

## Product Summary

BV <sub>DSS</sub>	Max R <sub>DS(ON)</sub>	Package	Max I <sub>D</sub> T <sub>A</sub> = +25°C
-100V	1Ω @ V <sub>GS</sub> = -10V	SOT23	-0.7A
	1.45Ω @ V <sub>GS</sub> = -6.0V		-0.5A

## Description

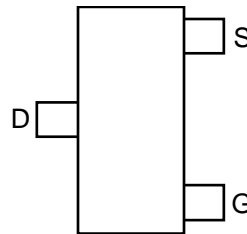
This MOSFET utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed, making it ideal for high-efficiency power management applications.

## Applications

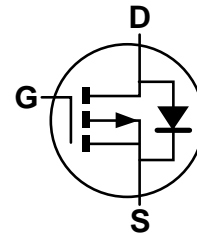
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



Top View



Top View  
Pin Out



Equivalent Circuit

## Features

- Fast Switching Speed
- Low Input Capacitance
- Low Gate Charge
- Low Threshold
- **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**
- **An Automotive-Compliant Part is Available Under Separate Data Sheet ([ZXMP10A13FQ](#))**

## Mechanical Data

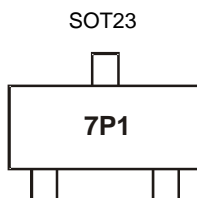
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.009 grams (Approximate)

## Ordering Information (Note 4)

Part Number	Case	Packaging
ZXMP10A13FTA	SOT23	3,000/Tape & Reel
ZXMP10A13FTC	SOT23	10,000/Tape & Reel

- 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/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>.

