30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D T_A = 25°C
-30V	75mΩ @ V_{GS} = -10V	-3.8A
	100mΩ @ V_{GS} = -4.5V	-3.3A

Description

This MOSFET utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed, making it ideal for high-efficiency power management applications.

Applications

- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control

Features

- Fast switching speed
- Low on-resistance
- Low threshold
- Low gate drive
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

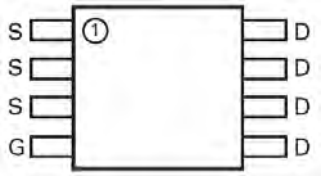
Mechanical Data

- Case: MSOP8
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.028 grams (approximate)

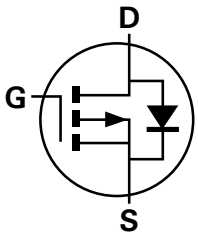
MSOP8



Top View



Top View
Pin Out



Equivalent Circuit

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXM64P03XTA	ZXM64P03	7	12	1,000 Units

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com.

Marking Information



ZXM64P03 = Product Type Marking Code

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

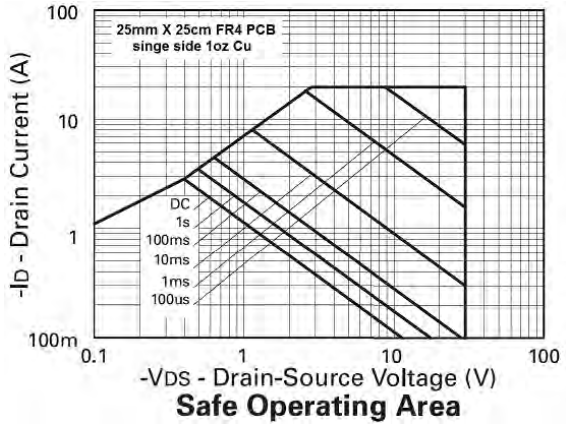
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current	V_{GS} = 4.5V	T_A = +25°C (Note 5) T_A = +70°C (Note 5)	I_D	-3.8 -3.0	A
Pulsed Drain Current (Note 7)			I_{DM}	-1.9	A
Continuous Source Current (Body Diode) (Note 6)			I_S	-2.3	A
Pulsed Source Current (Body Diode) (Note 7)			I_{SM}	-19	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

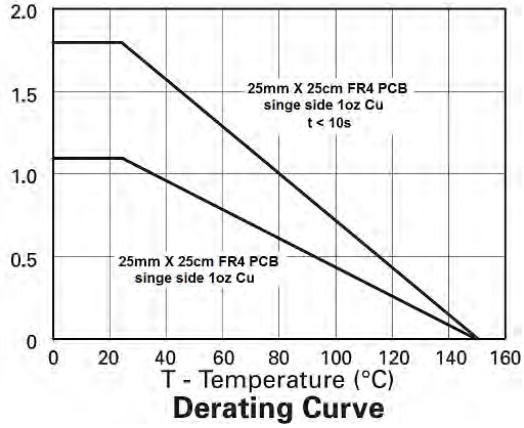
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.1 8.8	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	1.8 14.4	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	113	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	70	°C/W
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JL}$	39.8	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
6. For a device surface mounted on FR4 PCB measured at t ≤10 secs.
7. Repetitive rating pulse width limited by pulse current limited by maximum junction temperature.
8. Thermal resistance from junction to solder-point (at the end of the Drain lead).

