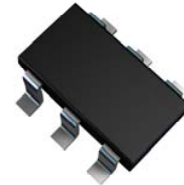


# ZXMN2088DE6

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

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (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

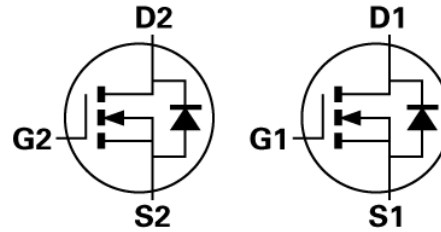
This new generation dual n-channel trench MOSFET from Zetex features low on-resistance achievable with low gate drive.

### Features

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

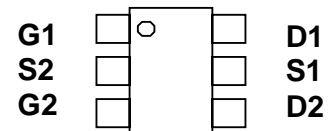
### Applications

- 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

# ZXMN2088DE6

## Absolute maximum ratings

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

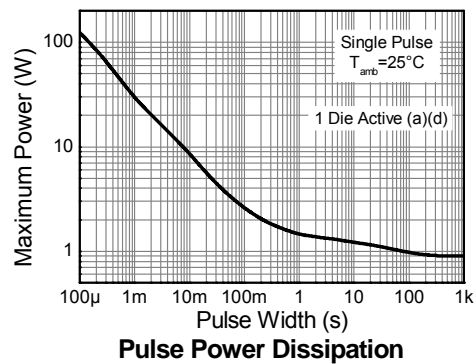
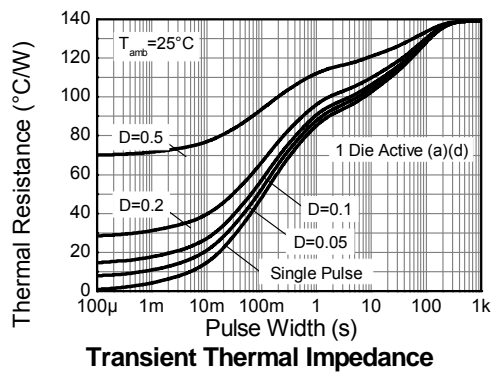
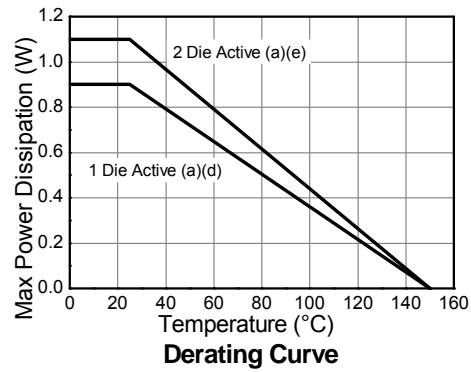
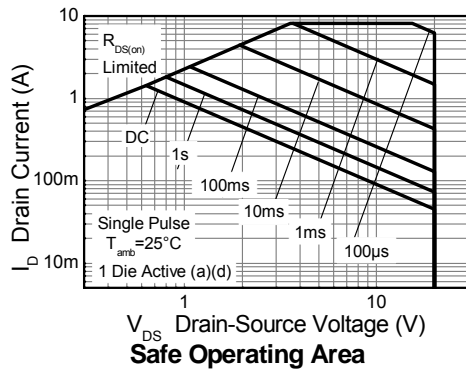
## Thermal resistance

Parameter	Symbol	Value	Unit
Junction to Ambient <sup>(a) (d)</sup>	$R_{\theta JA}$	139	$^\circ C/W$
Junction to Ambient <sup>(a) (e)</sup>	$R_{\theta JA}$	113	$^\circ C/W$
Junction to Ambient <sup>(b) (d)</sup>	$R_{\theta JA}$	96	$^\circ C/W$

## 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) As above measured at  $t \leq 5$  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



