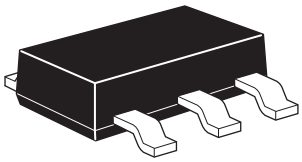
ZXMN6A09G
60V SOT223 N-channel enhancement mode MOSFET

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.040 @ V_{GS}= 10V	7.5
	0.060 @ V_{GS}= 4.5V	6.2

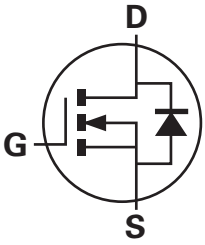


Description

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.

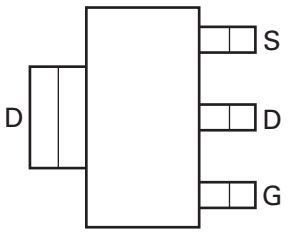
Features

- 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
ZXMN6A09GTA	7	12	1000

Device marking

ZXMN
6A09

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	7.5	A
@ V_{GS}=10V; T_{amb}=70°C(b)		6	
@ V_{GS}=10V; T_{amb}=25°C(a)		5.4	
Pulsed drain current(c)	I_{DM}	33	A
Continuous source current (body diode)(b)	I_S	3.5	A
Pulsed source current (body diode)(c)	I_{SM}	33	A
Power dissipation at T_{amb} =25°C(a)	P_D	2	W
Linear derating factor		16	mW/°C
Power dissipation at T_{amb} =25°C(b)	P_D	3.9	W
Linear derating factor		31	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)	$R_{\Theta JA}$	62.5	°C/W
Junction to ambient(b)	$R_{\Theta JA}$	32.2	°C/W

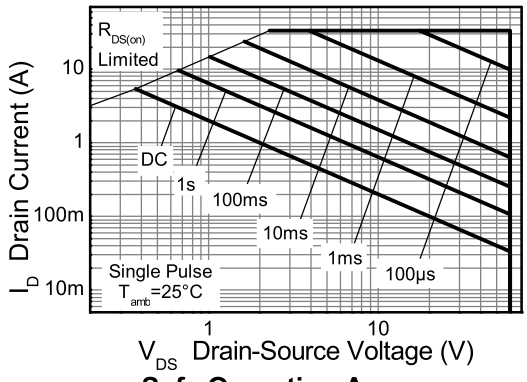
NOTES:

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

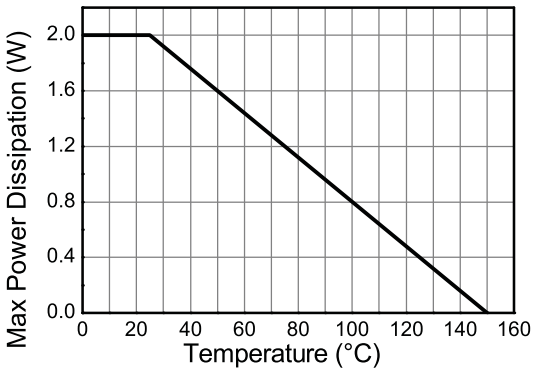
(b) For a device surface mounted on FR4 PCB measured at t ≤10 sec.