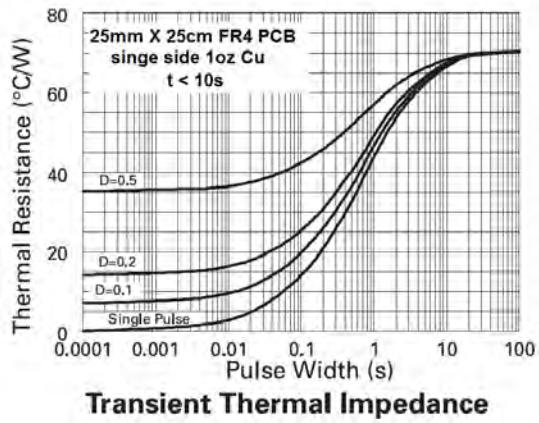
Thermal Characteristics



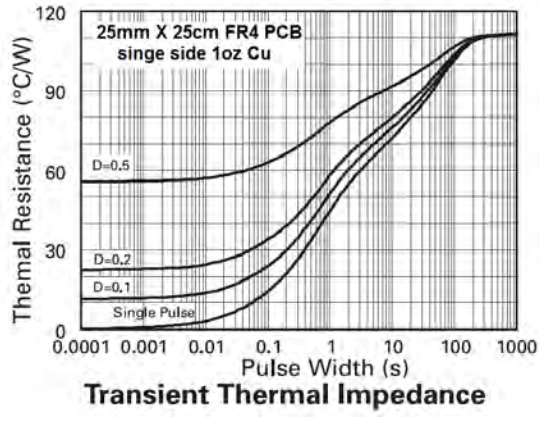
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Transient Thermal Impedance

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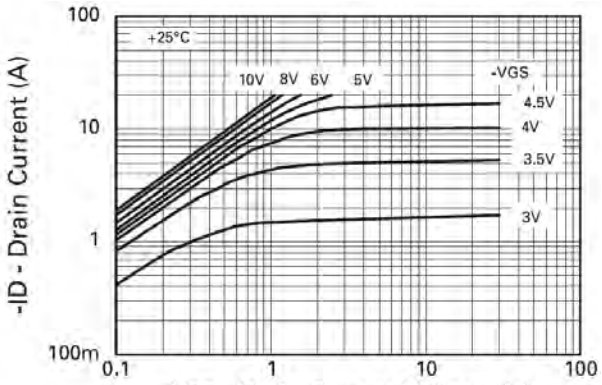
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	I_D = -250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	I_D = -250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 9)	$R_{DS\ (ON)}$	—	—	75	mΩ	V_{GS} = -10V, I_D = -2.4A
				100		V_{GS} = -4.5V, I_D = -1.2A
Forward Transconductance (Notes 9 and 11)	g_{fs}	2.3	—	—	S	V_{DS} = -10V, I_D = -1.2A
Diode Forward Voltage (Note 9)	V_{SD}	—	—	-0.95	V	T_J = +25°C, I_S = -2.4A, V_{GS} = 0V
Reverse Recovery Time (Note 11)	t_{rr}	—	30.2	—	ns	T_J = +25°C, I_F = -2.4A,
Reverse Recovery Charge (Note 11)	Q_{rr}	—	27.8	—	nC	di/dt = 100A/μs
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	825	—	pF	V_{DS} = -25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	250	—		
Reverse Transfer Capacitance	C_{rss}	—	80	—		
Turn-On Delay Time (Note 10)	$t_{d(on)}$	—	4.4	—	ns	V_{DD} = -15V, I_D = -2.4A, R_G = 6.2Ω, R_D = 6.2Ω (Refer to test circuit)
Turn-On Rise Time (Note 10)	t_r	—	6.2	—		
Turn-Off Delay Time (Note 10)	$t_{d(off)}$	—	40	—		
Turn-Off Fall Time (Note 10)	t_f	—	29.2	—		
Total Gate Charge (Note 10)	Q_g	—	—	46	nC	V_{DS} = -24V, V_{GS} = -10V, I_D = -2.4A (Refer to test circuit)
Gate-Source Charge (Note 10)	Q_{gs}	—	—	9		
Gate-Drain Charge (Note 10)	Q_{gd}	—	—	11.5		

