70V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

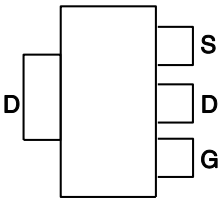
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

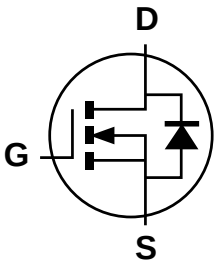
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top View



Equivalent Circuit

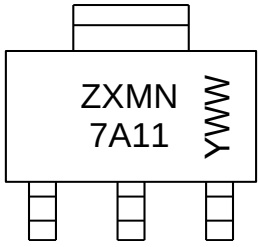
Ordering Information (Note 4)

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 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

SOT223



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

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

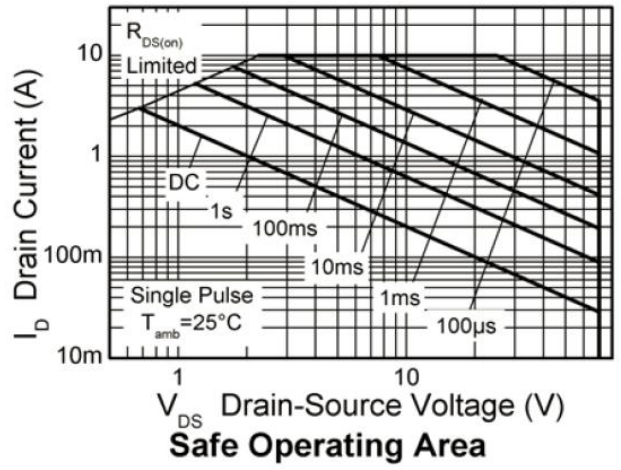
Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	70	V
Gate-Source Voltage		V_G	±20	V
Continuous Drain Current, V_{GS} = 10V,	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A = +25°C (Note 5)	I_D	3.8 3.0 2.7	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	5	A
Pulsed Drain Current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

Thermal Resistance (@T_A = +25°C, unless otherwise specified.)

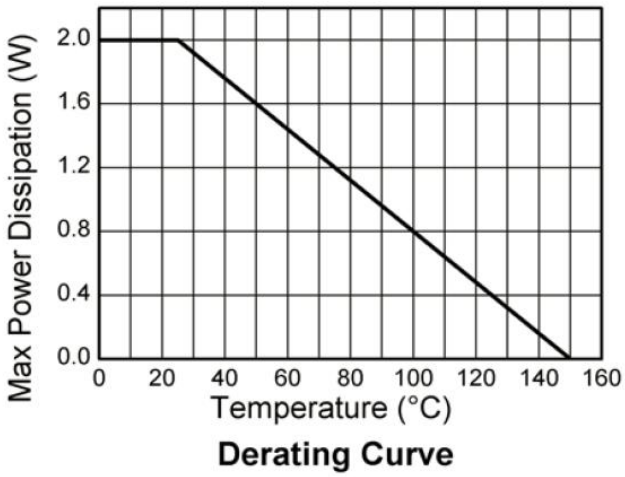
Characteristic	Symbol	Value	Units
Total Power Dissipation at T_A = +25°C (Note 5) Linear Derating Factor (Note 5)	P_D	2.0 16	W mW/°C
Total Power Dissipation at T_A = +25°C (Note 6) Linear Derating Factor (Note 6)	P_D	3.9 31	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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 ≤ 5 sec.
7. Repetitive rating 25mm x 25mm FR4 PCB, D=0.05 pulse width=10µs - pulse width limited by maximum junction temperature.

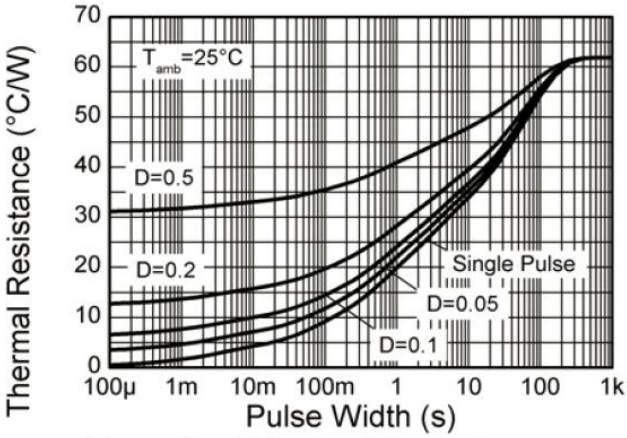
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)



