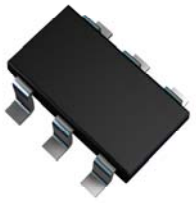
ZXMN2088DE6
20V Dual SOT23-6 N-channel enhancement mode MOSFET with low gate drive capability

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.200 @ V_{GS}= 4.5V	2.1
	0.240 @ V_{GS}= 2.5V	1.9
	0.310 @ V_{GS}= 1.8V	1.7

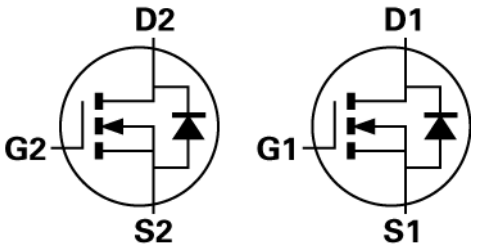


Description

This new generation dual n-channel trench MOSFET from Zetex features low on-resistance achievable with low gate drive.

Features

- Low on-resistance
- Low gate drive capability
- SOT23-6 (dual) package

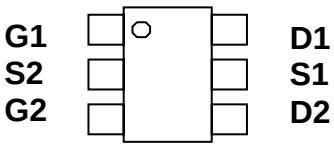


Applications

- Power Management functions
- Disconnect switches
- Relay driving and load switching

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2088DE6TA	7	8	3,000



Pinout – top view

Device marking

2088

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-Source voltage	V_{DSS}	20	V
Gate-Source voltage	V_{GS}	± 8	V
Continuous Drain current @ V_{GS}= 4.5V; T_A=25°C [b] [d]	I_D	2.1	A
@ V_{GS}= 4.5V; T_A=70°C [b] [d]		1.7	
@ V_{GS}= 4.5V; T_A=25°C [a] [d]		1.7	
Pulsed Drain current [c]	I_{DM}	8	A
Power dissipation at T_A =25°C [a] [d]	P_D	0.9	W
Linear derating factor		7.2	mW/°C
Power dissipation at T_A =25°C [a] [e]	P_D	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at T_A =25°C [b] [d]	P_D	1.3	W
Linear derating factor		10.4	mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C

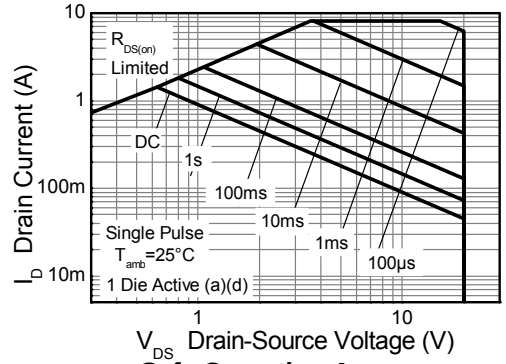
Thermal resistance

Parameter	Symbol	Value	Unit
Junction to Ambient [a] [d]	$R_{\theta JA}$	139	°C/W
Junction to Ambient [a] [e]	$R_{\theta JA}$	113	°C/W
Junction to Ambient [b] [d]	$R_{\theta JA}$	96	°C/W

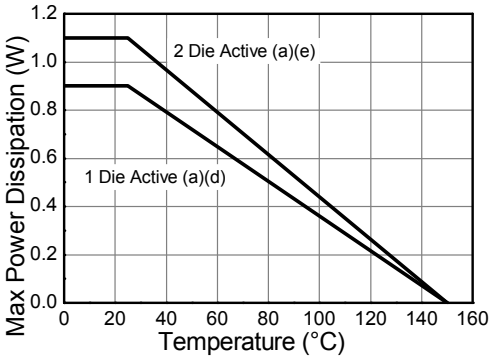
NOTES:

(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) As above measured at t ≤ 5 sec.
(c) Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300us – pulse width limited by maximum junction temperature.
(d) For device with one active die
(e) For device with two active die running at equal power.

