

## DUAL 20V N-CANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

**$V_{(BR)DSS}=20V$ ;  $R_{DS(ON)}=0.13\Omega$ ;  $I_D=2.4A$**

### 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.



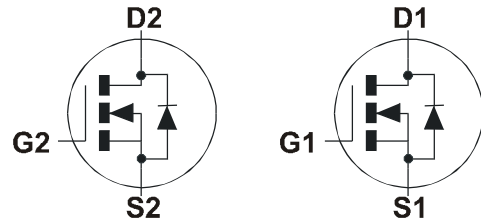
**MSOP8**

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23 package

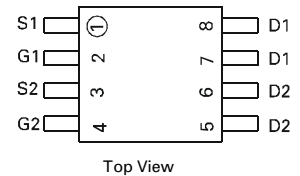
### APPLICATIONS

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



### ORDERING INFORMATION

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXMD63N02XTA	7	12mm embossed	1000 units
ZXMD63N02XTC	13	12mm embossed	4000 units



### DEVICE MARKING

- ZXMD63N02

# ZXMD63N02X

## 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)(d) ( $V_{GS}=4.5V$ ; $T_A=70^\circ C$ )(b)(d)	$I_D$	2.4 1.9	A
Pulsed Drain Current (c)(d)	$I_{DM}$	19	A
Continuous Source Current (Body Diode)(b)(d)	$I_S$	1.5	A
Pulsed Source Current (Body Diode)(c)(d)	$I_{SM}$	19	A
Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor	$P_D$	0.87 6.9	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (a)(e) Linear Derating Factor	$P_D$	1.04 8.3	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor	$P_D$	1.25 10	W mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j$ : $T_{stg}$	-55 to +150	$^\circ C$

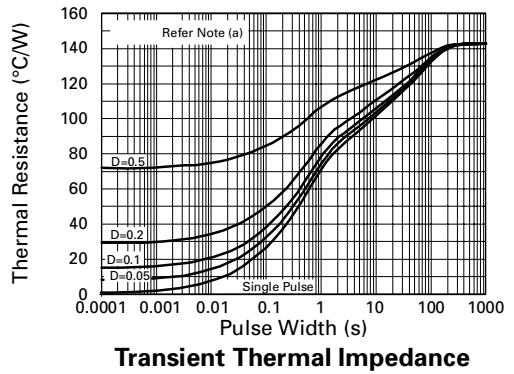
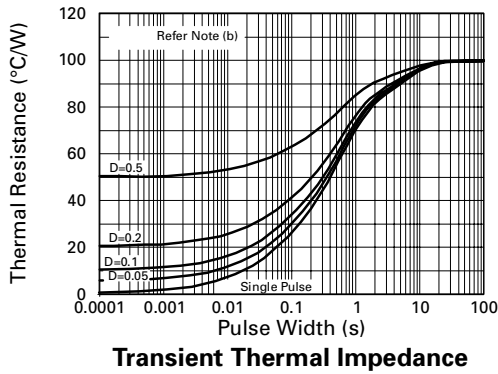
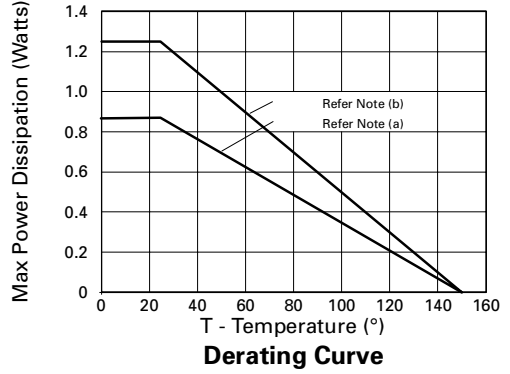
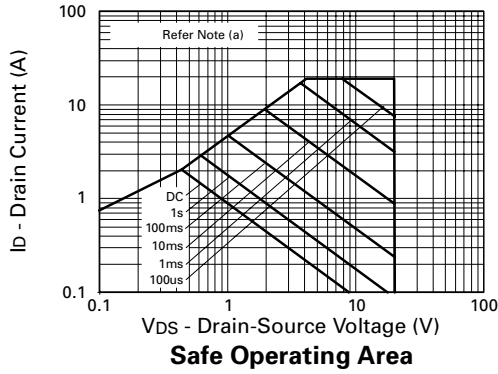
## THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)(d)	$R_{\theta JA}$	143	$^\circ C/W$
Junction to Ambient (b)(d)	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient (a)(e)	$R_{\theta JA}$	120	$^\circ C/W$

### 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.
- (d) For device with one active die.
- (e) For device with two active die running at equal power.

