

Product Summary

BV _{DSS}	Max R _{DS(ON)}	Package	Max I _D T _A = +25°C
-100V	1Ω @ V _{GS} = -10V	SOT23	-0.7A
	1.45Ω @ V _{GS} = -6.0V		-0.5A

Description

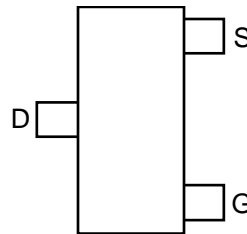
This MOSFET utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed, making it ideal for high-efficiency power management applications.

Applications

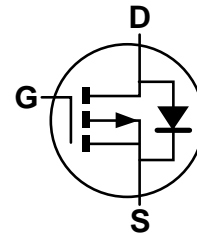
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



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

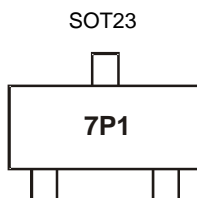
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.009 grams (Approximate)

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 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.)

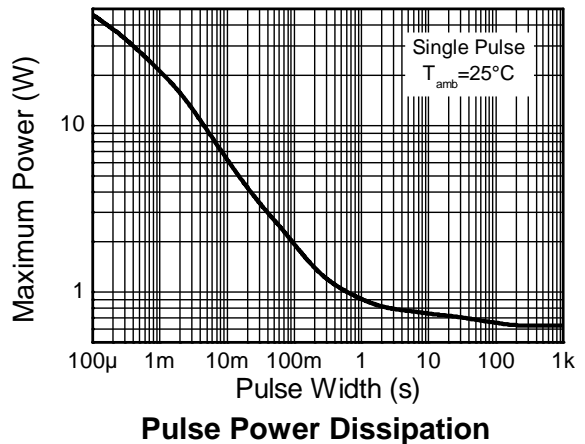
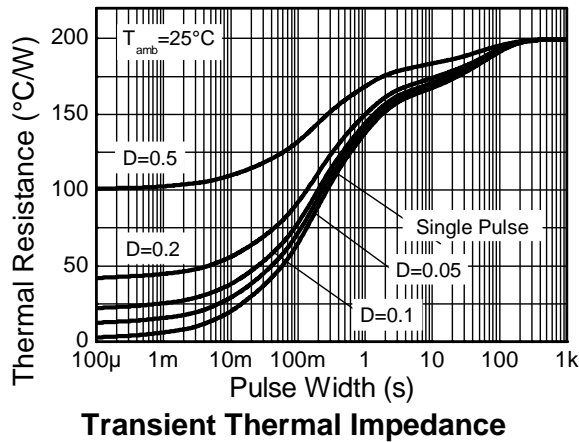
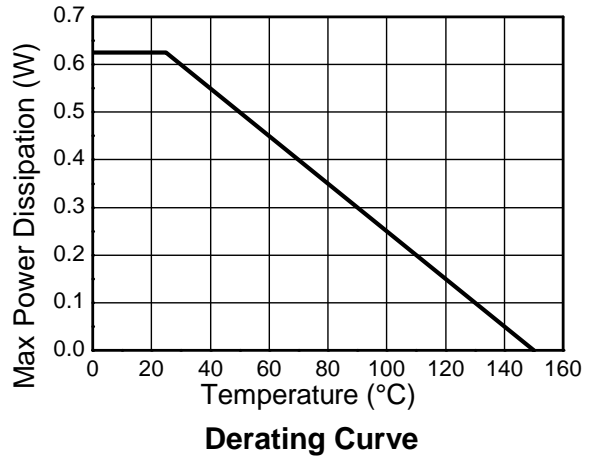
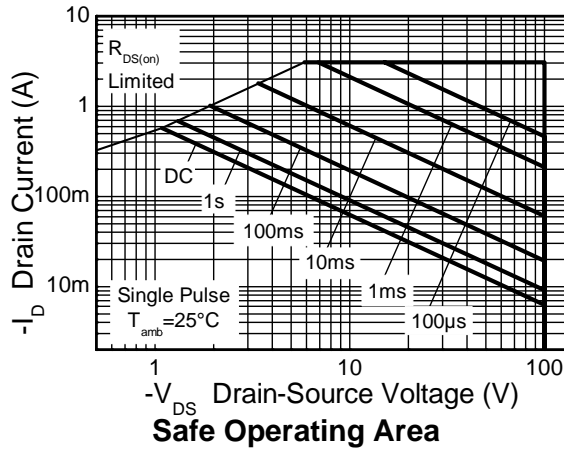
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current	$V_{GS} = 10\text{V}$	$T_A = +70^\circ\text{C}$ (Note 6)	I_D	-0.7	A
		(Note 6)		-0.5	
		(Note 6)		-0.6	
Pulsed Drain Current (Note 7)			I_{DM}	-3.1	A
Continuous Source 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	mW/ $^\circ\text{C}$
Power Dissipation (Note 6)		P_D	806	mW
Linear Derating Factor			6.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	155	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 8)		$R_{\theta JL}$	194	$^\circ\text{C/W}$
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)

