

**30V P-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max $I_D$ $T_A = 25^\circ C$
-30V	75m $\Omega$ @ $V_{GS} = -10V$	-3.8A
	100m $\Omega$ @ $V_{GS} = -4.5V$	-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**

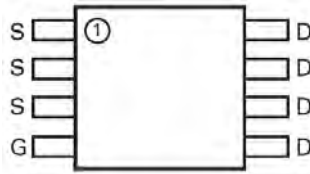
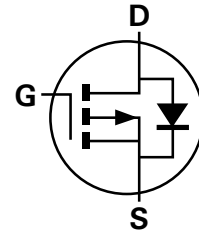
- Fast switching speed
- Low on-resistance
- Low threshold
- Low gate drive
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**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 
- Weight: 0.028 grams (approximate)



Top View

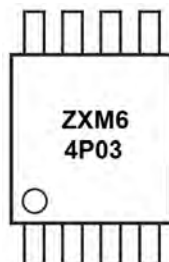

 Top View  
Pin Out


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

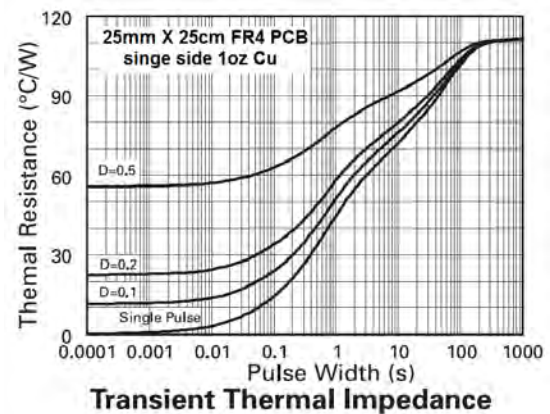
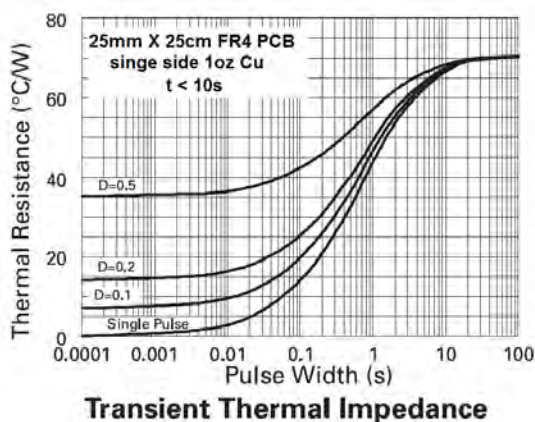
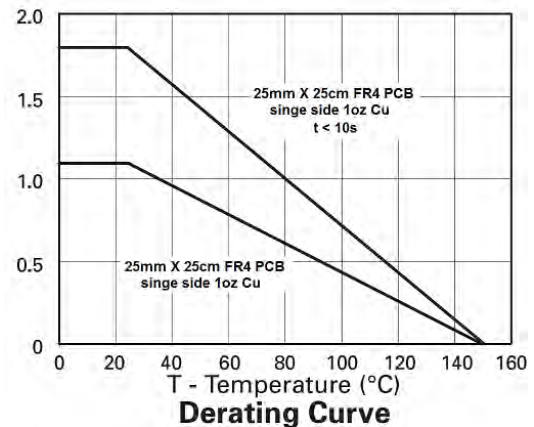
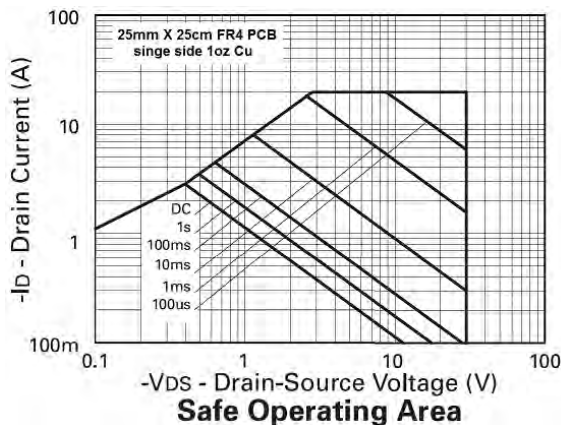
**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 4.5V	T <sub>A</sub> = +25°C (Note 5) T <sub>A</sub> = +70°C (Note 5)	I <sub>D</sub>	-3.8 -3.0	A
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	-1.9	A
Continuous Source Current (Body Diode) (Note 6)			I <sub>S</sub>	-2.3	A
Pulsed Source Current (Body Diode) (Note 7)			I <sub>SM</sub>	-19	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1.1	W
Linear Derating Factor		8.8	mW/°C
Power Dissipation (Note 6)	P <sub>D</sub>	1.8	W
Linear Derating Factor		14.4	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	113	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	70	°C/W
Thermal Resistance, Junction to Ambient (Note 8)	R <sub>θJL</sub>	39.8	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

