70V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{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 yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

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)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An automotive-compliant part is available under a separate datasheet (ZXMP7A17GQ)**

Applications

- Motor control
- Transformer driving switches
- DC-DC converters
- Power-management functions
- Uninterrupted power supplies

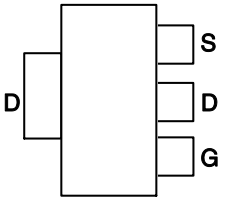
Mechanical Data

- Package: SOT223
- Package 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)

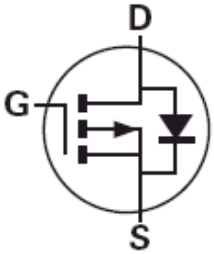
SOT223 (Type DN)



Top View



Pin Out – Top View



Equivalent Circuit

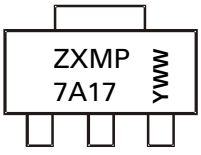
Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
ZXMP7A17GTA	SOT223 (Type DN)	1,000	Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SOT223 (Type DN)



ZXMP7A17 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5 = 2025)
WW or $\overline{WW}$ = Week Code (01 to 53)

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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	-3.7	A
Pulsed Source Current (Body Diode)		(Note 7)	I_{SM}	-9.6	A

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

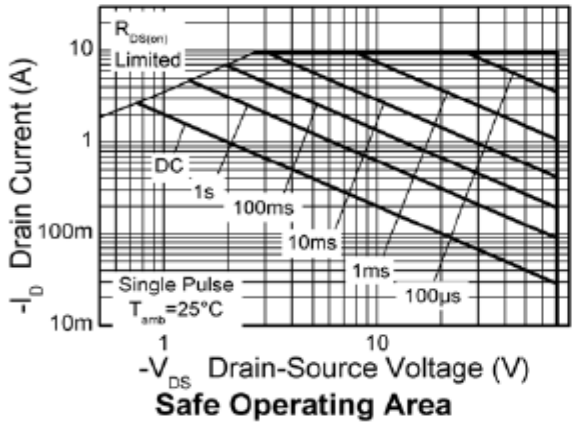
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	2.0	W
Linear Derating Factor			16.0	mW/°C
	(Note 6)		3.9	W
			31	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	62.5	°C/W
	(Note 6)		34	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

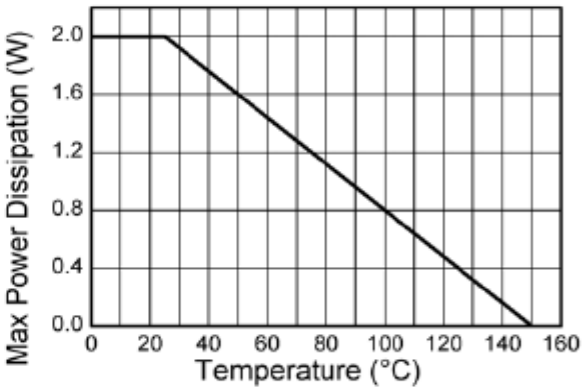
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-70	—	—	V	I_D = -250µA, V_{GS} = 0
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -70V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0
ON CHARACTERISTICS						
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} = 0
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} = 0 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
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	
Gate-Drain Charge (Note 10)	Q_{gd}	—	3.66	—	nC	
Turn-On Delay Time (Note 10)	$t_{D(ON)}$	—	2.5	—	ns	V_{DD} = -35V, V_{GS} = -10V I_D = -1A, $R_G \cong$ 6.0Ω
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.

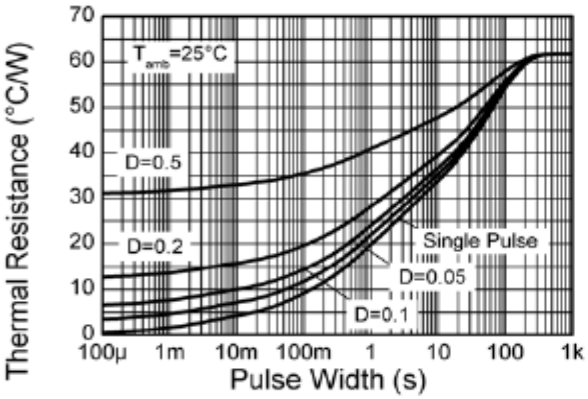
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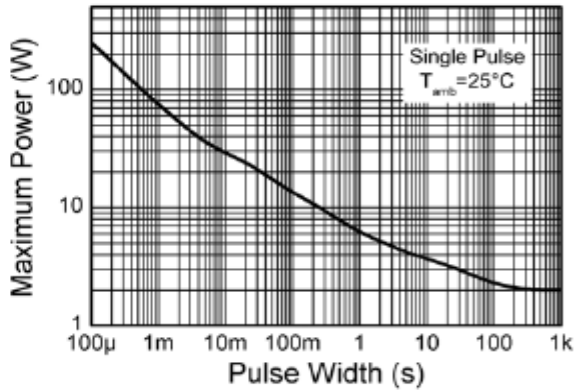
Safe Operating Area



