

**70V P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ C$
-70V	160m $\Omega$ @ $V_{GS} = -10V$	-2.6A
	250m $\Omega$ @ $V_{GS} = -4.5V$	-1.6A

**Description**

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

**Features and Benefits**

- 100% Unclamped Inductive Switch (UIS) test in production
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 5)**

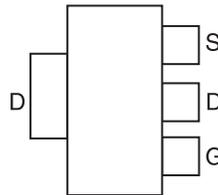
**Mechanical Data**

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 <sup>(3)</sup>
- Weight: 0.112 grams (approximate)

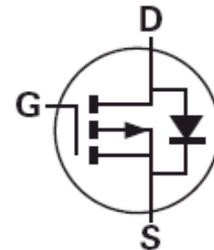
SOT223



Top View



Pin Out - Top View



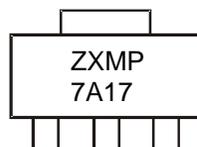
Equivalent Circuit

**Ordering Information** (Note 4)

Part Number	Qualification	Case	Packaging
ZXMP7A17GTA	Commercial	SOT223	1,000/Tape & Reel
ZXMP7A17GQTA	Automotive	SOT223	1,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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/products/packages.html>
  5. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).

**Marking Information**



ZXMP7A17 = Product Type Marking Code

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-70	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 10V	(Note 7)	-3.7	A
		T <sub>A</sub> = +70°C (Note 7)	-2.9	
		(Note 6)	-2.6	
Pulsed Drain Current	V <sub>GS</sub> = 10V	I <sub>DM</sub>	-9.6	A
Continuous Source Current (Body diode)		I <sub>S</sub>	-4.8	A
Pulsed Source Current (Body diode)		I <sub>SM</sub>	-9.6	A

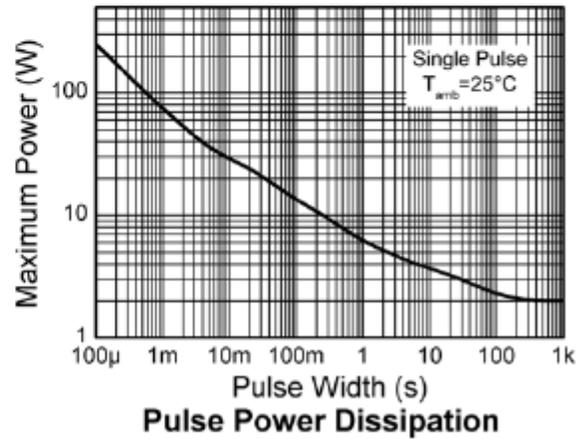
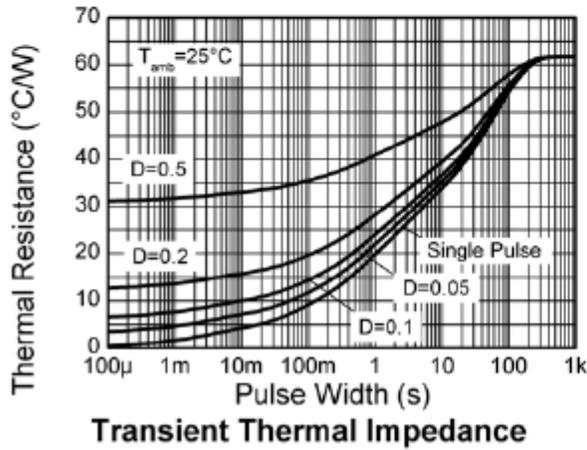
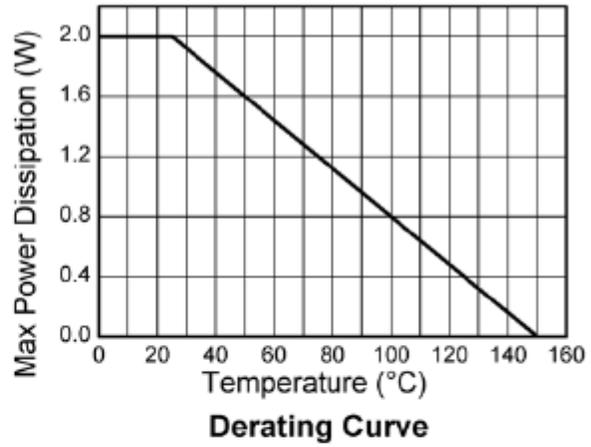
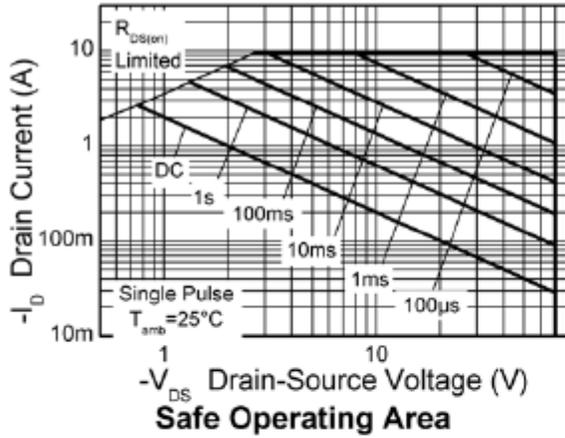
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

