

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = +25^\circ\text{C}$
-100V	350m Ω @ $V_{GS} = -10\text{V}$	-2.4A
	450m Ω @ $V_{GS} = -6\text{V}$	-2.1A

Description and Applications

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.

- Motor controls
- DC-DC converters
- Power management functions
- Relay and solenoid driving

Features and Benefits

- Fast Switching Speed
- Low Input Capacitance
- Low Gate Drive
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

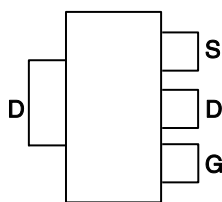
Mechanical Data

- Package: SOT223 (Type DN)
- Package Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.112 grams (Approximate)

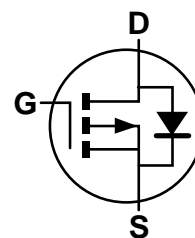
SOT223 (Type DN)



Top View



Pin Out - Top



Equivalent Circuit

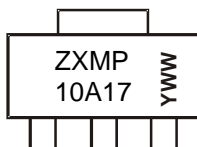
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZXMP10A17GTA	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)



ZXMP 10A17 = Product Type Marking Code

YWW = Date Code Marking

Y or \bar{Y} = Last Digit of Year (ex: 2 = 2022)

WW or $\bar{W}\bar{W}$ = Week Code (01–53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

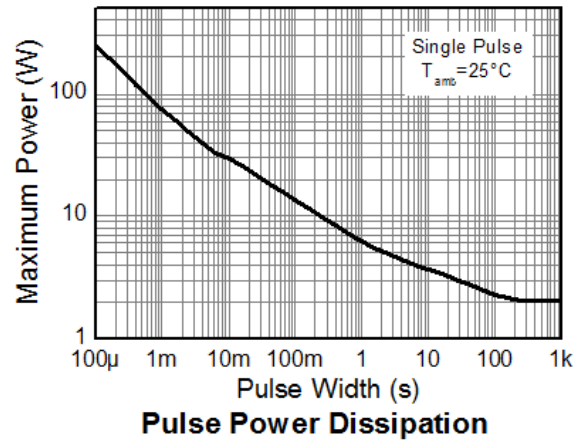
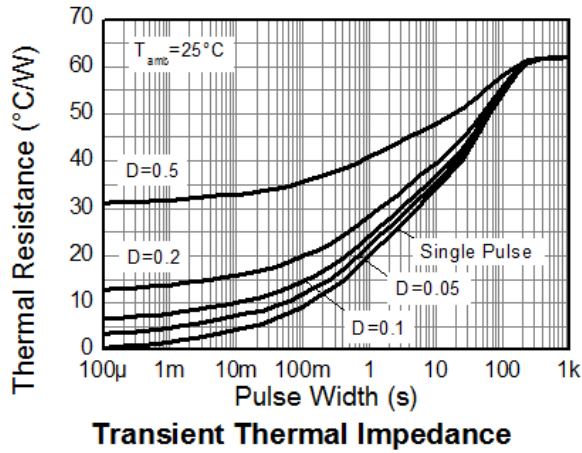
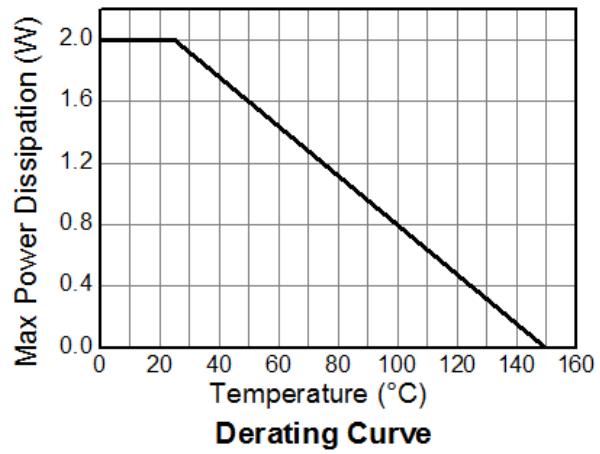
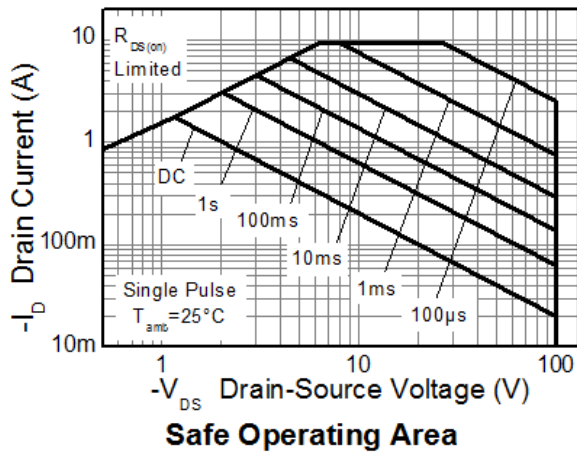
Characteristic			Symbol	Value	Unit	
Drain-Source Voltage			V_{DSS}	-100	V	
Gate-Source Voltage			V_{GS}	± 20	V	
Continuous Drain Current	$V_{GS} = 10\text{V}$	(Note 6)	I_D	-2.4	A	
		$T_A = +70^\circ\text{C}$ (Note 6)		-1.9		
		(Note 5)		-1.7		
Pulsed Drain Current	$V_{GS} = 10\text{V}$	(Note 7)	I_{DM}	-9.4	A	
Continuous Source Current (Body Diode)			(Note 6)	I_S	-2.4	A
Pulsed Source Current (Body Diode)			(Note 7)	I_{SM}	-9.4	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	2.0	W
	(Note 6)		16	
Linear Derating Factor	(Note 5)	$R_{\theta JA}$	3.9	$\text{mW}/^\circ\text{C}$
	(Note 6)		31	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JL}$	62.5	$^\circ\text{C}/\text{W}$
	(Note 6)		32.0	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JL}$	9.8	$^\circ\text{C}/\text{W}$
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

