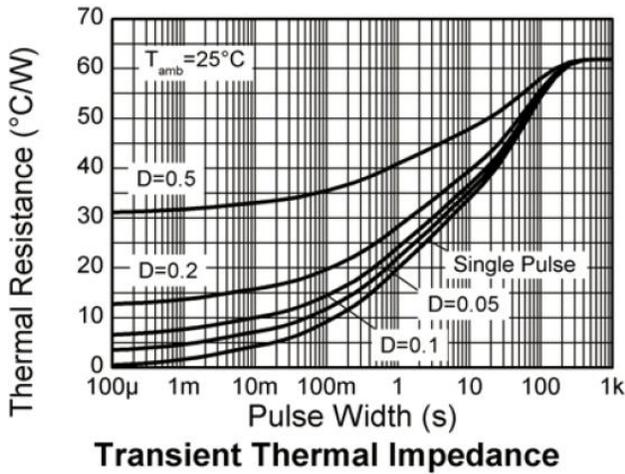
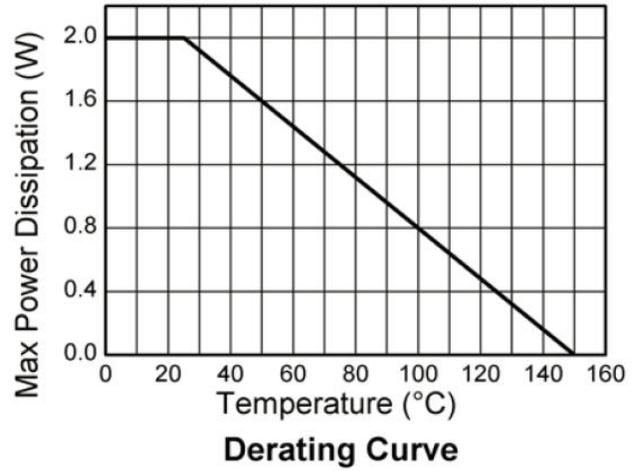
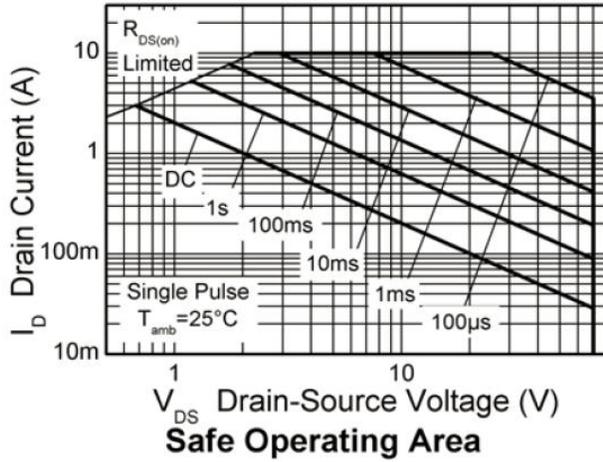
Characteristic	Symbol	Value	Units
Drain-Source Voltage	$V_{DSS}$	70	V
Gate-Source Voltage	$V_G$	$\pm 20$	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ ,	$I_D$	$T_A = +25^\circ\text{C}$ (Note 6)	3.8
		$T_A = +70^\circ\text{C}$ (Note 6)	3.0
		$T_A = +25^\circ\text{C}$ (Note 5)	2.7
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	5	A
Pulsed Drain Current	$I_{DM}$	10	A
Pulsed Source Current (Body Diode)	$I_{SM}$	10	A

**Thermal Resistance** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2.0	W
Linear Derating Factor (Note 5)		16	mW/ $^\circ\text{C}$
Total Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 6)	$P_D$	3.9	W
Linear Derating Factor (Note 6)		31	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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  $t \leq 5$  sec.
  7. Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.05$  pulse width=10 $\mu\text{s}$  - pulse width limited by maximum junction temperature.

