

# ZXMN2A03E6

## 20V N-CANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.055\Omega$   $I_D=4.5A$

### 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

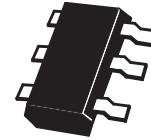
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

### ORDERING INFORMATION

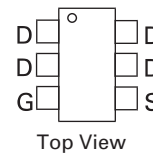
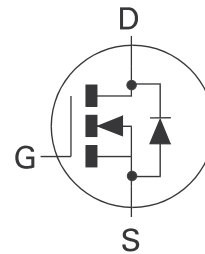
DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN2A03E6TA	7"	8mm	3000 units
ZXMN2A03E6TC	13"	8mm	10000 units

### DEVICE MARKING

- 2A3



SOT23-6



Top View

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## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DSS}$	20	V
Gate Source Voltage	$V_{GS}$	$\pm 12$	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)	$I_D$	4.5 3.6 3.6	A
Pulsed Drain Current (c)	$I_{DM}$	16	A
Continuous Source Current (Body Diode) (b)	$I_S$	2.7	A
Pulsed Source Current (Body Diode)(c)	$I_{SM}$	16	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 25mm x 25mm FR4 PCB,  $D = 0.05$ , pulse width  $10\mu s$  - pulse width limited by maximum junction temperature.



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## ELECTRICAL CHARACTERISTICS (at T<sub>A</sub> = 25°C unless otherwise stated).

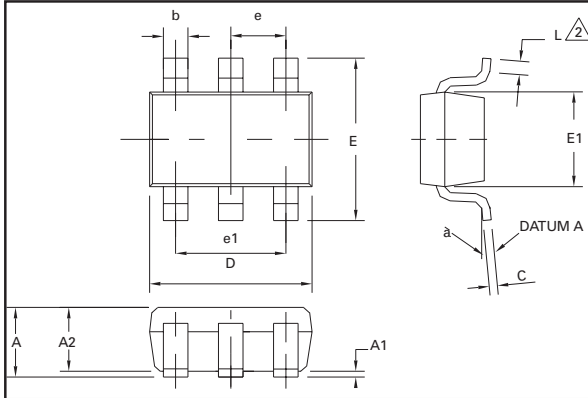
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	20			V	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	0.7			V	I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>
Static Drain-Source On-State Resistance (1)	R <sub>DS(on)</sub>			0.055 0.100	Ω	V <sub>GS</sub> =4.5V, I <sub>D</sub> =7.2A V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.6A
Forward Transconductance (1)(3)	g <sub>fs</sub>		12		S	V <sub>DS</sub> =10V, I <sub>D</sub> =7.2A
<b>DYNAMIC (3)</b>						
Input Capacitance	C <sub>iss</sub>		823		pF	V <sub>DS</sub> =15 V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		159		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		93		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	t <sub>d(on)</sub>		4.3		ns	V <sub>DD</sub> = 10V, I <sub>D</sub> =3.5A R <sub>G</sub> =6.0Ω, V <sub>GS</sub> =5V
Rise Time	t <sub>r</sub>		8.0		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		17.7		ns	
Fall Time	t <sub>f</sub>		10.0		ns	
Total Gate Charge	Q <sub>g</sub>		8.6		nC	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.5A
Gate-Source Charge	Q <sub>gs</sub>		1.9		nC	
Gate-Drain Charge	Q <sub>gd</sub>		2.5		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	V <sub>SD</sub>		0.85	0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> =4.2A, V <sub>GS</sub> =0V
Reverse Recovery Time (3)	t <sub>rr</sub>		14.2		ns	T <sub>J</sub> =25°C, I <sub>F</sub> =3.5A, di/dt= 100A/μs
Reverse Recovery Charge (3)	Q <sub>rr</sub>		7.2		nC	

### NOTES

- (1) Measured under pulsed conditions. Width ≤300μs. Duty cycle ≤ 2% .  
 (2) Switching characteristics are independent of operating junction temperature.  
 (3) For design aid only, not subject to production testing.

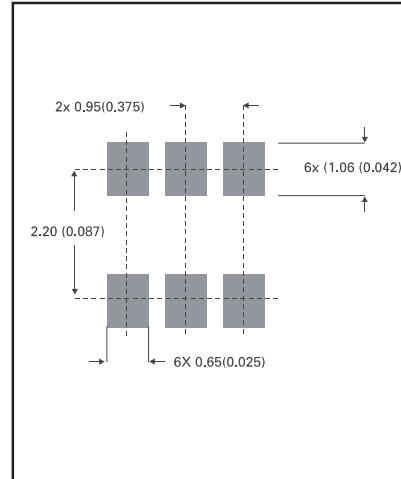
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## PACKAGE DIMENSIONS



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	0.002
e	0.95 REF		0.037 REF	
e1	1.90 REF		0.074 REF	
L	0°	10°	0°	10°

## PAD LAYOUT DETAILS



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