- Notes:
- For a device surface mounted on 25mm x 25mm x 1.6mm 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 5, except the device is measured at $t \leq 10$ seconds.
 - Same as Note 5, except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
 - Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

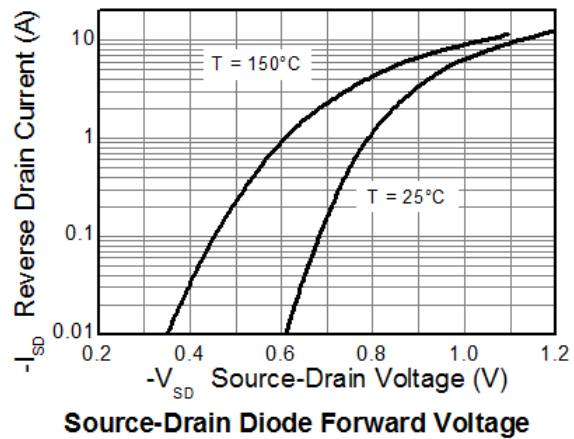
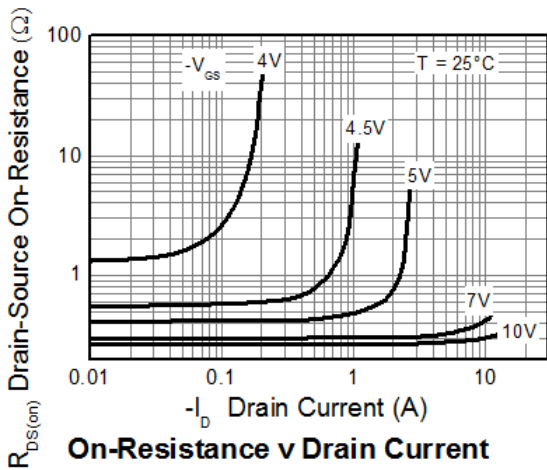
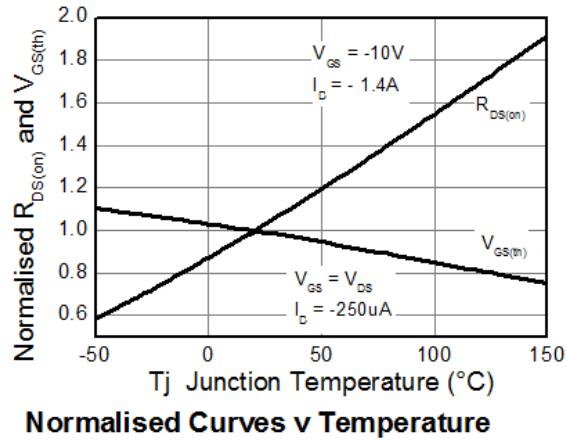
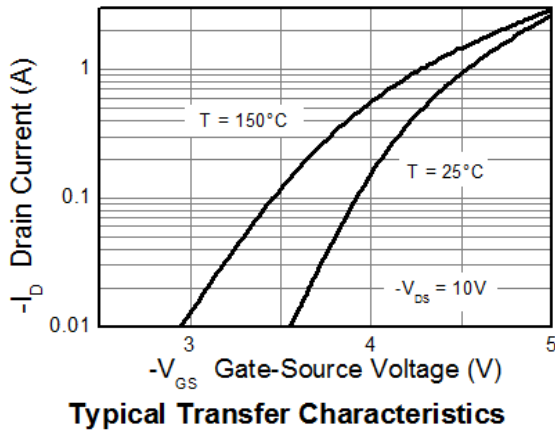
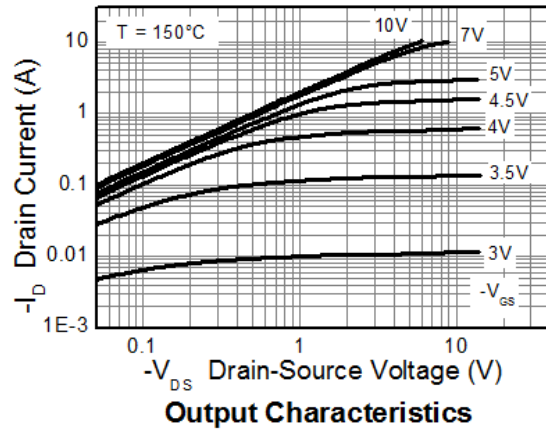
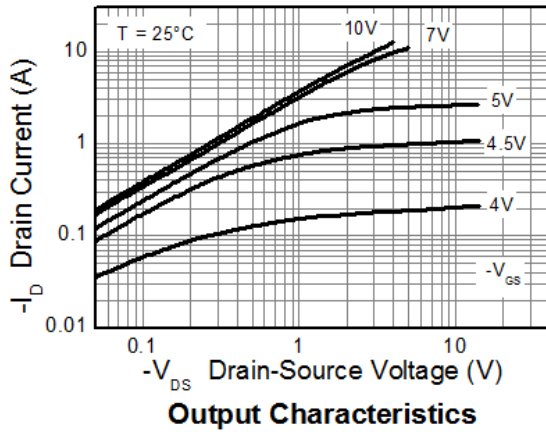


Electrical Characteristics (@T_A = +25°C unless otherwise specified.)

