

# ZXMN2A01E6

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## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

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### SUMMARY

$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.12\Omega$   $I_D=3.03A$

### 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
- SOT23-6 package

### APPLICATIONS

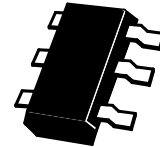
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

### ORDERING INFORMATION

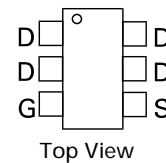
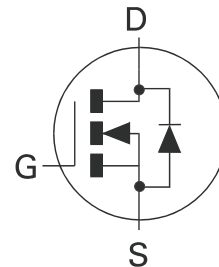
DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN2A01E6TA	7"	8mm	3000 units
ZXMN2A01E6TC	13"	8mm	10000 units

### DEVICE MARKING

- 2A1



SOT23-6



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### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	20	V
Gate Source Voltage	$V_{GS}$	12	V
Continuous Drain Current $V_{GS}=4.5V; T_A=25^{\circ}C$ (b) $V_{GS}=4.5V; T_A=70^{\circ}C$ (b) $V_{GS}=4.5V; T_A=25^{\circ}C$ (a)	$I_D$	3.03 2.43 2.44	A
Pulsed Drain Current (c)	$I_{DM}$	10	A
Continuous Source Current (Body Diode) (b)	$I_S$	1.8	A
Pulsed Source Current (Body Diode)(c)	$I_{SM}$	10	A
Power Dissipation at $T_A=25^{\circ}C$ (a) Linear Derating Factor	$P_D$	1.1 8.8	W mW/ $^{\circ}C$
Power Dissipation at $T_A=25^{\circ}C$ (b) Linear Derating Factor	$P_D$	1.7 13.6	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 (a)	$R_{\theta JA}$	113	$^{\circ}C/W$
Junction to Ambient (b)	$R_{\theta JA}$	73	$^{\circ}C/W$

#### 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) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature.

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## ELECTRICAL CHARACTERISTICS (at $T_A = 25^\circ\text{C}$ unless otherwise stated).

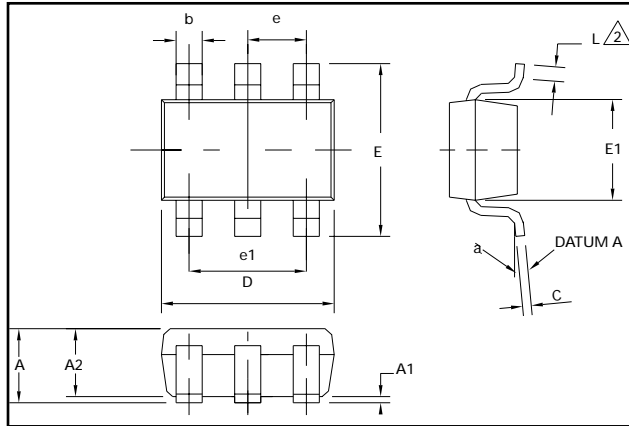
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=20\text{V}$ , $V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 12\text{V}$ , $V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.7			V	$I_D=250\mu\text{A}$ , $V_{DS}=V_{GS}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$		0.09	0.12 0.30	$\Omega$	$V_{GS}=4.5\text{V}$ , $I_D=4\text{A}$ $V_{GS}=2.5\text{V}$ , $I_D=1.5\text{A}$
Forward Transconductance (3)	$g_{fs}$		6.2		S	$V_{DS}=10\text{V}$ , $I_D=4\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		299		pF	$V_{DS}=15\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$
Output Capacitance	$C_{oss}$		60		pF	
Reverse Transfer Capacitance	$C_{rss}$		33		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		2.31		ns	$V_{DD}=10\text{V}$ , $I_D=4\text{A}$ $R_G=6.0\Omega$ , $V_{GS}=5\text{V}$
Rise Time	$t_r$		2.60		ns	
Turn-Off Delay Time	$t_{d(off)}$		1.55		ns	
Fall Time	$t_f$		1.31		ns	
Total Gate Charge	$Q_g$		3.1		nC	$V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=4\text{A}$
Gate-Source Charge	$Q_{gs}$		0.7		nC	
Gate-Drain Charge	$Q_{gd}$		1.0		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$		0.84	0.95	V	$T_J=25^\circ\text{C}$ , $I_S=0.6\text{A}$ , $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		11.2		ns	$T_J=25^\circ\text{C}$ , $I_F=4\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge (3)	$Q_{rr}$		3.64		nC	

### NOTES

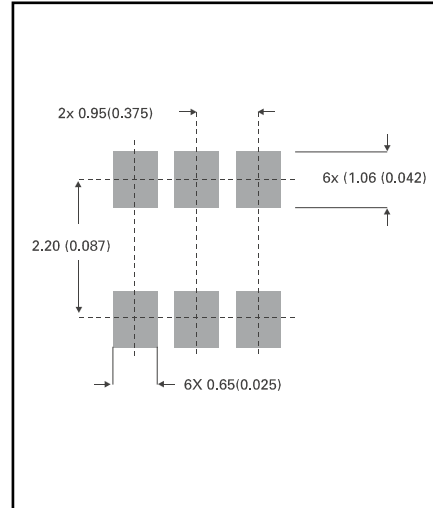
- (1) Measured under pulsed conditions. Width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

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## PACKAGE DIMENSIONS



## PAD LAYOUT DETAILS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.35	0.057
A1	0.00	0.15	0	0.006
A2	0.90	1.30	0.035	0.051
b	0.35	0.50	0.014	0.019
C	0.09	0.20	0.0035	0.008
D	2.80	3.00	0.110	0.118
E	2.60	3.00	0.102	0.118
E1	1.50	1.75	0.059	0.069
L	0.10	0.60	0.004	0.024
e	0.95 REF		0.037 REF	
e1	1.90 REF		0.074 REF	
L	0°	10°	0°	10°

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