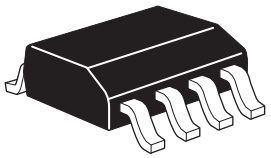
ZXMN6A09DN8
60V SO8 N-channel enhancement mode MOSFET

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.040 @ V_{GS}= 10V	5.6
	0.060 @ V_{GS}= 4.5V	4.6

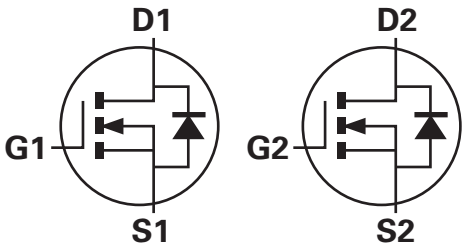


Description

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.

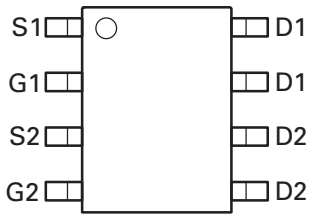
Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOIC 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
ZXMN6A09DN8TA	7	12	500

Device marking

ZXMN
6A09D

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	5.6	A
@ V_{GS}=10V; T_{amb}=70°C(b)		4.5	
@ V_{GS}=10V; T_{amb}=25°C(a)		4.3	
Pulsed drain current(c)	I_{DM}	27	A
Continuous source current (body diode)(b)	I_S	3.5	A
Pulsed source current (body diode)(c)	I_{SM}	27	A
Power dissipation at T_{amb} = 25°C(a)(d)	P_D	1.25	W
Linear derating factor		10	mW/°C
Power dissipation at T_{amb} = 25°C(b)(e)	P_D	1.8	W
Linear derating factor		14	mW/°C
Power dissipation at T_{amb} = 25°C(b)(d)	P_D	2.1	W
Linear derating factor		17	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)(d)	$R_{\Theta JA}$	100	°C/W
Junction to ambient(a)(e)	$R_{\Theta JA}$	70	°C/W
Junction to ambient(b)(d)	$R_{\Theta JA}$	60	°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.

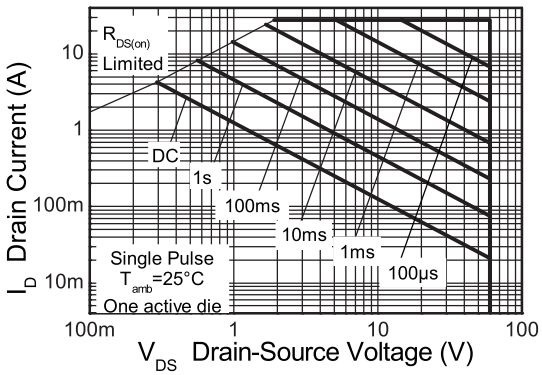
(b) For a device surface mounted on FR4 PCB measured at t ≤10 sec.

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

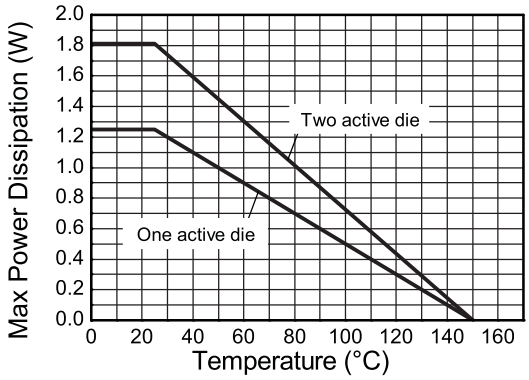
(d) For a dual device with one active die.

(e) For a device with two active die running at equal power.