## CHARACTERISTICS



# ZXMD63N02X

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

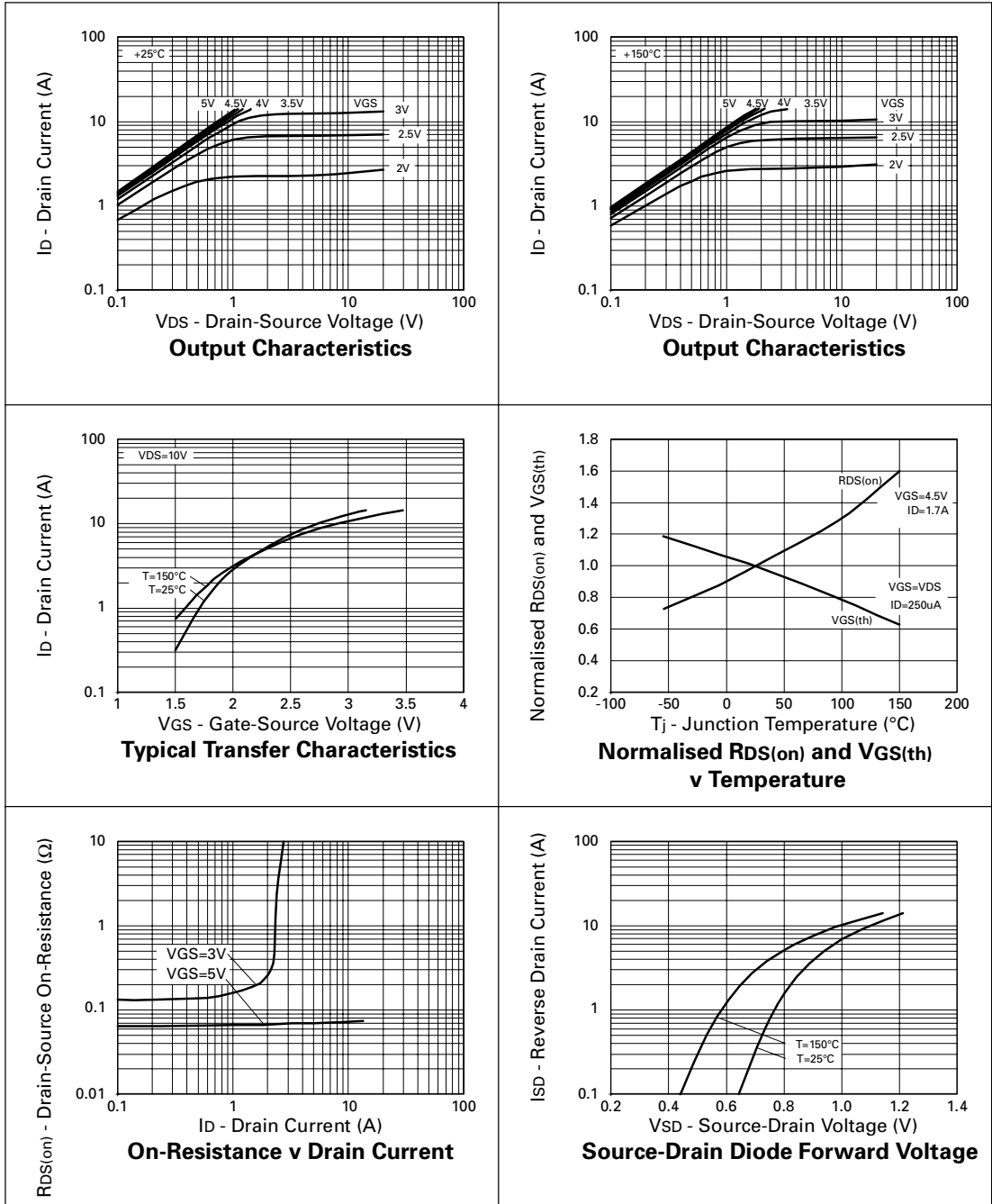
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20			V	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$
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)	$R_{DS(on)}$			0.130 0.150	$\Omega$ $\Omega$	$V_{GS}=4.5\text{V}, I_D=1.7\text{A}$ $V_{GS}=2.7\text{V}, I_D=0.85\text{A}$
Forward Transconductance (3)	$g_{fs}$	2.6			S	$V_{DS}=10\text{V}, I_D=0.85\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		350		pF	$V_{DS}=15\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$		120		pF	
Reverse Transfer Capacitance	$C_{rss}$		50		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		3.4		ns	$V_{DD}=10\text{V}, I_D=1.7\text{A}$ $R_G=6.0\Omega, R_D=5.7\Omega$ (Refer to test circuit)
Rise Time	$t_r$		8.1		ns	
Turn-Off Delay Time	$t_{d(off)}$		13.5		ns	
Fall Time	$t_f$		9.1		ns	
Total Gate Charge	$Q_g$			6	nC	$V_{DS}=16\text{V}, V_{GS}=4.5\text{V},$ $I_D=1.7\text{A}$ (Refer to test circuit)
Gate-Source Charge	$Q_{gs}$			0.65	nC	
Gate Drain Charge	$Q_{gd}$			2.5	nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$			0.95	V	$T_j=25^{\circ}\text{C}, I_S=1.7\text{A},$ $V_{GS}=0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		15.0		ns	$T_j=25^{\circ}\text{C}, I_F=1.7\text{A},$ $di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge(3)	$Q_{rr}$		5.9		nC	

