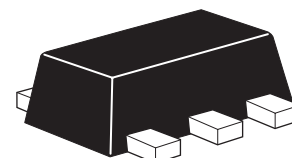


ZXMN6A11Z

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

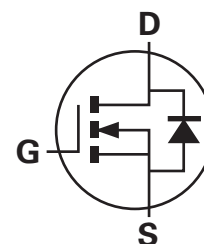


Description

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

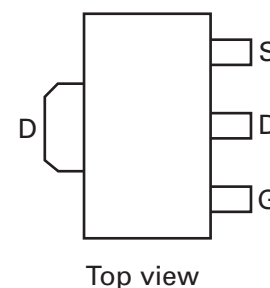


Applications

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

Ordering information

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



Device marking

11N6

ZXMN6A11Z

Absolute maximum ratings

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

Thermal resistance

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

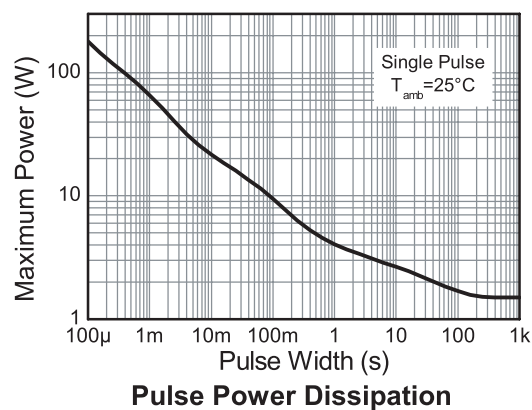
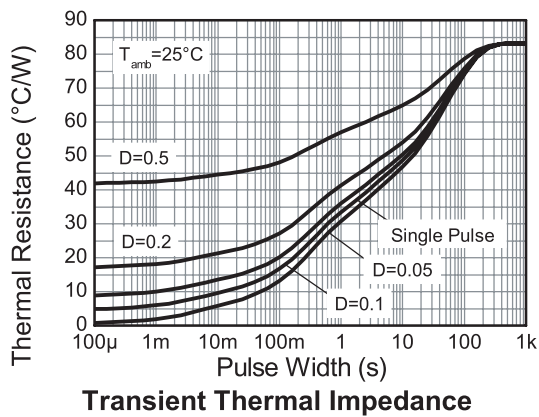
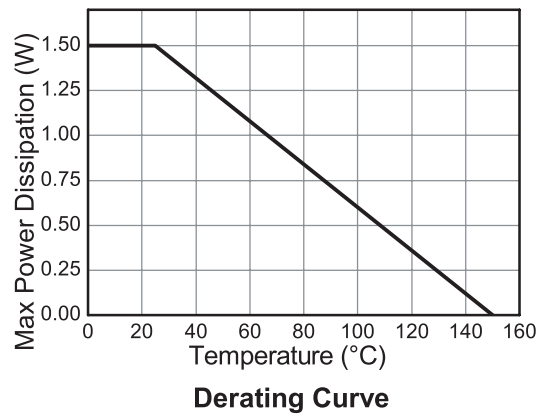
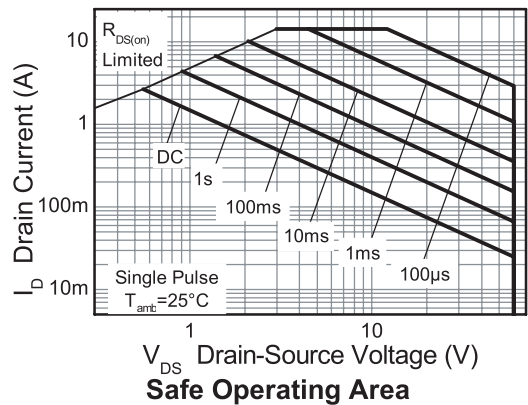
NOTES:

(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 300 μs - pulse width limited by maximum junction temperature.

Typical characteristics



ZXMN6A11Z

Electrical characteristics (@ $T_{amb} = 25^{\circ}\text{C}$ 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	