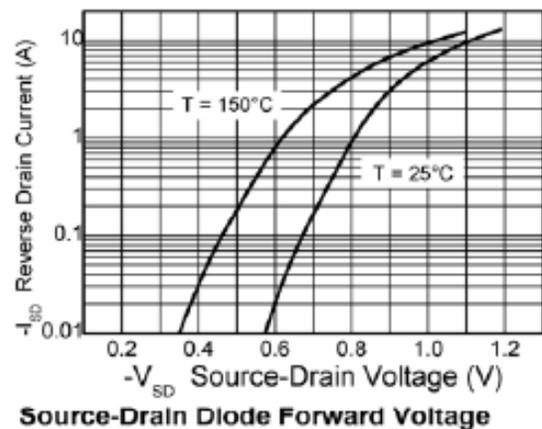
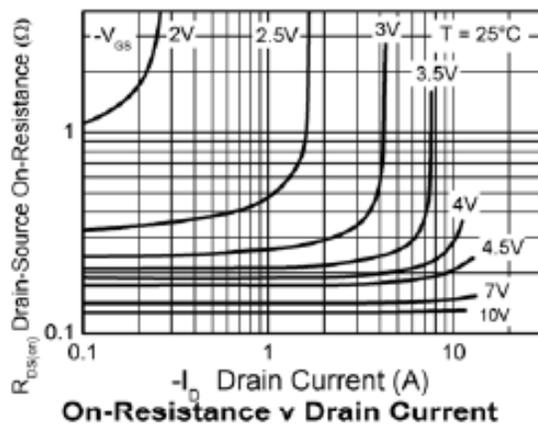
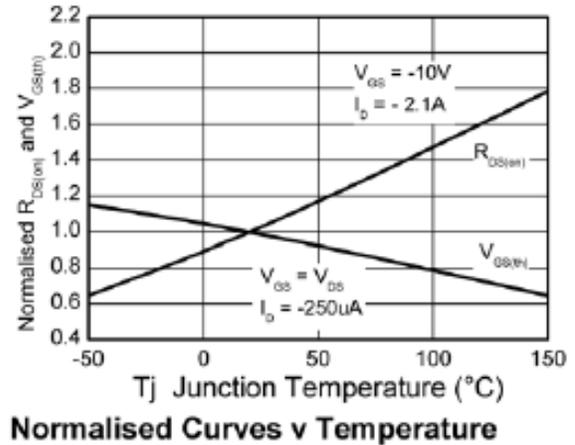
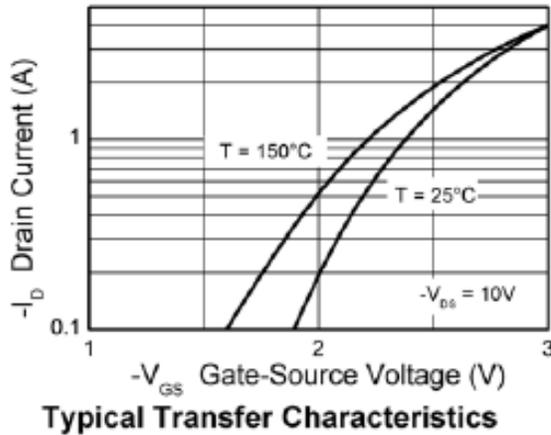
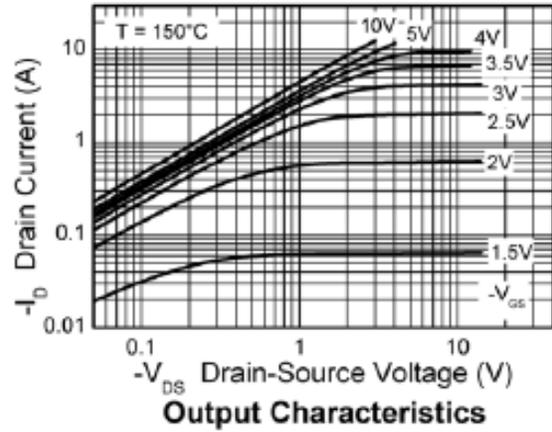
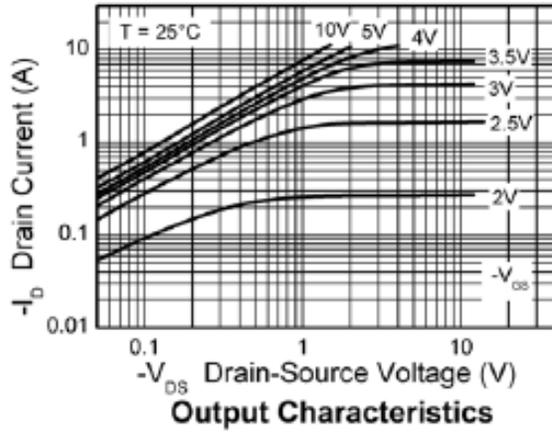
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P <sub>D</sub>	2.0	W
	(Note 7)		16.0	
Linear Derating Factor	(Note 6)	R <sub>θJA</sub>	3.9	mW/°C
	(Note 7)		31	
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>θJA</sub>	62.5	°C/W
	(Note 7)		34	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

