

ZXMN6A11Z

60V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT89 PACKAGE

Product Summary

V _{(BR)DSS}	R _{DS(on)} Max	I _D max T _A = 25°C (Note 5)
60V	120mΩ @ V _{GS} = 10V	3.6A
00 v	180mΩ @ $V_{GS} = 4.5V$	2.9A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance (R_{DS(on)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC Converters
- Power Management functions
- · Motor control
- Disconnect switches

Features and Benefits

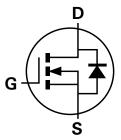
- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- Low Gate Drive
- Lead Free/RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

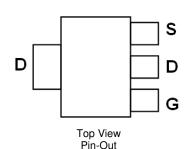
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (approximate)



Top View



Device symbol



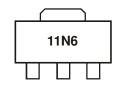
Ordering Information (Note 3)

ſ	Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
	ZXMN6A11ZTA	11N6	7	12	1,000

Notes:

- 1. No purposefully added lead.
- 2. Diodes Inc's "Green" Policy can be found on our website at http://www.diodes.com
- 3. For packaging details, go to our website at http://www.diodes.com

Marking Information



11N6 = Product type Marking Code



ZXMN6A11Z

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	Steady State	@ V _{GS} = 10V; T _A = 25°C (Note 5) @ V _{GS} = 10V; T _A = 75°C (Note 5) @ V _{GS} = 10V; T _A = 25°C (Note 4)	ID	3.6 2.9 2.7	Α
Pulsed Drain Current (Note 6)			I _{DM}	14.5	Α
Continuous Source Current (Body Diode) (Note 5)			I _S	3.7	Α
Pulsed Source Current (Body Diode) (Note 6)			I _{SM}	14.5	Α

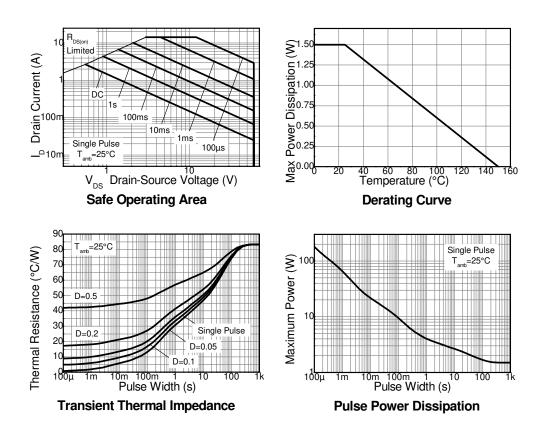
Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	D-	1.5	W
Linear Derating Factor	P _D	12	mW/°C
Power Dissipation (Note 5)	Б	2.6	W
Linear Derating Factor	P _D	21	mW/°C
Thermal Resistance, Junction to Ambient (Note 4)	$R_{ heta JA}$	83.3	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{ heta JA}$	47.4	°C/W
Operating and Storage Temperature Range	T_{J}, T_{STG}	-55 to +150	°C

Notes:

- 4. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions. 5. For a device surface mounted on FR4 PCB measured at $t \le 10$ sec.
- 6. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300µs pulse width limited by maximum junction temperature.

Thermal Characteristics





ZXMN6A11Z

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Тур	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 T _J = 25°C	I _{DSS}	-	-	1.0	μΑ	$V_{DS} = 60V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	-	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	1	-	2.2	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
Statio Drain Source On Begintenes (Note 7)	В	-	-	120	mΩ	$V_{GS} = 10V, I_D = 2.5A$	
Static Drain-Source On-Resistance (Note 7)	R _{DS (ON)}		-	180		$V_{GS} = 4.5V, I_D = 2A$	
Forward Transconductance (Note 7 & 9)	g _{FS}	-	4.9	-	S	$V_{DS} = 15V, I_D = 2.5A$	
Diodes Forward Voltage (Note 7)	V_{SD}	-	0.85	0.95	V	$T_J = 25^{\circ}C$, $I_S = 2.8A$, $V_{GS} = 10V$	
DYNAMIC CHARACTERISTICS							
Input Capacitance (Note 8 & 9)	C _{iss}	-	330	-	pF	V 40V V 0V	
Output Capacitance (Note 8 & 9)	Coss	-	35.2	-	pF	$V_{DS} = 40V, V_{GS} = 0V,$ -f = 1.0MHz	
Reverse Transfer Capacitance (Note 8 & 9)	C _{rss}	-	17.1	-	pF	1 = 1.0WHZ	
Gate Charge (Note 8 & 9)	Qg	-	3	-	nC	$V_{GS} = 5V, V_{DS} = 15V, I_D = 2.5A$	
Total Gate Charge (Note 8 & 9)	Qg	-	5.7	-	nC		
Gate-Source Charge (Note 8 & 9)	Q _{gs}	-	1.25	-	nC	$V_{GS} = 10V, V_{DS} = 15V,$	
Gate-Drain Charge (Note 8 & 9)	Q _{gd}	-	0.86	-	nC	$I_D = 2.5A$	
Reverse Recovery Time (Note 9)	t _{rr}		21.5		ns	$T_J = 25^{\circ}C$, $I_S = 2.5A$,	
Reverse Recovery Charge (Note 9)	Q _{rr}		20.5		nC	$di/dt = 100A/\mu s$	
Turn-On Delay Time (Note 8 & 9)	t _{D(on)}	-	1.95	-	ns		
Turn-On Rise Time (Note 8 & 9)	t _r	-	3.5	-	ns	$V_{GS} = 10V, V_{DD} = 30V,$	
Turn-Off Delay Time (Note 8 & 9)	t _{D(off)}	-	8.2	-	ns	$R_G = 6\Omega$, $I_D = 2.5A$	
Turn-Off Fall Time (Note 8 & 9)	t _f	-	4.6	-	ns		