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

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

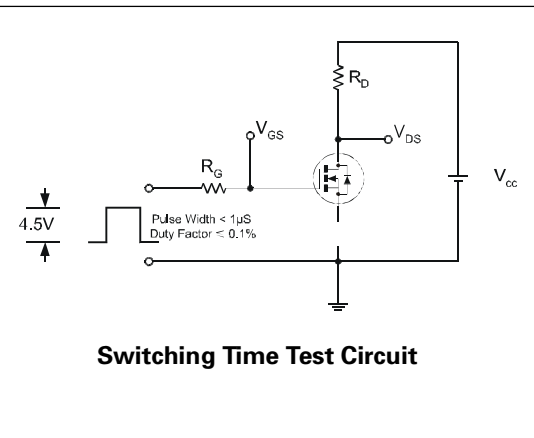
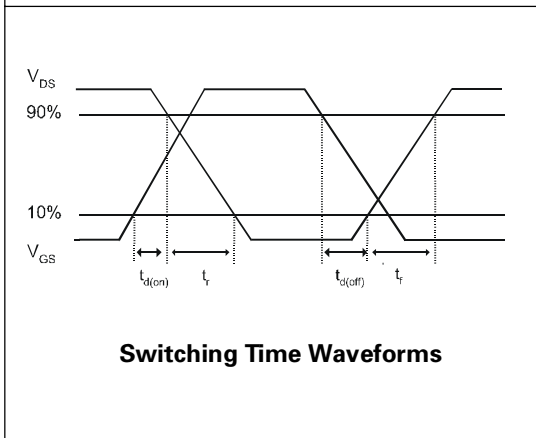
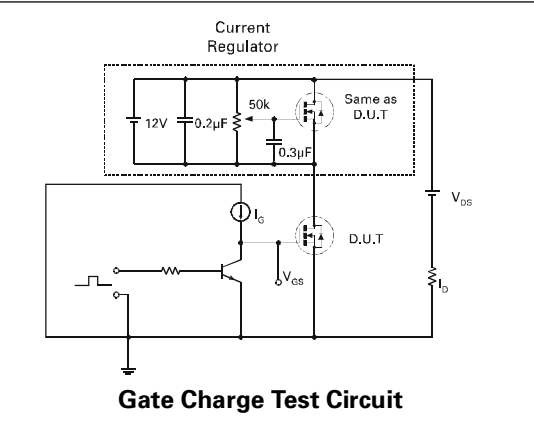
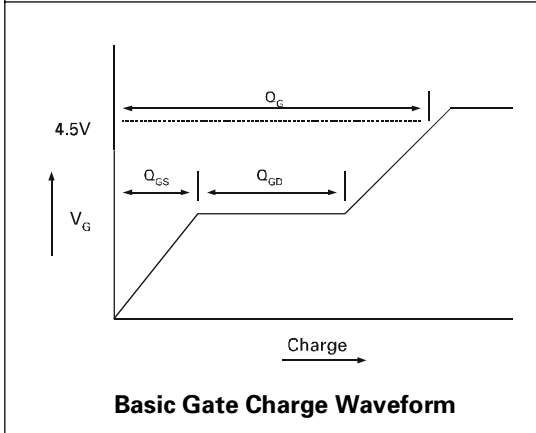
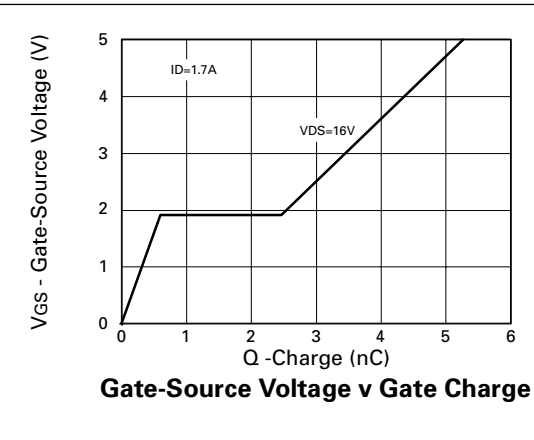
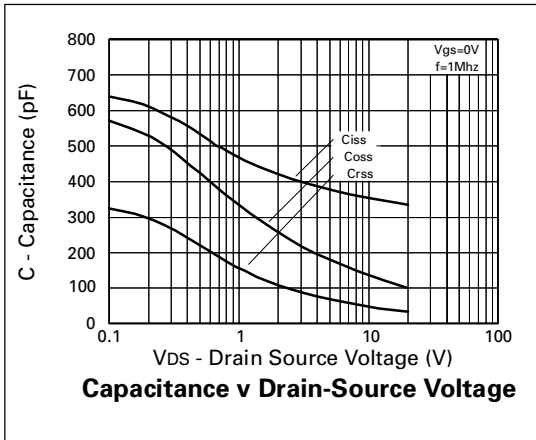
(3) For design aid only, not subject to production testing.