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

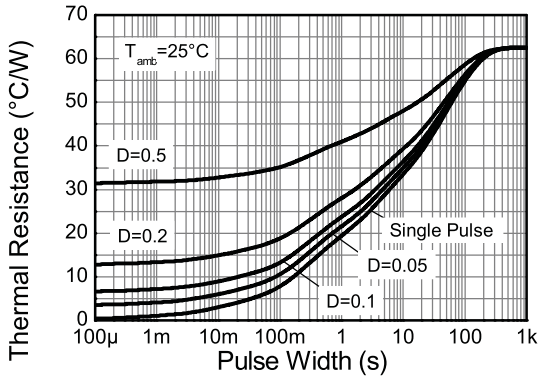
Characteristics



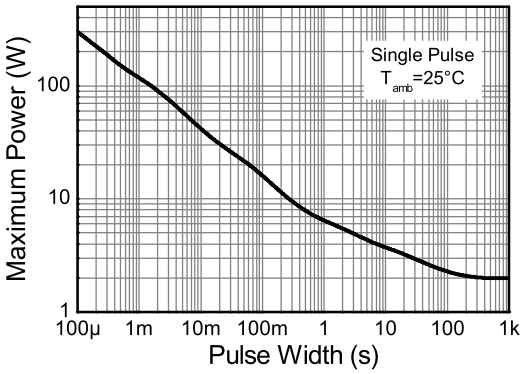
Safe Operating Area



Derating Curve



Transient Thermal Impedance



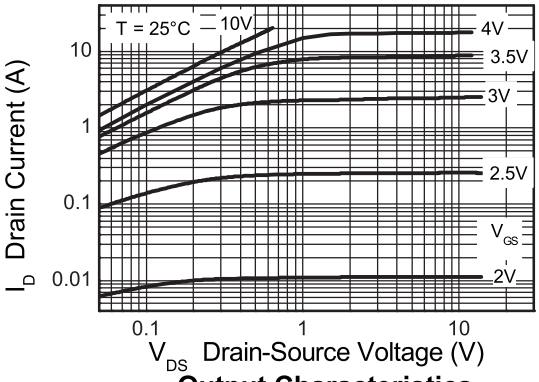
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

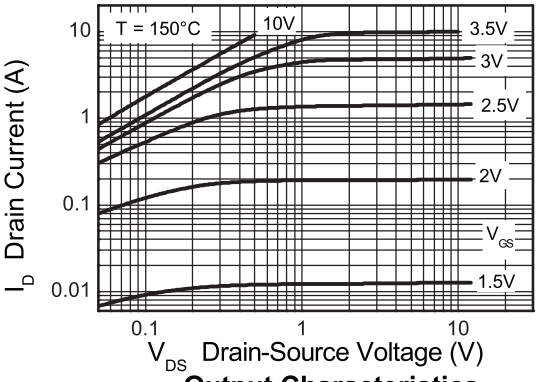
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	60			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS}= 60V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	1.0		3.0	V	I_D= 250μA, V_{DS}=V_{GS}
Static drain-source on-state resistance (*)	$R_{DS(on)}$			0.040	Ω	V_{GS}= 10V, I_D= 8.2A
				0.060	Ω	V_{GS}= 4.5V, I_D = 7.4A
Forward transconductance(*)(‡)	g_{fs}		15		S	V_{DS}= 15V, I_D= 8.2A
Dynamic(‡)						
Input capacitance	C_{iss}		1407		pF	V_{DS}= 40V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		121		pF	
Reverse transfer capacitance	C_{rss}		59		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		4.9		ns	V_{DD}= 15V, I_D= 3.5A R_G≅6.0Ω, V_{GS}= 10V
Rise time	t_r		5.0		ns	
Turn-off delay time	$t_{d(off)}$		25.3		ns	
Fall time	t_f		4.6		ns	
Total gate charge	Q_g		12.4		nC	V_{DS}= 15V, V_{GS}= 5V I_D= 3.5A
Total gate charge	Q_g		24.2		nC	V_{DS}= 15V, V_{GS}= 5V I_D= 3.5A
Gate-source charge	Q_{gs}		5.2		nC	
Gate drain charge	Q_{gd}		3.5		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.85	0.95	V	T_j=25°C, I_S= 6.6A, V_{GS}=0V
Reverse recovery time(‡)	t_{rr}		26.3		ns	T_j=25°C, I_S= 3.5A, di/dt=100A/μs
Reverse recovery charge(‡)	Q_{rr}		26.6		nC	

