70V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Description

This MOSFET is 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

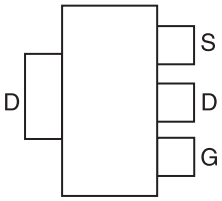
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

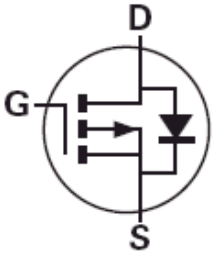
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top View



Equivalent Circuit

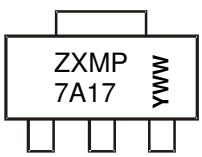
Ordering Information (Note 4)

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

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 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.

Marking Information

SOT223



ZXMP7A17 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{WW}$ = Week Code (01~53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-70	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current	V_{GS} = -10V	(Note 6)	I_D	-3.7	A
		T_A = +70°C (Note 6)		-2.9	
		(Note 5)		-2.6	
Pulsed Drain Current	V_{GS}= -10V	(Note 7)	I_{DM}	-9.6	A
Continuous Source Current (Body Diode)		(Note 6)	I_S	-4.8	A
Pulsed Source Current (Body Diode)		(Note 7)	I_{SM}	-9.6	A

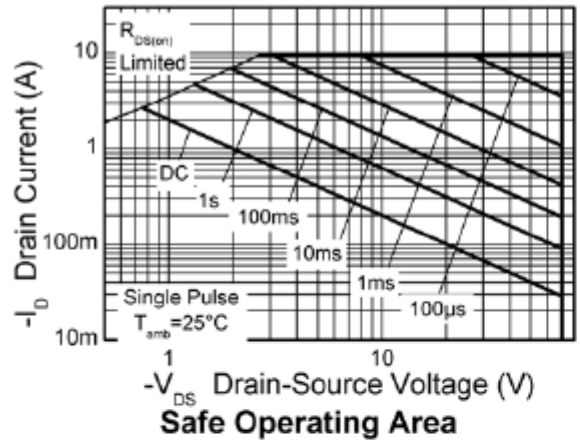
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	2.0	W
Linear Derating Factor			16.0	mW/°C
	(Note 6)		3.9	W
			31	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	62.5	°C/W
	(Note 6)		34	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

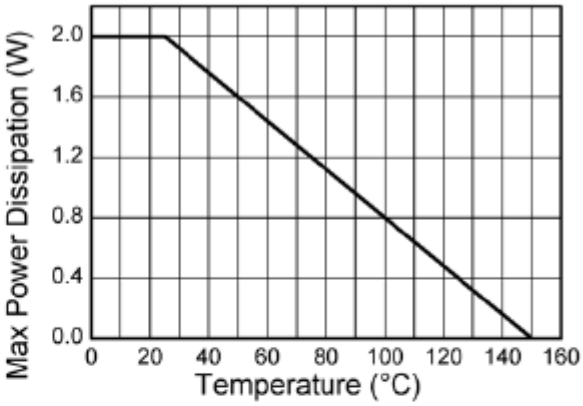
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-70	—	—	V	I_D = -250µA, V_{GS}= 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS}= -70V, 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 8)	$R_{DS(ON)}$	—	—	0.16	Ω	V_{GS}= -10V, I_D= -2.1A
				0.25		V_{GS}= -4.5V, I_D= -1.7A
Forward Transconductance (Notes 8 & 9)	g_{fs}	—	4.4	—	S	V_{DS}= -15V, I_D= -2.1A
Diode Forward Voltage (Note 8)	V_{SD}	—	-0.85	-0.95	V	I_S= -2.0A, V_{GS}= 0V
Reverse recovery time (Note 9)	t_{rr}	—	29.8	—	ns	I_S= -2.1A, di/dt= 100A/µs
Reverse recovery charge (Note 9)	Q_{rr}	—	38.5	—	nC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	635	—	pF	V_{DS}= -40V, V_{GS}= 0V f= 1MHz
Output Capacitance	C_{oss}	—	52	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	42.5	—	pF	
Total Gate Charge (Note 10)	Q_g	—	9.6	—	nC	V_{GS}= -5V; V_{DS}= -35V, I_D= -2.1A
Total Gate Charge (Note 10)	Q_g	—	18	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Gate-Source Charge (Note 10)	Q_{gs}	—	1.77	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Gate-Drain Charge (Note 10)	Q_{gd}	—	3.66	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Turn-On Delay Time (Note 10)	$t_{D(on)}$	—	2.5	—	ns	V_{DD}= -35V, V_{GS}= -10V I_D= -1A, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 10)	t_r	—	3.4	—	ns	
Turn-Off Delay Time (Note 10)	$t_{D(off)}$	—	27.9	—	ns	
Turn-Off Fall Time (Note 10)	t_f	—	8	—	ns	

