

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub> Max</b>	<b>I<sub>D</sub></b> <b>T<sub>A</sub> = +25°C</b>
70V	0.13Ω @ V <sub>GS</sub> = 10V	3.8A

## Description

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:

- 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)**
- **The ZXMN7A11GQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

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

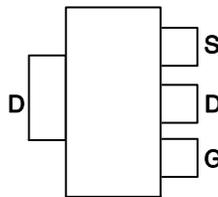
## Mechanical Data

- Package: SOT223 (Type DN)
- Package 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)

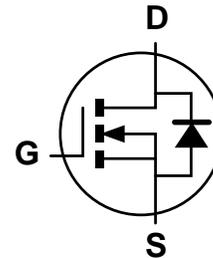
SOT223 (Type DN)



Top View



Pin Out - Top View



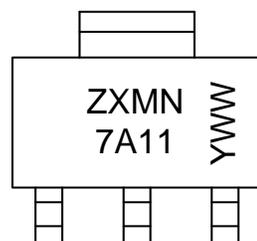
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Compliance	Package	Packing	
			Qty.	Carrier
ZXMN7A11GQTA	Automotive	SOT223 (Type DN)	1,000	Tape & Reel
ZXMN7A11GQTC	Automotive	SOT223 (Type DN)	4,000	Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  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



ZXMN 7A11 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 2= 2022)  
 WW or  $\bar{W}W$  = Week Code (01 to 53)

