

100V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

BV _{DSS}	Max R _{DS(ON)}	Package	Max I _D T _A = +25°C Note 5
-100V	1.0Ω @ 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

Features

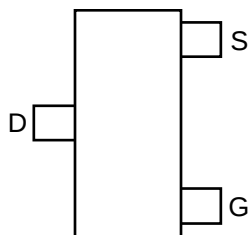
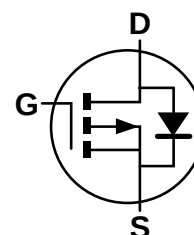
- Fast Switching Speed
- Low Input Capacitance
- Low Gate Charge
- Low Threshold
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: SOT-23
- 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 Ⓔ3
- Weight: 0.008 grams (Approximate)



Top View

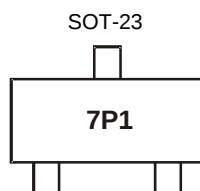

 Top View
Pin Out


Equivalent Circuit

Ordering Information (Notes 4 & 5)

Part Number	Compliance	Case	Quantity per reel
ZXMP10A13FTA	Standard	SOT23	3,000
ZXMP10A13FQTA	Automotive	SOT23	3,000
ZXMP10A13FTC	Standard	SOT23	10,000
ZXMP10A13FQTC	Automotive	SOT23	10,000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
 5. 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°C, unless otherwise specified.)

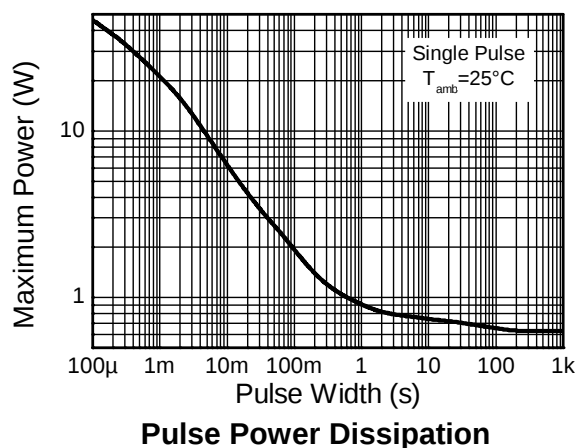
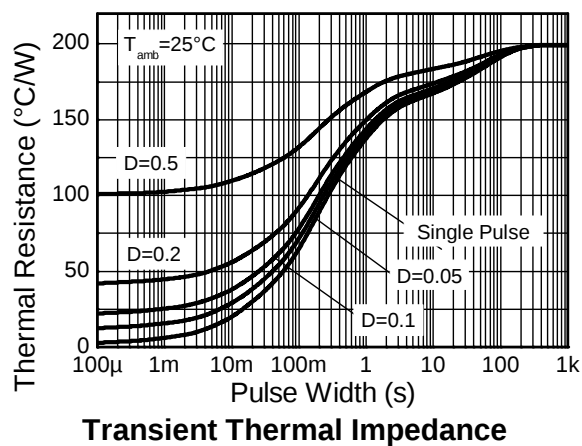
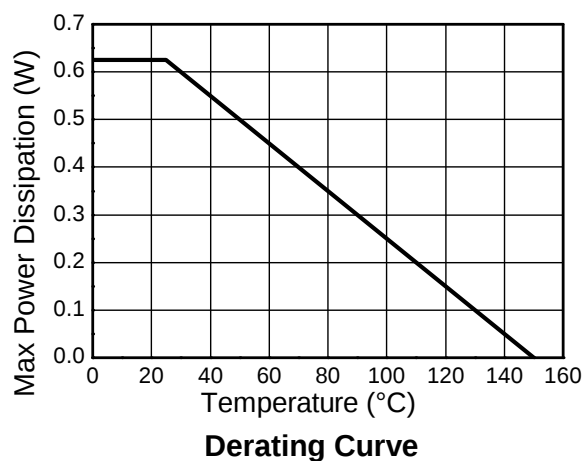
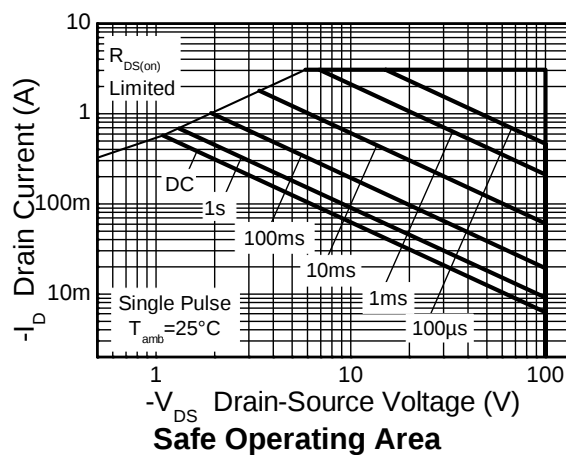
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-100	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	T _A = +70°C (Note 6)	I _D	-0.7 -0.5 -0.6	A
Pulsed Drain Current (Note 8)			I _{DM}	-3.1	A
Continuous Source Current (Body Diode) (Note 6)			I _S	-1.1	A
Pulsed Source Current (Body Diode) (Note 8)			I _{SM}	-3.1	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	625	mW
Linear Derating Factor		5	mW/°C
Power Dissipation (Note 7)	P _D	806	mW
Linear Derating Factor		6.4	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	200	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	155	°C/W
Thermal Resistance, Junction to Leads (Note 9)	R _{θJL}	194	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Notes:
6. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
 7. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
 8. Repetitive rating 25mm x 25mm FR4 PCB, D=0.05 pulse width=10μs - pulse current limited by maximum junction temperature.
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

