

**20V P-CHANNEL ENHANCEMENT MODE MOSFET****SUMMARY** **$V_{(BR)DSS}=-20V$ ;  $R_{DS(ON)}=0.090\Omega$ ;  $I_D=-3.5A$** **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**

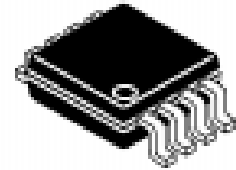
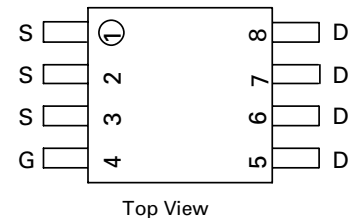
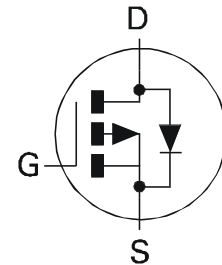
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

**ORDERING INFORMATION**

DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
ZXM64P02XTA	7	12mm embossed	1000 units
ZXM64P02XTC	13	12mm embossed	4000 units

**DEVICE MARKING**

- ZXM4P02

**MSOP8**

# ZXM64P02X

## 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)	$I_D$	-3.5 -2.8	A
Pulsed Drain Current (c)	$I_{DM}$	-19	A
Continuous Source Current (Body Diode)(b)	$I_S$	-2.0	A
Pulsed Source Current (Body Diode)(c)	$I_{SM}$	-19	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	$^\circ C/W$