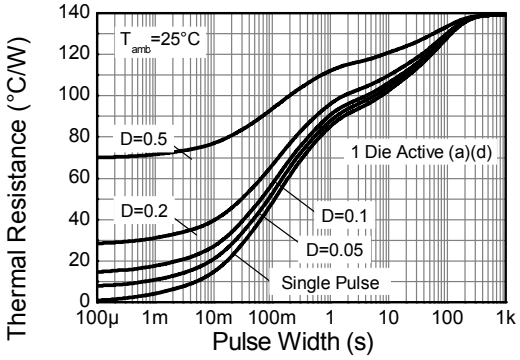
Thermal Characteristics



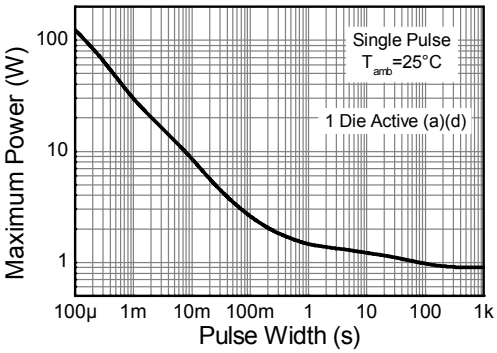
Safe Operating Area



Derating Curve



Transient Thermal Impedance

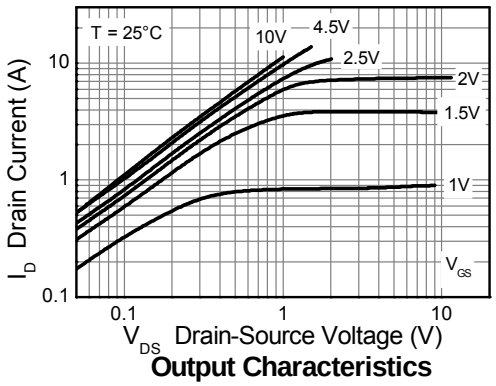


Pulse Power Dissipation

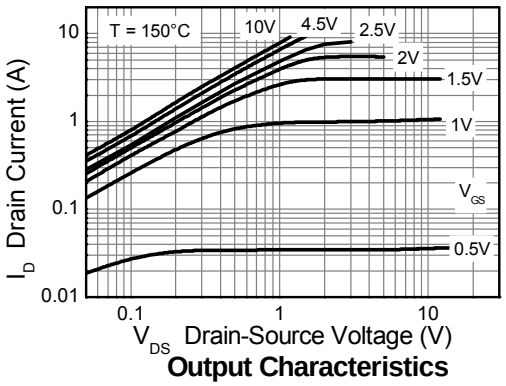
Electrical characteristics (at T_{amb} = 25°C unless otherwise stated).						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Conditions**
Static						
Drain-Source breakdown voltage	$V_{(BR)DSS}$	20			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			100	nA	V_{DS}= 3V, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS}= 20V, V_{GS}=0V
Gate-Body leakage	I_{GSS}			100	nA	V_{GS}=±8V, V_{DS}=0V
Gate-Source threshold voltage	$V_{GS(th)}$	0.4		1.0	V	I_D= 250μA, V_{DS}=V_{GS}
Static Drain-Source on-state resistance (*)	$R_{DS(on)}$		112 137 165	0.200 0.240 0.310	Ω Ω Ω	V_{GS}= 4.5V, I_D= 1.0A V_{GS}= 2.5V, I_D= 0.6A V_{GS}= 1.8V, I_D= 0.3A
Forward transconductance (*) (‡)	g_{fs}		4.6		S	V_{DS}= 10V, I_D= 1.0A
Dynamic (‡)						
Input capacitance	C_{iss}		279		pF	V_{DS}= 10V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		52		pF	
Reverse transfer capacitance	C_{rss}		29		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		2		ns	V_{DD}= 10V,V_{GS}=4.5V I_D= 1A $R_G \approx 6.0\Omega$
Rise time	t_r		3.2		ns	
Turn-off delay time	$t_{d(off)}$		12.7		ns	
Fall time	t_f		6.2		ns	
Gate Charge						
Total Gate charge	Q_g		3.8		nC	V_{DS}= 10V, V_{GS}= 4.5V I_D= 2.4A
Gate-Source charge	Q_{gs}		0.41		nC	
Gate Drain charge	Q_{gd}		0.56		nC	
Source-drain diode						
Diode forward voltage (‡)	V_{SD}		0.75	0.95	V	T_j=25°C, I_S= 1.0A, V_{GS}=0V
Reverse recovery time	t_{rr}		6.6		ns	T_j = 25°C, I_F = 1.24A di/dt = 100A/μs
Reverse recovery charge	Q_{rr}		1.6		nC	