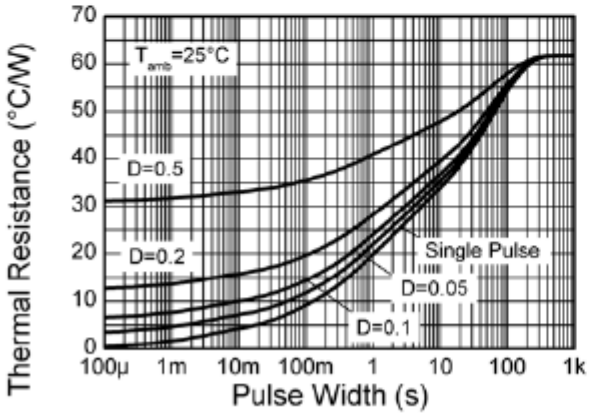
Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Same as Note 5, except the device is measured at t ≤ 5 seconds.
7. Same as Note 5, except the device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



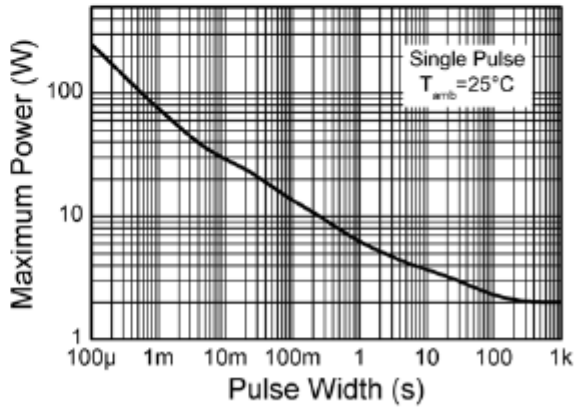
Safe Operating Area



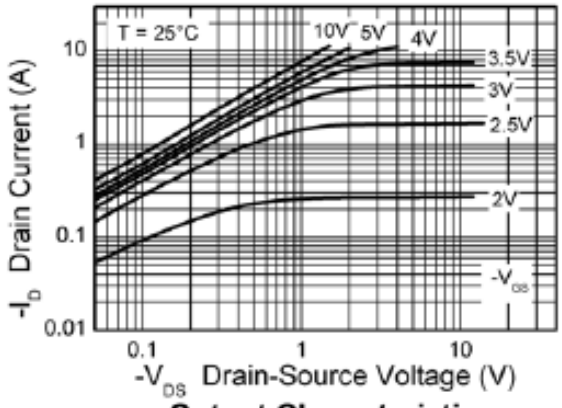
Derating Curve



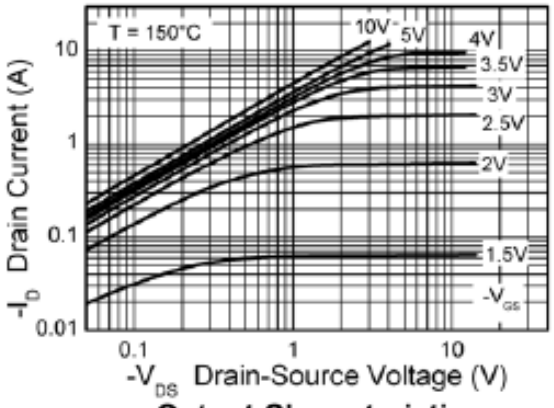
Transient Thermal Impedance



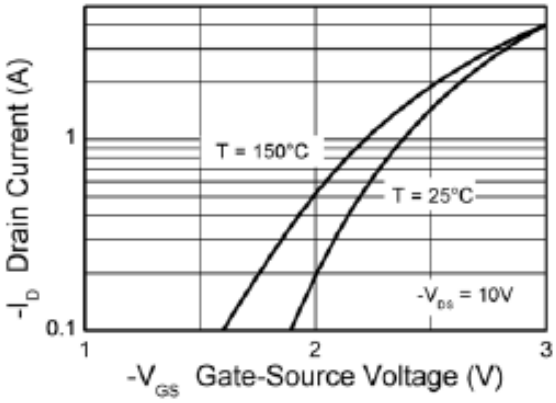
Pulse Power Dissipation



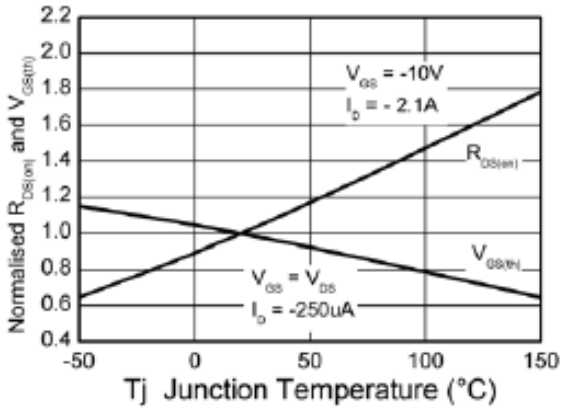
Output Characteristics



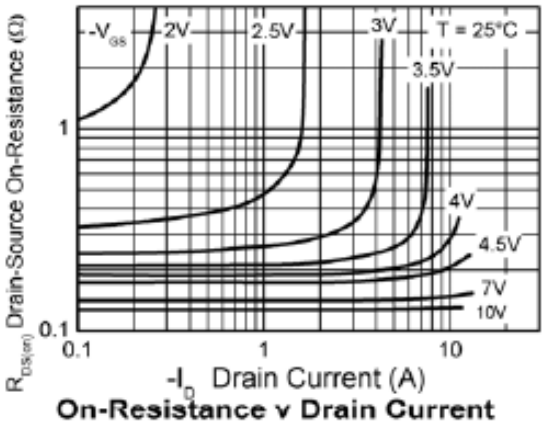
Output Characteristics



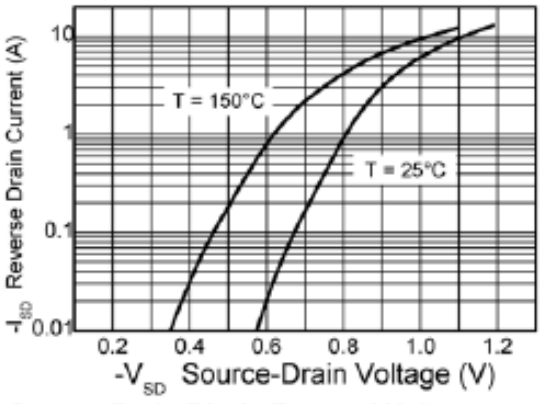