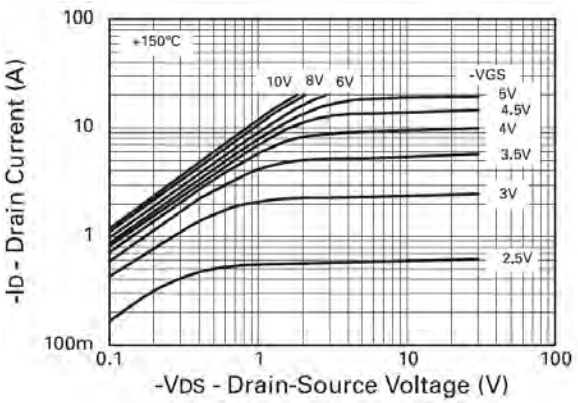
Notes: 9. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.
10. Switching characteristics are independent of operating junction temperature.
11. For design aid only, not subject to production testing.

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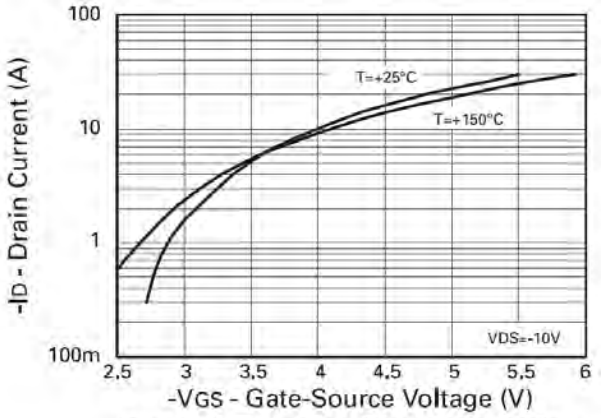
Typical Characteristics