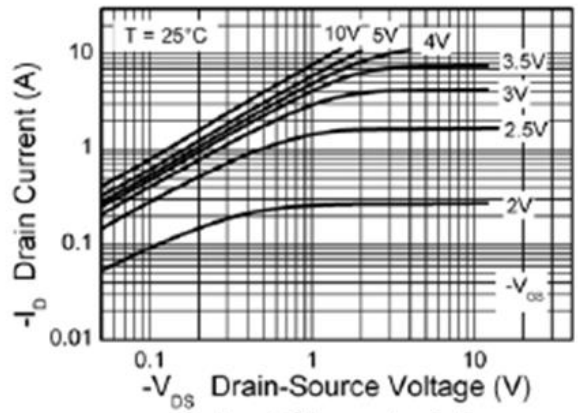
Derating Curve



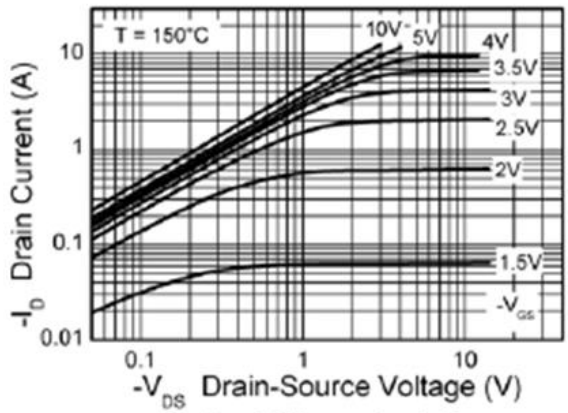
Transient Thermal Impedance



Pulse Power Dissipation

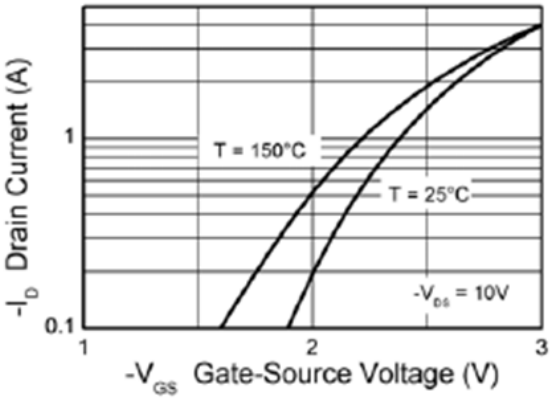


Output Characteristics

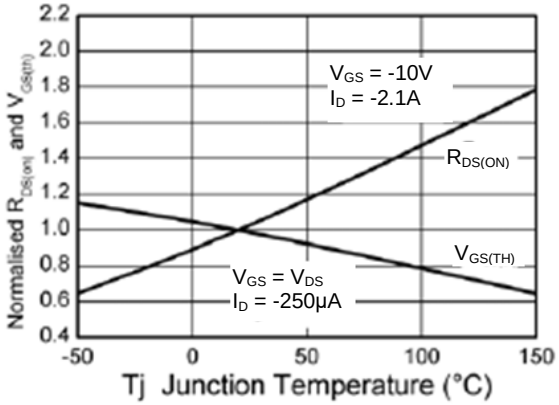


Output Characteristics

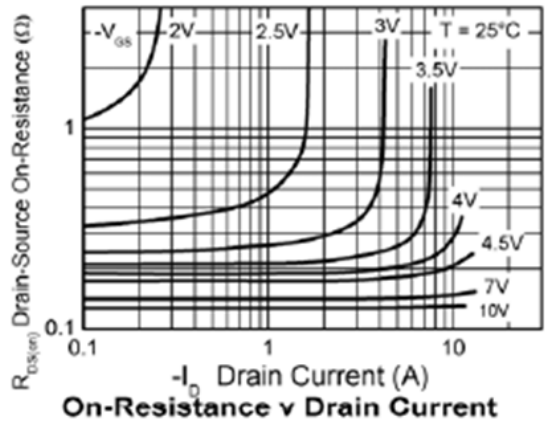
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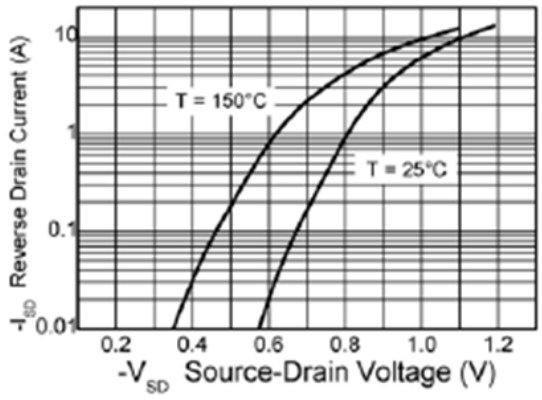
Typical Transfer Characteristics