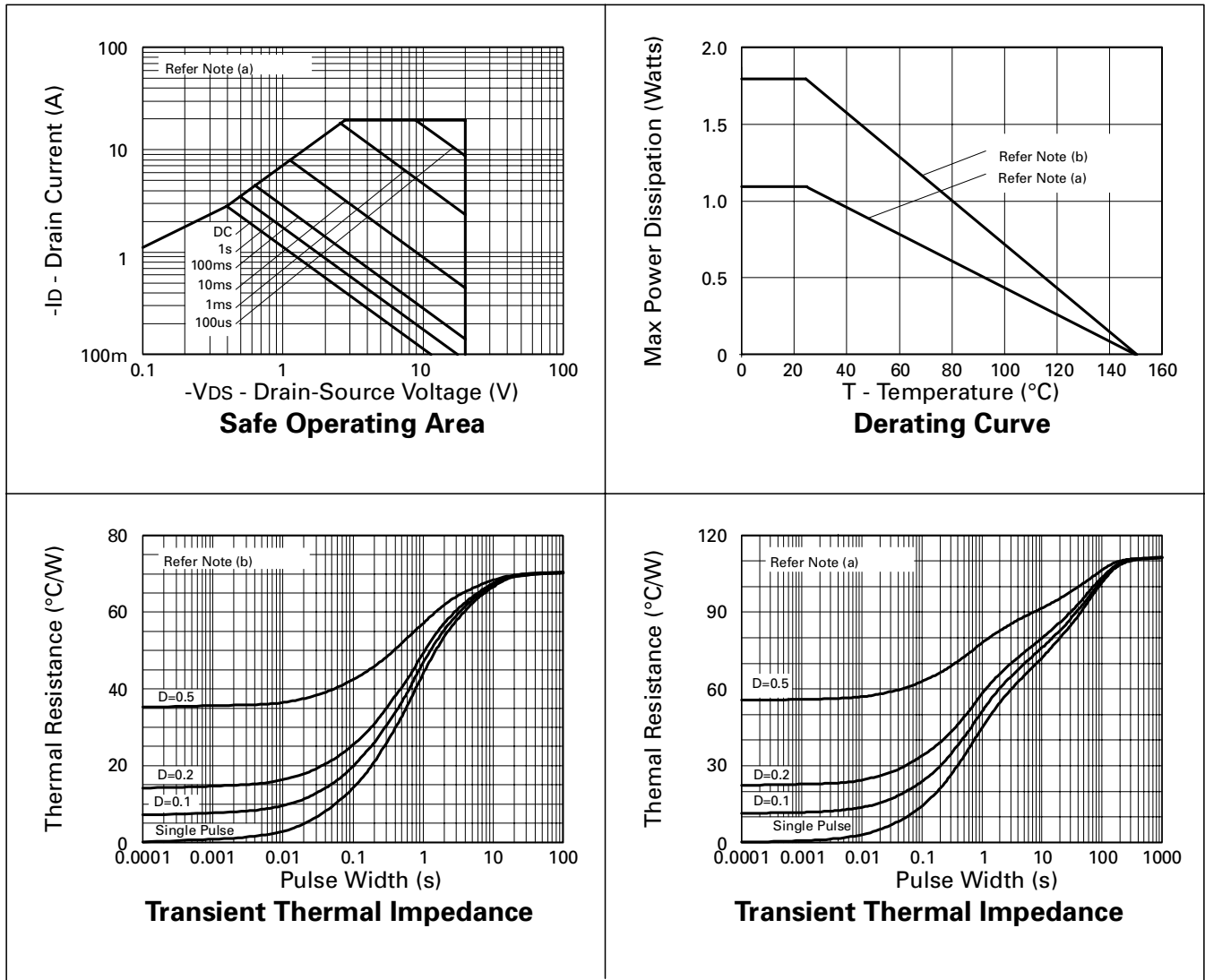
### NOTES

(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.

## CHARACTERISTICS



# ZXM64P02X

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

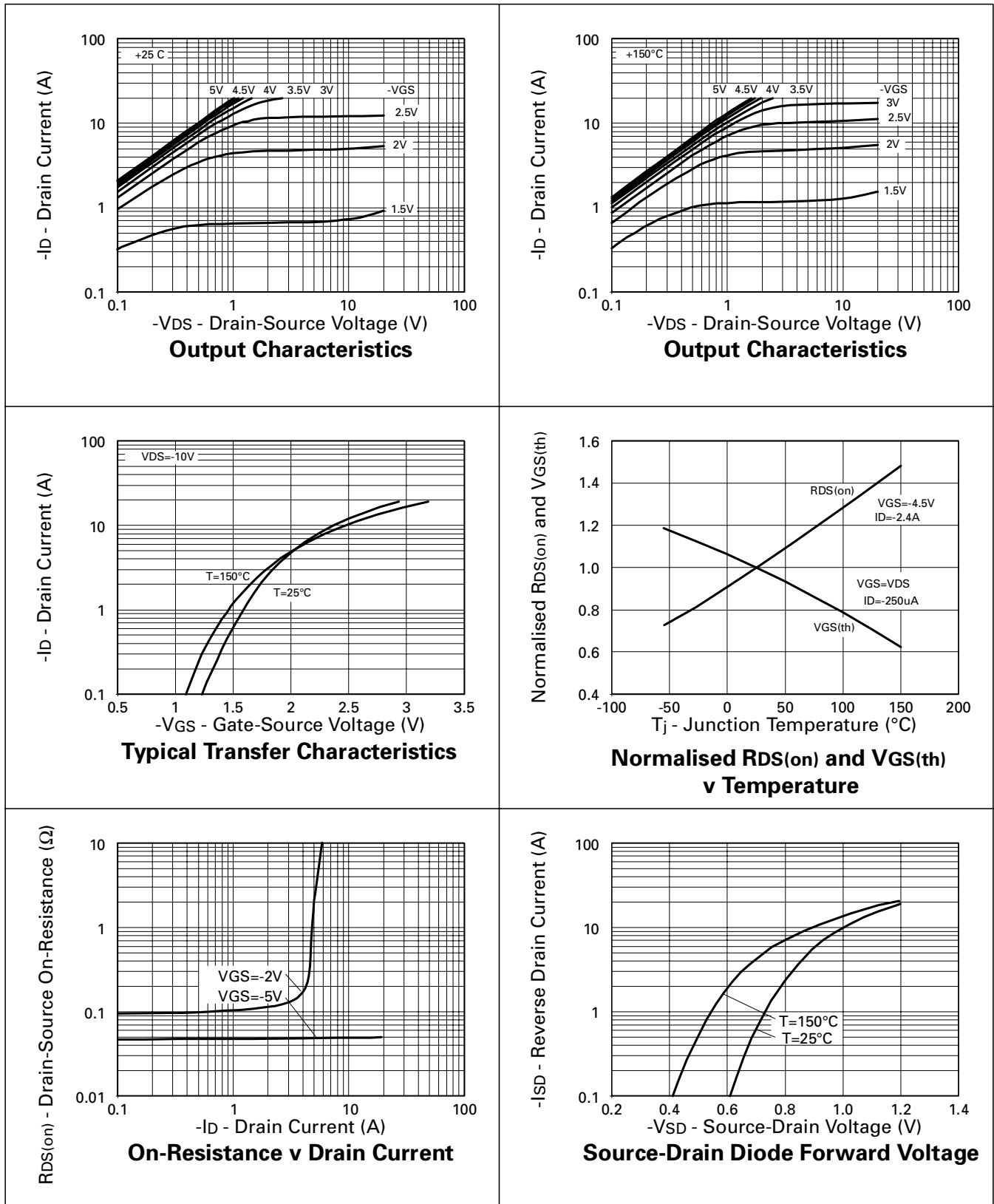
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-20			V	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			-1	$\mu\text{A}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$			$\pm 100$	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)	$R_{DS(on)}$			0.090 0.13	$\Omega$ $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -2.4\text{A}$ $V_{GS} = -2.7\text{V}, I_D = -1.2\text{A}$
Forward Transconductance (3)	$g_{fs}$	2.6			S	$V_{DS} = -10\text{V}, I_D = -1.2\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		900		pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		350		pF	
Reverse Transfer Capacitance	$C_{rss}$		150		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		5.6		ns	$V_{DD} = -10\text{V}, I_D = -2.4\text{A}$ $R_G = 6.0\Omega, R_D = 4.0\Omega$ (Refer to test circuit)
Rise Time	$t_r$		12.3		ns	
Turn-Off Delay Time	$t_{d(off)}$		45.5		ns	
Fall Time	$t_f$		40.0		ns	
Total Gate Charge	$Q_g$			6.9	nC	
Gate-Source Charge	$Q_{gs}$			1.3	nC	$V_{DS} = -16\text{V}, V_{GS} = -4.5\text{V}, I_D = -2.4\text{A}$ (Refer to test circuit)
Gate Drain Charge	$Q_{gd}$			2.5	nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$			-0.95	V	$T_j = 25^{\circ}\text{C}, I_S = -2.4\text{A}, V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		46.0		ns	$T_j = 25^{\circ}\text{C}, I_F = -2.4\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge(3)	$Q_{rr}$		35.0		nC	