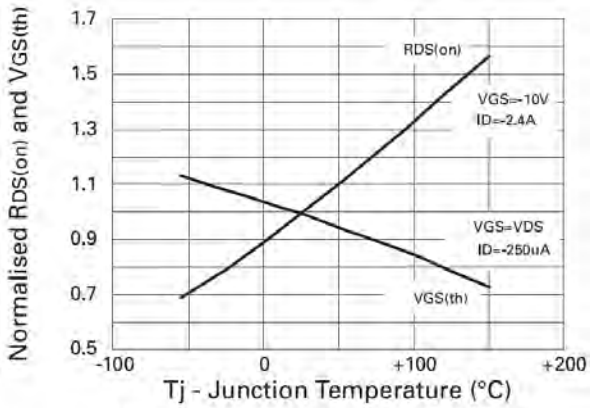
Output Characteristics



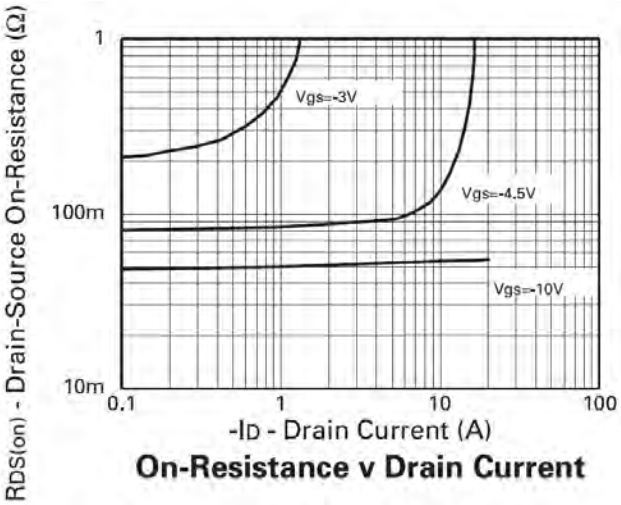
Output Characteristics



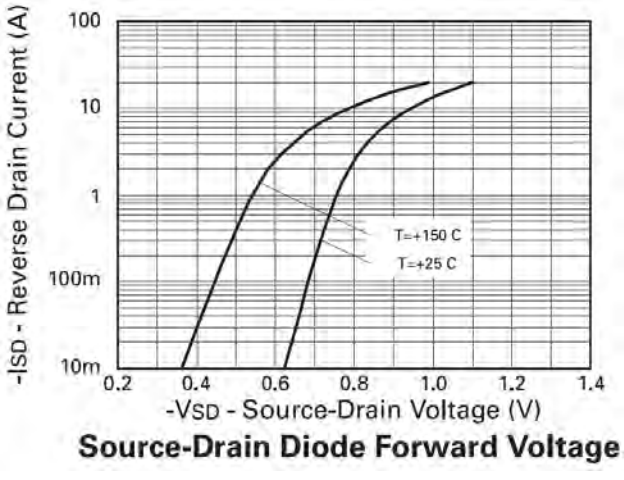
Typical Transfer Characteristics



Normalised RDS(on) and VGS(th) v Temperature



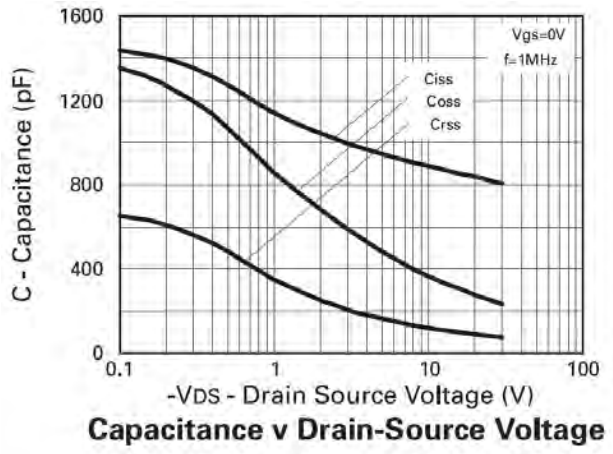
On-Resistance v Drain Current



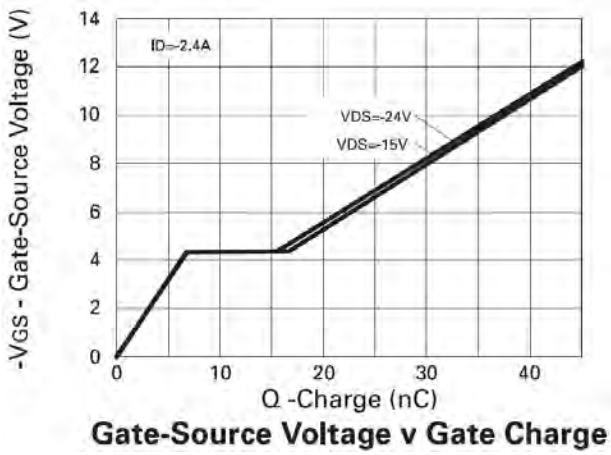
Source-Drain Diode Forward Voltage

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Typical Characteristics - continued