# ZXMN2088DE6

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

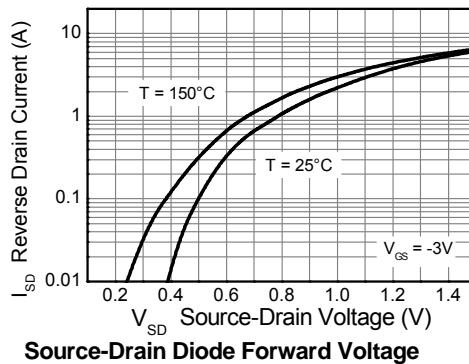
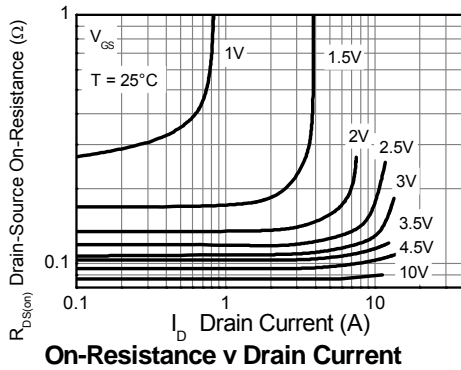
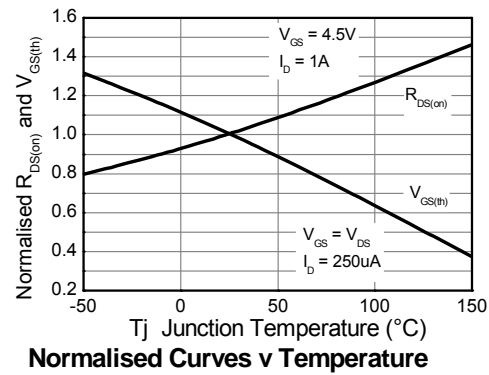
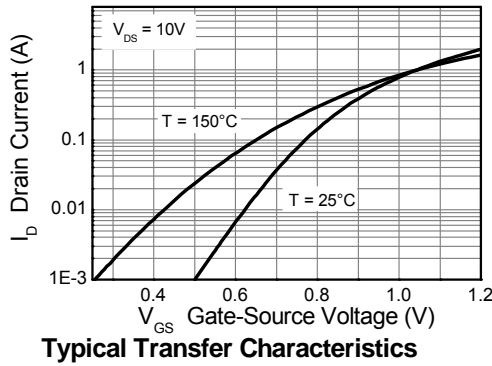
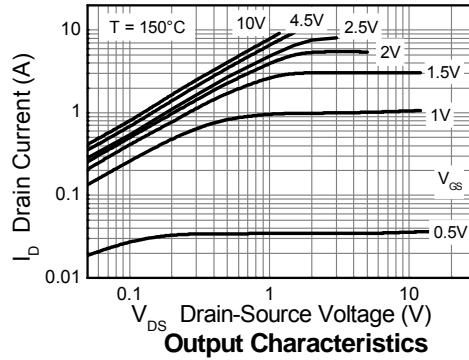
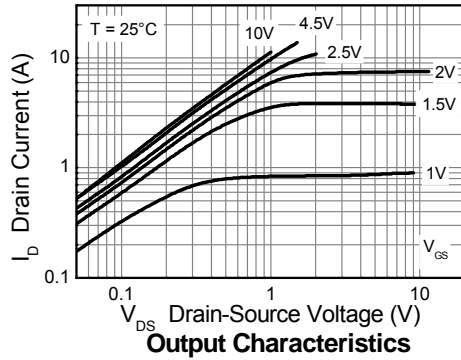
## NOTES:

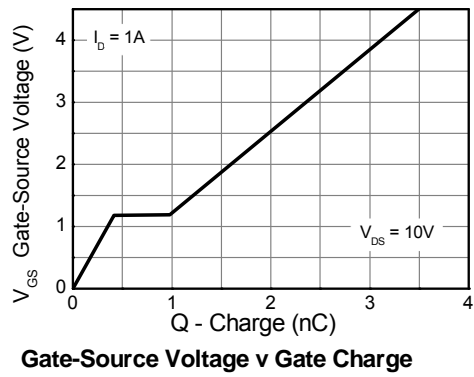
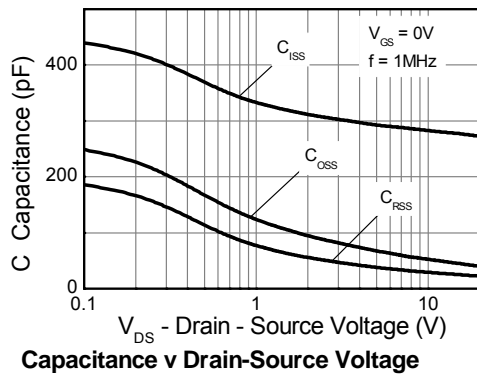
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