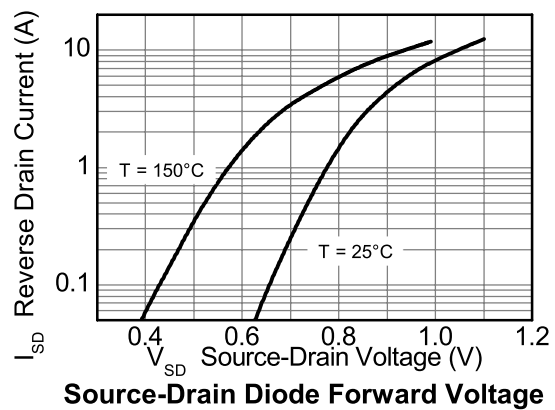
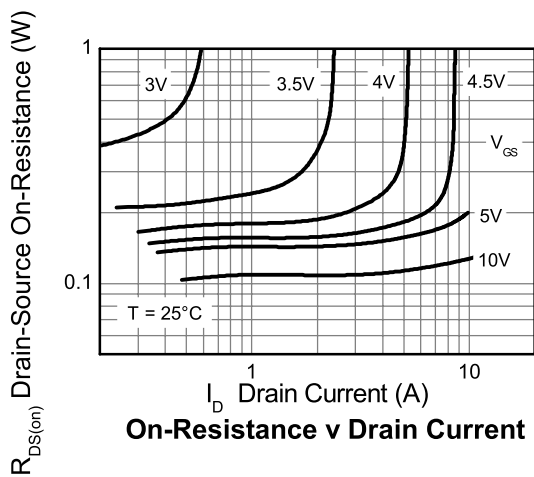
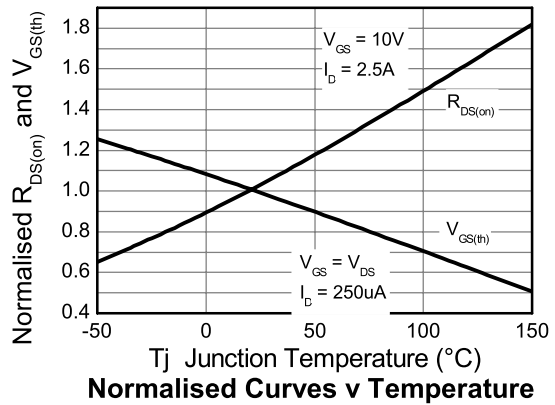
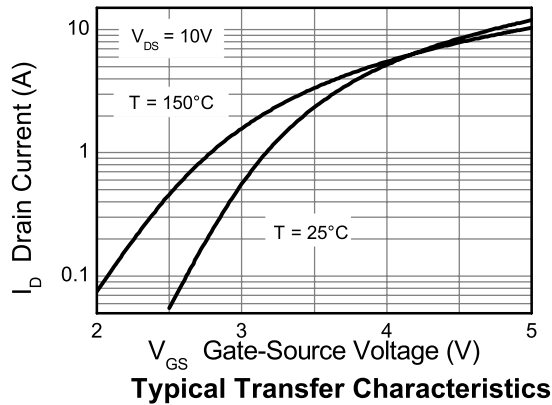
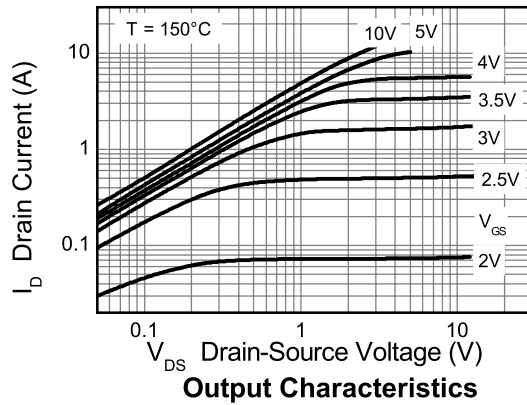
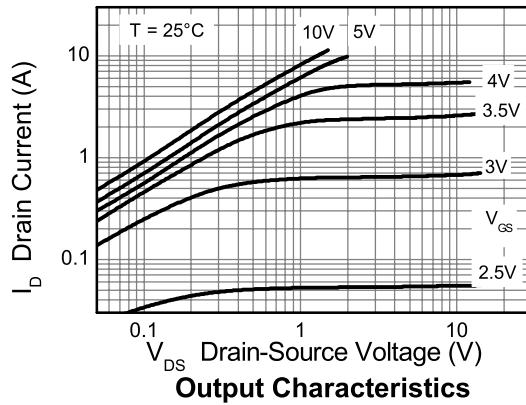
NOTES:

(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

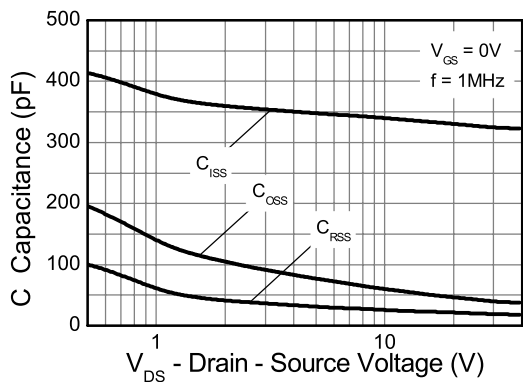
(†) Switching characteristics are independent of operating junction temperature.

(‡) For design aid only, not subject to production testing.