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

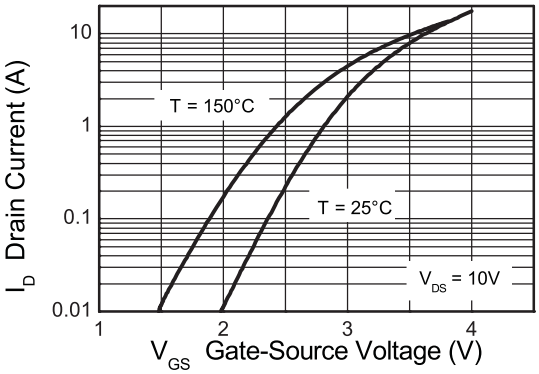
Typical characteristics



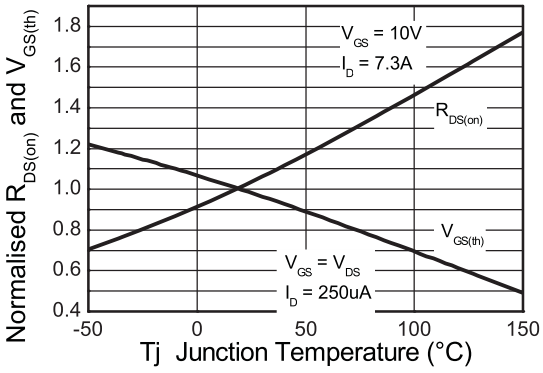
Output Characteristics



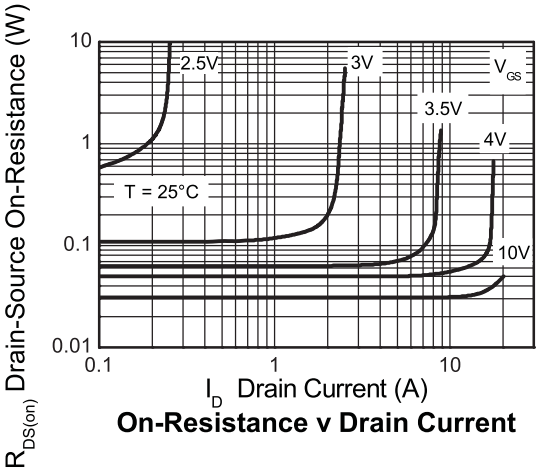
Output Characteristics



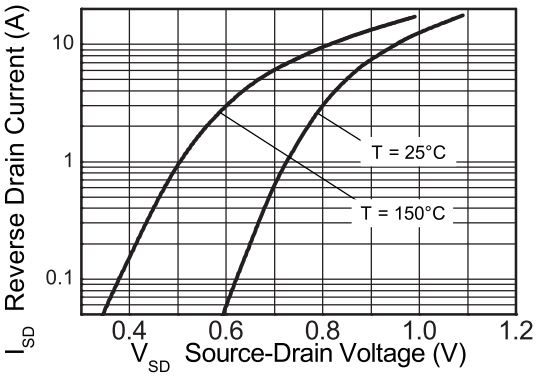
Typical Transfer Characteristics



Normalised Curves v Temperature

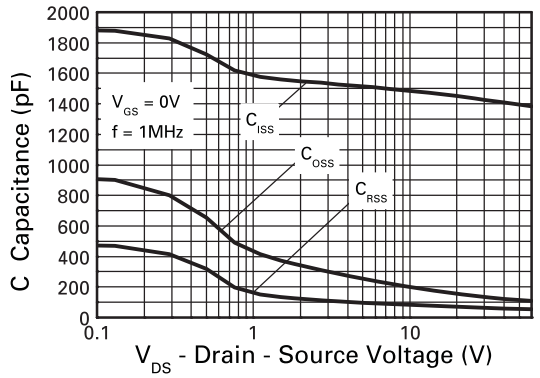


On-Resistance v Drain Current

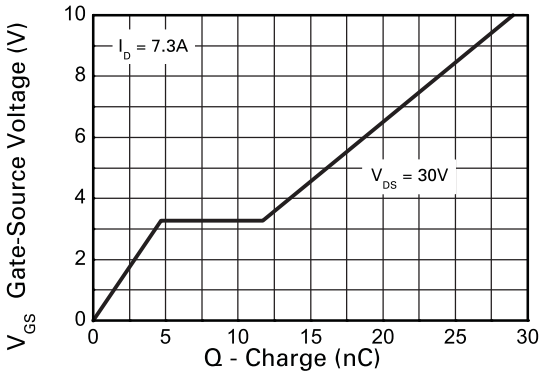


Source-Drain Diode Forward Voltage

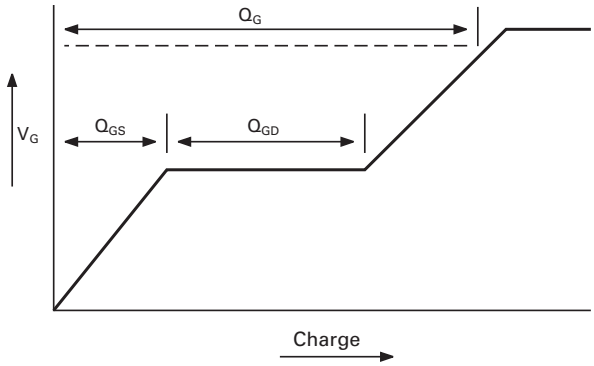
Typical characteristics