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

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

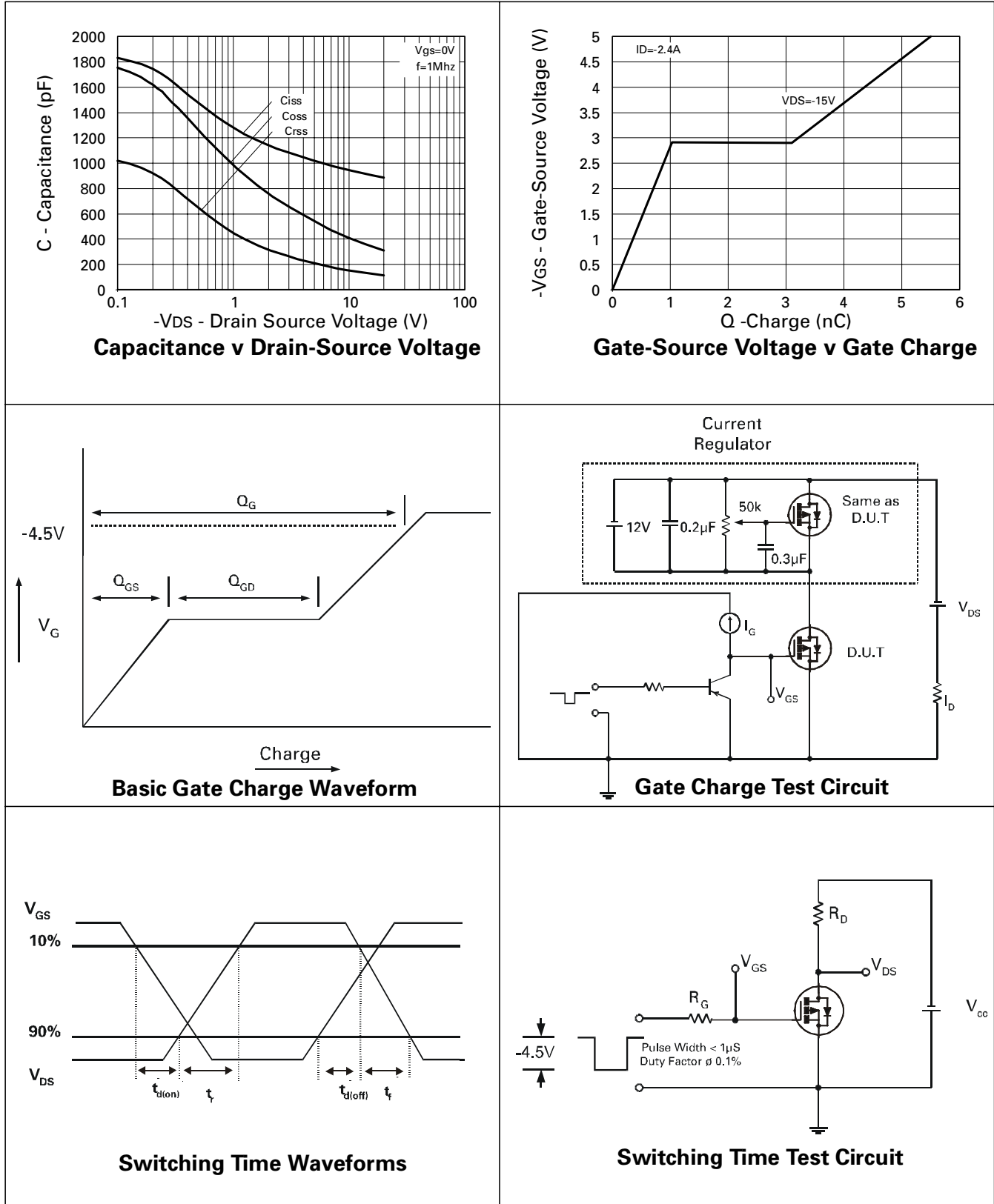
(3) For design aid only, not subject to production testing.

