

# ZXMN3A03E6

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## 30V N-CANNEL ENHANCEMENT MODE MOSFET

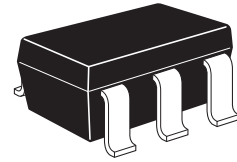
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### SUMMARY

$V_{(BR)DSS} = 30V$ ;  $R_{DS(ON)} = 0.050\Omega$ ;  $I_D = 4.6A$

### 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.



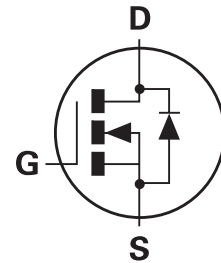
SOT23-6

### 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

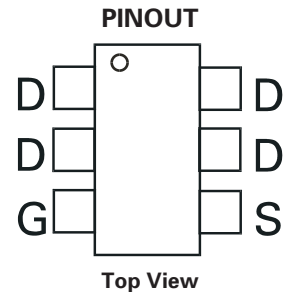


### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMN3A03E6TA	7"	8mm	3000 units
ZXMN3A03E6TC	13"	8mm	10000 units

### DEVICE MARKING

- 3A3



# ZXMN3A03E6

## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	$V_{DSS}$	30	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current $V_{GS}=10V; T_A=25^{\circ}C$ <sup>(b)</sup> $V_{GS}=10V; T_A=70^{\circ}C$ <sup>(b)</sup> $V_{GS}=10V; T_A=25^{\circ}C$ <sup>(a)</sup>	$I_D$	4.6 3.7 3.7	A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	17	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	2.6	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	17	A
Power dissipation at $T_A=25^{\circ}C$ <sup>(a)</sup> Linear derating factor	$P_D$	1.1 8.8	W mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ <sup>(b)</sup> 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

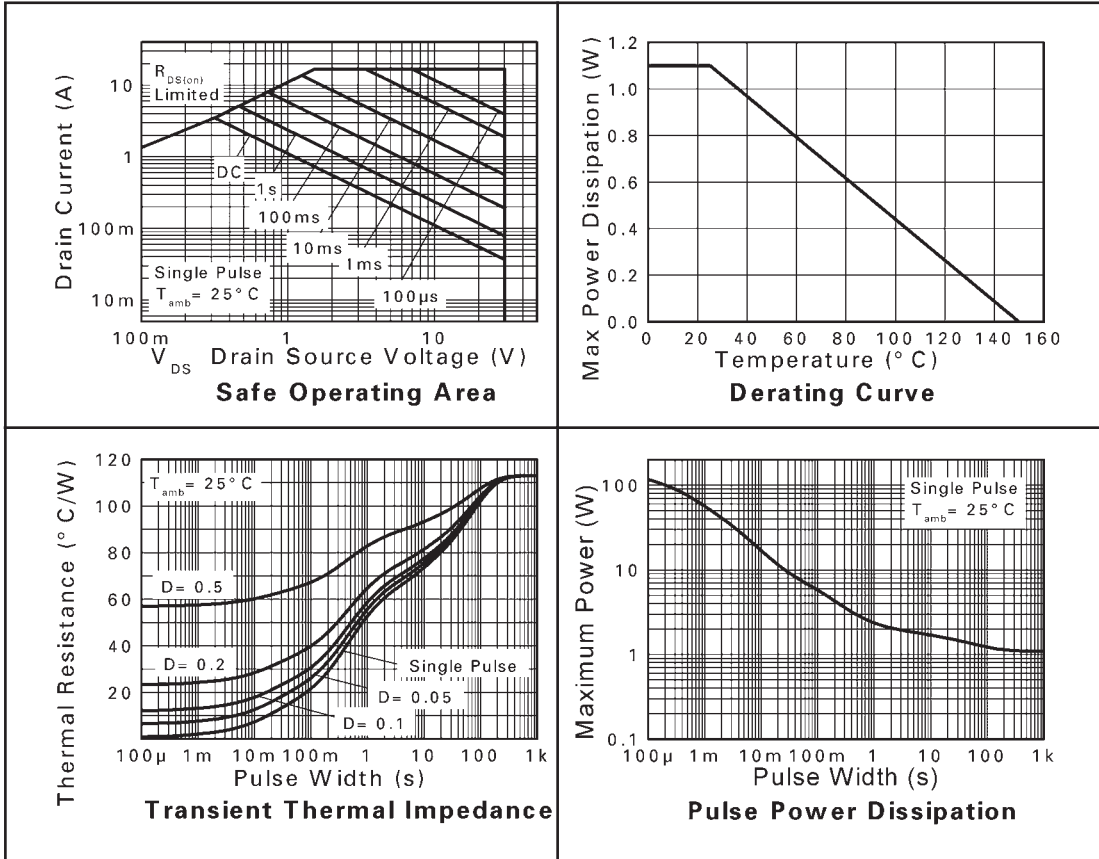
PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	113	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	73	$^{\circ}C/W$