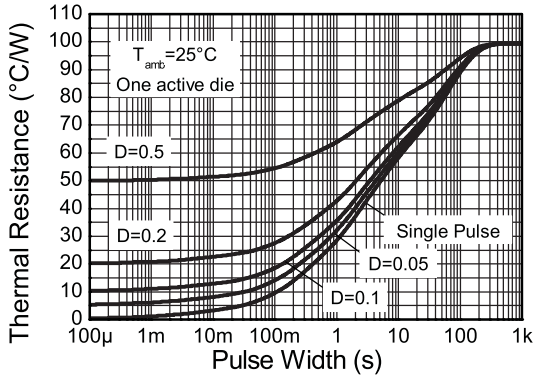
Characteristics



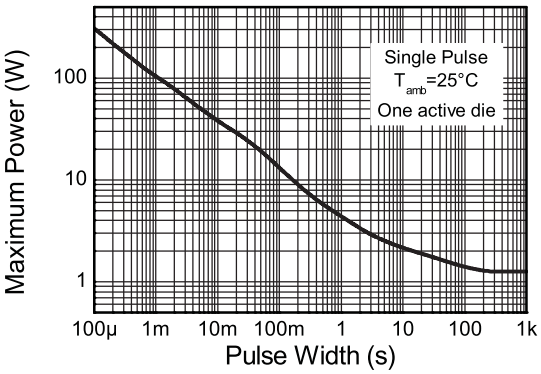
Safe Operating Area



Derating Curve



Transient Thermal Impedance



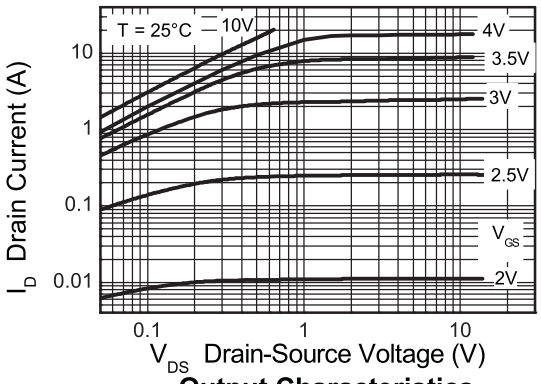
Pulse Power Dissipation

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

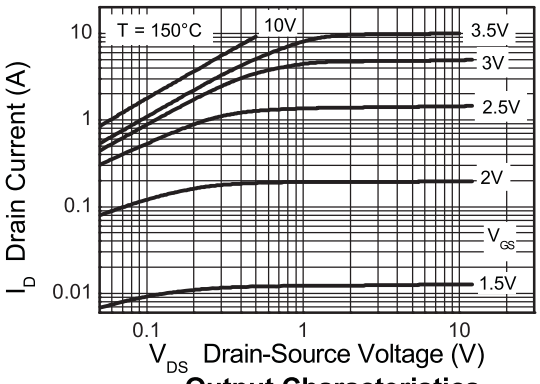
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	60			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS}= 60V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±20V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	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.

