20V P-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS}$=-20V; $R_{DS(ON)}$=0.090Ω; I_D= -3.5A



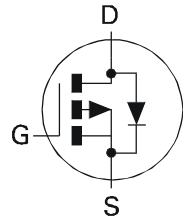
MSOP8

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.

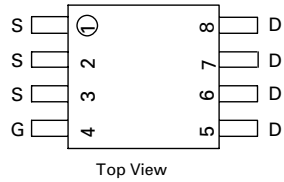
FEATURES

- 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



Top View

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

- ZXM64P02

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	-20	V
Gate- Source Voltage	V_{GS}	± 12	V
Continuous Drain Current (V_{GS}=4.5V; T_A=25°C)(b) (V_{GS}=4.5V; T_A=70°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°C (a) Linear Derating Factor	P_D	1.1 8.8	W mW/°C
Power Dissipation at T_A=25°C (b) Linear Derating Factor	P_D	1.8 14.4	W mW/°C
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +150	°C

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	113	°C/W
Junction to Ambient (b)	$R_{\theta JA}$	70	°C/W

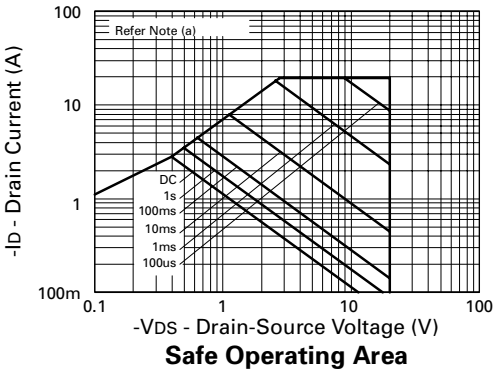
NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

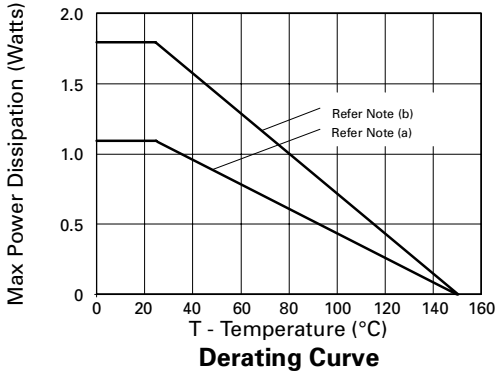
(b) For a device surface mounted on FR4 PCB measured at t⩽10 secs.