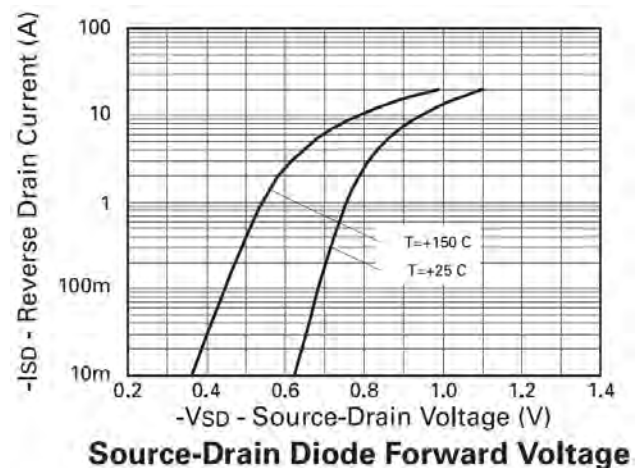
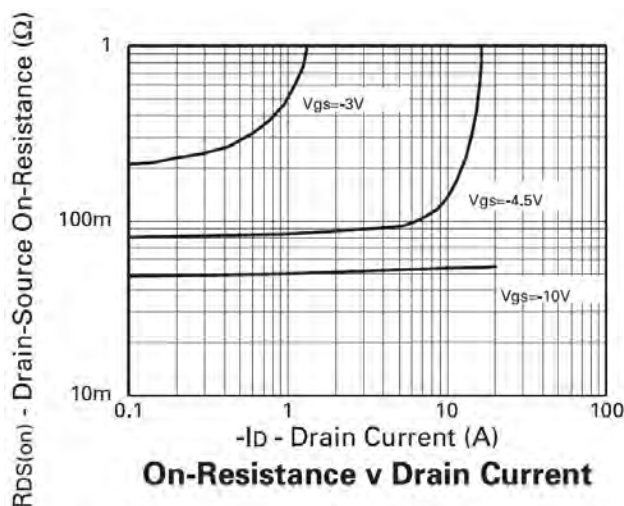
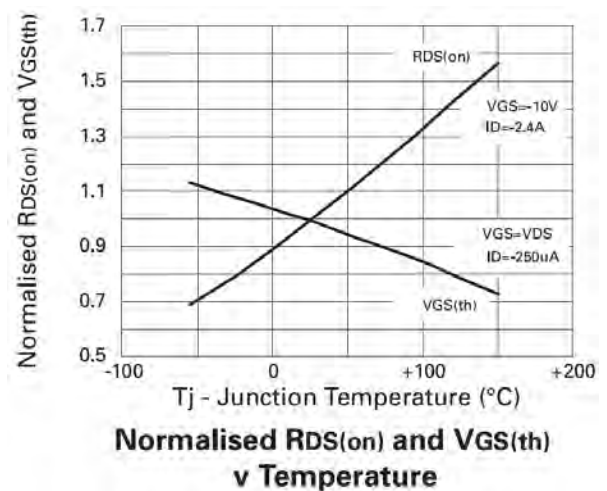
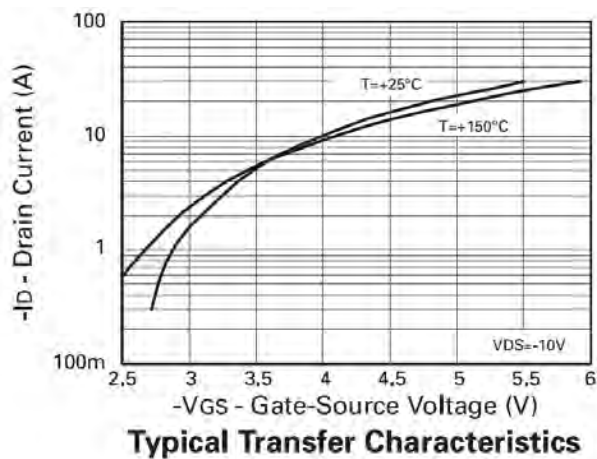
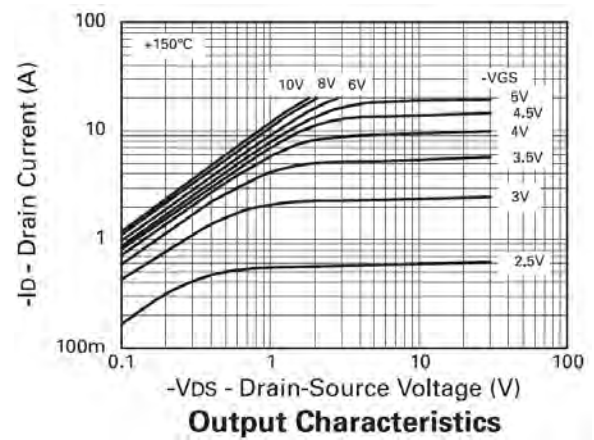
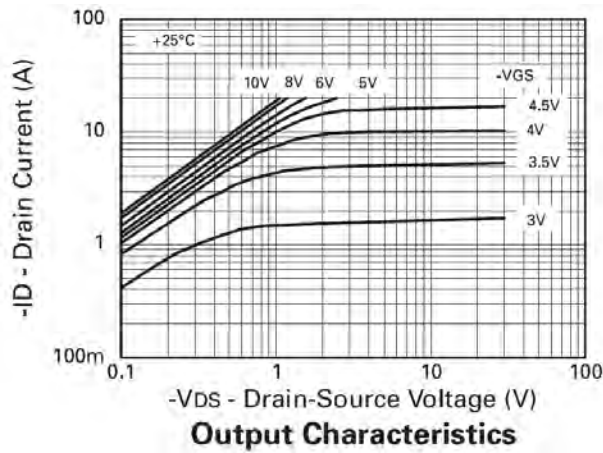
**Thermal Characteristics**