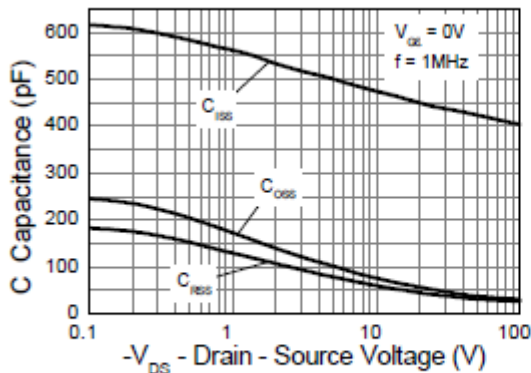
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-0.5	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	-2.0	—	-4.0	V	I _D = -250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 9)	R _{DS(on)}	—	—	0.350	Ω	V _{GS} = -10V, I _D = -1.4A
				0.450		V _{GS} = -6V, I _D = -1.2A
Forward Transconductance (Notes 9 & 10)	g _{fs}	—	2.8	—	S	V _{DS} = -15V, I _D = -1.4A
Diode Forward Voltage (Note 9)	V _{SD}	—	-0.85	-0.95	V	I _S = -1.7A, V _{GS} = 0V
Reverse Recovery Time (Note 10)	t _{rr}	—	33	—	ns	I _F = -1.5A, di/dt = 100A/μs
Reverse Recovery Charge (Note 10)	Q _{rr}	—	48	—	nC	
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	424	—	pF	V _{DS} = -50V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	36.6	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	29.8	—	pF	
Total Gate Charge (Note 11)	Q _g	—	7.1	—	nC	V _{GS} = -6.0V
Total Gate Charge (Note 11)	Q _g	—	10.7	—	nC	V _{GS} = -10V I _D = -1.4A
Gate-Source Charge (Note 11)	Q _{gs}	—	1.7	—	nC	
Gate-Drain Charge (Note 11)	Q _{gd}	—	3.8	—	nC	
Turn-On Delay Time (Note 11)	t _{D(on)}	—	3.0	—	ns	V _{DD} = -15V, V _{GS} = -10V I _D = -1A, R _G ≅ 6.0Ω
Turn-On Rise Time (Note 11)	t _r	—	3.5	—	ns	
Turn-Off Delay Time (Note 11)	t _{D(off)}	—	13.4	—	ns	
Turn-Off Fall Time (Note 11)	t _f	—	7.2	—	ns	

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

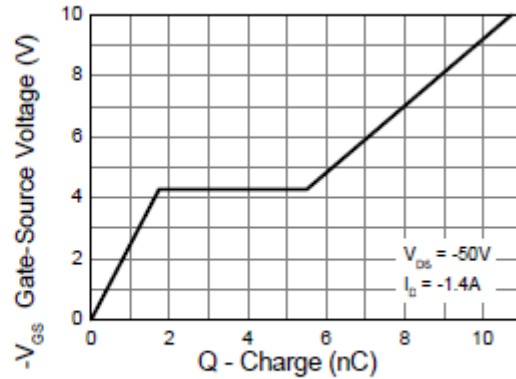
Typical Characteristics



Typical Characteristics (continued)

