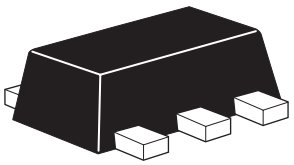
ZXMN6A11Z
60V SOT89 N-channel enhancement mode MOSFET

Summary

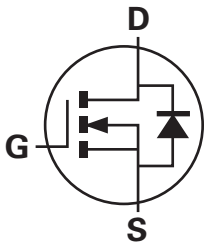


$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.120 @ V_{GS}= 10V	3.6
	0.180 @ V_{GS}= 4.5V	2.9

Description

This new generation trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

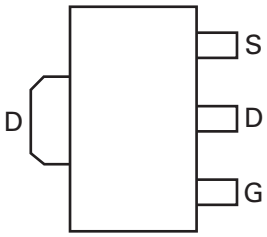
Features



- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT89 package

Applications

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control



Top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A11ZTA	7	12	1,000

Device marking

11N6

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current @ V_{GS}= 10V; T_{amb}=25°C(b)	I_D	3.6	A
@ V_{GS}= 10V; T_{amb}=70°C(b)		2.9	
@ V_{GS}= 10V; T_{amb}=25°C(a)		2.7	
Pulsed drain current(c)	I_{DM}	14.5	A
Continuous source current (body diode)(b)	I_S	3.7	A
Pulsed source current (body diode)(c)	I_{SM}	14.5	A
Power dissipation at T_{amb} =25°C(a)	P_D	1.5	W
Linear derating factor		12	mW/°C
Power dissipation at T_{amb} =25°C(b)	P_D	2.6	W
Linear derating factor		21	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient(a)	$R_{\Theta JA}$	83.3	°C/W
Junction to ambient(b)	$R_{\Theta JA}$	47.4	°C/W

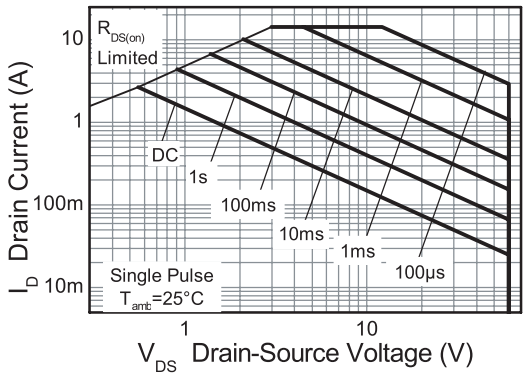
NOTES:

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

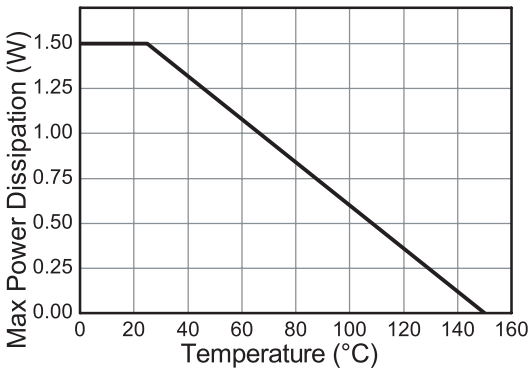
(b) For a device surface mounted on FR4 PCB measured at t 10 sec.

(c) Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs - pulse width limited by maximum junction temperature.