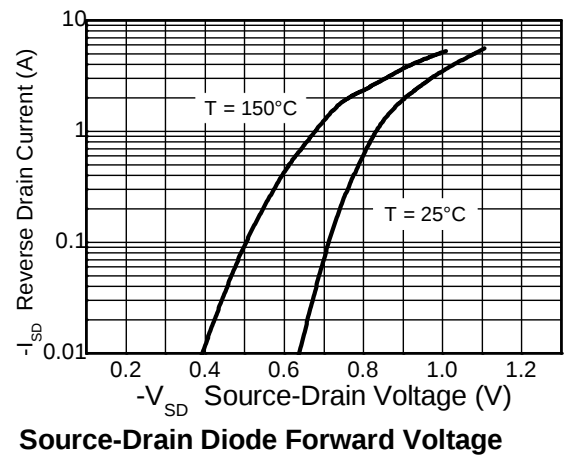
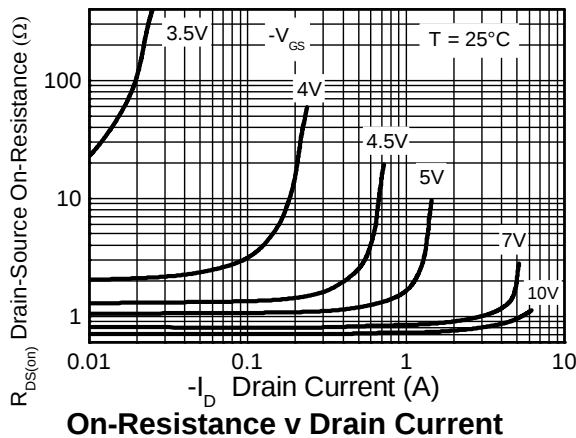
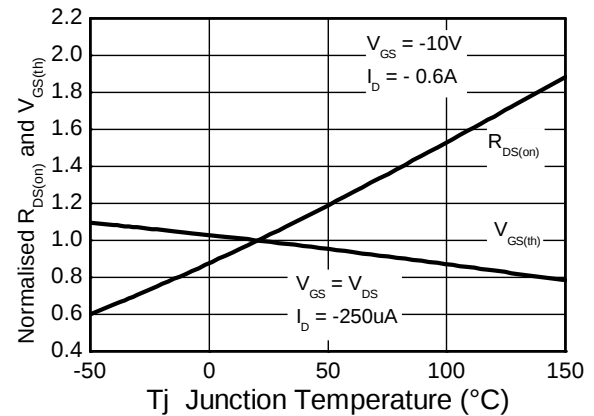
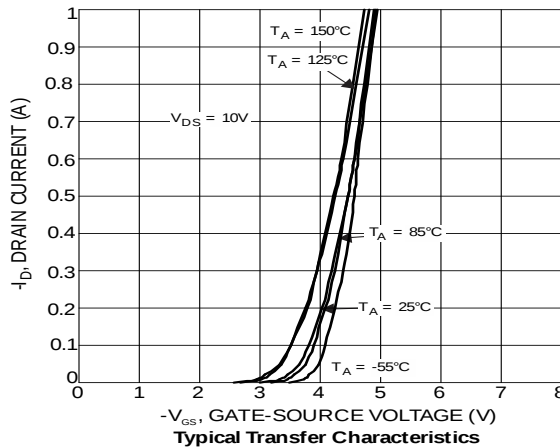
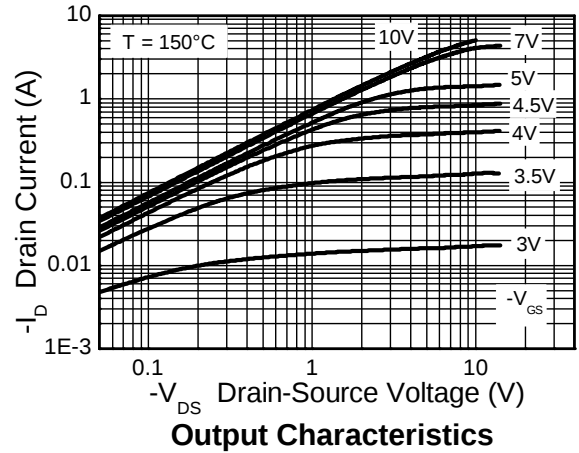
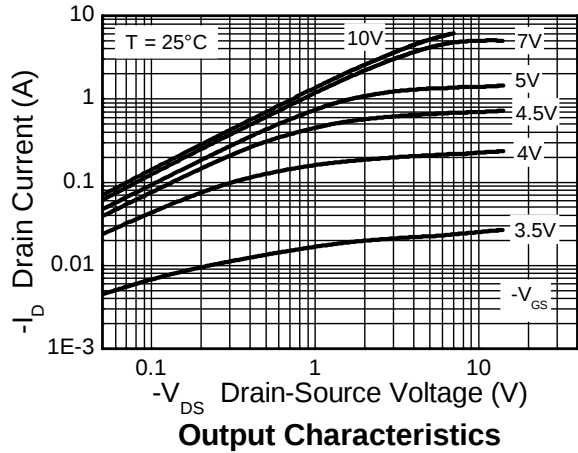