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

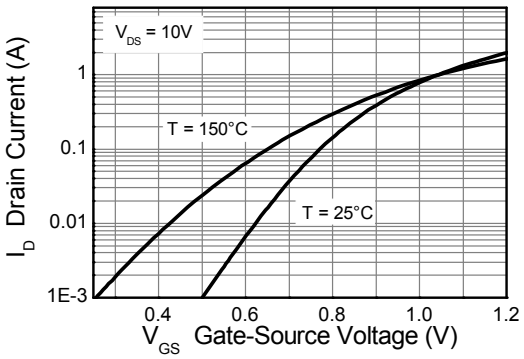
Typical Characteristics



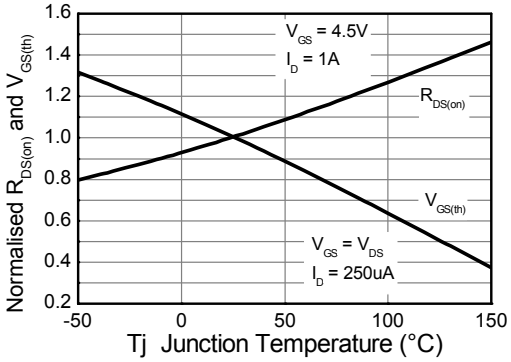
Output Characteristics



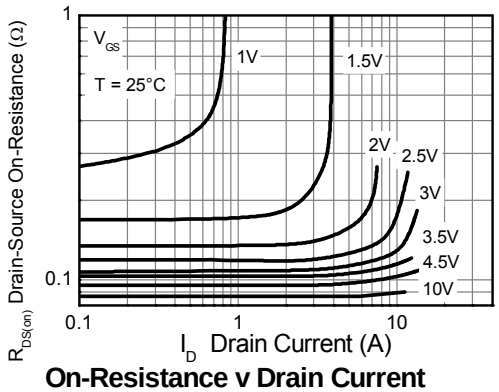
Output Characteristics



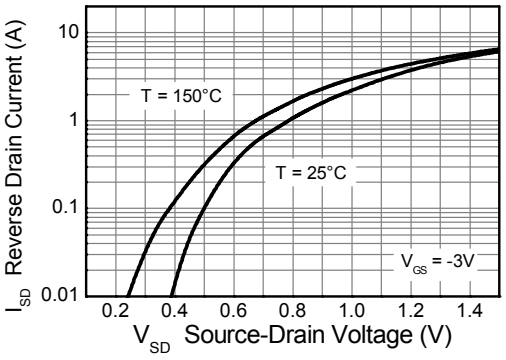
Typical Transfer Characteristics



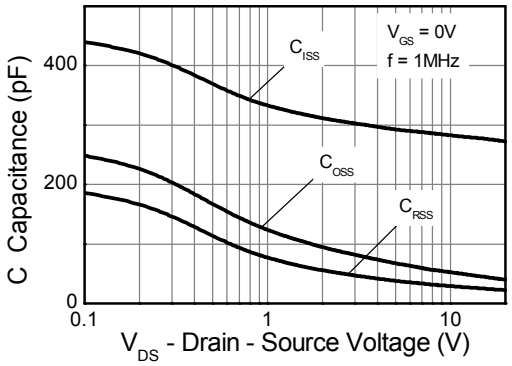
Normalised Curves v Temperature



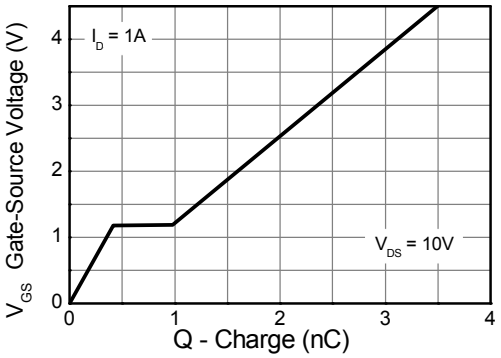
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