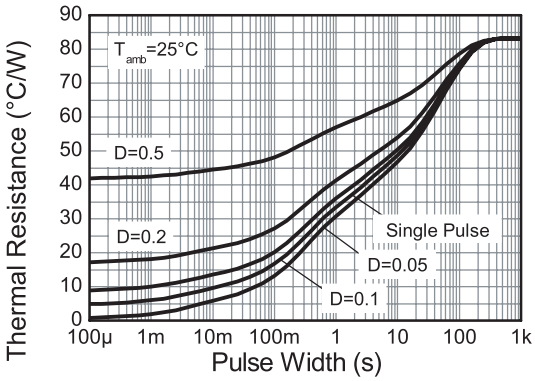
Typical characteristics



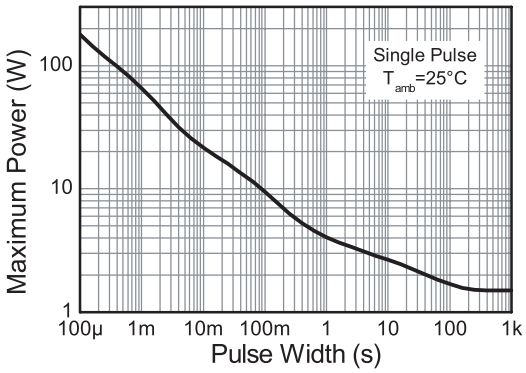
Safe Operating Area



Derating Curve



Transient Thermal Impedance



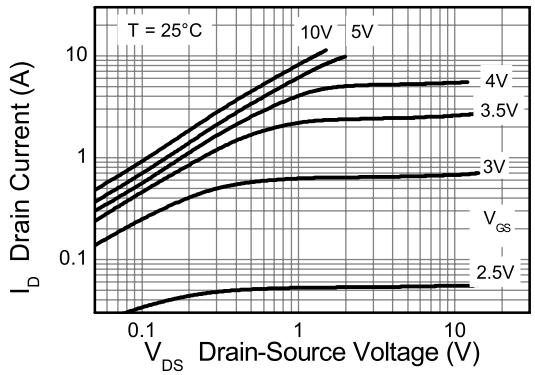
Pulse Power Dissipation

Electrical characteristics (@ T_{amb} = 25°c unless otherwise stated)

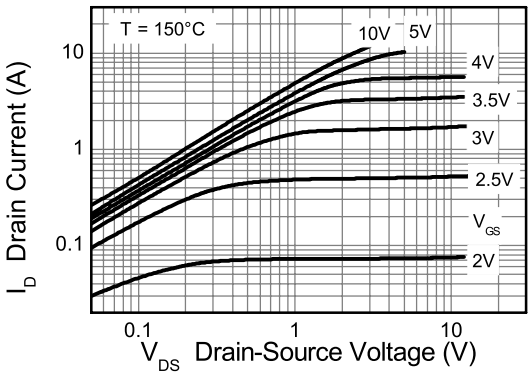
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	60			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1.0	μA	V_{DS}= 60V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	1.0			V	I_D= 250μA, V_{DS}=V_{GS}
Static drain-source on-state resistance (*)	$R_{DS(on)}$			0.120	Ω	V_{GS}= 10V, I_D= 2.5A
				0.180	Ω	V_{GS}= 4.5V, I_D = 2A
Forward transconductance(*)(‡)	g_{fs}		4.9		S	V_{DS}= 15V, I_D= 2.5A
Dynamic(‡)						
Input capacitance	C_{iss}		330		pF	V_{DS}= 40V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		35.2		pF	
Reverse transfer capacitance	C_{rss}		17.1		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		1.95		ns	V_{DD}= 30V, I_D= 2.5A R_G≅6.0Ω, V_{GS}= 10V
Rise time	t_r		3.5		ns	
Turn-off delay time	$t_{d(off)}$		8.2		ns	
Fall time	t_f		4.6		ns	
Gate charge	Q_g		3.0		nC	V_{DS}= 15V, V_{GS}= 5V I_D= 2.5A
Total gate charge	Q_g		5.7		nC	V_{DS}= 15V, V_{GS}= 10V I_D= 2.5A
Gate-source charge	Q_{gs}		1.25		nC	
Gate drain charge	Q_{gd}		0.86		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.85	0.95	V	T_j=25°C, I_S= 2.8A, V_{GS}=0V
Reverse recovery time(‡)	t_{rr}		21.5		ns	T_j=25°C, I_S= 2.5A, di/dt=100A/μs
Reverse recovery charge(‡)	Q_{rr}		20.5		nC	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.
(†) Switching characteristics are independent of operating junction temperature.
(‡) For design aid only, not subject to production testing.