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

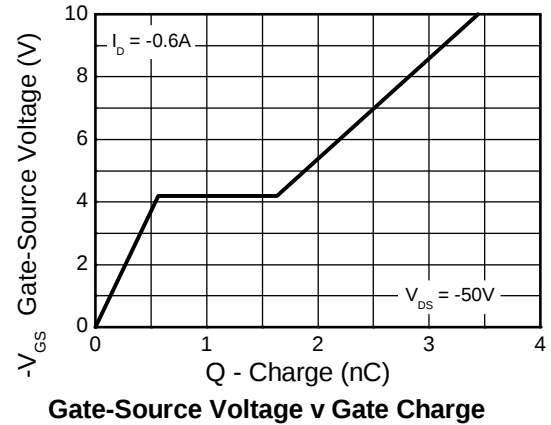
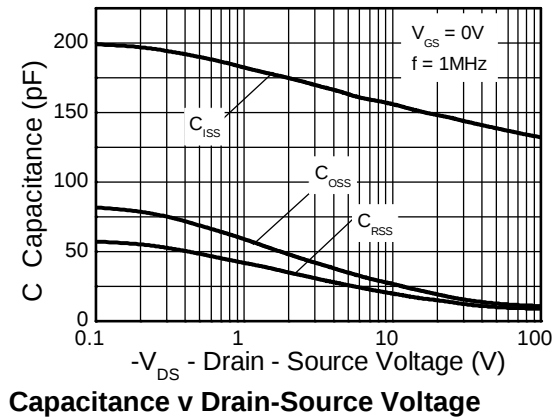
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{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 10)	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 10 and 12)	g _{fs}	—	1.2	—	S	V _{DS} = -15V, I _D = -0.6A
Diode Forward Voltage (Note 10)	V _{SD}	—	-0.85	-0.95	V	T _J = +25°C, I _S = -0.75A, V _{GS} = 0V
Reverse Recovery Time (Note 12)	t _{rr}	—	29	—	ns	T _J = +25°C, I _F = -0.9A, di/dt = 100A/μs
Reverse Recovery Charge (Note 12)	Q _{rr}	—	31	—	nC	
DYNAMIC CHARACTERISTICS (Note 12)						
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 11)	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 11)	t _r	—	2.1	—		
Turn-Off Delay Time (Note 11)	t _{D(off)}	—	5.9	—		
Turn-Off Fall Time (Note 11)	t _f	—	3.3	—		
Total Gate Charge (Note 11)	Q _g	—	1.8	—	nC	V _{DS} = -50V, V _{GS} = -5.0V, I _D = -0.6A
Total Gate Charge (Note 11)	Q _g	—	3.5	—	nC	V _{DS} = -50V, V _{GS} = -10V, I _D = -0.6A
Gate-Source Charge (Note 11)	Q _{gs}	—	0.6	—		
Gate-Drain Charge (Note 11)	Q _{gd}	—	1.6	—		