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	—	—	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 9)	R <sub>DS(on)</sub>	—	—	75	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.4A
				100		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.2A
Forward Transconductance (Notes 9 and 11)	g <sub>fs</sub>	2.3	—	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1.2A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	—	-0.95	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = -2.4A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 11)	t <sub>rr</sub>	—	30.2	—	ns	T <sub>J</sub> = +25°C, I <sub>F</sub> = -2.4A,
Reverse Recovery Charge (Note 11)	Q <sub>rr</sub>	—	27.8	—	nC	di/dt = 100A/μs
<b>DYNAMIC CHARACTERISTICS</b> (Note 11)						
Input Capacitance	C <sub>iss</sub>	—	825	—	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	250	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	80	—		
Turn-On Delay Time (Note 10)	t <sub>d(on)</sub>	—	4.4	—	ns	V <sub>DD</sub> = -15V, I <sub>D</sub> = -2.4A, R <sub>G</sub> = 6.2Ω, R <sub>D</sub> = 6.2Ω (Refer to test circuit)
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	6.2	—		
Turn-Off Delay Time (Note 10)	t <sub>d(off)</sub>	—	40	—		
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	29.2	—	nC	V <sub>DS</sub> = -24V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.4A (Refer to test circuit)
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	—	46		
Gate-Source Charge (Note 10)	Q <sub>gs</sub>	—	—	9		
Gate-Drain Charge (Note 10)	Q <sub>gd</sub>	—	—	11.5		

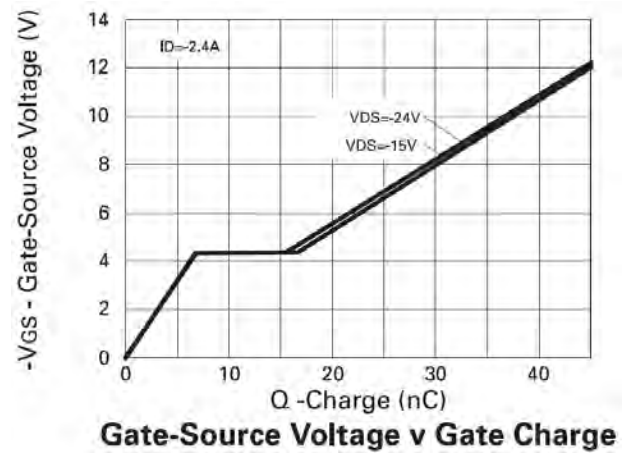
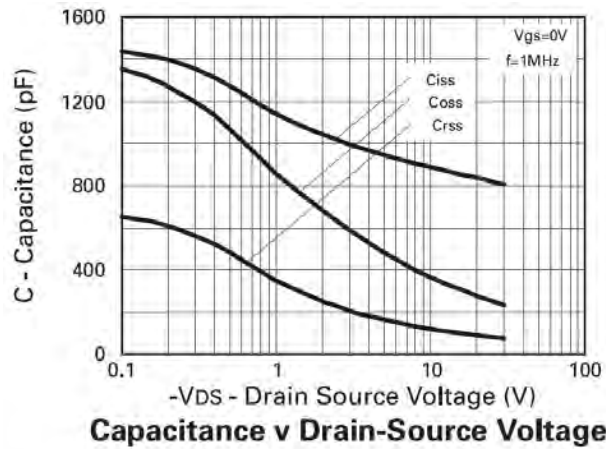
- Notes:
- 9. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.
  - 10. Switching characteristics are independent of operating junction temperature.
  - 11. For design aid only, not subject to production testing.