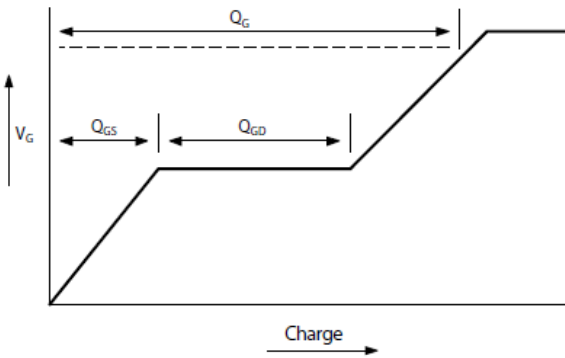


Capacitance v Drain-Source Voltage

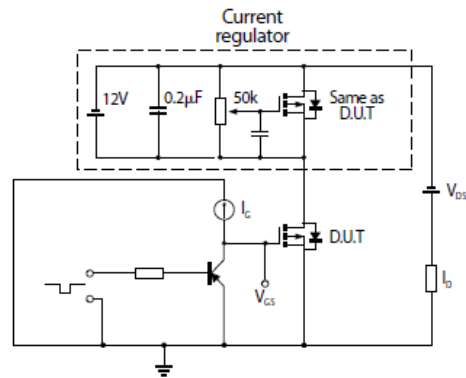


Gate-Source Voltage v Gate Charge

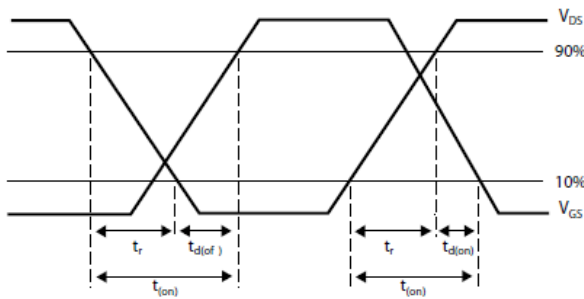
Test Circuits



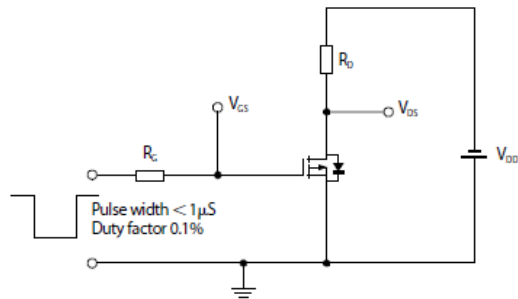
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

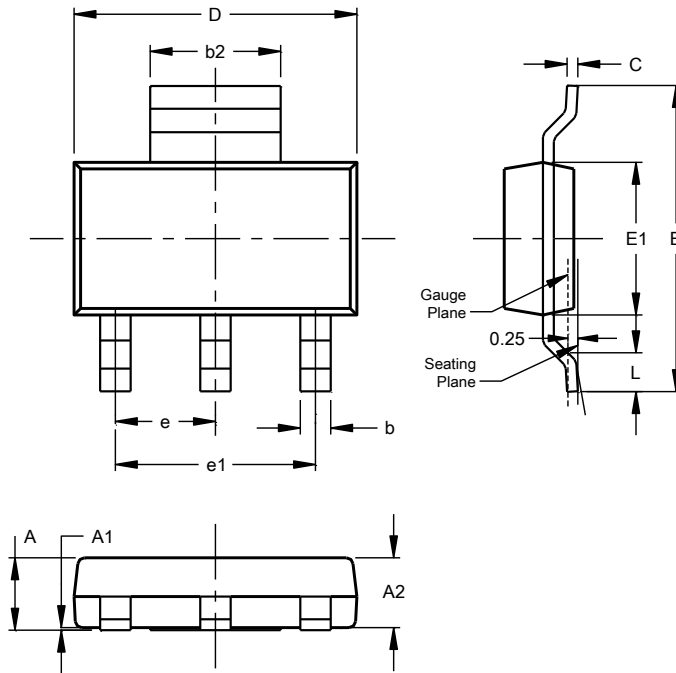


Switching time test circuit

Package Outline Dimensions

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

SOT223 (Type DN)

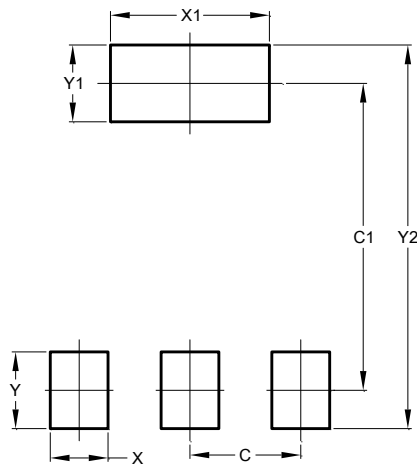


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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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