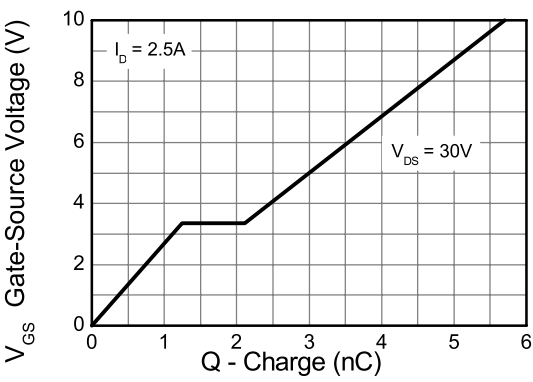
Typical characteristics



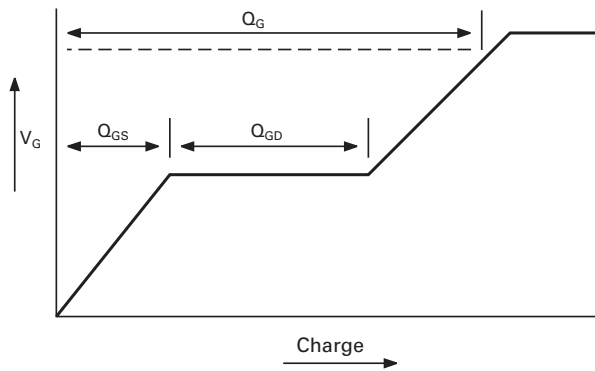
Typical characteristics



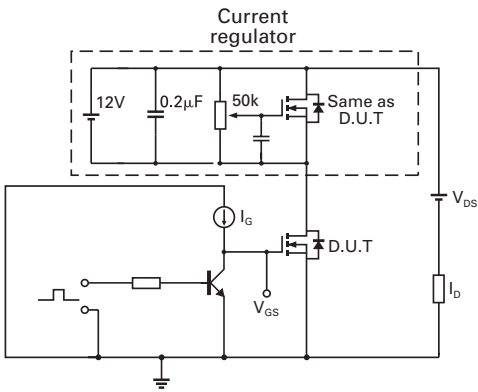
Capacitance v Drain-Source Voltage



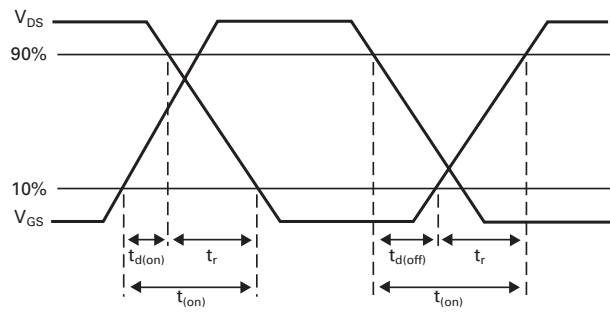
Gate-Source Voltage v Gate Charge



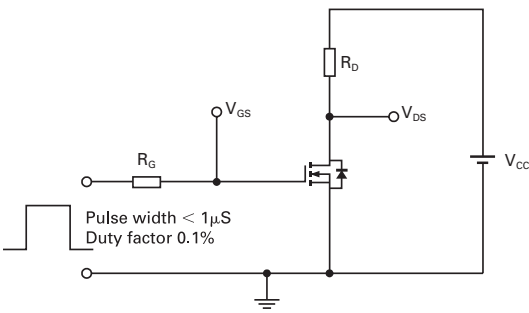
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

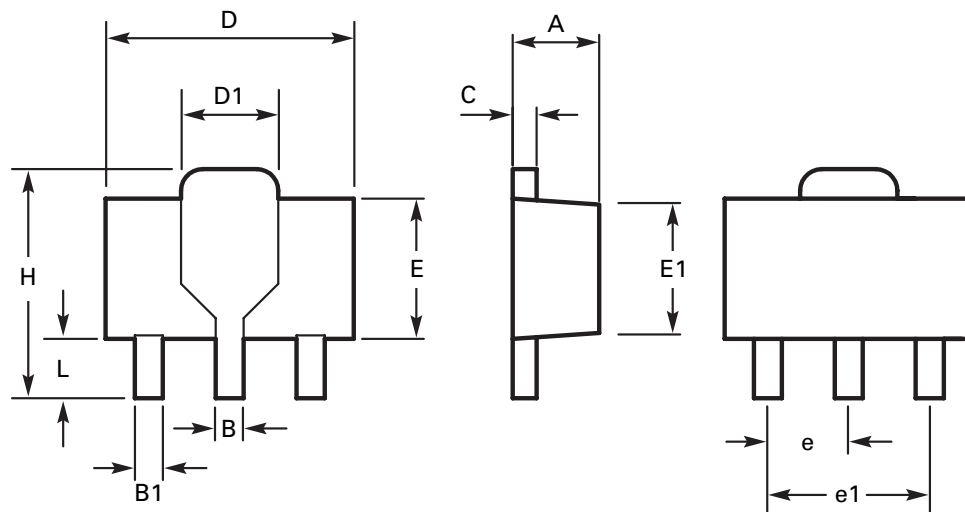


Switching time test circuit

ZXMN6A11Z

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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

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

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