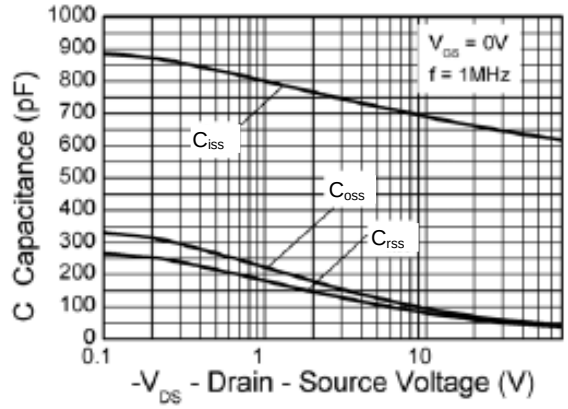
Normalised Curves v Temperature



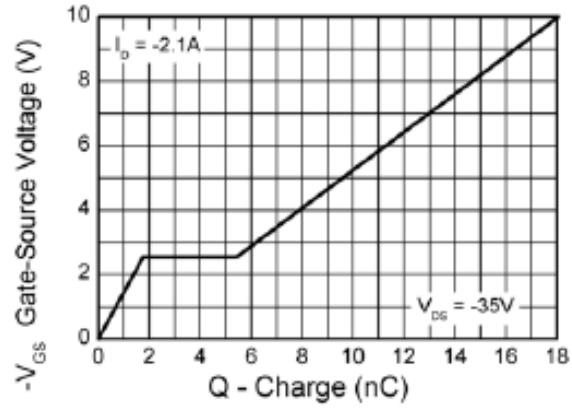
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage



Capacitance v Drain-Source Voltage



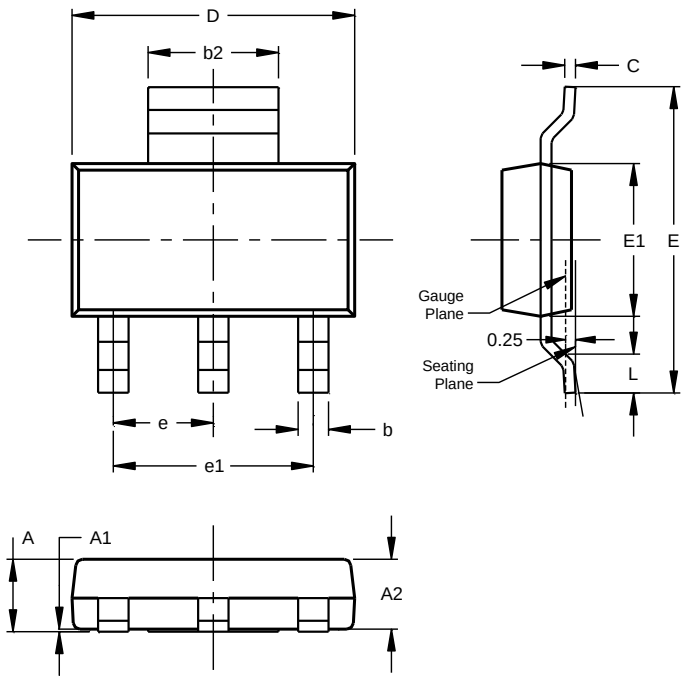
Gate-Source Voltage v Gate Charge

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223 (Type DN)

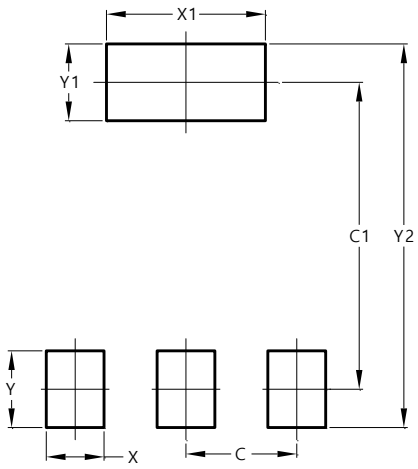


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223 (Type DN)



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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