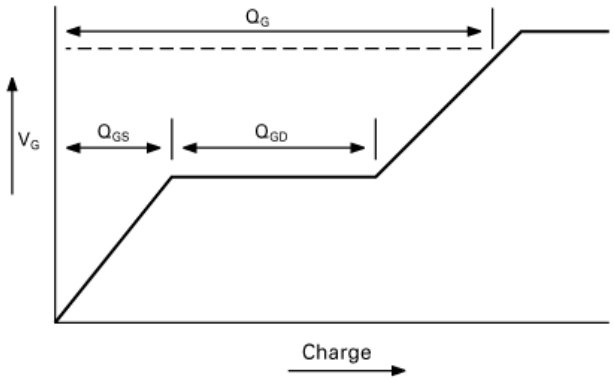


Capacitance v Drain-Source Voltage

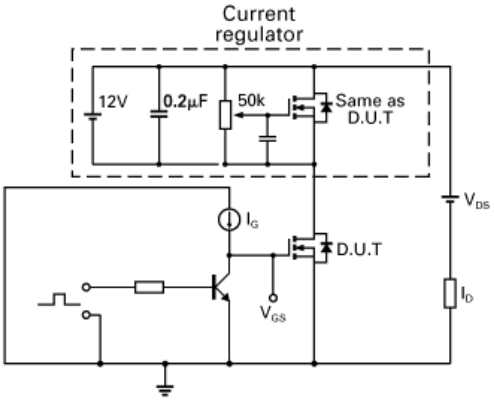


Gate-Source Voltage v Gate Charge

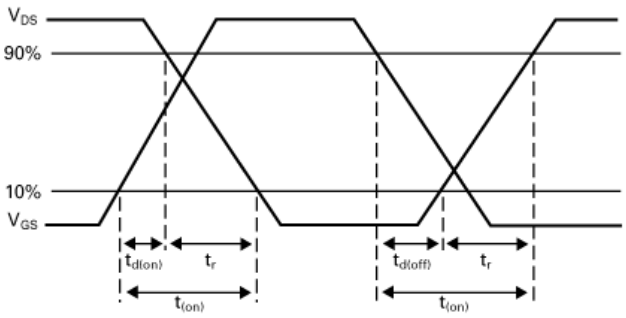
Test Circuits



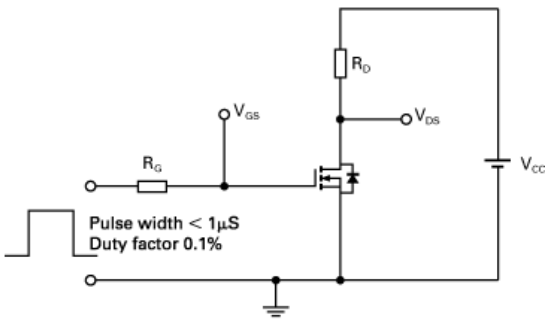
Basic gate charge waveform



Gate charge test circuit



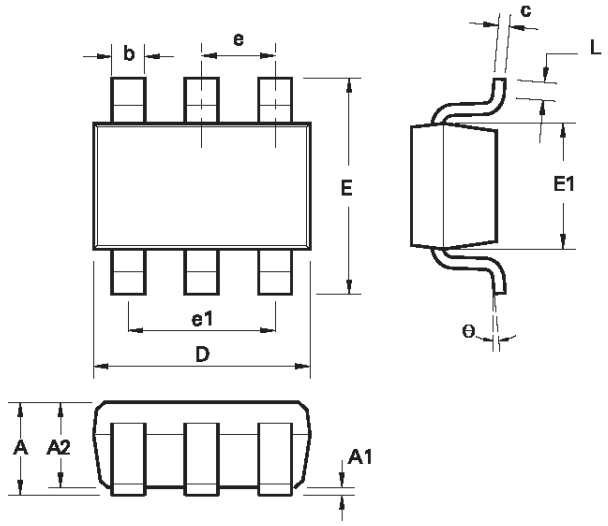
Switching time waveforms



Switching time test circuit

Packaging details – SOT236

Package outline



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.35	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
L	0.10	0.60	0.0039	0.0236
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0°	30°	0°	30°

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 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	Diodes Zetex (Asia) Limited 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Diodes Incorporated 15660 N. Dallas Parkway Suite 850, Dallas TX 75248, USA www.diodes.com

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Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А