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

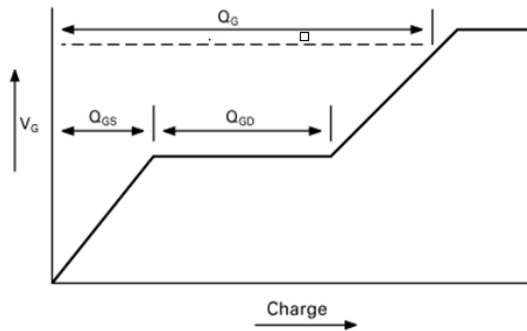
Typical Characteristics



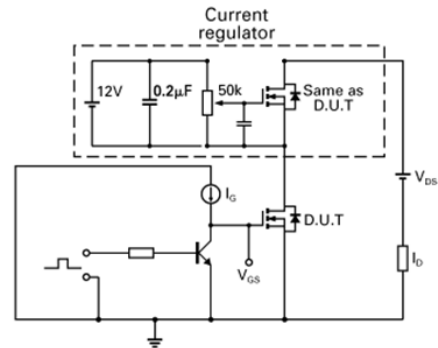
Typical Characteristics (cont.)



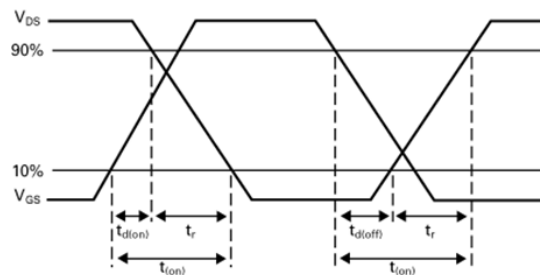
Test Circuits



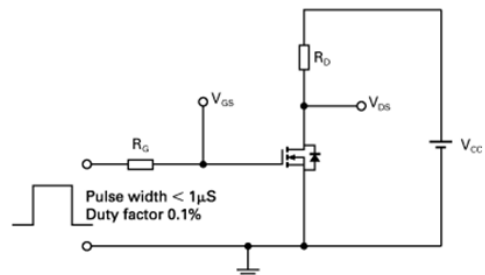
Basic gate charge waveform



Gate charge test circuit



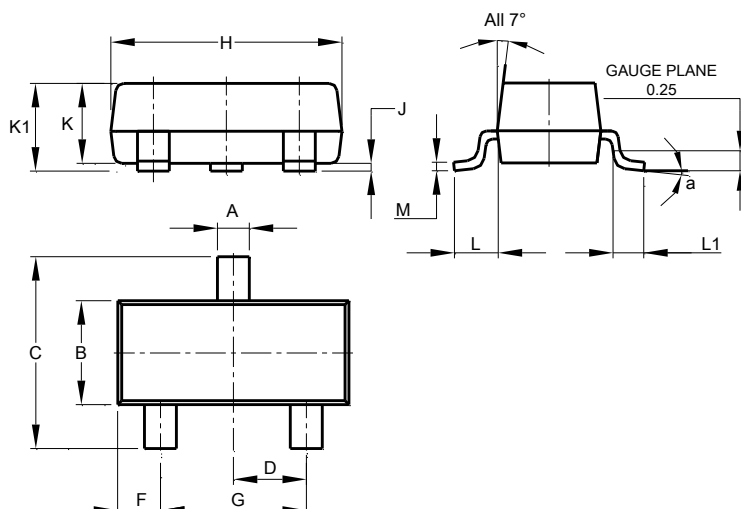
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

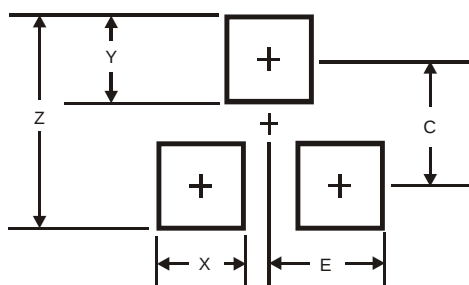
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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	8°		
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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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