### 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  $t \leq 10$  secs.  
 (c) Repetitive rating 25mm x 25mm FR4 PCB,  $D = 0.05$ , pulse width 10  $\mu s$  - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

# ZXMN3A03E6

## CHARACTERISTICS



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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	$V_{(BR)DSS}$	30			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero gate voltage drain current	$I_{DSS}$			0.5	$\mu\text{A}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$
Gate-body leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$
Gate-source threshold voltage	$V_{GS(th)}$	1			V	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$
Static drain-source on-state resistance <sup>(1)</sup>	$R_{DS(on)}$			0.050 0.065	$\Omega$	$V_{GS}=10\text{V}, I_D=7.8\text{A}$ $V_{GS}=4.5\text{V}, I_D=6.8\text{A}$
Forward transconductance <sup>(1)(3)</sup>	$g_{fs}$		10		S	$V_{DS}=10\text{V}, I_D=7.8\text{A}$
<b>DYNAMIC</b> <sup>(3)</sup>						
Input capacitance	$C_{iss}$		600		pF	$V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output capacitance	$C_{oss}$		104		pF	
Reverse transfer capacitance	$C_{rss}$		58.5		pF	
<b>SWITCHING</b> <sup>(2) (3)</sup>						
Turn-on delay time	$t_{d(on)}$		2.9		ns	$V_{DD}=15\text{V}, I_D=3.5\text{A}$ $R_G=6.0\Omega, V_{GS}=10\text{V}$
Rise time	$t_r$		6.4		ns	
Turn-off delay time	$t_{d(off)}$		16.0		ns	
Fall time	$t_f$		11.2		ns	
Gate charge	$Q_g$		6.9		nC	$V_{DS}=15\text{V}, V_{GS}=5\text{V},$ $I_D=3.5\text{A}$
Total gate charge	$Q_g$		12.6		nC	$V_{DS}=15\text{V}, V_{GS}=10\text{V},$ $I_D=3.5\text{A}$
Gate-source charge	$Q_{gs}$		2.0		nC	
Gate-drain charge	$Q_{gd}$		2.0		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode forward voltage <sup>(1)</sup>	$V_{SD}$		0.85	0.95	V	$T_J=25^\circ\text{C}, I_S=3.2\text{A},$ $V_{GS}=0\text{V}$
Reverse recovery time <sup>(3)</sup>	$t_{rr}$		18.8		ns	$T_J=25^\circ\text{C}, I_F=3.5\text{A},$ $di/dt= 100\text{A}/\mu\text{s}$
Reverse recovery charge <sup>(3)</sup>	$Q_{rr}$		14.1		nC	

