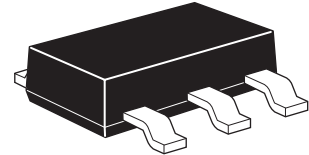


ZXMN6A11G

60V SOT223 N-channel enhancement mode MOSFET

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.120 @ $V_{GS}= 10V$	4.4
	0.180 @ $V_{GS}= 4.5V$	3.5

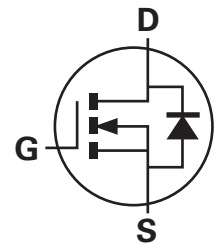


Description

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.

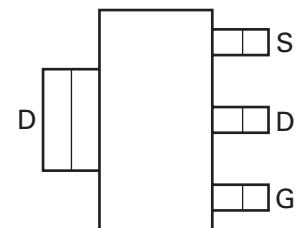
Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT223 package



Applications

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



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A11GTA	7	12	1,000

Device marking

ZXMN
6A11

ZXMN6A11G

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current @ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(b)}$	I_D	4.4	A
@ $V_{GS} = 10V$; $T_{amb} = 70^{\circ}C^{(b)}$		3.5	
@ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(a)}$		3.1	
Pulsed drain current ^(c)	I_{DM}	15.6	A
Continuous source current (body diode) ^(b)	I_S	5	A
Pulsed source current (body diode) ^(c)	I_{SM}	15.6	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	P_D	2.0	W
Linear derating factor		16	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	P_D	3.9	W
Linear derating factor		31	mW/ $^{\circ}C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^{\circ}C$

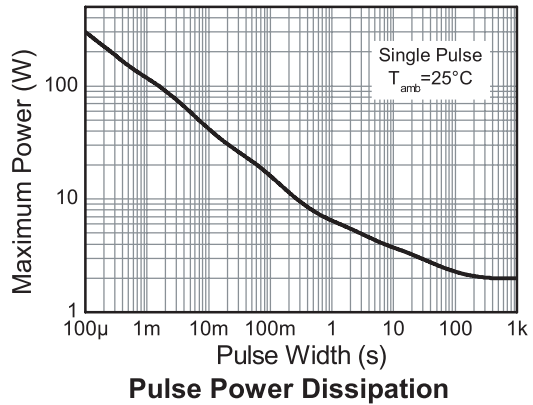
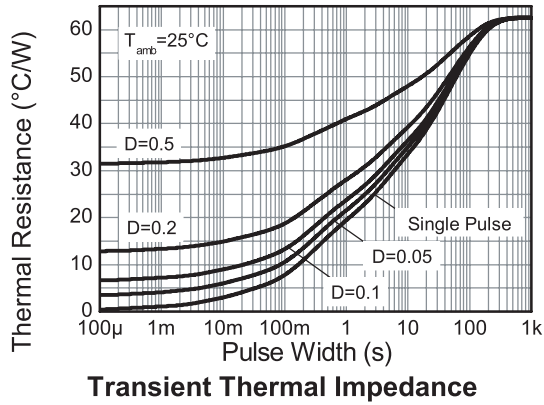
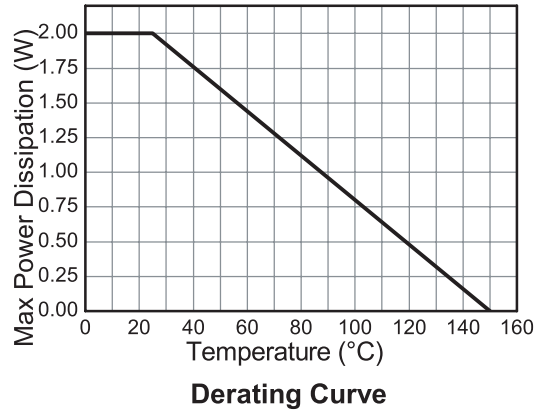
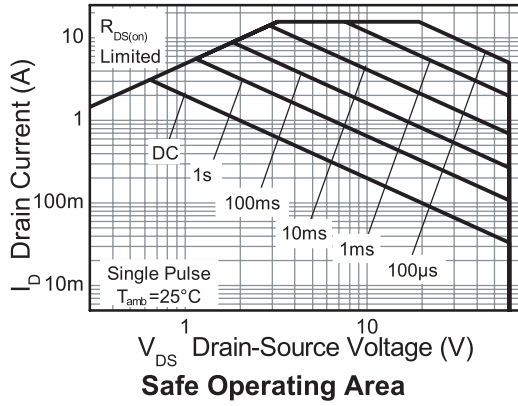
Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\theta JA}$	62.5	$^{\circ}C/W$
Junction to ambient ^(b)	$R_{\theta JA}$	32	$^{\circ}C/W$

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 $t \leq 10$ sec.
- (c) Repetitive rating - 25mm x 25mm FR4 PCB, $D=0.02$, pulse width 300 μ s - pulse width limited by maximum junction temperature.