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

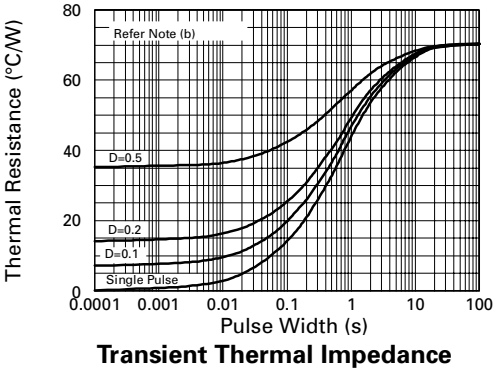
CHARACTERISTICS



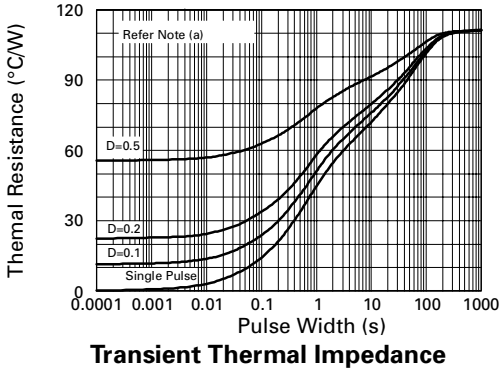
Safe Operating Area



Derating Curve



Transient Thermal Impedance



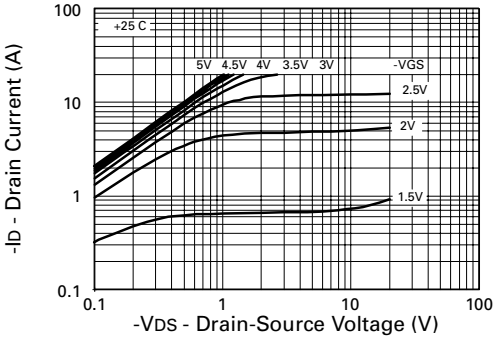
Transient Thermal Impedance

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

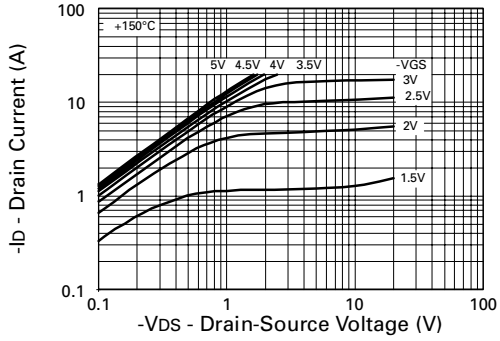
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-20			V	I_D=-250µA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}			-1	µA	V_{DS}=-20V, V_{GS}=0V
Gate-Body Leakage	I_{GSS}			±100	nA	V_{GS}=± 12V, V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	-0.7			V	I_D=-250µA, V_{DS}= V_{GS}
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			0.090 0.13	Ω Ω	V_{GS}=-4.5V, I_D=-2.4A V_{GS}=-2.7V, I_D=-1.2A
Forward Transconductance (3)	g_{fs}	2.6			S	V_{DS}=-10V,I_D=-1.2A
DYNAMIC (3)						
Input Capacitance	C_{iss}		900		pF	V_{DS}=-15 V, V_{GS}=0V, f=1MHz
Output Capacitance	C_{oss}		350		pF	
Reverse Transfer Capacitance	C_{rss}		150		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	$t_{d(on)}$		5.6		ns	V_{DD}=-10V, I_D=-2.4A R_G=6.0Ω, R_D=4.0Ω (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	V_{DS}=-16V,V_{GS}=-4.5V, I_D=-2.4A (Refer to test circuit)
Gate-Source Charge	Q_{gs}			1.3	nC	
Gate Drain Charge	Q_{gd}			2.5	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V_{SD}			-0.95	V	T_j=25°C, I_S=-2.4A, V_{GS}=0V
Reverse Recovery Time (3)	t_{rr}		46.0		ns	T_j=25°C, I_F=-2.4A, di/dt= 100A/µs
Reverse Recovery Charge(3)	Q_{rr}		35.0		nC	

(1) Measured under pulsed conditions. Width=300µs. Duty cycle ≤2% .
(2) Switching characteristics are independent of operating junction temperature.
(3) For design aid only, not subject to production testing.