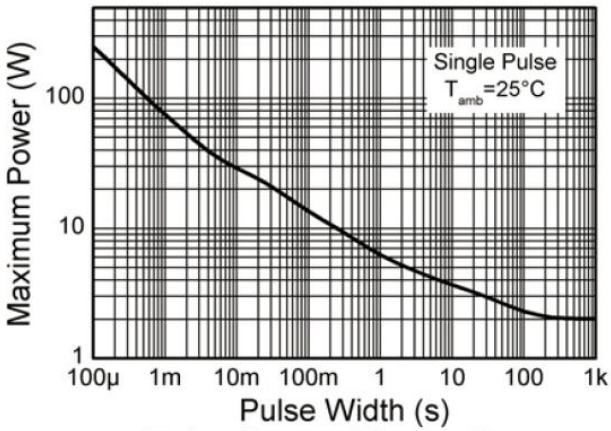
Safe Operating Area



Derating Curve



Transient Thermal Impedance



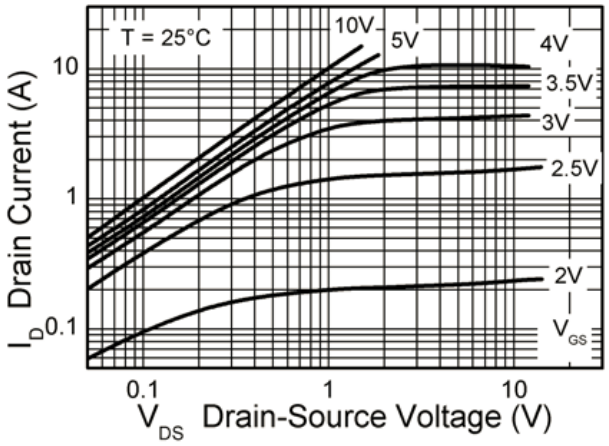
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

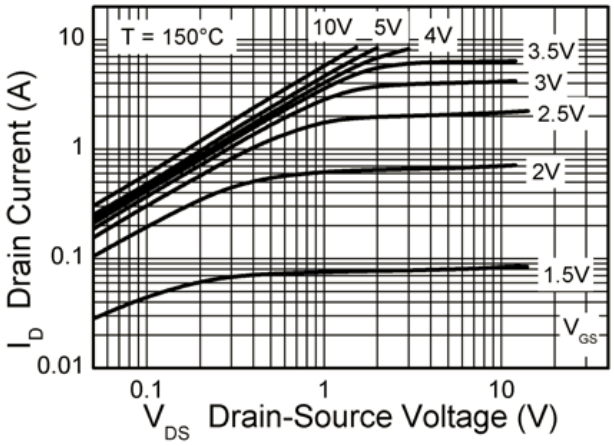
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	70	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 70V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS\ (ON)}$	—	—	0.13	Ω	V_{GS} = 10V, I_D = 4.4A
		—	—	0.19		V_{GS} = 4.5V, I_D = 3.8A
Forward Transfer Admittance	g_{fs}	—	4.66	—	S	V_{DS} = 15V, I_D = 4.4A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.85	0.95	V	T_J = +25°C , V_{GS} = 0V, I_S = 2.5A
DYNAMIC CHARACTERISTICS (Notes 9 &10)						
Input Capacitance	C_{iss}	—	298	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	35	—		
Reverse Transfer Capacitance	C_{rss}	—	21	—		
Total Gate Charge	Q_g	—	4.35	—	nC	V_{DS} = 35V, V_{GS} = 5.0V, I_D = 4.4A
Total Gate Charge	Q_g	—	7.4	—	nC	V_{DS} = 35V, V_{GS} = 10V, I_D = 4.4A
Gate-Source Charge	Q_{gs}	—	1.06	—		
Gate-Drain Charge	Q_{gd}	—	1.8	—		
Turn-On Delay Time	$t_{D(on)}$	—	1.9	—	ns	V_{DS} = 35V, V_{GS} = 10V, I_D = 1 A, $R_G \cong$ 6.0Ω
Turn-On Rise Time	t_r	—	2	—		
Turn-Off Delay Time	$t_{D(off)}$	—	11.5	—		
Turn-Off Fall Time	t_f	—	5.8	—		
Body Diode Reverse Recovery Time	t_{rr}	—	19.8	—	ns	T_J = +25°C, IS = 2.5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	14	—	nC	

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.