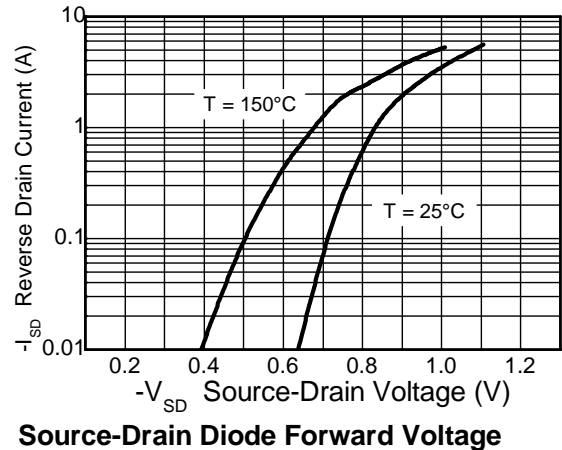
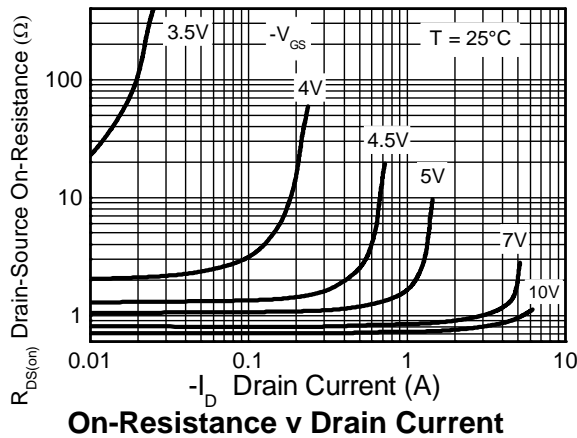
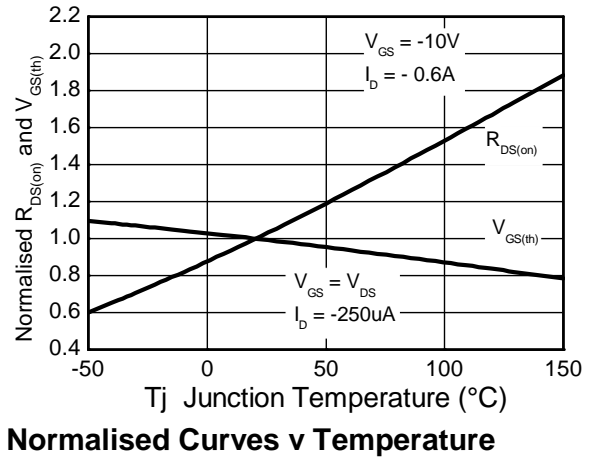
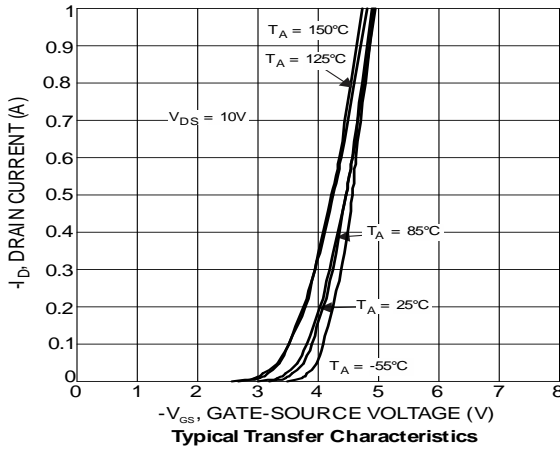
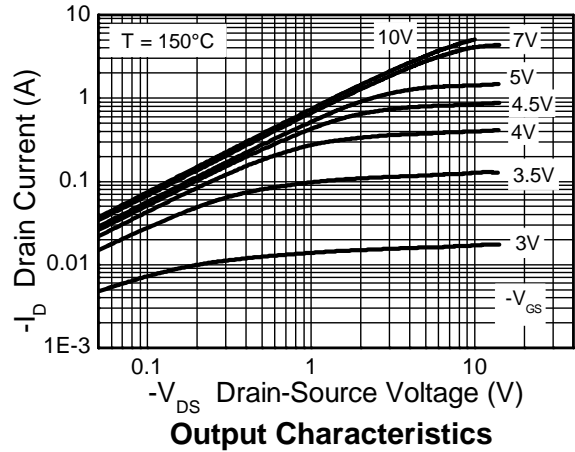
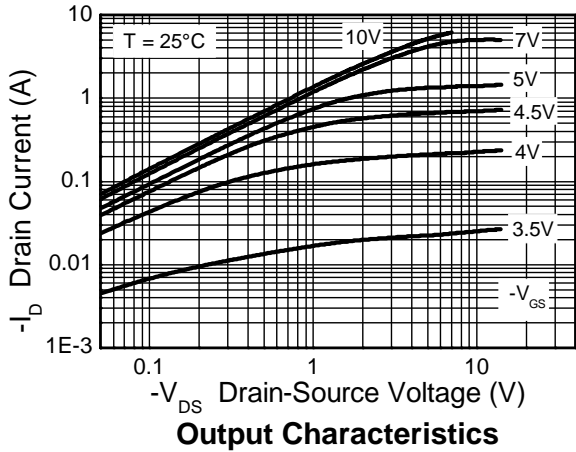