## Marking Information



7P1 = Product Type Marking Code

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

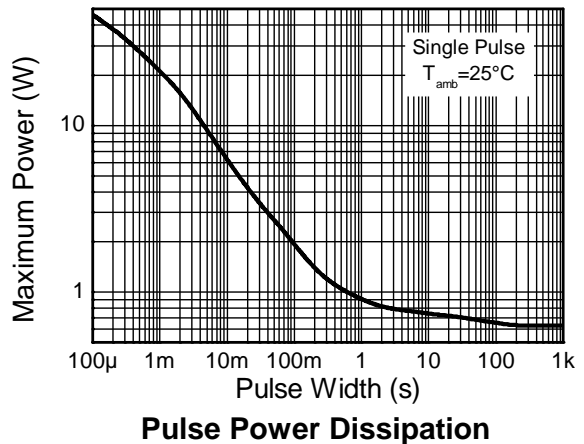
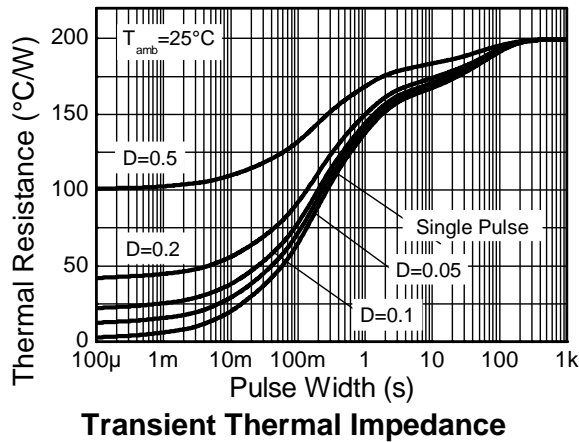
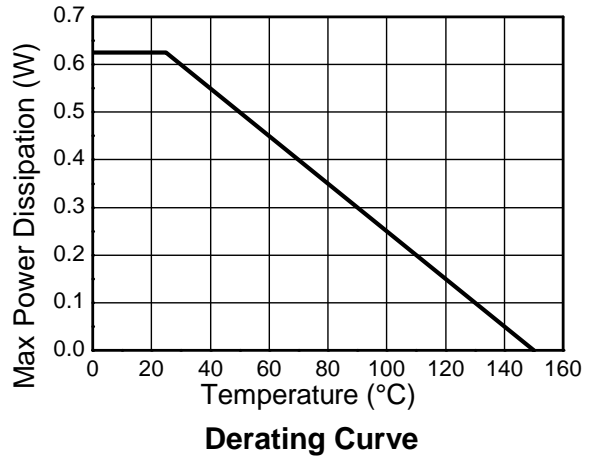
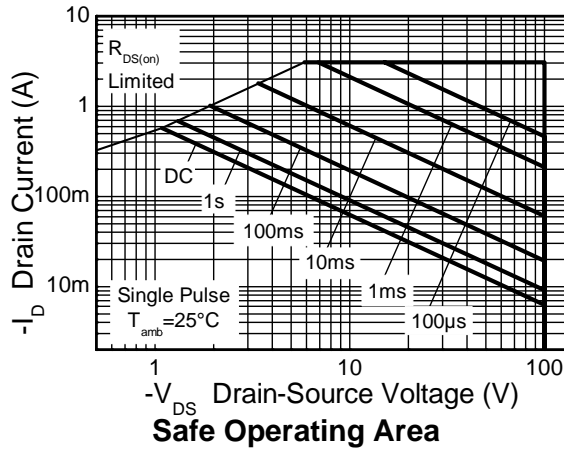
Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	-100	V
Gate-Source Voltage			$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$V_{GS} = 10\text{V}$	$T_A = +70^\circ\text{C}$ (Note 6)	$I_D$	-0.7	A
		(Note 6)		-0.5	
		(Note 6)		-0.6	
Pulsed Drain Current (Note 7)			$I_{DM}$	-3.1	A
Continuous Source Current (Body Diode) (Note 5)			$I_S$	-1.1	A
Pulsed Source Current (Body Diode) (Note 7)			$I_{SM}$	-3.1	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		$P_D$	625	mW
Linear Derating Factor			5	$\text{mW}/^\circ\text{C}$
Power Dissipation (Note 6)		$P_D$	806	mW
Linear Derating Factor			6.4	$\text{mW}/^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 8)		$R_{\theta JL}$	194	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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.
  6. For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.
  7. Repetitive rating 25mm x 25mm FR4 PCB,  $D=0.05$  pulse width= $10\mu\text{s}$  - pulse current limited by maximum junction temperature.
  8. Thermal resistance from junction to solder-point (at the end of the drain lead).