**NOTES:**

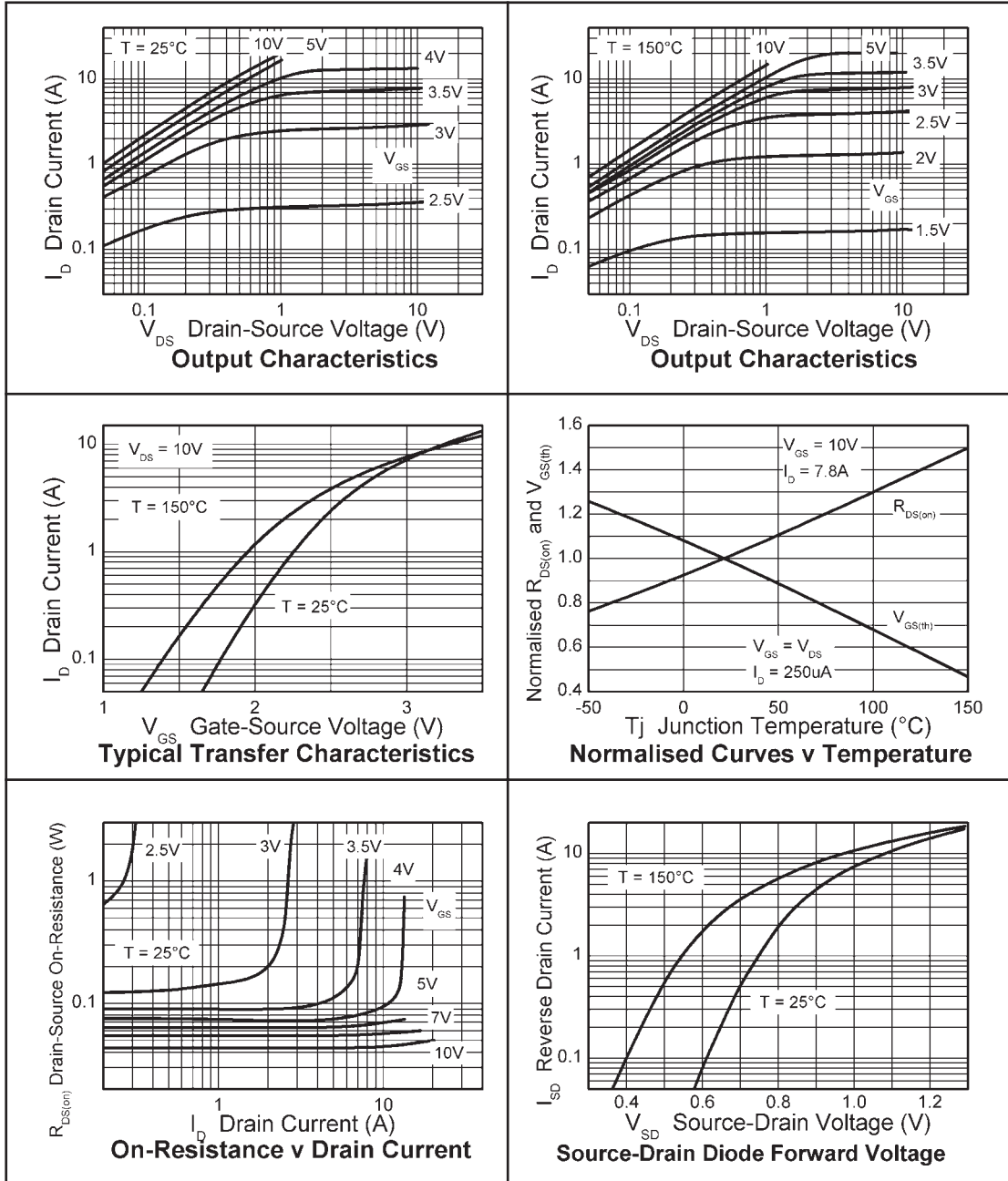
(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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

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

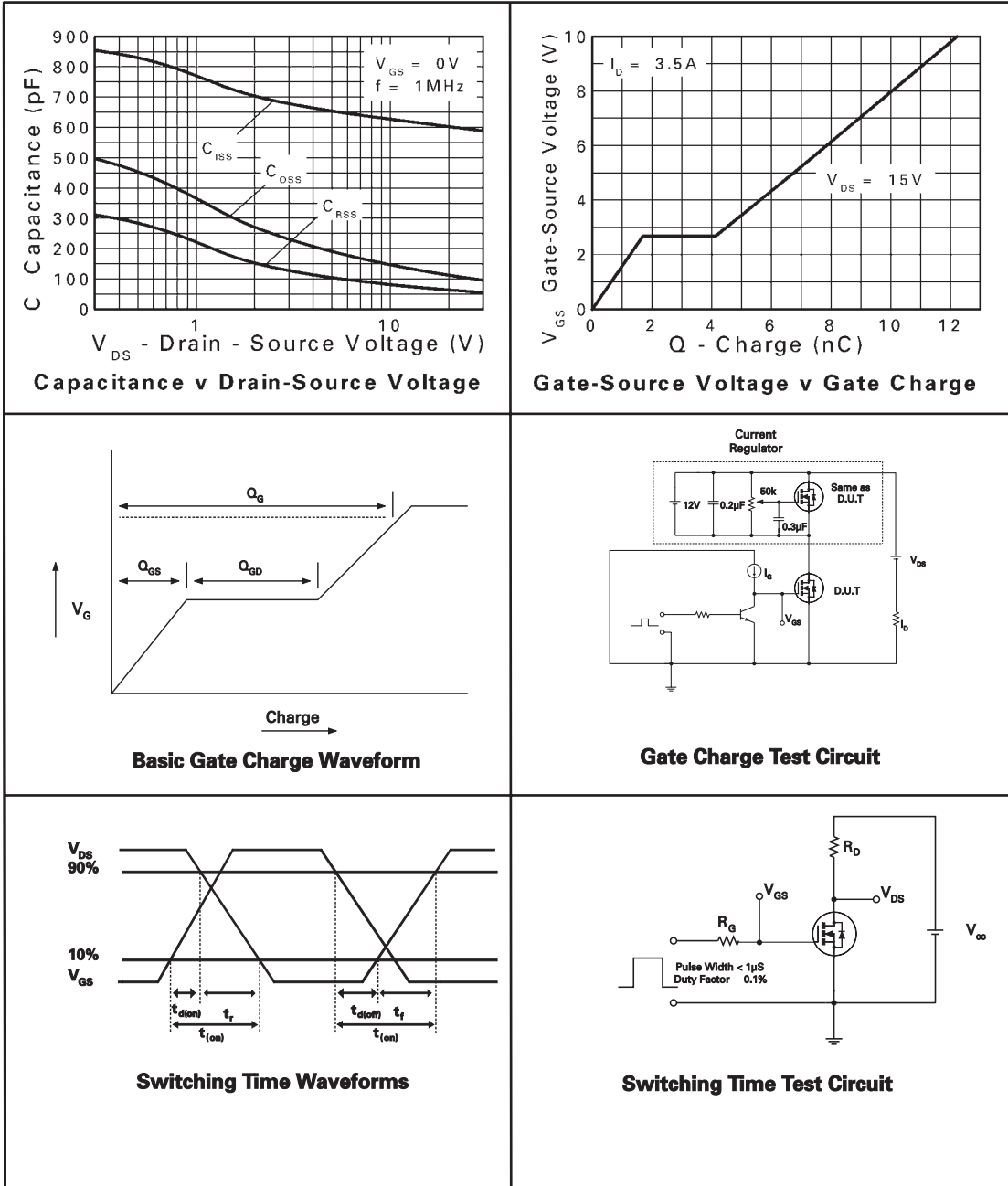
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## TYPICAL CHARACTERISTICS