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

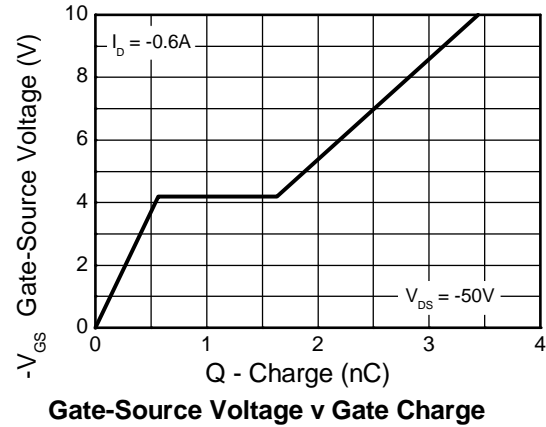
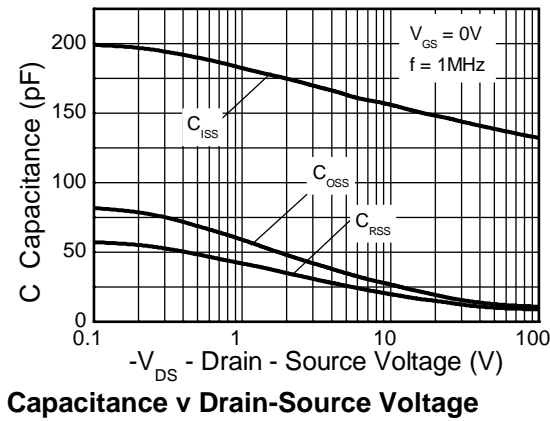
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{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)}	—	—	1.0	Ω	V _{GS} = -10V, I _D = -0.6A
				1.45		V _{GS} = -6.0V, I _D = -0.5A
Forward Transconductance (Notes 9 & 11)	g _{FS}	—	1.2	—	S	V _{DS} = -15V, I _D = -0.6A
Diode Forward Voltage (Note 9)	V _{SD}	—	-0.85	-0.95	V	T _J = +25°C, I _S = -0.75A, V _{GS} = 0V
Reverse Recovery Time (Note 11)	t _{RR}	—	29	—	ns	T _J = +25°C, I _F = -0.9A, di/dt = 100A/μs
Reverse Recovery Charge (Note 11)	Q _{RR}	—	31	—	nC	
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C _{ISS}	—	141	—	pF	V _{DS} = -50V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{OSS}	—	13.1	—		
Reverse Transfer Capacitance	C _{RSS}	—	10.8	—		
Turn-On Delay Time (Note 10)	t _{D(ON)}	—	1.6	—	ns	V _{DD} = -50V, I _D = -1.0A, R _G ≅ 6.0Ω, V _{GS} = -10V
Turn-On Rise Time (Note 10)	t _R	—	2.1	—		
Turn-Off Delay Time (Note 10)	t _{D(OFF)}	—	5.9	—		
Turn-Off Fall Time (Note 10)	t _F	—	3.3	—		
Total Gate Charge (Note 10)	Q _G	—	1.8	—	nC	V _{DS} = -50V, V _{GS} = -5.0V, I _D = -0.6A
Total Gate Charge (Note 10)	Q _G	—	3.5	—	nC	V _{DS} = -50V, V _{GS} = -10V, I _D = -0.6A
Gate-Source Charge (Note 10)	Q _{GS}	—	0.6	—		
Gate-Drain Charge (Note 10)	Q _{GD}	—	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.