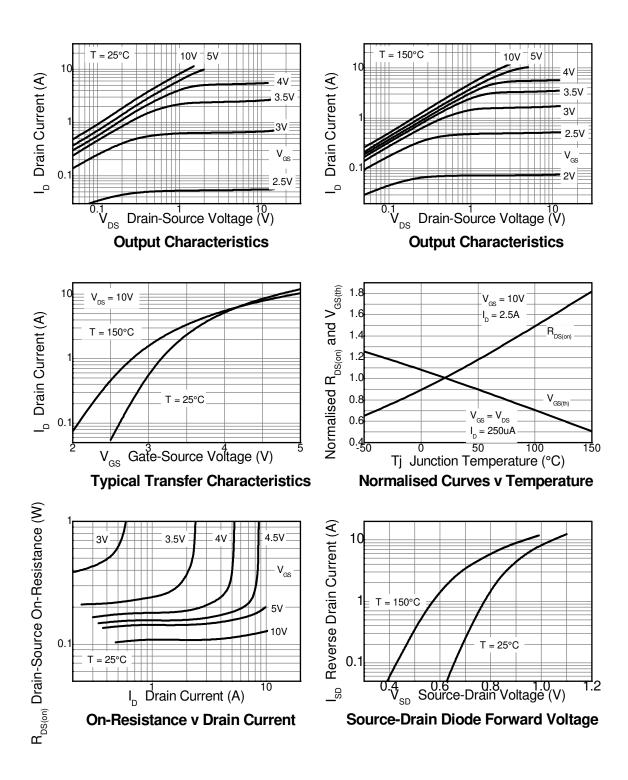
Notes:

^{7.} Measured under pulsed conditions. Pulse width \leq 300 μ s; duty cycle \leq 2%. 8. Switching characteristics are independent of operating junction temperature.

^{9.} For design aid only, not subject to production testing.

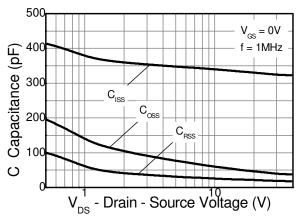


Typical Characteristics

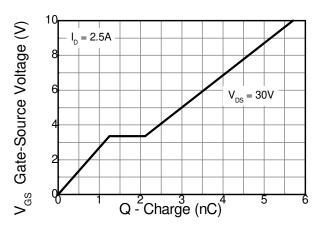




Typical Characteristics - Continued

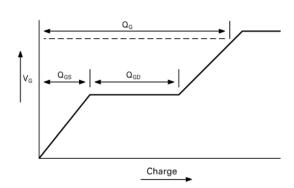


Capacitance v Drain-Source Voltage

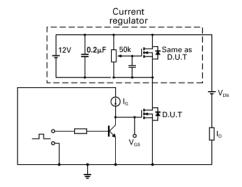


Gate-Source Voltage v Gate Charge

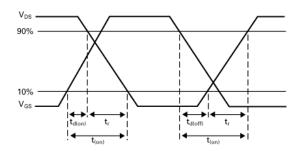
Test Circuits



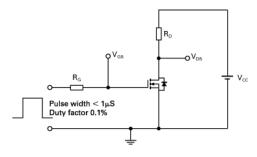
Basic gate charge waveform



Gate charge test circuit



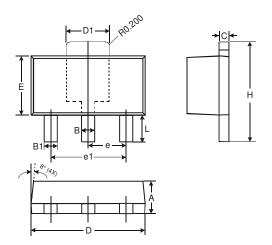
Switching time waveforms



Switching time test circuit

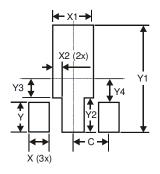


Package Outline Dimensions



SOT89				
Dim	Min	Max		
Α	1.40	1.60		
В	0.44	0.62		
B1	0.35	0.54		
С	0.35	0.43		
D	4.40	4.60		
D1	1.52	1.83		
Е	2.29	2.60		
е	1.50 Typ			
e1	3.00 Typ			
Н	3.94	4.25		
L	0.89	1.20		
All Dimensions in mm				

Suggested Pad Layout



Dimensions	Value (in mm)
Х	0.900
X1	1.733
X2	0.416
Υ	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
^	1 500





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