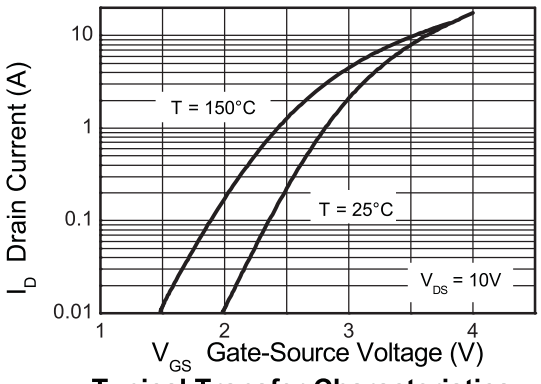
Typical characteristics



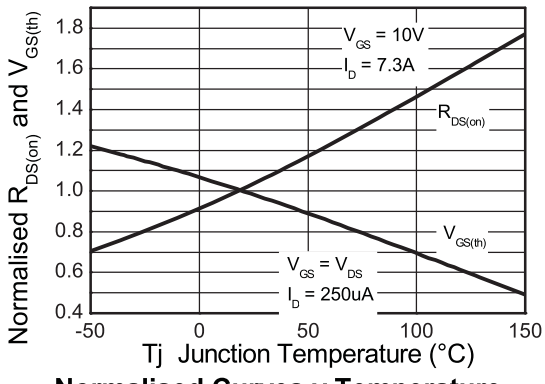
Output Characteristics



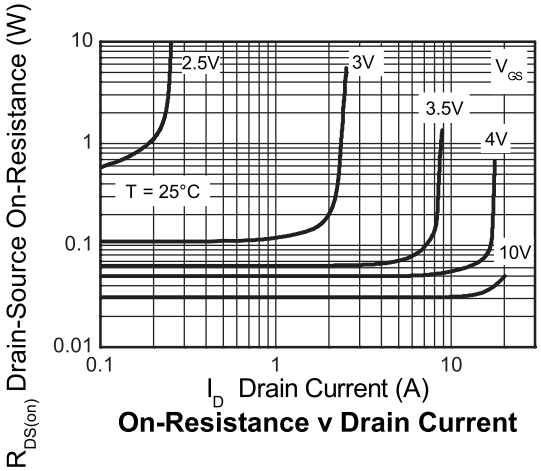
Output Characteristics



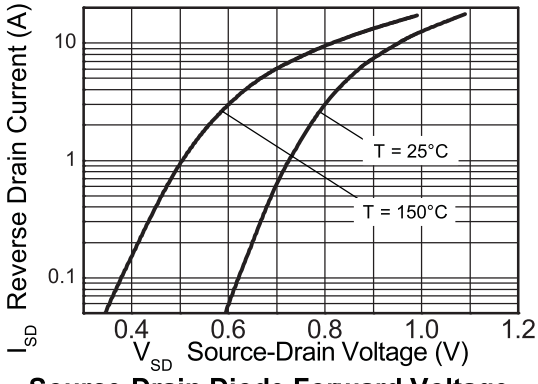
Typical Transfer Characteristics



Normalised Curves v Temperature

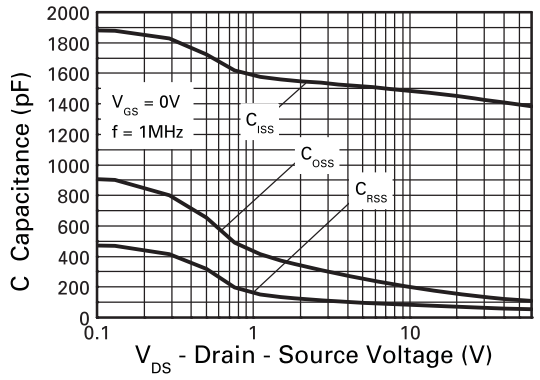


On-Resistance v Drain Current

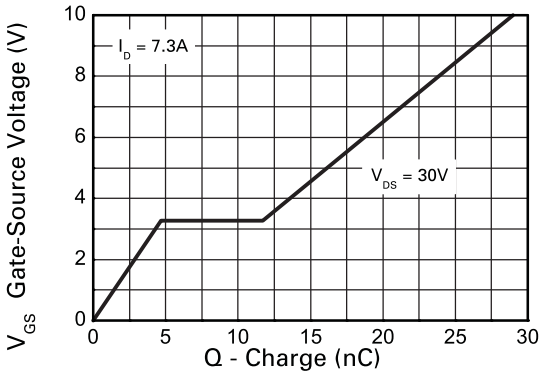


Source-Drain Diode Forward Voltage

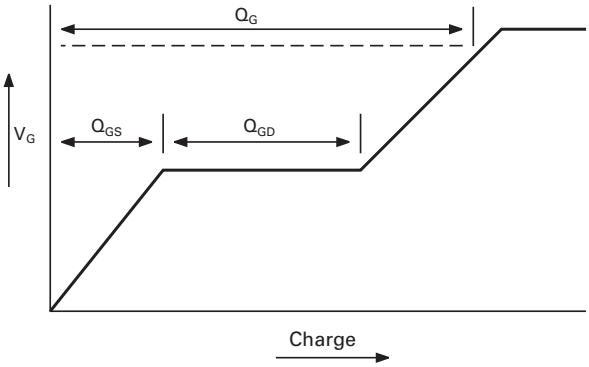
Typical characteristics