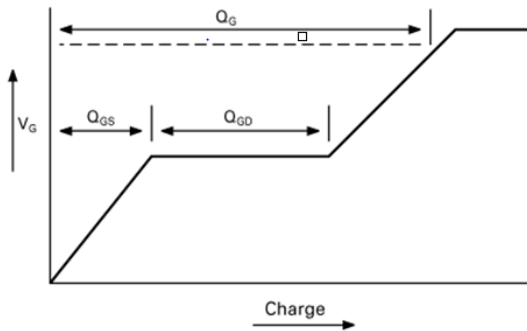
Typical Characteristics



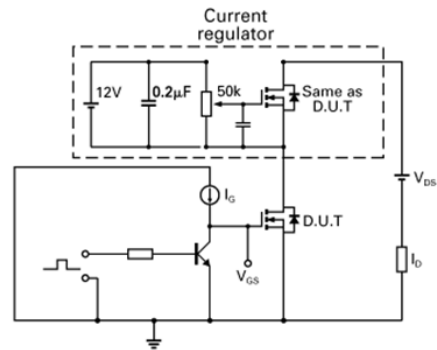
Typical Characteristics (Continued)



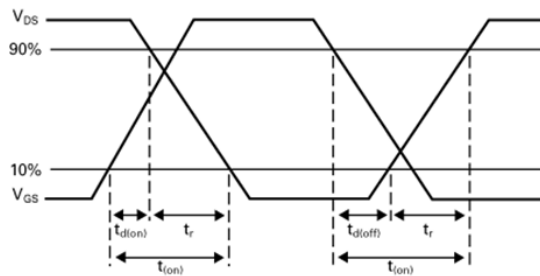
Test Circuits



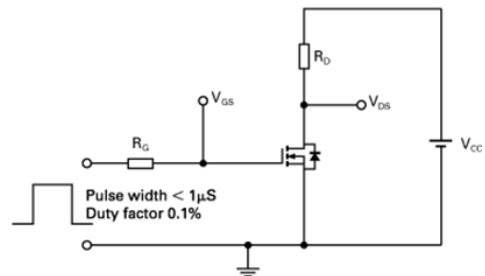
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

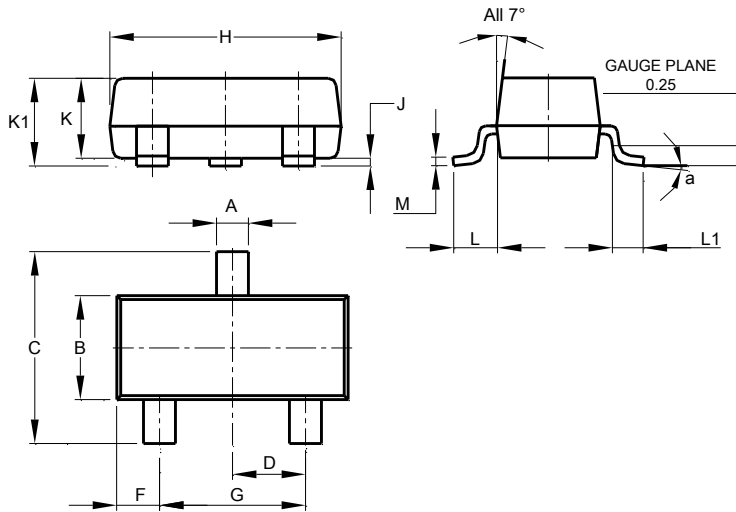


Switching time test circuit

Package Outline Dimensions

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

SOT23

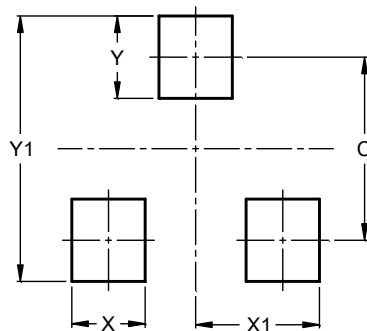


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	—
All Dimensions in mm			

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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