## Typical Characteristics

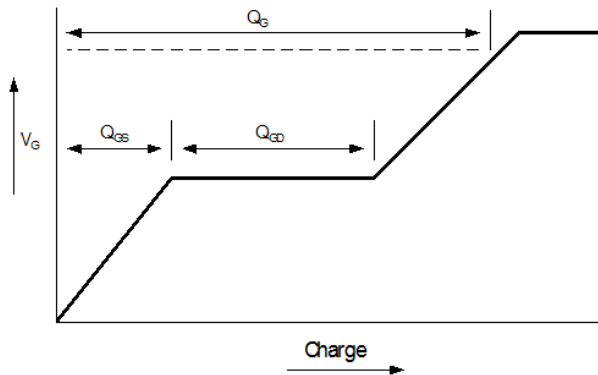




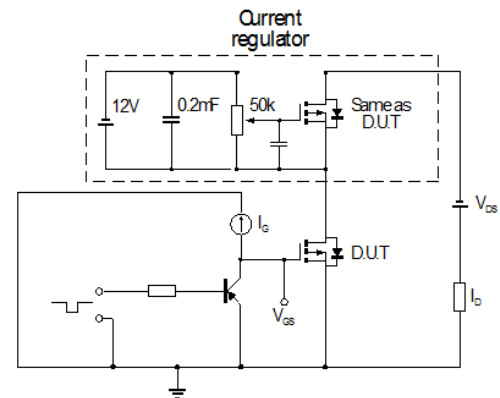
## Typical Characteristics - continued



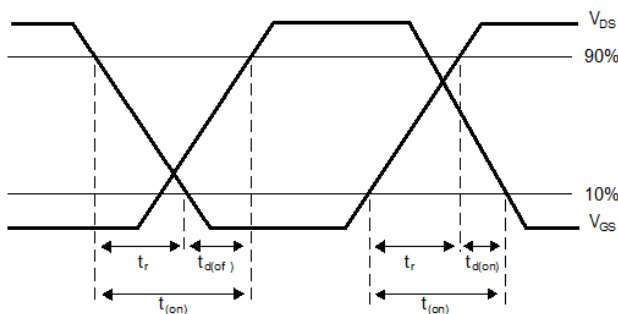
## Test Circuits



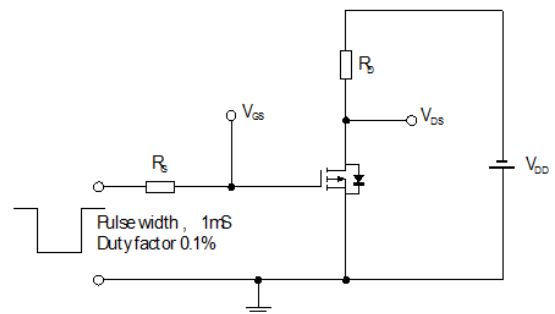
**Basic gate charge waveform**



**Gate charge test circuit**



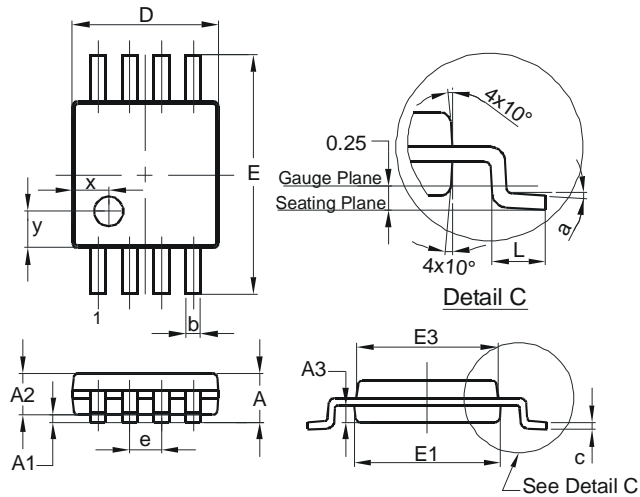
**Switching time waveforms**



**Switching time test circuit**

## Package Outline Dimensions

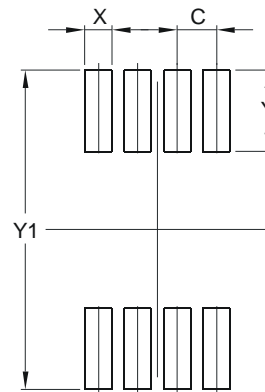
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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