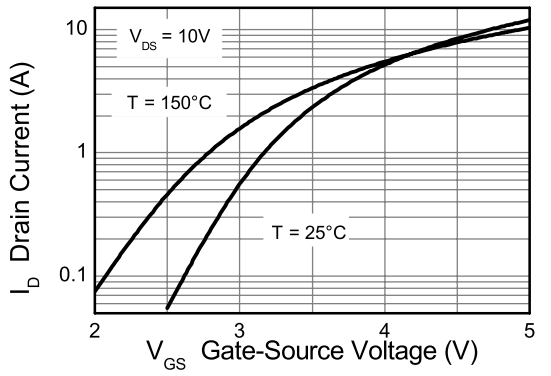
Typical characteristics



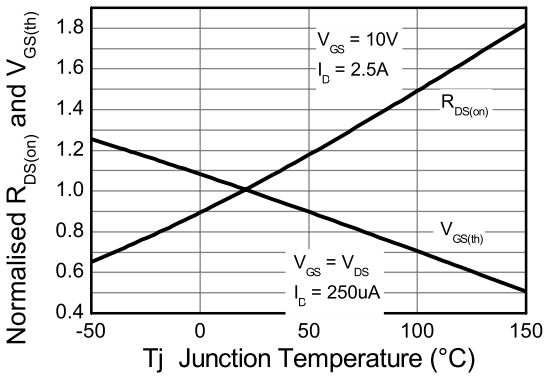
Output Characteristics



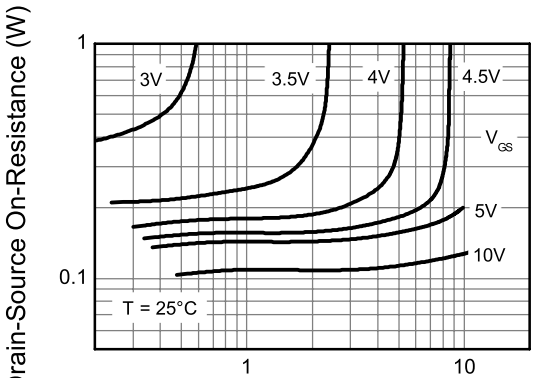
Output Characteristics



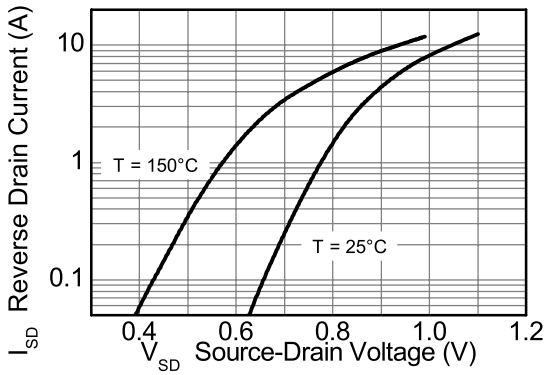
Typical Transfer Characteristics



Normalised Curves v Temperature

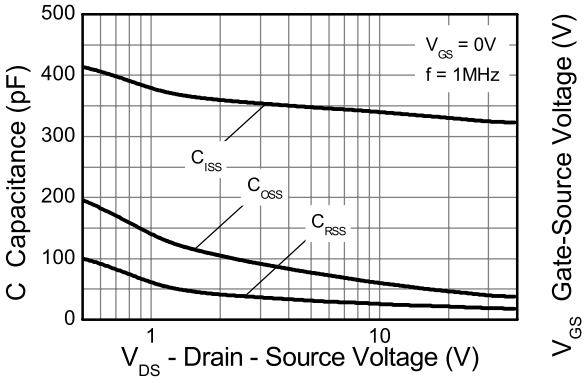


On-Resistance v Drain Current

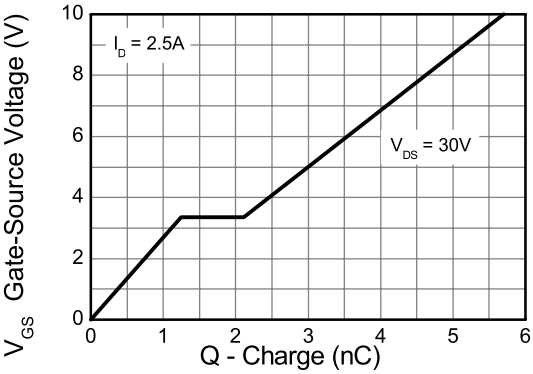


Source-Drain Diode Forward Voltage

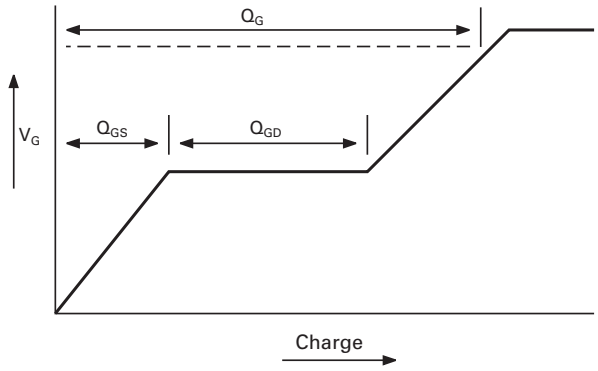
Typical characteristics



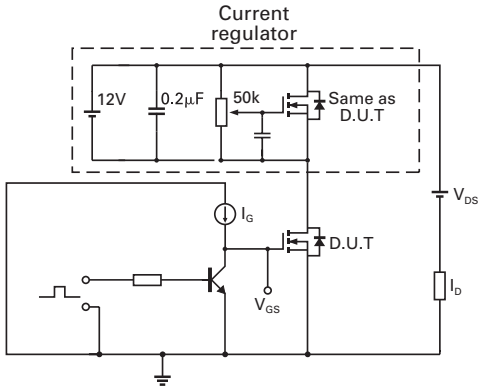
Capacitance v Drain-Source Voltage



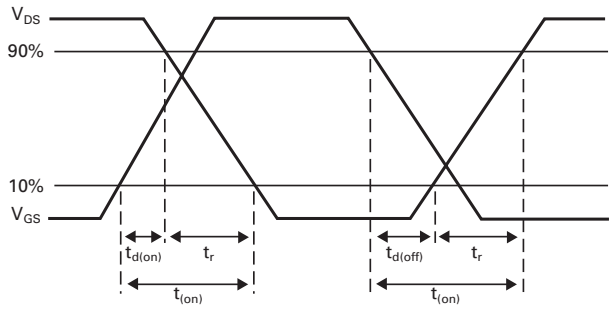