Typical Transfer Characteristics



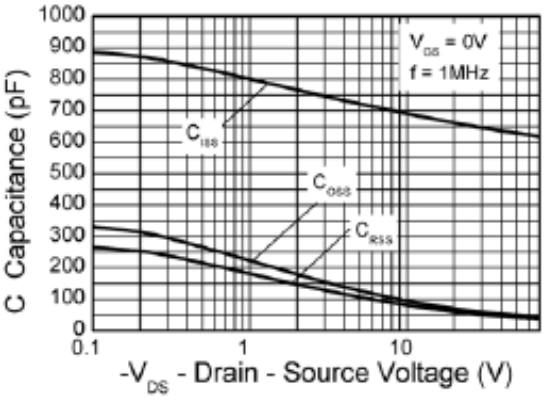
Normalised Curves v Temperature



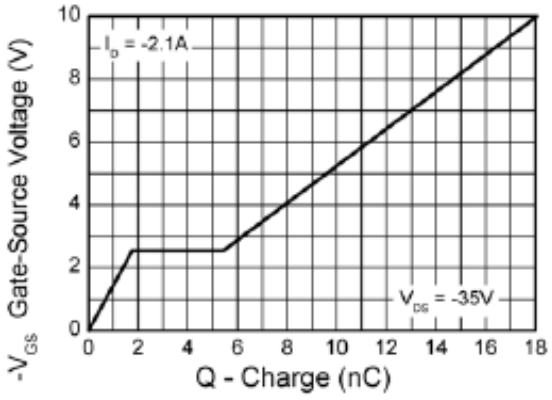
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage



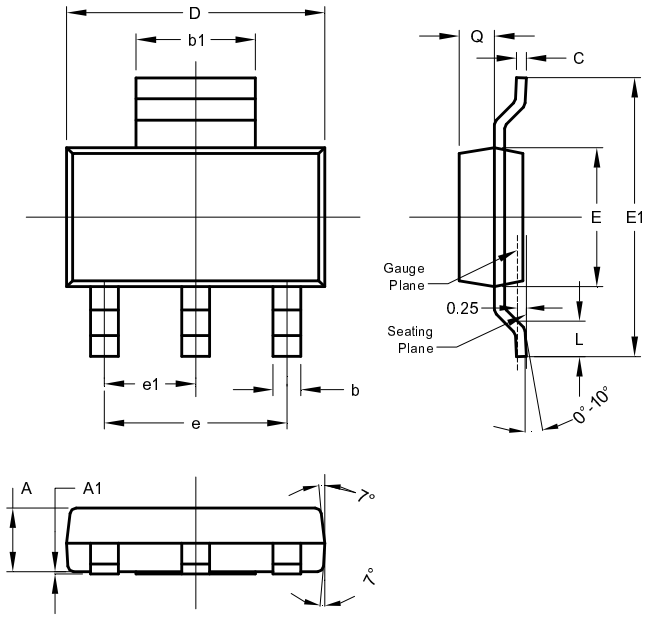
Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

Package Outline Dimensions

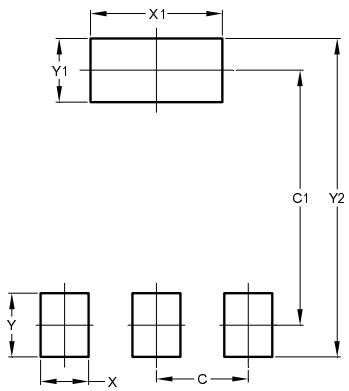
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
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

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



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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