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

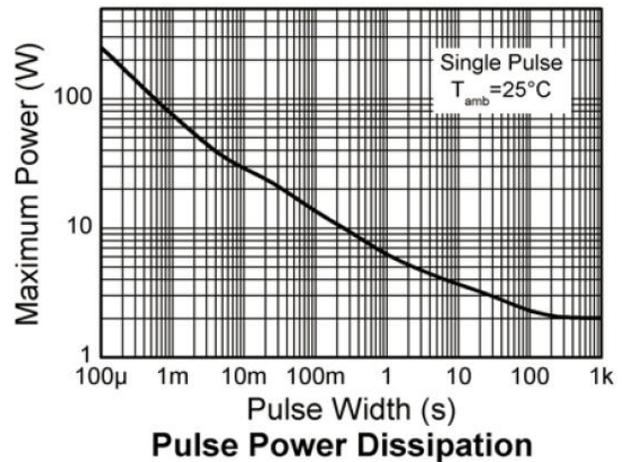
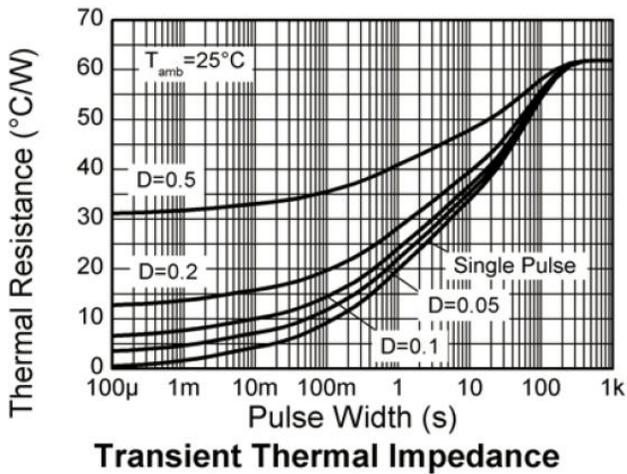
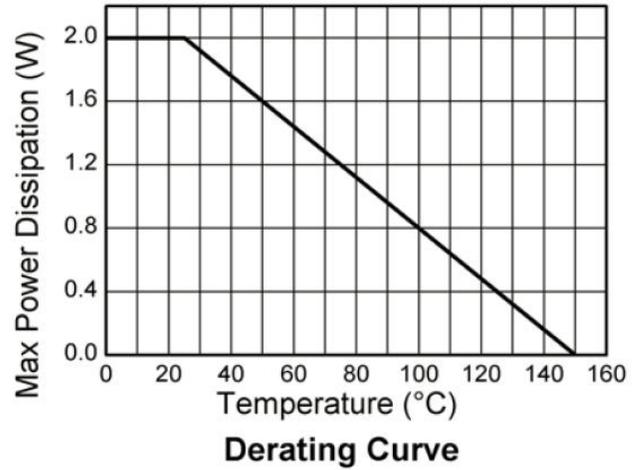
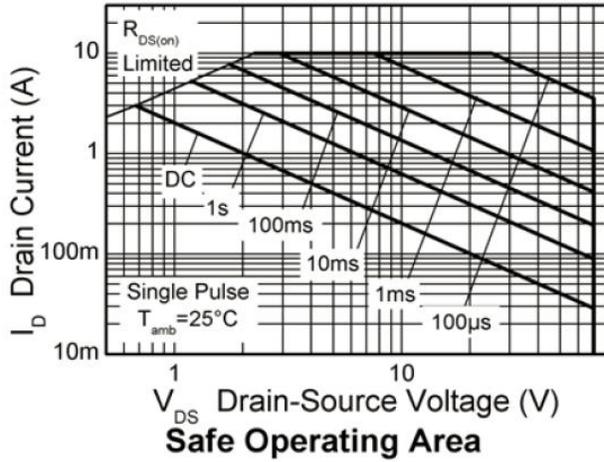
Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	70	V
Gate-Source Voltage	V <sub>G</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>A</sub> = +25°C (Note 6)	3.8
		T <sub>A</sub> = +70°C (Note 6)	3.0
		T <sub>A</sub> = +25°C (Note 5)	2.7
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	3.8	A
Pulsed Drain Current	I <sub>DM</sub>	10	A
Pulsed Source Current (Body Diode)	I <sub>SM</sub>	10	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation at T <sub>A</sub> = +25°C (Note 5)	P <sub>D</sub>	2.0	W
Linear Derating Factor (Note 5)		16	mW/°C
Total Power Dissipation at T <sub>A</sub> = +25°C (Note 6)	P <sub>D</sub>	3.9	W
Linear Derating Factor (Note 6)		31	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	62.5	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	32	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- 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 ≤ 5 sec.