Gate-Source Voltage v Gate Charge



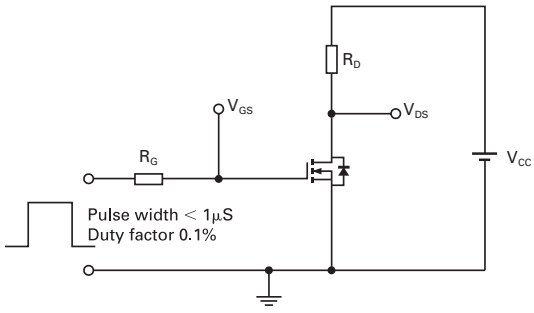
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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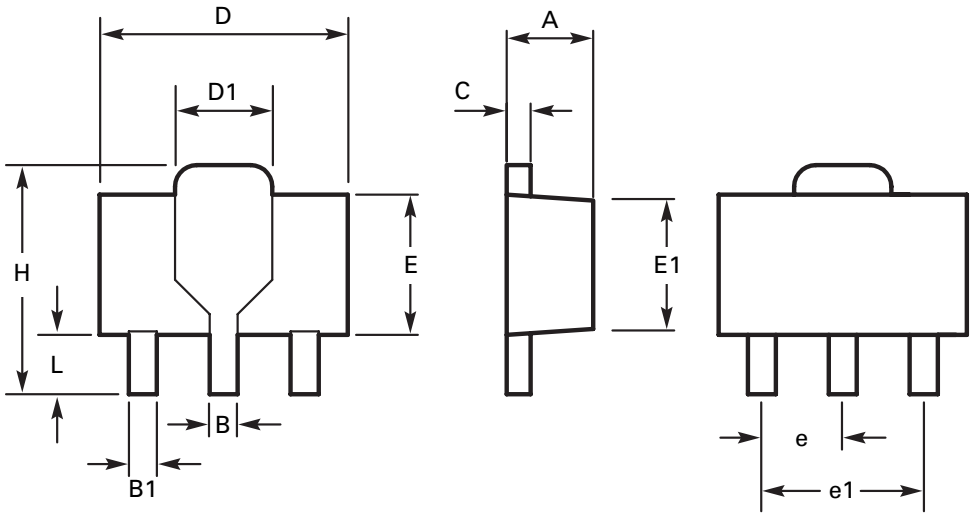
Package outline - SOT89



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E	2.29	2.60	0.090	0.102
B	0.44	0.56	0.017	0.022	E1	2.13	2.29	0.084	0.090
B1	0.36	0.48	0.014	0.019	e	1.50 BSC		0.059 BSC	
C	0.35	0.44	0.014	0.017	e1	3.00 BSC		0.118 BSC	
D	4.40	4.60	0.173	0.181	H	3.94	4.25	0.155	0.167
D1	1.52	1.83	0.064	0.072	L	0.89	1.20	0.035	0.047

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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