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

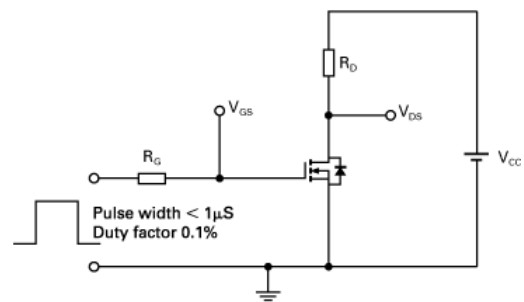
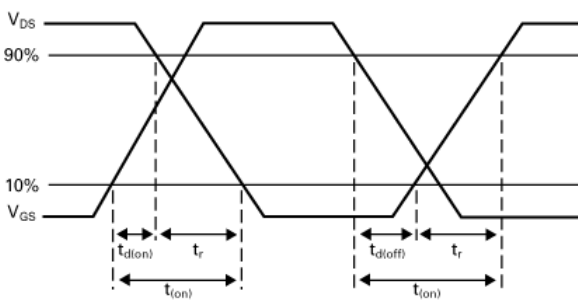
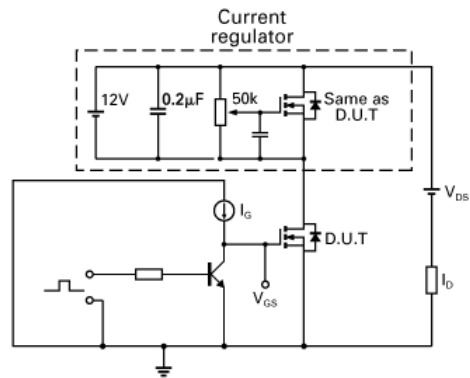
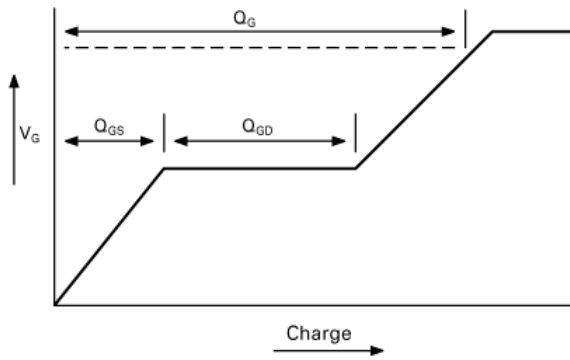
(‡) For design aid only, not subject to production testing.

## Typical Characteristics





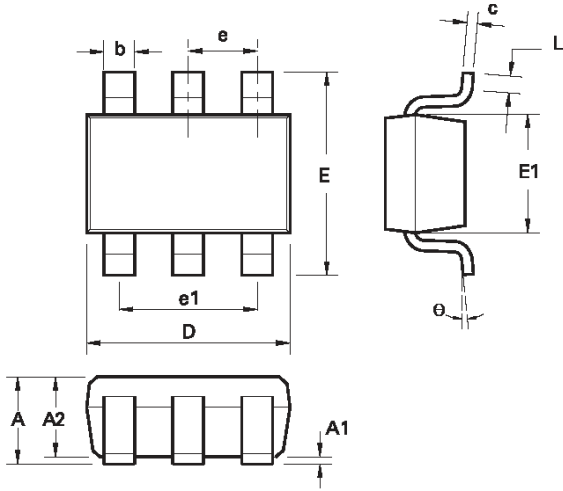
## Test Circuits



# ZXMN2088DE6

## 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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"Obsolete"	Production has been discontinued

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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