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

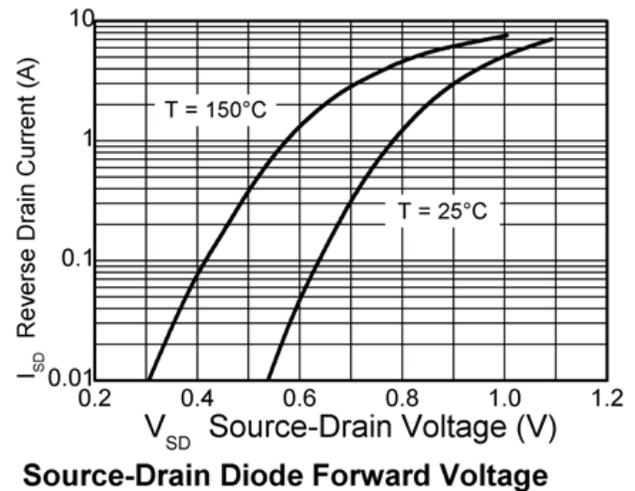
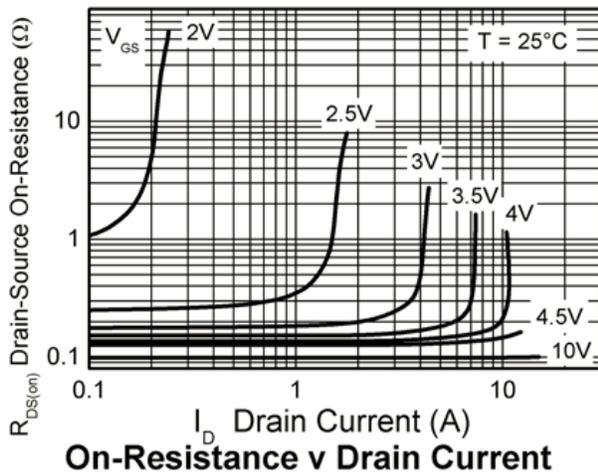
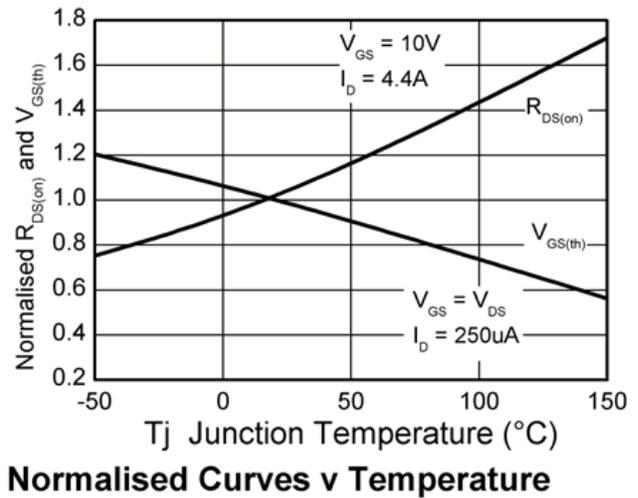
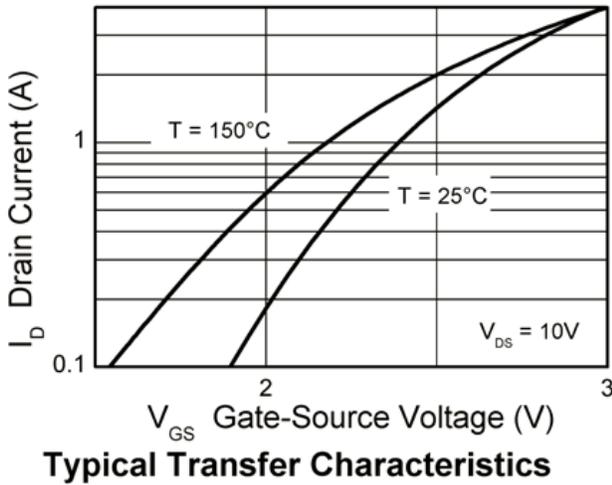
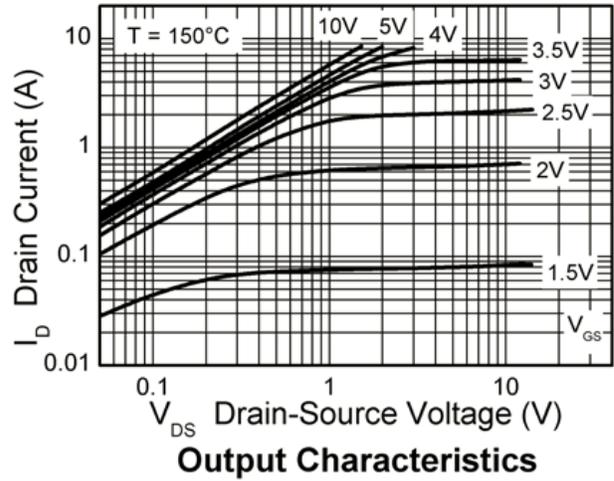
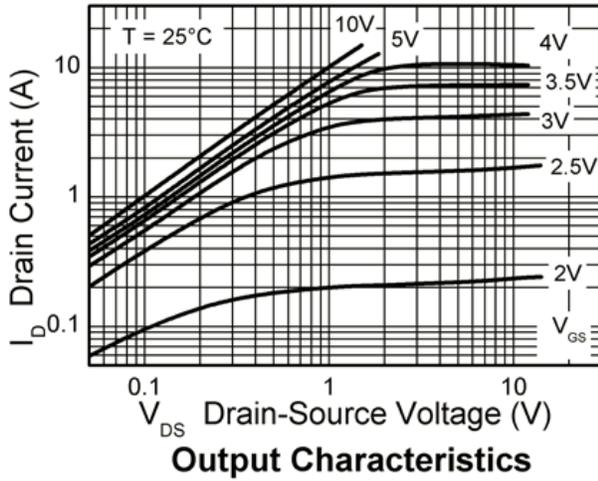


