

## 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.040\Omega$ ;  $I_D=5.4A$**

### DESCRIPTION

This new generation of high density MOSFETs from Zetex utilises 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
- Low profile SOIC package

### APPLICATIONS

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

### ORDERING INFORMATION

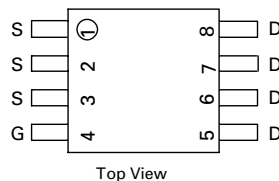
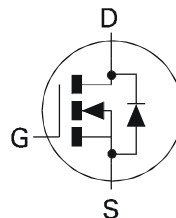
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXM64N02XTA	7	12mm embossed	1000 units
ZXM64N02XTC	13	12mm embossed	4000 units

### DEVICE MARKING

- ZXM4N02



**MSOP8**



# ZXM64N02X

## 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)	$I_D$	5.4 4.3	A
Pulsed Drain Current (c)	$I_{DM}$	30	A
Continuous Source Current (Body Diode)(b)	$I_S$	2.4	A
Pulsed Source Current (Body Diode)(c)	$I_{SM}$	30	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	$P_D$	1.8 14.4	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 (a)	$R_{\theta JA}$	113	$^{\circ}C/W$
Junction to Ambient (b)	$R_{\theta JA}$	70	$^{\circ}C/W$

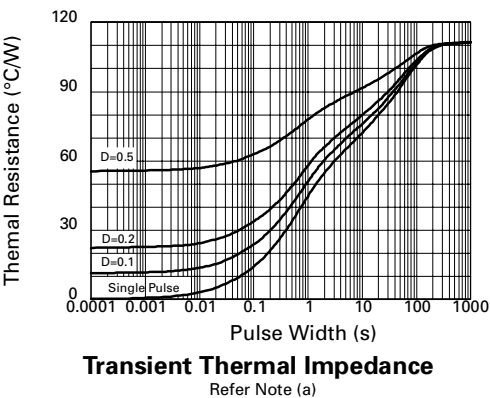
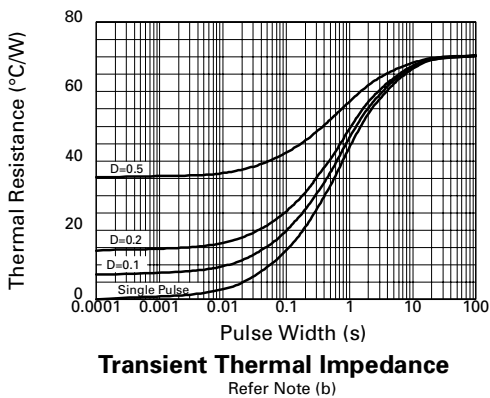
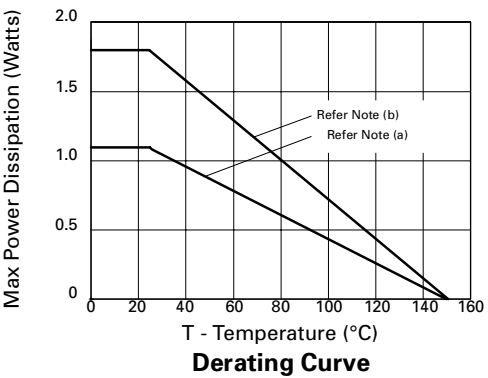
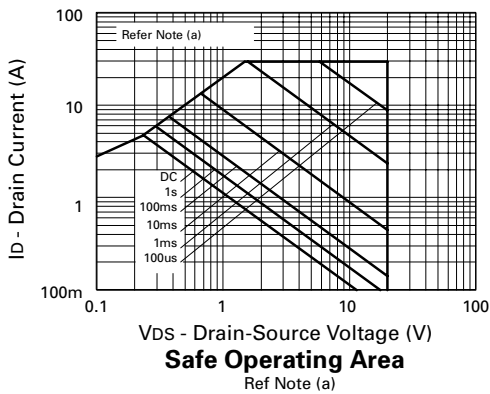
### NOTES

(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 - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