**Thermal Characteristics (Continued)**

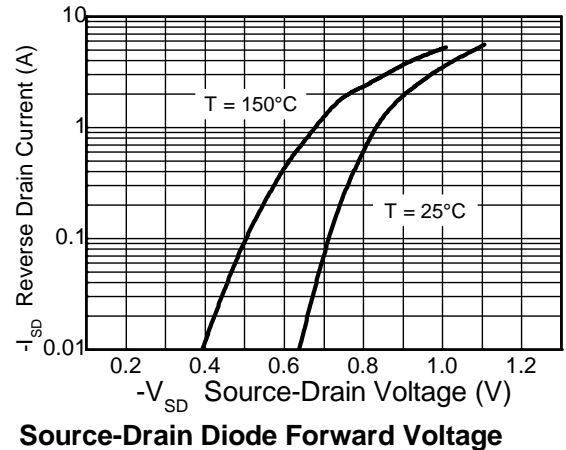
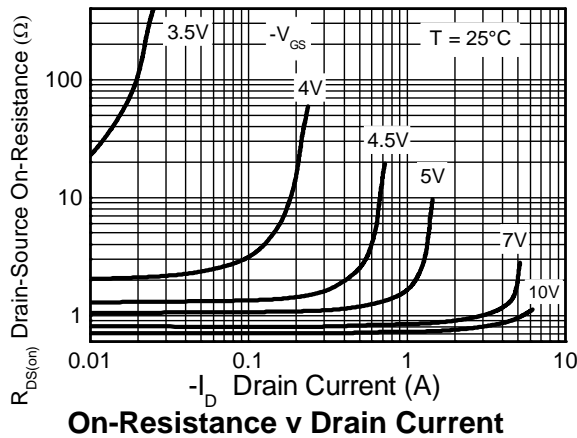
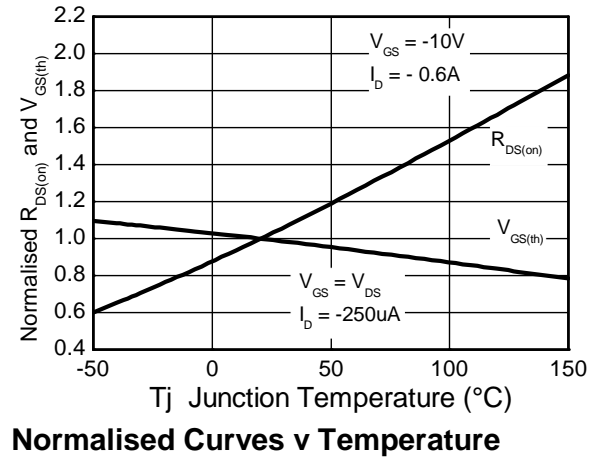
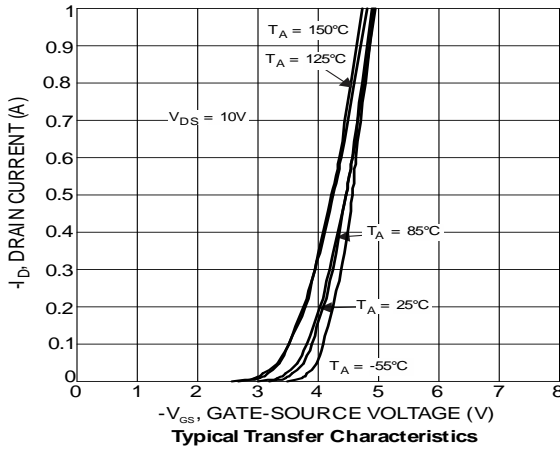
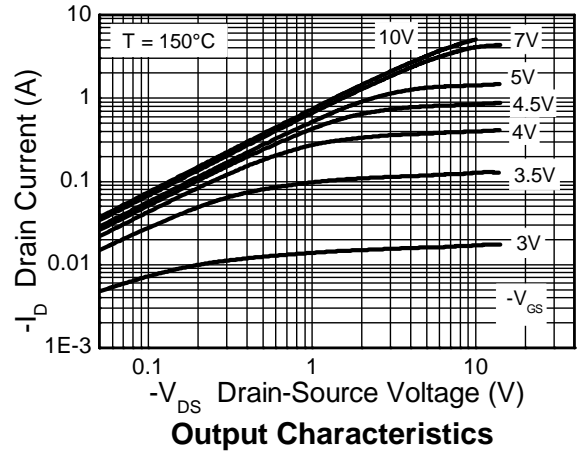
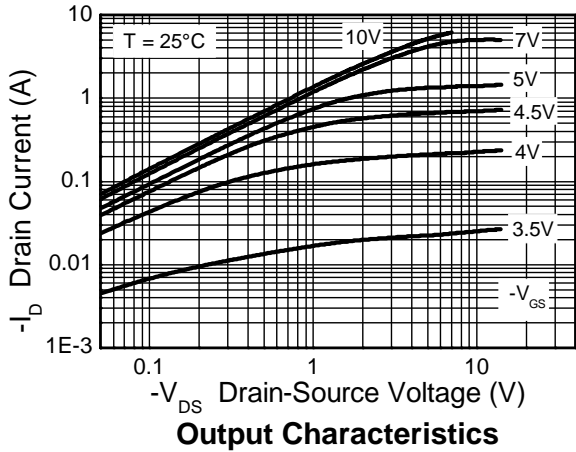