## TYPICAL CHARACTERISTICS



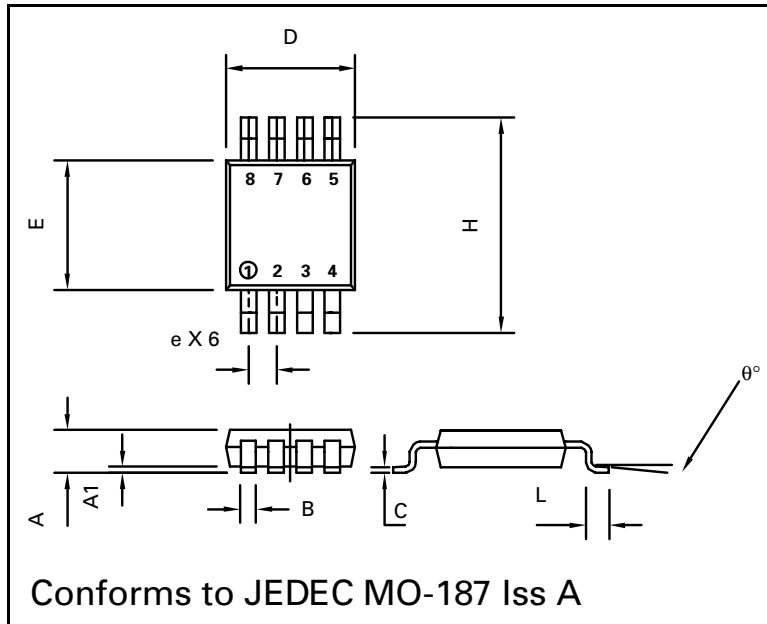
# ZXM64P02X

## TYPICAL CHARACTERISTICS



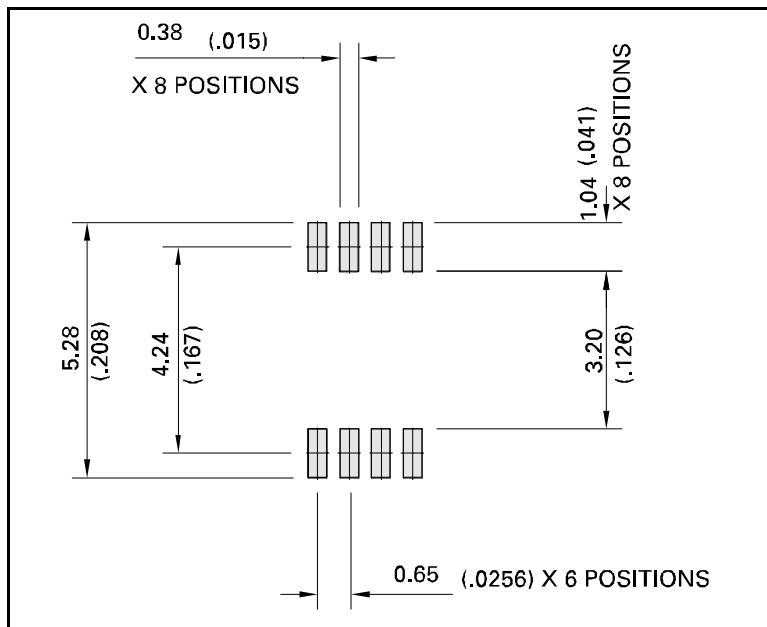
# ZXM64P02X

## 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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