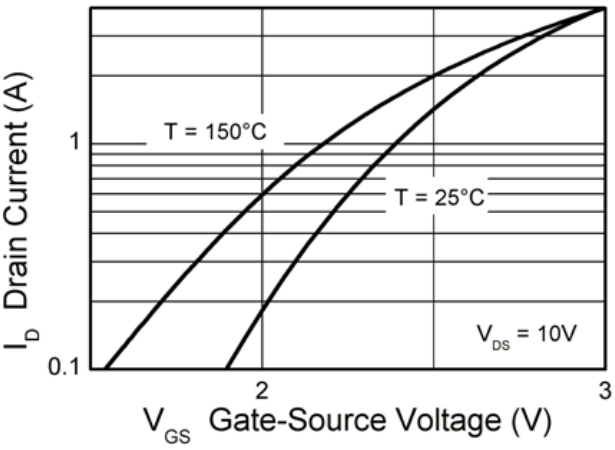
Typical Characteristics



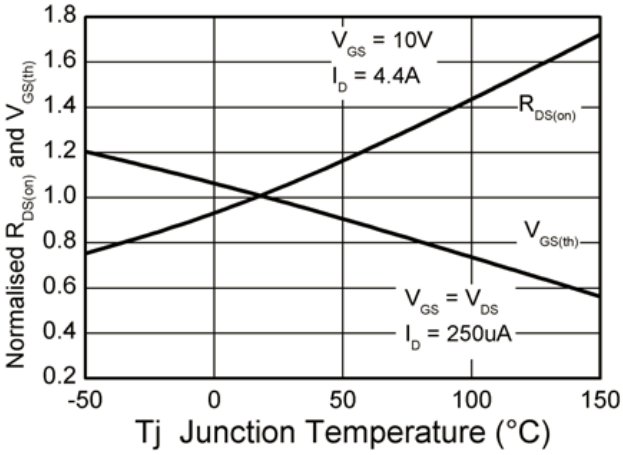
Output Characteristics



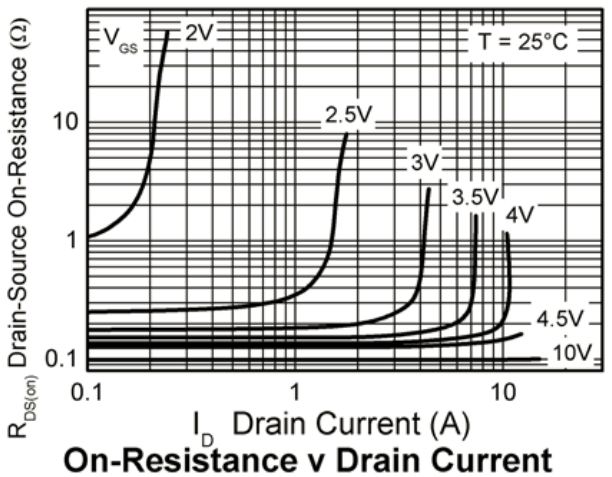
Output Characteristics



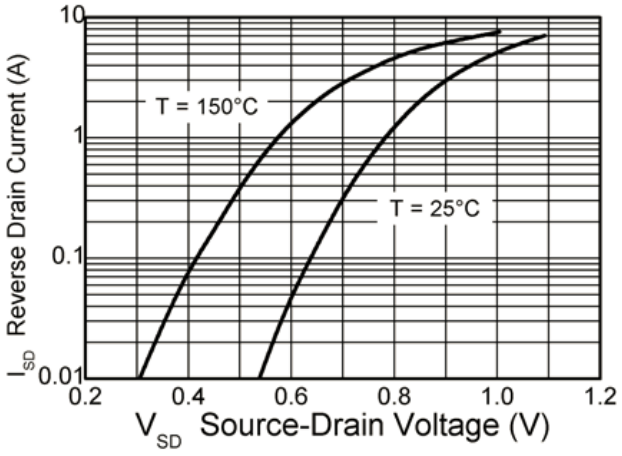
Typical Transfer Characteristics



Normalised Curves v Temperature

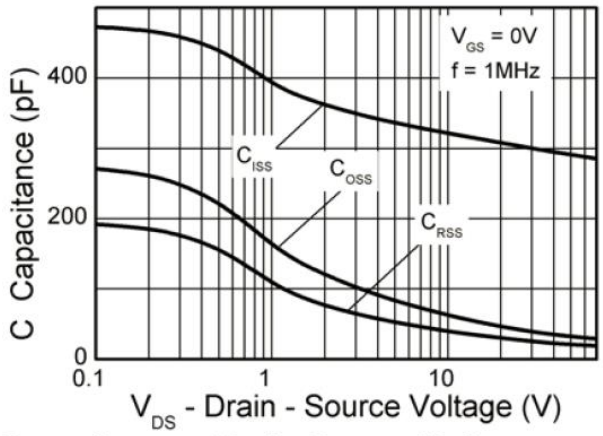


On-Resistance v Drain Current