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

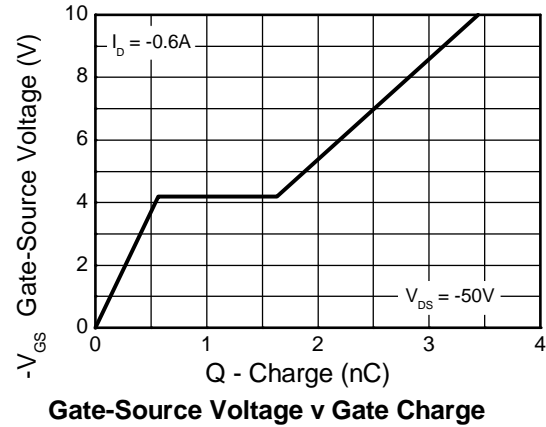
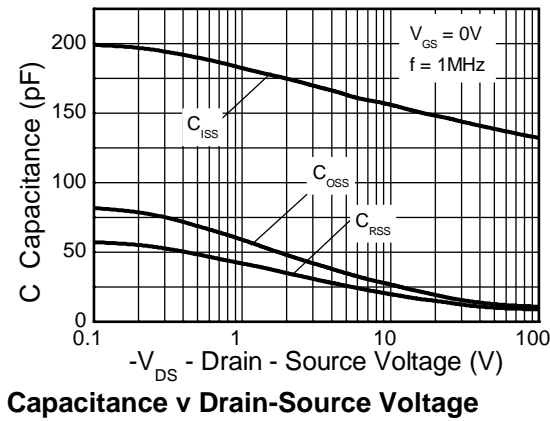
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-100	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -100V, V <sub>GS</sub> = 0V
Gate-Source 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>	-2.0	—	-4.0	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>	—	—	1.0	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -0.6A
				1.45		V <sub>GS</sub> = -6.0V, I <sub>D</sub> = -0.5A
Forward Transconductance (Notes 9 & 11)	g <sub>FS</sub>	—	1.2	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -0.6A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	-0.85	-0.95	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = -0.75A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 11)	t <sub>RR</sub>	—	29	—	ns	T <sub>J</sub> = +25°C, I <sub>F</sub> = -0.9A, di/dt = 100A/μs
Reverse Recovery Charge (Note 11)	Q <sub>RR</sub>	—	31	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>ISS</sub>	—	141	—	pF	V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	13.1	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	10.8	—		
Turn-On Delay Time (Note 10)	t <sub>D(ON)</sub>	—	1.6	—	ns	V <sub>DD</sub> = -50V, I <sub>D</sub> = -1.0A, R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = -10V
Turn-On Rise Time (Note 10)	t <sub>R</sub>	—	2.1	—		
Turn-Off Delay Time (Note 10)	t <sub>D(OFF)</sub>	—	5.9	—		
Turn-Off Fall Time (Note 10)	t <sub>F</sub>	—	3.3	—		
Total Gate Charge (Note 10)	Q <sub>G</sub>	—	1.8	—	nC	V <sub>DS</sub> = -50V, V <sub>GS</sub> = -5.0V, I <sub>D</sub> = -0.6A
Total Gate Charge (Note 10)	Q <sub>G</sub>	—	3.5	—	nC	V <sub>DS</sub> = -50V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -0.6A
Gate-Source Charge (Note 10)	Q <sub>GS</sub>	—	0.6	—		
Gate-Drain Charge (Note 10)	Q <sub>GD</sub>	—	1.6	—		

- 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.