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

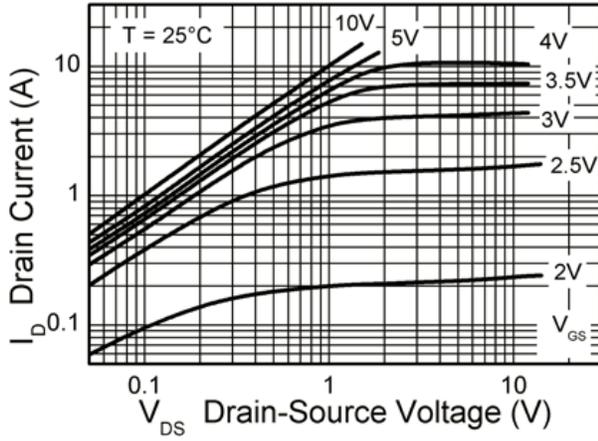


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

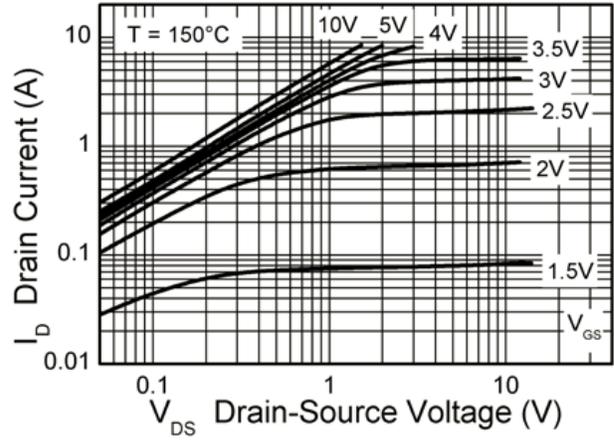
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	70	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 70V, V <sub>GS</sub> = 0V
Gate-Source 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>	1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>	—	—	0.13	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.4A
		—	—	0.19		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.8A
Forward Transfer Admittance	g <sub>fs</sub>	—	4.66	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4.4A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.85	0.95	V	T <sub>J</sub> = +25°C, V <sub>GS</sub> = 0V, I <sub>S</sub> = 2.5A
<b>DYNAMIC CHARACTERISTICS (Notes 9 &amp; 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	298	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	35	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	21	—		
Total Gate Charge	Q <sub>g</sub>	—	4.35	—	nC	V <sub>DS</sub> = 35V, V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 4.4A
Total Gate Charge	Q <sub>g</sub>	—	7.4	—	nC	V <sub>DS</sub> = 35V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.4A
Gate-Source Charge	Q <sub>gs</sub>	—	1.06	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	1.8	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	1.9	—	ns	V <sub>DS</sub> = 35V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 1 A, R <sub>G</sub> ≅ 6.0Ω
Turn-On Rise Time	t <sub>r</sub>	—	2	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	11.5	—		
Turn-Off Fall Time	t <sub>f</sub>	—	5.8	—		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	—	19.8	—	ns	T <sub>J</sub> = +25°C, I <sub>S</sub> = 2.5A,
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	—	14	—	nC	di/dt = 100A/μs

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.