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

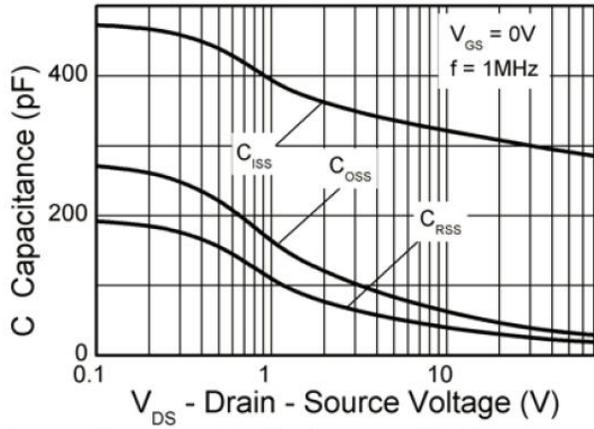
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	70	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 70V, V <sub>GS</sub> = 0V
Gate-Source 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 7)	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 7)	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 8 &amp; 9)</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> = 1A, 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:
7. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  8. Switching characteristics are independent of operating junction temperature.
  9. For design aid only, not subject to production testing.

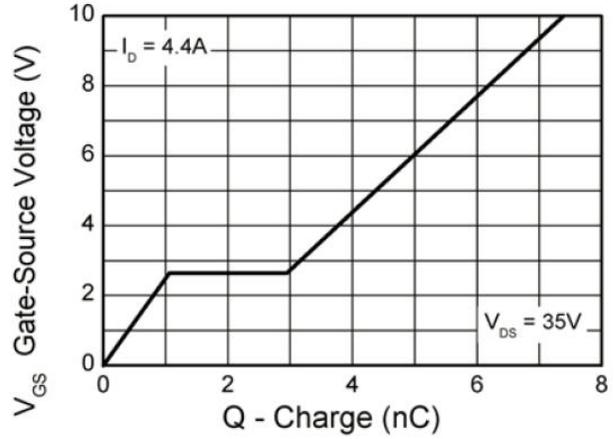
**Typical Characteristics**



**Typical Characteristics** (continued)



**Capacitance v Drain-Source Voltage**

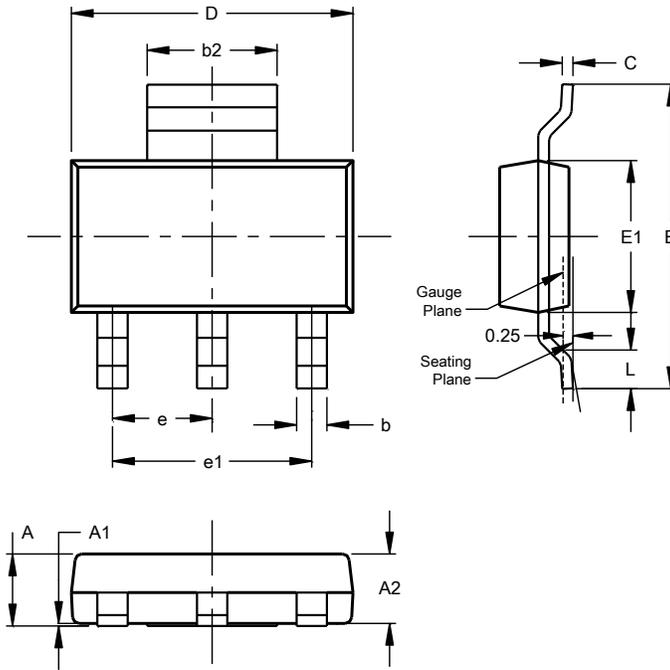


**Gate-Source Voltage v Gate Charge**

**Package Outline Dimensions**

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

**SOT223 (Type DN)**

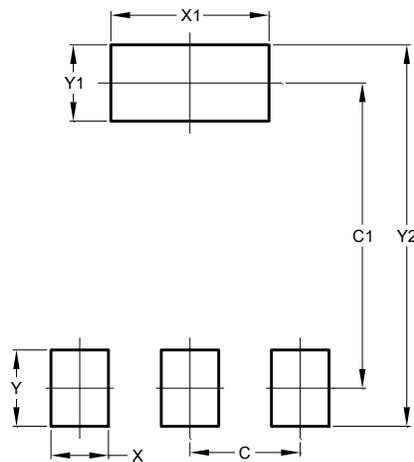


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT223 (Type DN)**



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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