

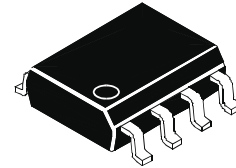
## DUAL 20V P-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY

$V_{(BR)DSS} = -20V$ ;  $R_{DS(ON)} = 0.050\Omega$ ;  $I_D = -5.1A$

### DESCRIPTION

This new generation of high density 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.



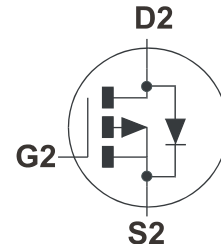
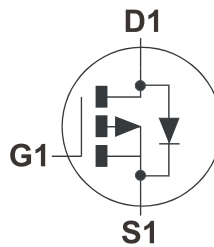
SO8

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

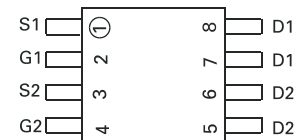
### APPLICATIONS

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



### ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMD65P02N8TA	7"	12mm	500 units
ZXMD65P02N8TC	13"	12mm	2500 units



Top View

### DEVICE MARKING

- ZXMD  
65P02

# ZXMD65P02N8

## 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) $V_{GS}=-4.5V$ ; $T_A=25^\circ C$ (a)(d)	$I_D$	-5.1 -4.1 -4.0	A
Pulsed Drain Current (c)(d)	$I_{DM}$	-18	A
Continuous Source Current (Body Diode)(b)(d)	$I_S$	-3.1	A
Pulsed Source Current (Body Diode)(c)(d)	$I_{SM}$	-18	A
Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor	$P_D$	1.25 10	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (a)(e) Linear Derating Factor	$P_D$	1.75 14	W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor	$P_D$	2.0 16	W mW/ $^\circ C$

## THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)(d)	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient (a)(e)	$R_{\theta JA}$	71.4	$^\circ C/W$
Junction to Ambient (b)(d)	$R_{\theta JA}$	62.5	$^\circ C/W$

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



# ZXMD65P02N8

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNI T	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	$\mu\text{A}$	$V_{DS} = -16\text{V}$ , $V_{GS} = 0\text{V}$
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)	$R_{DS(on)}$			0.050 0.080	$\Omega$ $\Omega$	$V_{GS} = -4.5\text{V}$ , $I_D = -2.9\text{A}$ $V_{GS} = -2.5\text{V}$ , $I_D = -1.5\text{A}$
Forward Transconductance (1)(3)	$g_{fs}$		8.5		S	$V_{DS} = -10\text{V}$ , $I_D = -2.9\text{A}$
<b>DYNAMIC (3)</b>						
Input Capacitance	$C_{iss}$		960		pF	$V_{DS} = -15\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$		480		pF	
Reverse Transfer Capacitance	$C_{rss}$		240		pF	
<b>SWITCHING(2) (3)</b>						
Turn-On Delay Time	$t_{d(on)}$		6.6		ns	$V_{DD} = -10\text{V}$ , $I_D = -2.9\text{A}$ $R_G = 6.0\Omega$ , $V_{GS} = -5\text{V}$
Rise Time	$t_r$		29.9		ns	
Turn-Off Delay Time	$t_{d(off)}$		57.9		ns	
Fall Time	$t_f$		63.2		ns	
Total Gate Charge	$Q_g$		20		nC	$V_{DS} = -10\text{V}$ , $V_{GS} = -4.5\text{V}$ $I_D = -2.9\text{A}$
Gate-Source Charge	$Q_{gs}$		1.8		nC	
Gate Drain Charge	$Q_{gd}$		10		nC	
<b>SOURCE-DRAIN DIODE</b>						
Diode Forward Voltage (1)	$V_{SD}$			0.95	V	$T_j = 25^{\circ}\text{C}$ , $I_S = -2.9\text{A}$ , $V_{GS} = 0\text{V}$
Reverse Recovery Time (3)	$t_{rr}$		39.2		ns	$T_j = 25^{\circ}\text{C}$ , $I_F = -2.9\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge(3)	$Q_{rr}$		28.8		nC	

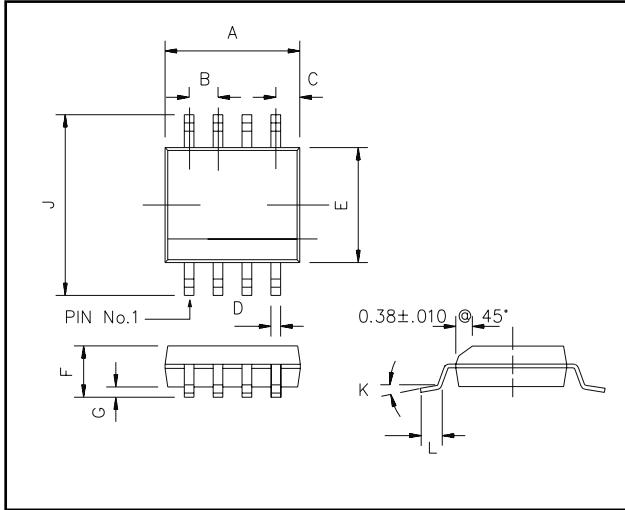
(1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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

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

# ZXMD65P02N8

## PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	4.80	4.98	0.189	0.196
B	1.27 BSC		0.05 BSC	
C	0.53 REF		0.02 REF	
D	0.36	0.46	0.014	0.018
E	3.81	3.99	0.15	0.157
F	1.35	1.75	0.05	0.07
G	0.10	0.25	0.004	0.010
J	5.80	6.20	0.23	0.24
K	0°	8°	0°	8°
L	0.41	1.27	0.016	0.050



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