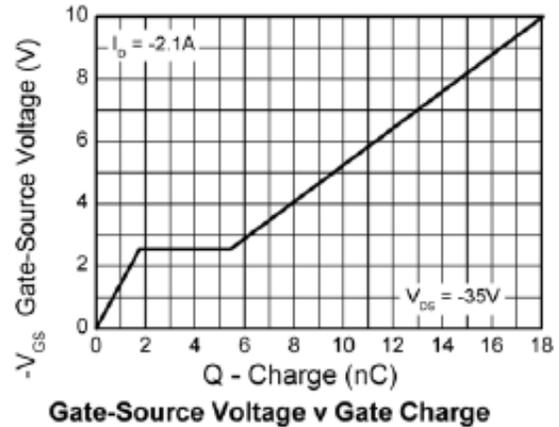
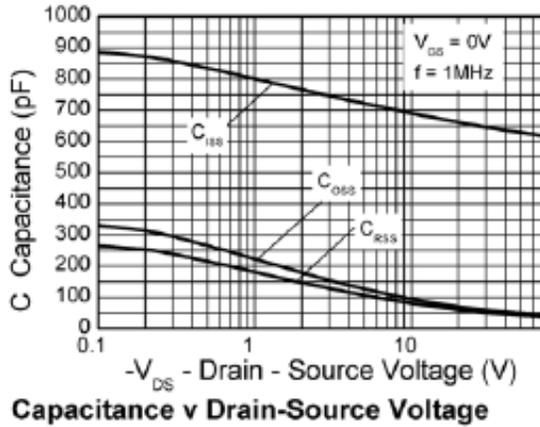
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	70	—	—	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> = -70V, 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>	—	—	0.16	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.1A
				0.25		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.7A
Forward Transconductance (Notes 9 & 10)	g <sub>fs</sub>	—	4.4	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -2.0A, V <sub>GS</sub> = 0V
Reverse recovery time (Note 10)	t <sub>rr</sub>	—	29.8	—	ns	I <sub>S</sub> = -2.1A, di/dt = 100A/μs
Reverse recovery charge (Note 10)	Q <sub>rr</sub>	—	38.5	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	635	—	pF	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	52	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	42.5	—	pF	
Total Gate Charge (Note 11)	Q <sub>g</sub>	—	9.6	—	nC	V <sub>GS</sub> = -5V
Total Gate Charge (Note 11)	Q <sub>g</sub>	—	18	—	nC	V <sub>GS</sub> = -10V
Gate-Source Charge (Note 11)	Q <sub>gs</sub>	—	1.77	—	nC	
Gate-Drain Charge (Note 11)	Q <sub>gd</sub>	—	3.66	—	nC	
Turn-On Delay Time (Note 11)	t <sub>D(on)</sub>	—	2.5	—	ns	V <sub>DD</sub> = -35V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A, R <sub>G</sub> = 6.0Ω
Turn-On Rise Time (Note 11)	t <sub>r</sub>	—	3.4	—	ns	
Turn-Off Delay Time (Note 11)	t <sub>D(off)</sub>	—	27.9	—	ns	
Turn-Off Fall Time (Note 11)	t <sub>f</sub>	—	8	—	ns	

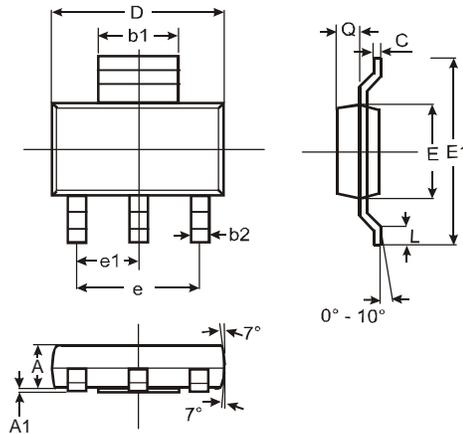
- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as note (6), except the device is measured at t ≤ 5 sec.
  - Same as note (6), except the device is pulsed with D = 0.05 and pulse width 10μs. The pulse current is limited by the maximum junction temperature.
  - Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
  - For design aid only, not subject to production testing.
  - Switching characteristics are independent of operating junction temperatures.





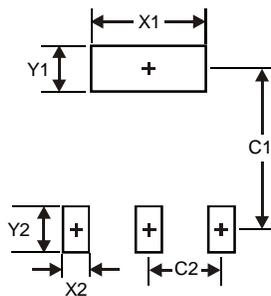


**Package Outline Dimensions**



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	4.60
e1	—	—	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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