

ZXMN6A09G 60V SOT223 N-channel enhancement mode MOSFET

Summary

V _{(BR)DSS}	$R_{DS(on)}\left(\Omega\right)$	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.

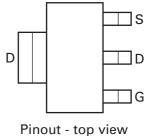
Features

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

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Applications

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



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	Α
@ 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	Α
Continuous source current (body diode)(b)	I _S	3.5	Α
Pulsed source current (body diode)(c)	I _{SM}	33	Α
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:

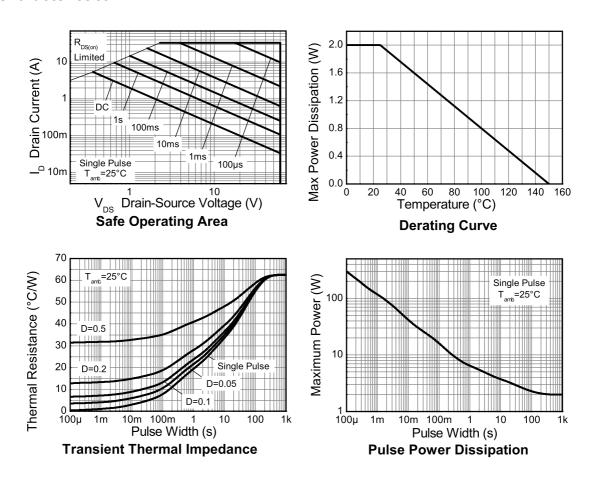
⁽a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

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

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

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Characteristics



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

Parameter	Symbol	Min.	Тур.	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	μΑ	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	$I_D=250\mu A, V_{DS}=V_{GS}$	
Static drain-source on-state	R _{DS(on)}			0.040	Ω	V _{GS} = 10V, I _D = 8.2A	
resistance ^(*)				0.060	Ω	$V_{GS} = 4.5V, I_D = 7.4A$	
Forward transconductance(*)(‡)	9 _{fs}		15		S	V _{DS} = 15V, I _D = 8.2A	
Dynamic ^(‡)		'					
Input capacitance	C _{iss}		1407		pF	V _{DS} = 40V, V _{GS} =0V	
Output capacitance	C _{oss}		121		pF	f=1MHz	
Reverse transfer capacitance	C _{rss}		59		pF		
Switching (†) (‡)		.l	!	!			
Turn-on-delay time	t _{d(on)}		4.9		ns	V _{DD} = 15V, I _D = 3.5A	
Rise time	t _r		5.0		ns	$R_{G} \approx 6.0 \Omega$, $V_{GS} = 10 V$	
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	Qg		24.2		nC	V _{DS} = 15V, V _{GS} = 5V	
Gate-source charge	O _{gs}		5.2		nC	I _D = 3.5A	
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,	
Reverse recovery charge ^(‡)	Q _{rr}		26.6		nC	di/dt=100A/μs	

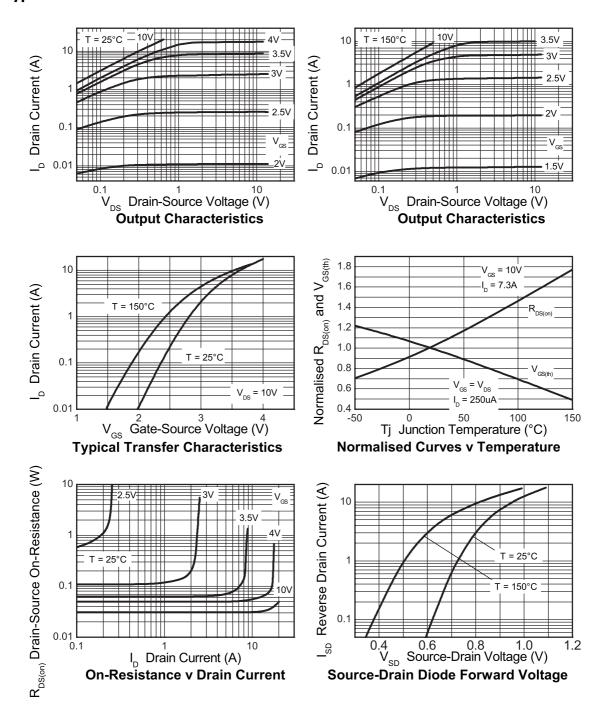
NOTES:

^(*) Measured under pulsed conditions. Pulse width \leq 300 s; duty cycle \leq 2%.

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

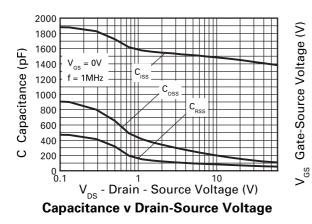
^(‡) For design aid only, not subject to production testing.

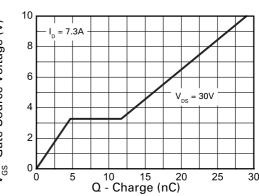
Typical characteristics



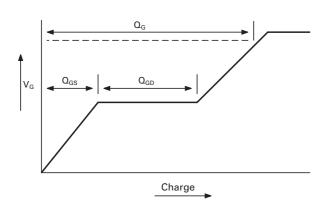
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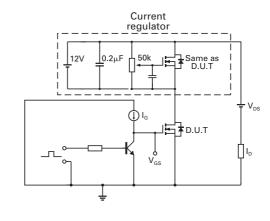
Typical characteristics





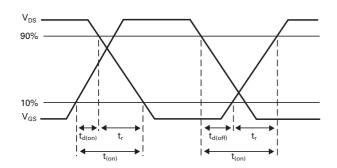
Gate-Source Voltage v Gate Charge

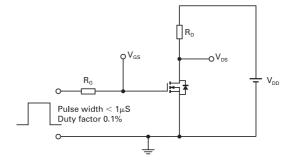




Basic gate charge waveform

Gate charge test circuit



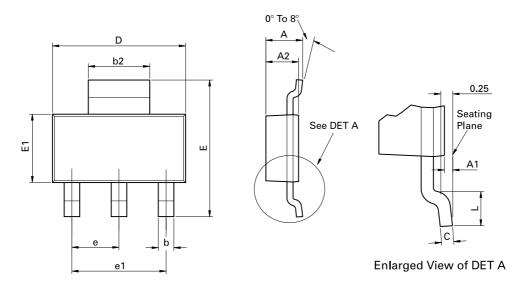


Switching time waveforms

Switching time test circuit

ZXMN6A09G

Package outline - SOT223



Conforms to JEDEC TO-261 AA Issue B

DIM	Millin	neters	Inc	hes	DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
Α	-	1.80	-	0.071	е	2.30	BSC	0.090	5 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
С	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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