## TYPICAL CHARACTERISTICS



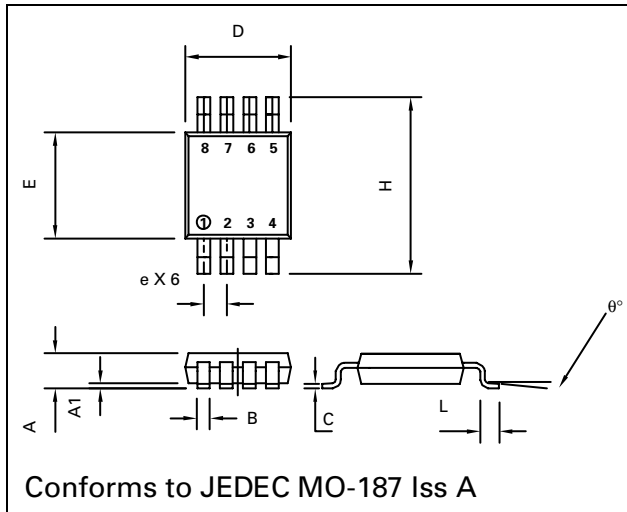
# ZXMD63N02X

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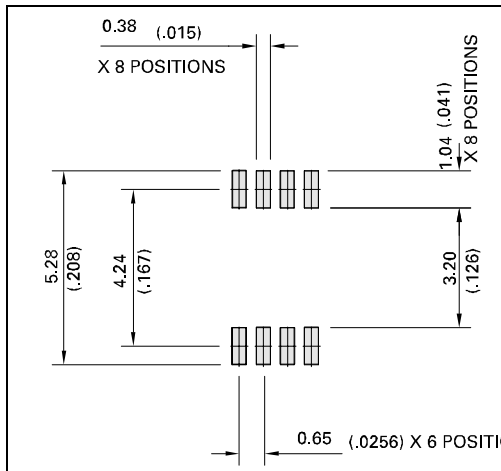
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## PACKAGE DIMENSIONS



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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