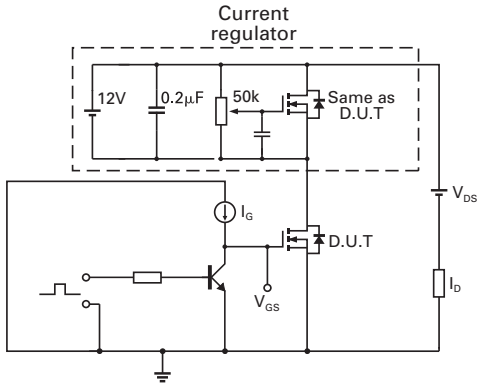
Capacitance v Drain-Source Voltage



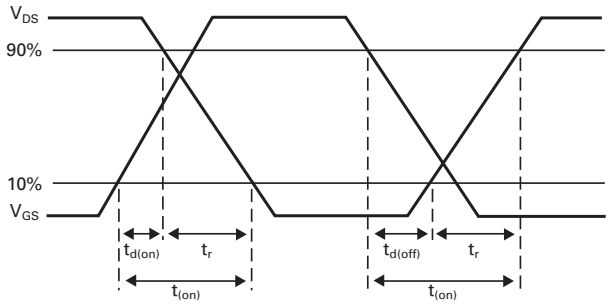
Gate-Source Voltage v Gate Charge



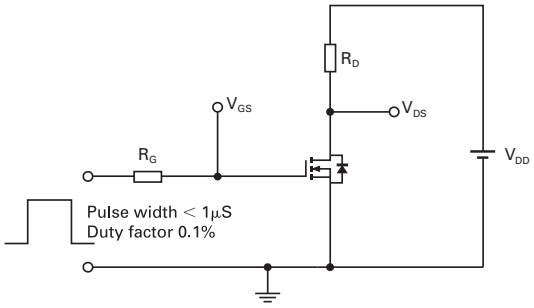
Basic gate charge waveform



Gate charge test circuit

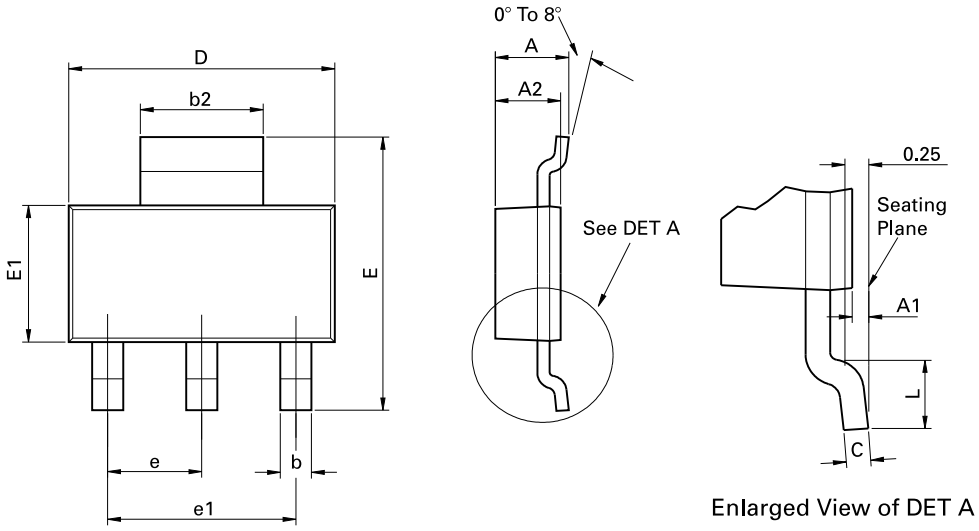


Switching time waveforms



Switching time test circuit

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

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

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
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