TYPICAL CHARACTERISTICS



# ZXM64N02X

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

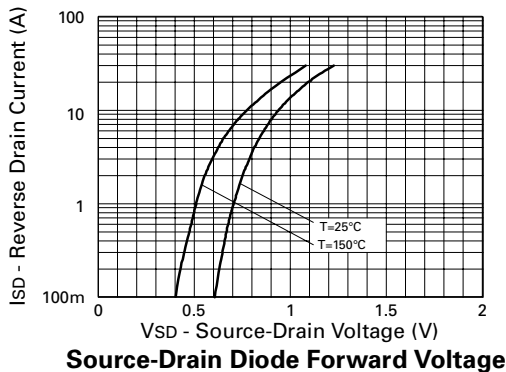
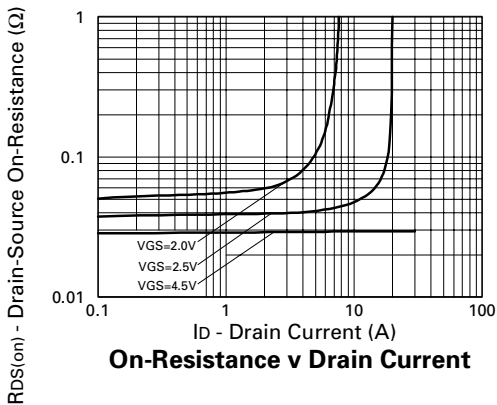
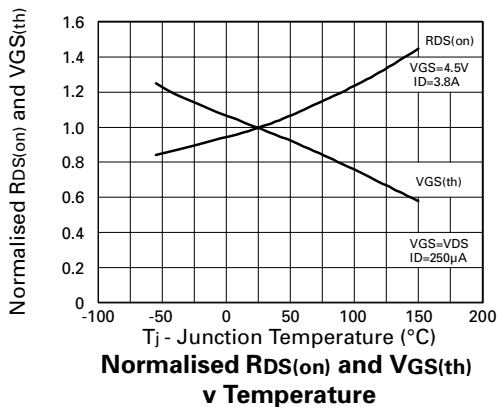
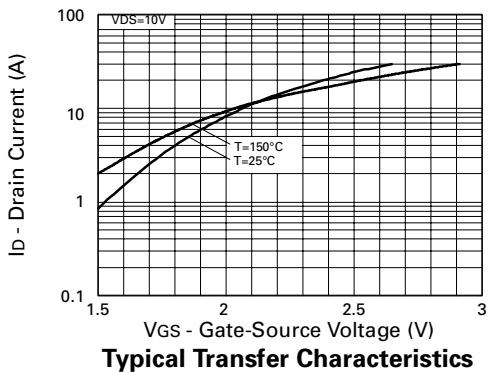
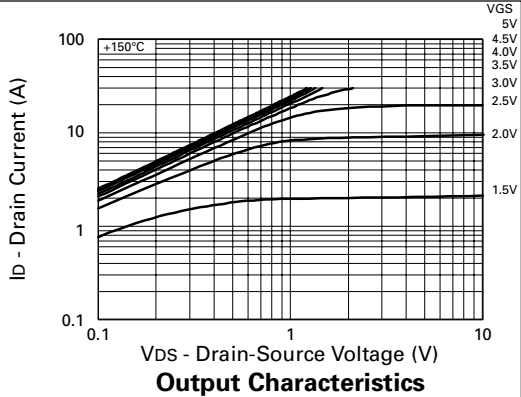
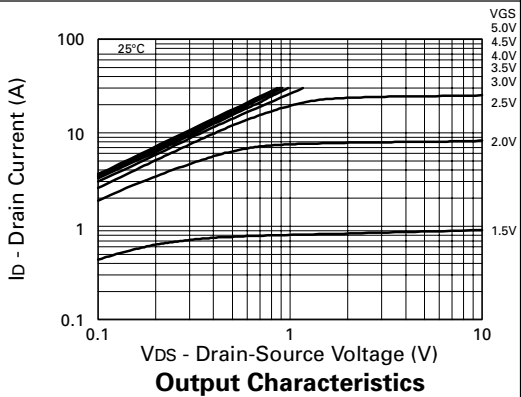
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	20			V	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V
Gate-Body Leakage	I <sub>GSS</sub>			100	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>			0.040 0.050	Ω Ω	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.8A V <sub>GS</sub> =2.7V, I <sub>D</sub> =1.9A
Forward Transconductance (3)	g <sub>fs</sub>	6.1			S	V <sub>DS</sub> =10V, I <sub>D</sub> =1.9A
DYNAMIC (3)						
Input Capacitance	C <sub>iss</sub>		1100		pF	V <sub>DS</sub> =15 V, V <sub>GS</sub> =0V, f=1MHz
Output Capacitance	C <sub>oss</sub>		350		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		100		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	t <sub>d(on)</sub>		5.7		ns	V <sub>DD</sub> =10V, I <sub>D</sub> =3.8A R <sub>G</sub> =6.2Ω, R <sub>D</sub> =2.6Ω (Refer to test circuit)
Rise Time	t <sub>r</sub>		9.6		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		28.3		ns	
Fall Time	t <sub>f</sub>		11.6		ns	
Total Gate Charge	Q <sub>g</sub>			16	nC	V <sub>DS</sub> =16V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.8A (Refer to test circuit)
Gate-Source Charge	Q <sub>gs</sub>			3.5	nC	
Gate Drain Charge	Q <sub>gd</sub>			5.4	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V <sub>SD</sub>			0.95	V	T <sub>j</sub> =25°C, I <sub>S</sub> =3.8A, V <sub>GS</sub> =0V
Reverse Recovery Time (3)	t <sub>rr</sub>		23.7		ns	T <sub>j</sub> =25°C, I <sub>F</sub> =3.8A, di/dt= 100A/μs
Reverse Recovery Charge(3)	Q <sub>rr</sub>		13.3		nC	