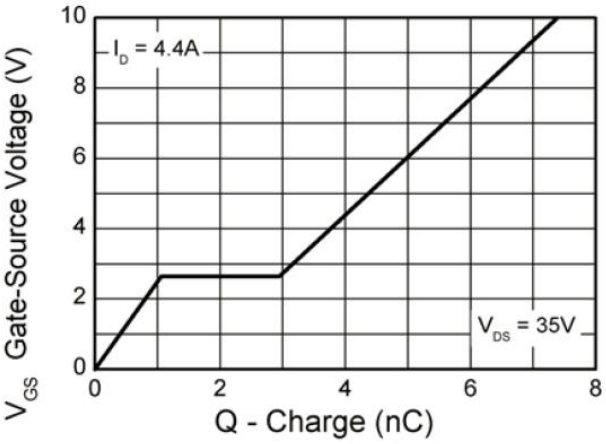


Source-Drain Diode Forward Voltage

Typical Characteristics



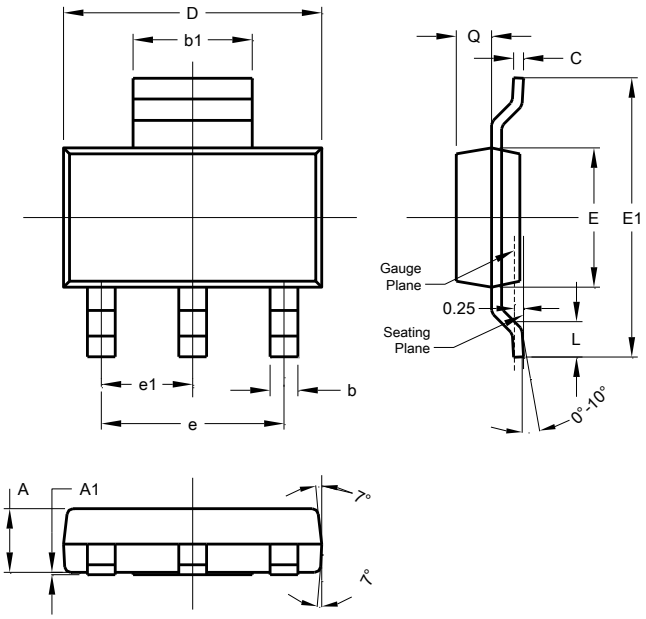
Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

Package Outline Dimensions

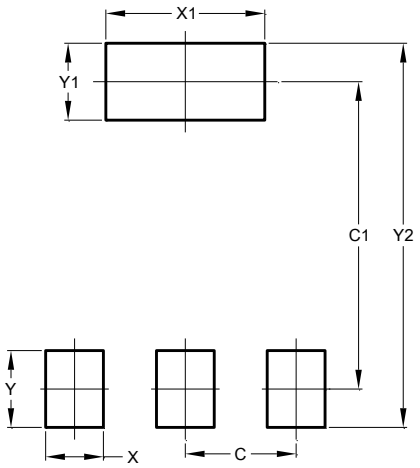
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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