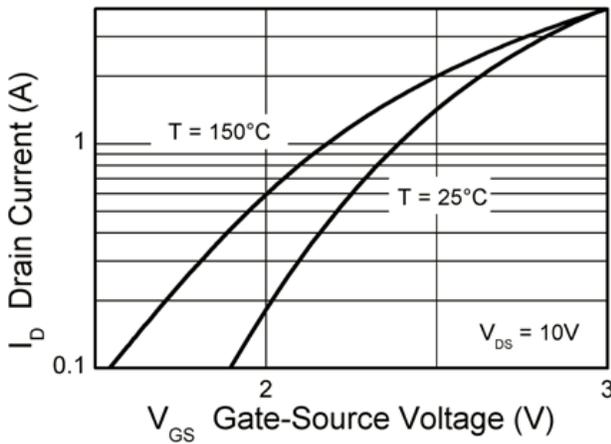
**Typical Characteristics**



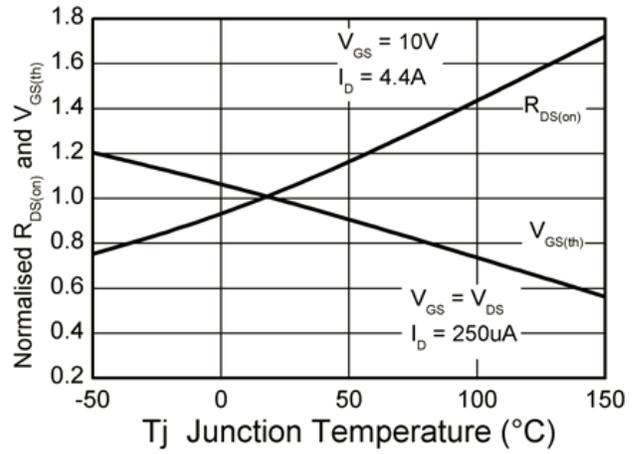
**Output Characteristics**



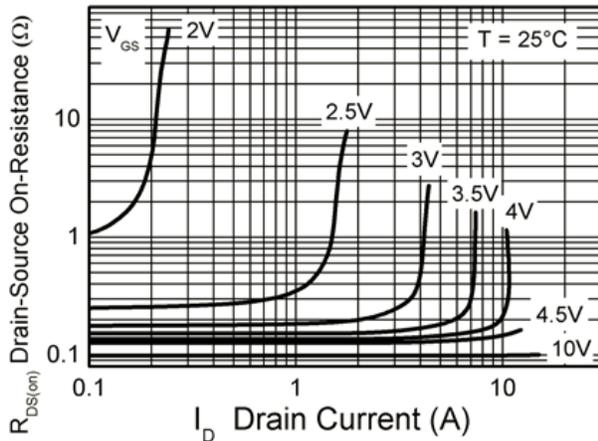
**Output Characteristics**



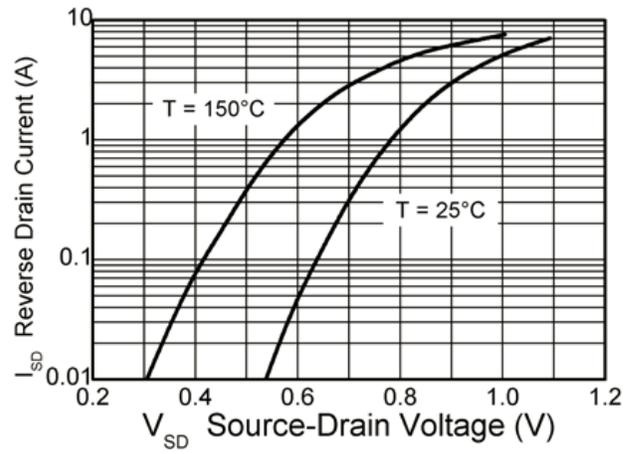
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

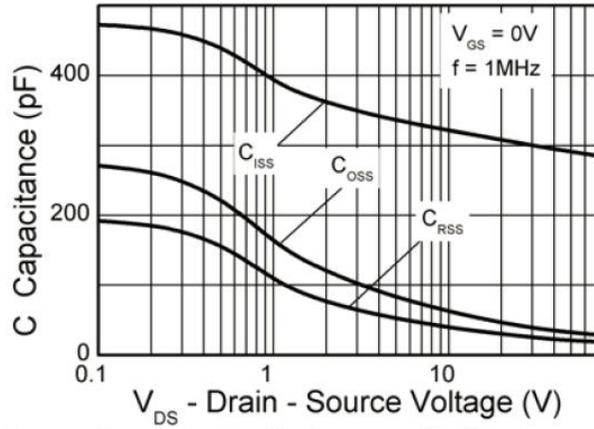


**On-Resistance v Drain Current**

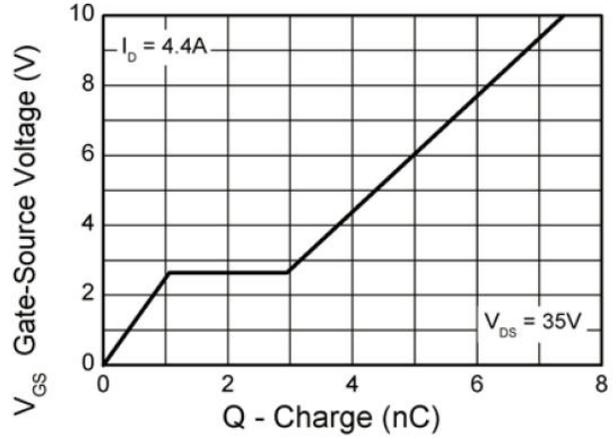


**Source-Drain Diode Forward Voltage**

**Typical Characteristics**



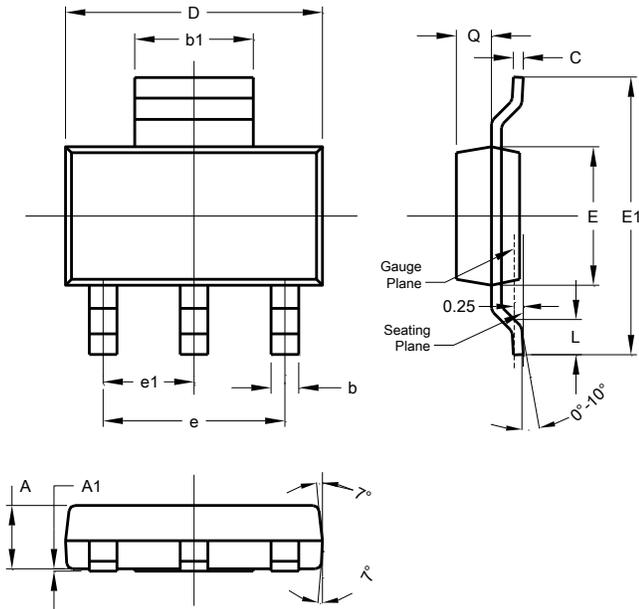
**Capacitance v Drain-Source Voltage**



**Gate-Source Voltage v Gate Charge**

**Package Outline Dimensions**

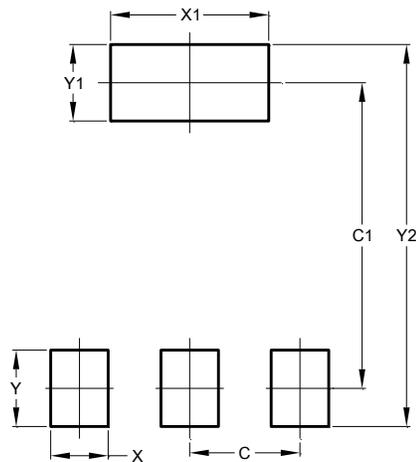
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> 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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