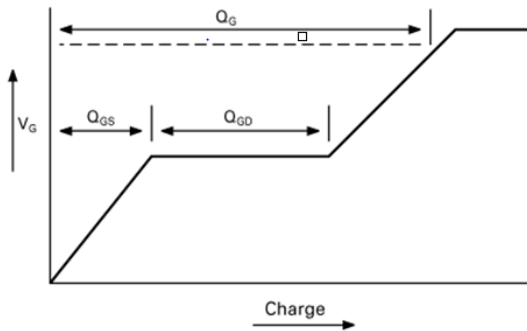
**Typical Characteristics**



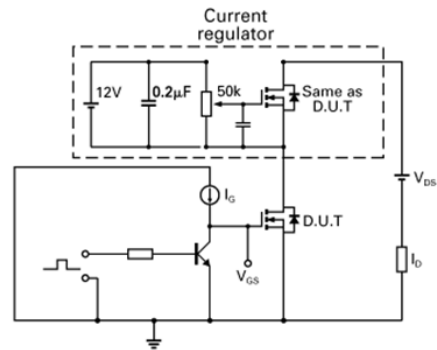
**Typical Characteristics** (Continued)



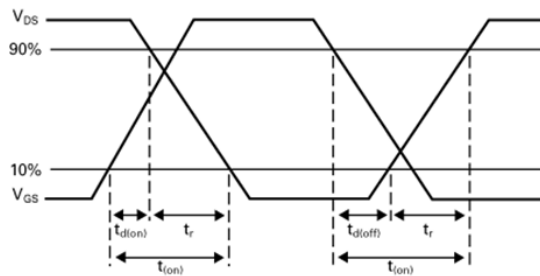
**Test Circuits**



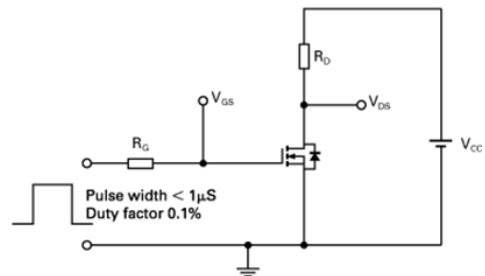
**Basic gate charge waveform**



**Gate charge test circuit**



**Switching time waveforms**

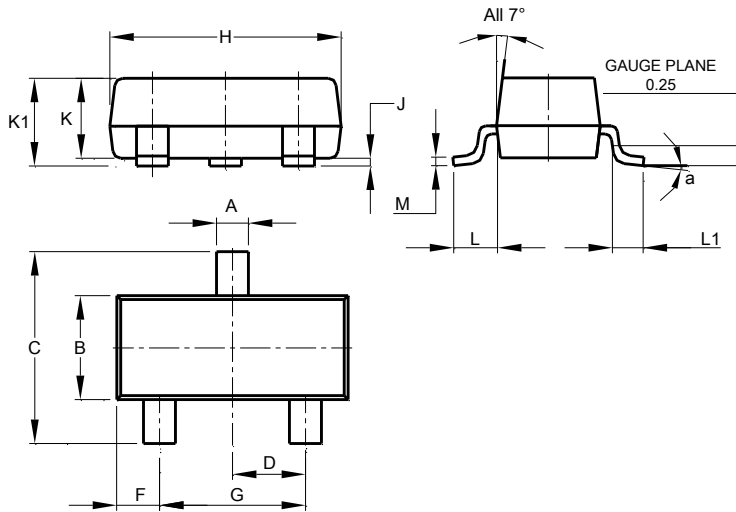


**Switching time test circuit**

**Package Outline Dimensions**

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

**SOT23**

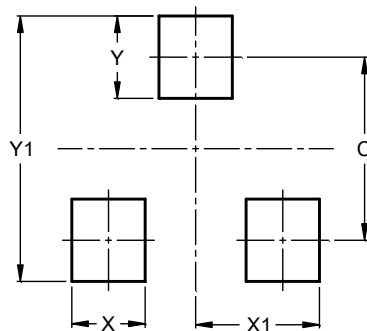


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	—
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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