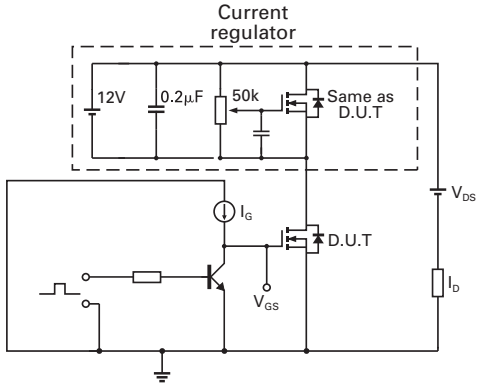
Capacitance v Drain-Source Voltage



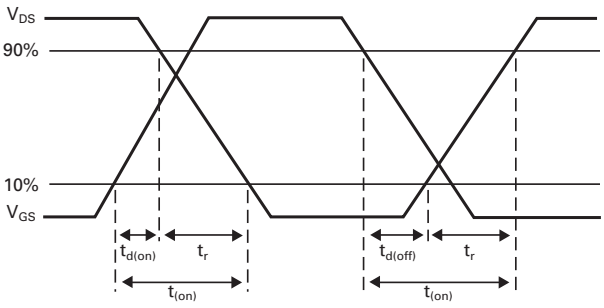
Gate-Source Voltage v Gate Charge



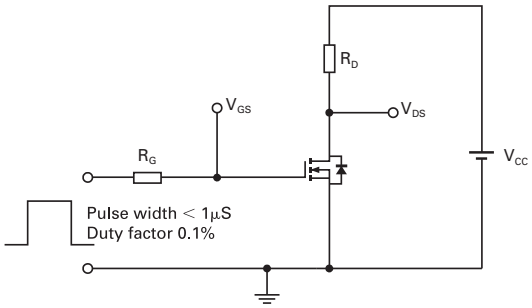
Basic gate charge waveform



Gate charge test circuit

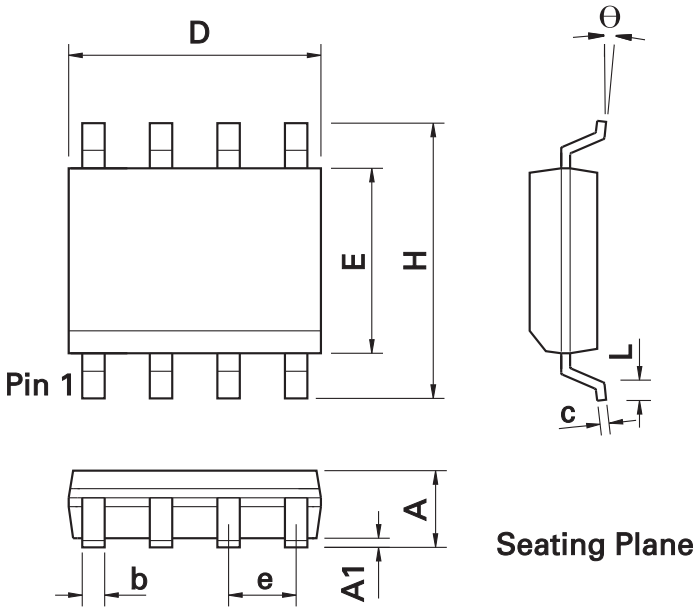


Switching time waveforms



Switching time test circuit

Package outline - SO8



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

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

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