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

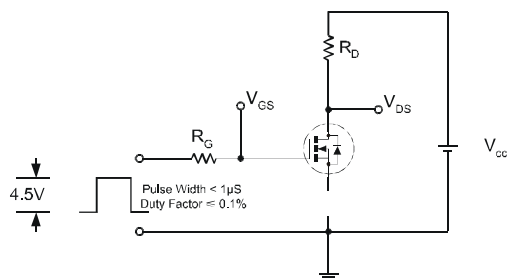
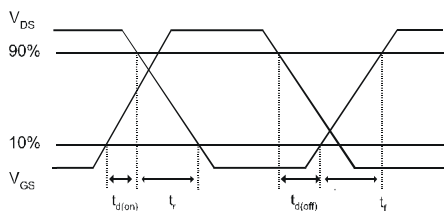
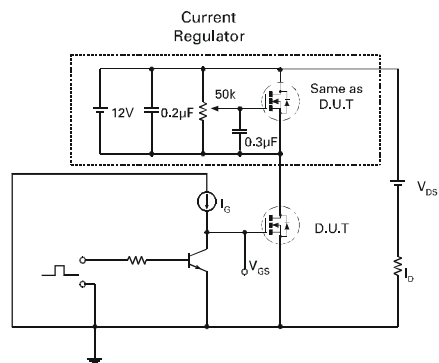
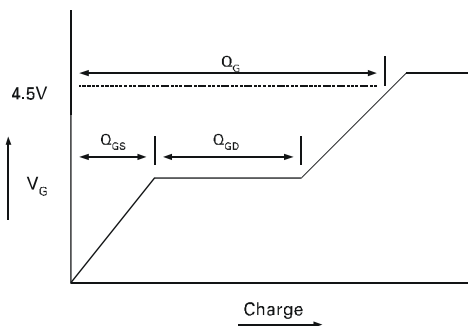
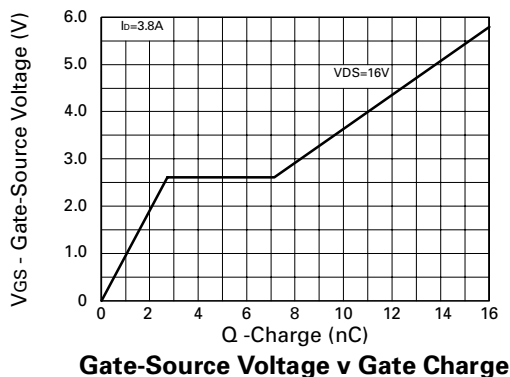
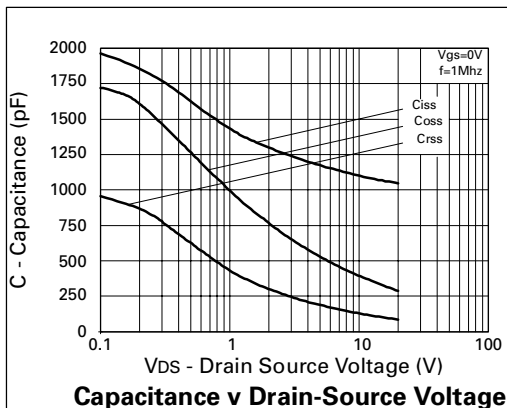
(2) Switching characteristics are independent of operating junction temperature.