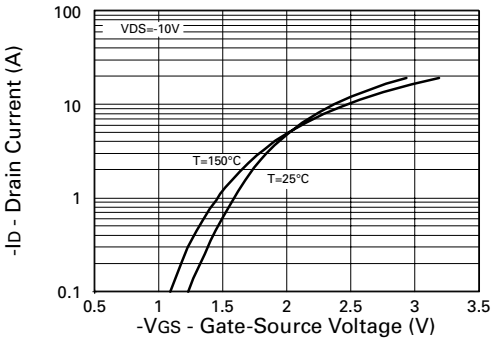
TYPICAL CHARACTERISTICS



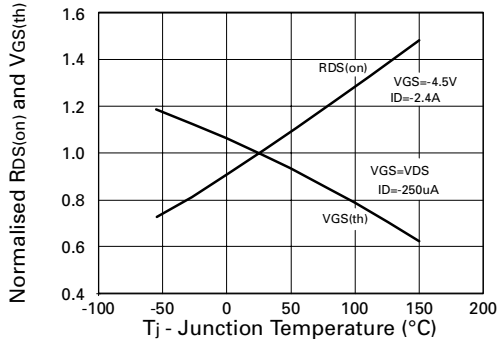
Output Characteristics



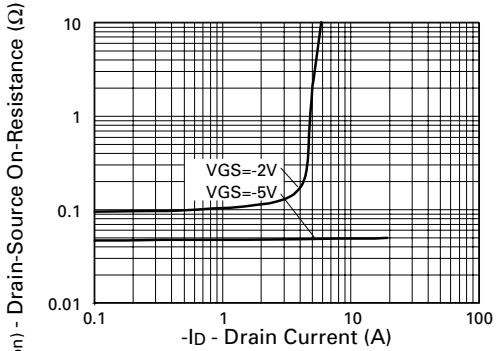
Output Characteristics



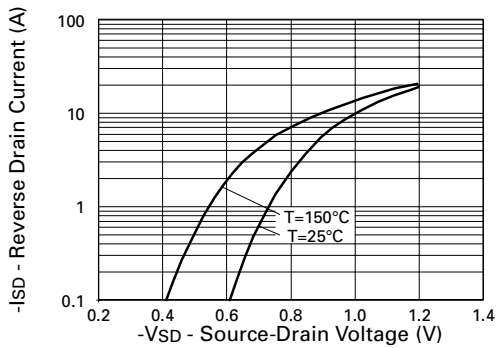
Typical Transfer Characteristics



Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature

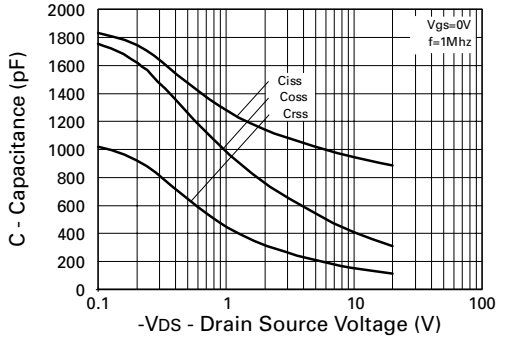


On-Resistance v Drain Current

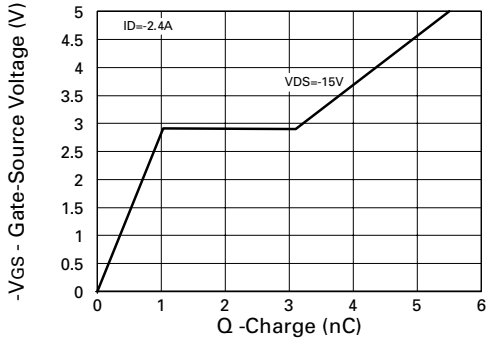


Source-Drain Diode Forward Voltage

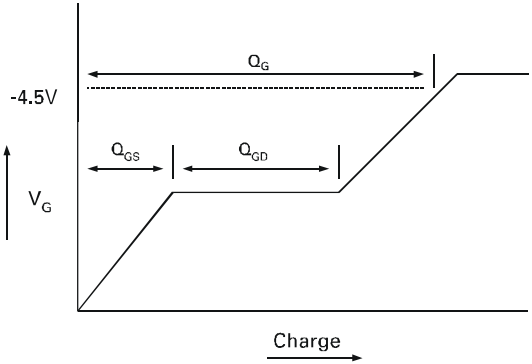
TYPICAL CHARACTERISTICS



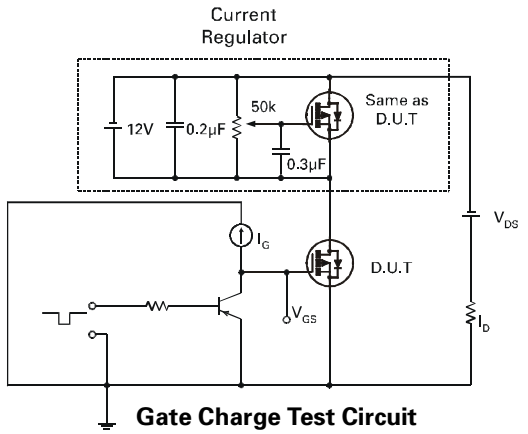
Capacitance v Drain-Source Voltage



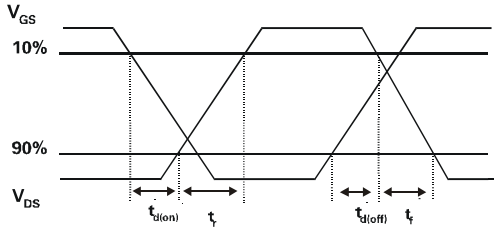
Gate-Source Voltage v Gate Charge



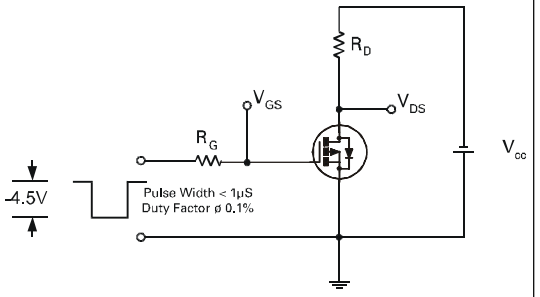
Basic Gate Charge Waveform



Gate Charge Test Circuit

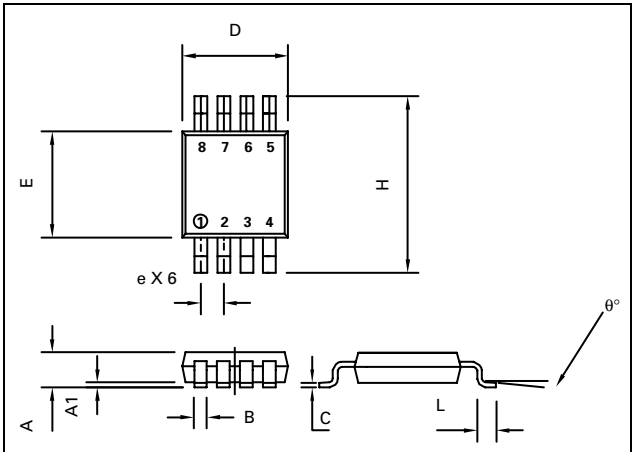


Switching Time Waveforms



Switching Time Test Circuit

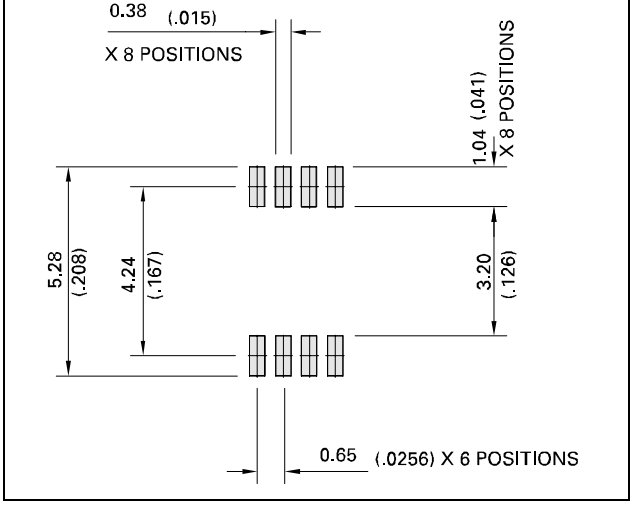
PACKAGE DIMENSIONS



Conforms to JEDEC MO-187 Iss A

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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