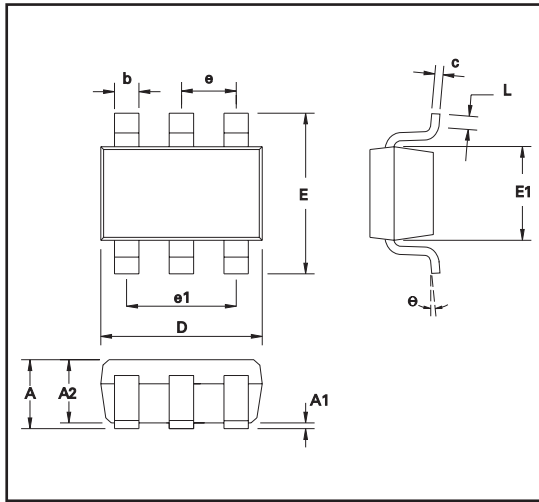
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## TYPICAL CHARACTERISTICS

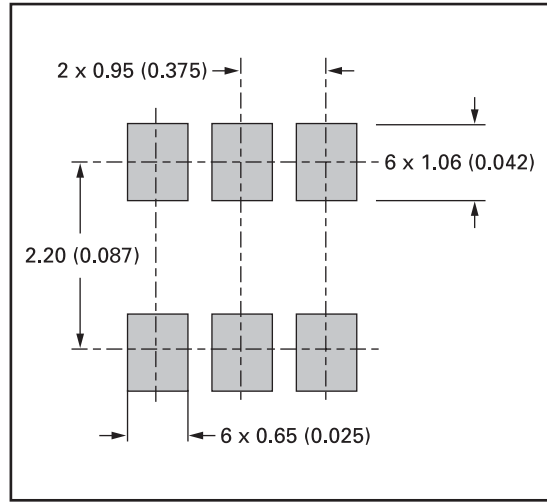


# ZXMN3A03E6

## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



CONTROLLING DIMENSIONS IN MILLIMETERS APPROX CONVERSIONS INCHES.

## PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.90	1.45	0.35	0.057	E	2.60	3.00	0.102	0.118
A1	0.00	0.15	0	0.006	E1	1.50	1.75	0.059	0.069
A2	0.90	1.30	0.035	0.051	L	0.10	0.60	0.004	0.002
b	0.35	0.50	0.014	0.019	e	0.95 REF		0.037 REF	
C	0.09	0.20	0.0035	0.008	e1	1.90 REF		0.074 REF	
D	2.80	3.00	0.110	0.118	L	0°	10°	0°	10°

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