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

TYPICAL CHARACTERISTICS

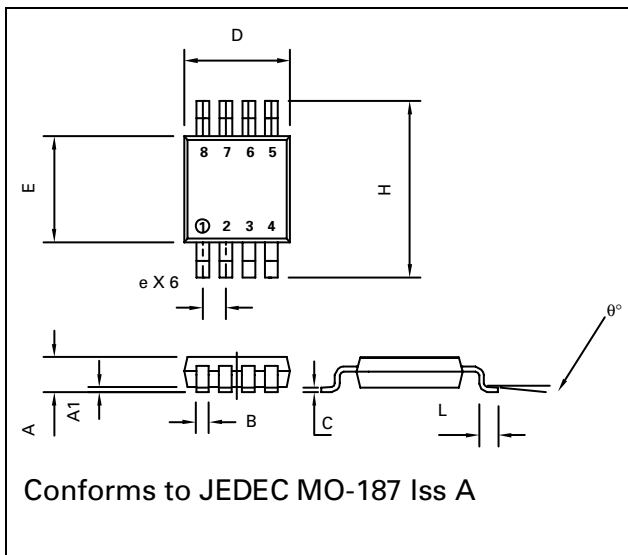


## TYPICAL CHARACTERISTICS



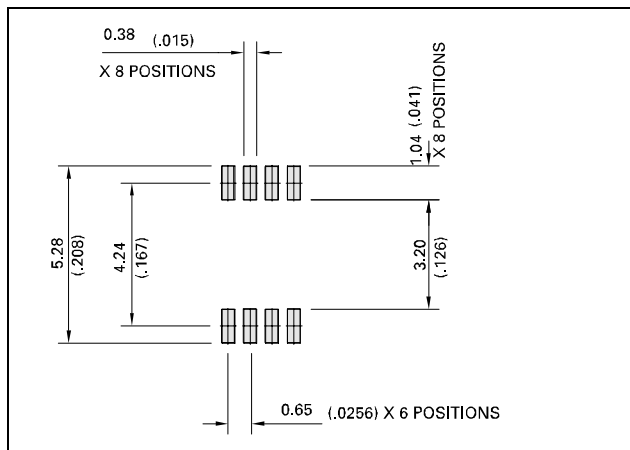
# ZXM64N02X

## PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	MIN	MAX	MIN	MAX
A		1.10		0.043
A1	0.05	0.15	0.002	0.006
B	0.25	0.40	0.010	0.016
C	0.13	0.23	0.005	0.009
D	2.90	3.10	0.114	0.122
e	0.65	BSC	0.0256	BSC
E	2.90	3.10	0.114	0.122
H	4.90	BSC	0.193	BSC
L	0.40	0.70	0.016	0.028
q°	0°	6°	0°	6°

## PAD LAYOUT DETAILS



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