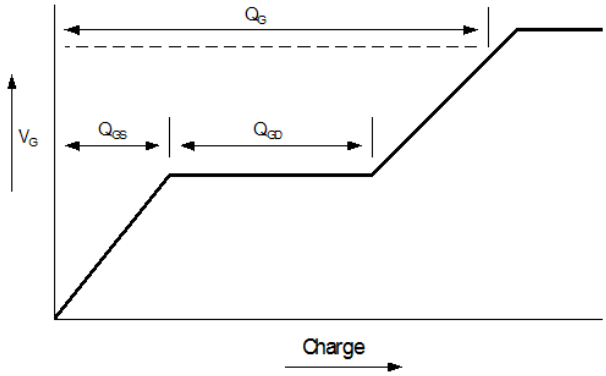


Capacitance v Drain-Source Voltage

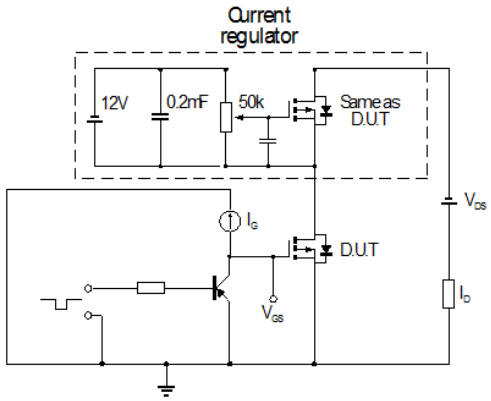


Gate-Source Voltage v Gate Charge

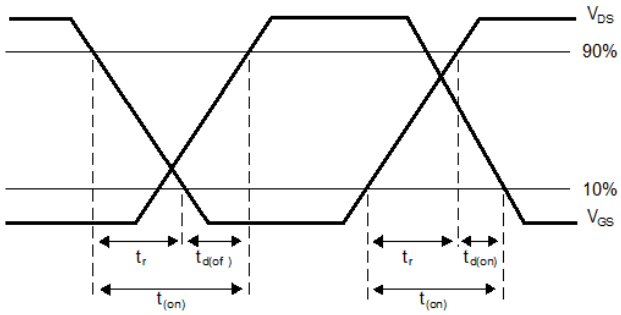
Test Circuits



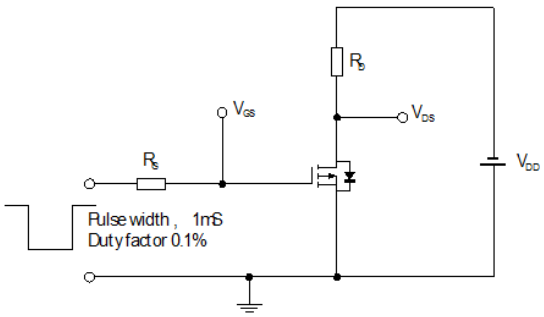
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

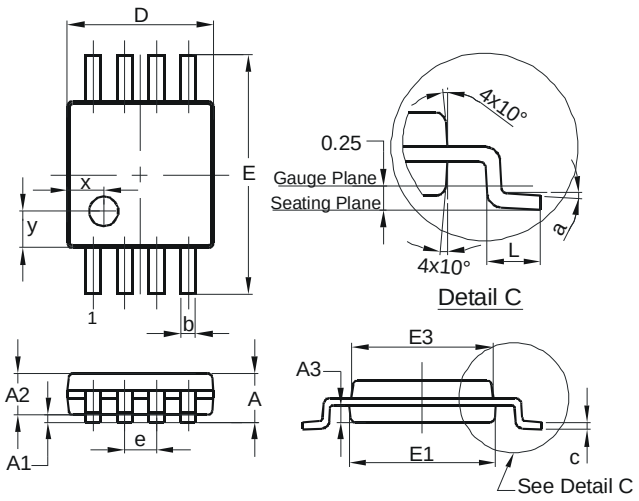


Switching time test circuit

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Package Outline Dimensions

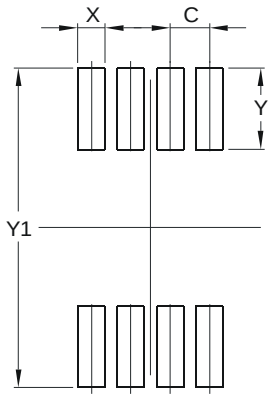
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



MSOP-8			
Dim	**Min**	**Max**	**Typ**
A	-	1.10	-
A1	0.05	0.15	0.10
A2	0.75	0.95	0.86
A3	0.29	0.49	0.39
b	0.22	0.38	0.30
c	0.08	0.23	0.15
D	2.90	3.10	3.00
E	4.70	5.10	4.90
E1	2.90	3.10	3.00
E3	2.85	3.05	2.95
e	-	-	0.65
L	0.40	0.80	0.60
a	0°	8°	4°
x	-	-	0.750
y	-	-	0.750
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	0.650
X	0.450
Y	1.350
Y1	5.300

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