Typical characteristics



ZXMN6A11G

Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	60			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero gate voltage drain current	I_{DSS}			1.0	μA	$V_{DS} = 60\text{V}$, $V_{GS} = 0\text{V}$
Gate-body leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-source threshold voltage	$V_{GS(th)}$	1.0			V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static drain-source on-state resistance ^(*)	$R_{DS(on)}$			0.120	Ω	$V_{GS} = 10\text{V}$, $I_D = 2.5\text{A}$
				0.180	Ω	$V_{GS} = 4.5\text{V}$, $I_D = 2\text{A}$
Forward transconductance ^{(*)(‡)}	g_{fs}		4.9		S	$V_{DS} = 15\text{V}$, $I_D = 2.5\text{A}$
Dynamic^(‡)						
Input capacitance	C_{iss}		330		pF	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
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	$V_{DD} = 30\text{V}$, $I_D = 2.5\text{A}$ $R_G = 6.0\Omega$, $V_{GS} = 10\text{V}$
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	$V_{DS} = 15\text{V}$, $V_{GS} = 5\text{V}$ $I_D = 2.5\text{A}$
Total gate charge	Q_g		5.7		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 2.5\text{A}$
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	$T_j = 25^{\circ}\text{C}$, $I_S = 2.8\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time ^(‡)	t_{rr}		21.5		ns	$T_j = 25^{\circ}\text{C}$, $I_S = 2.5\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge ^(‡)	Q_{rr}		20.5		nC	

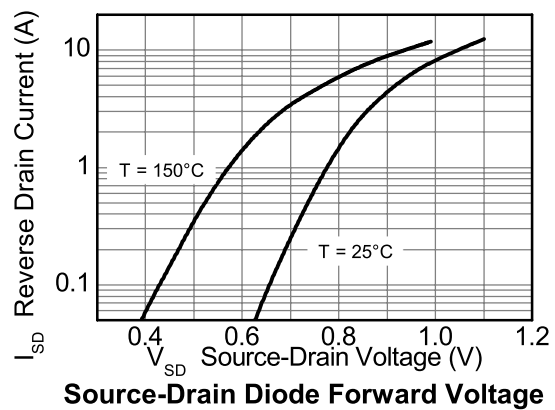
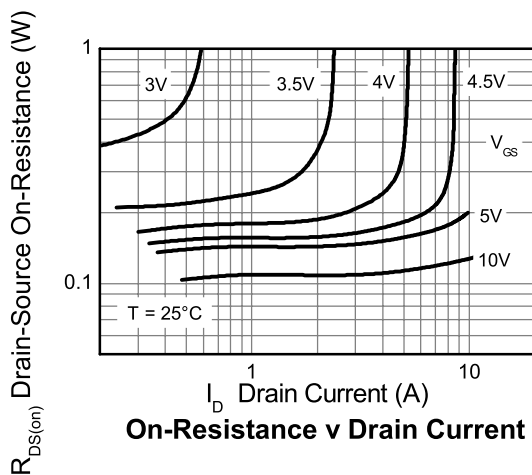
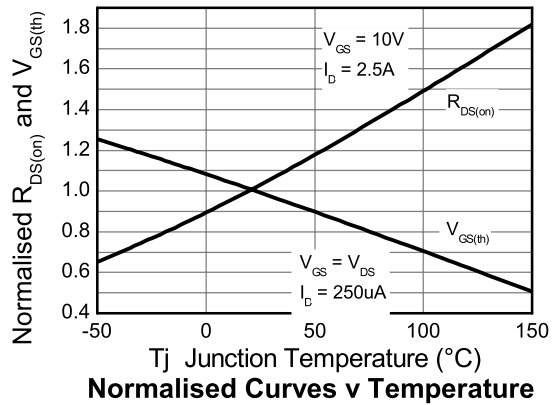
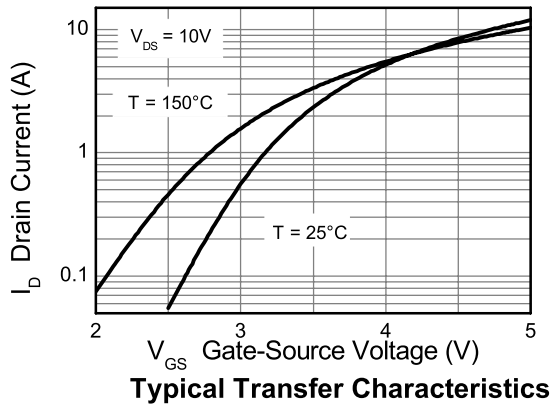
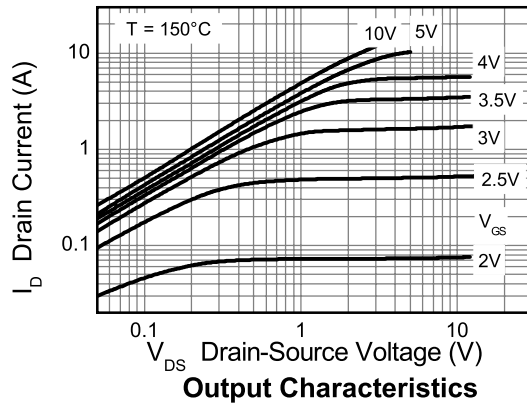
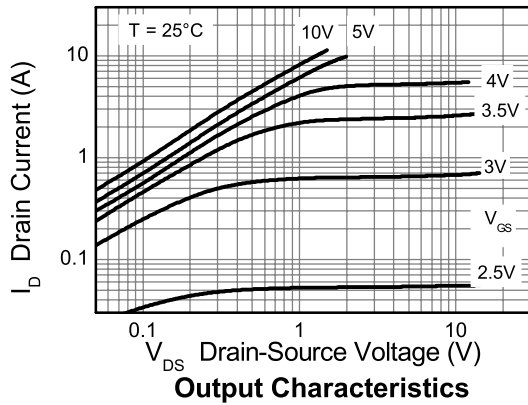
NOTES:

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

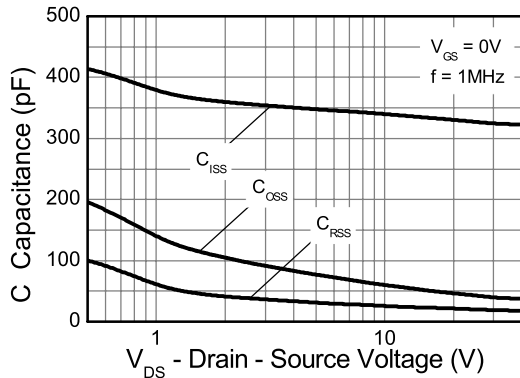
(†) Switching characteristics are independent of operating junction temperature.

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

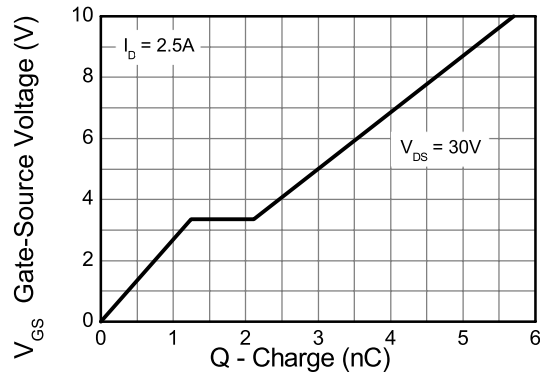
Typical characteristics



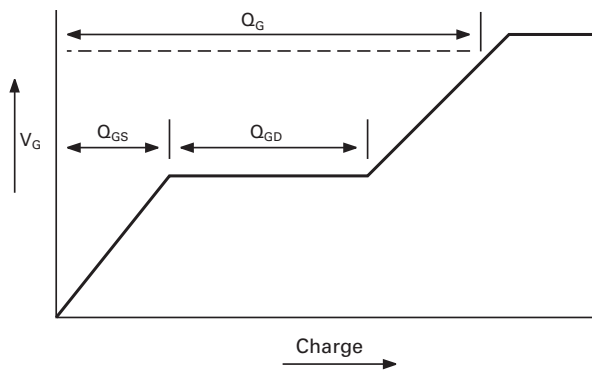
Typical characteristics



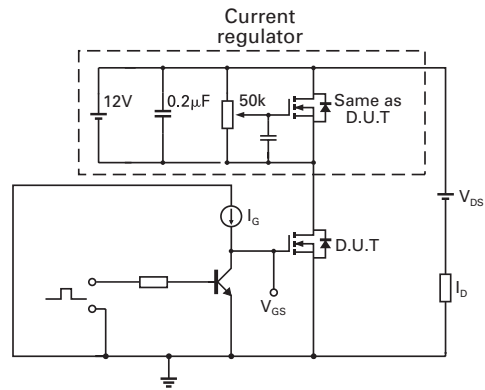
Capacitance v Drain-Source Voltage



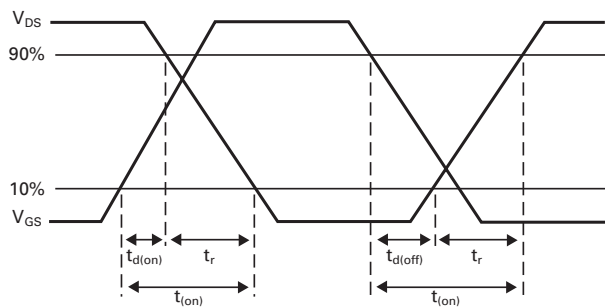
Gate-Source Voltage v Gate Charge



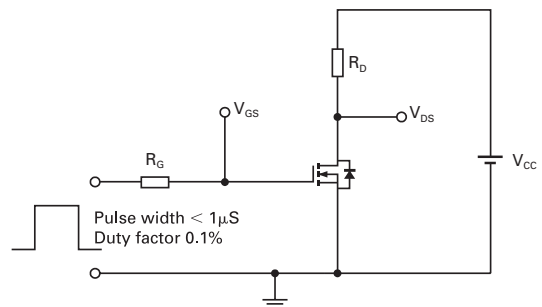
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



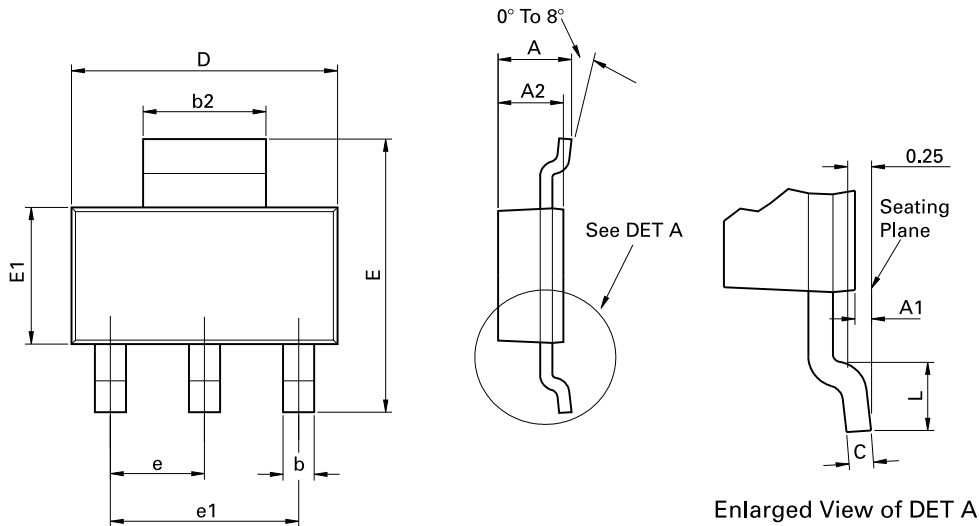
Switching time test circuit

ZXMN6A11G

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ZXMN6A11G

Package outline - SOT223



Conforms to JEDEC TO-261 AA Issue B

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	-	1.80	-	0.071	e	2.30 BSC		0.0905 BSC	
A1	0.02	0.10	0.0008	0.004	e1	4.60 BSC		0.181 BSC	
b	0.66	0.84	0.026	0.033	E	6.70	7.30	0.264	0.287
b2	2.90	3.10	0.114	0.122	E1	3.30	3.70	0.130	0.146
C	0.23	0.33	0.009	0.013	L	0.90	-	0.355	-
D	6.30	6.70	0.248	0.264	-	-	-	-	-

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 Telephone: (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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