

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

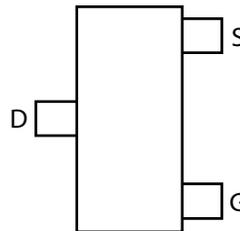
- Fast Switching Speed
- Low Input Capacitance
- Low Gate Charge
- Low Threshold
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

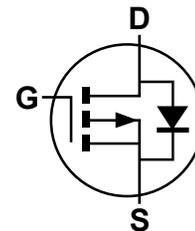
- Case: SOT-23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.008 grams (approximate)



Top View



Top View
Pin Out



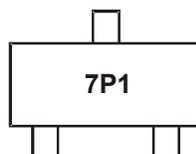
Equivalent Circuit

Ordering Information (Note 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.)

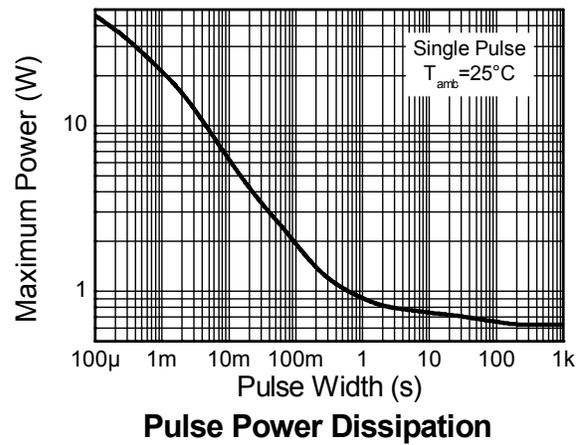
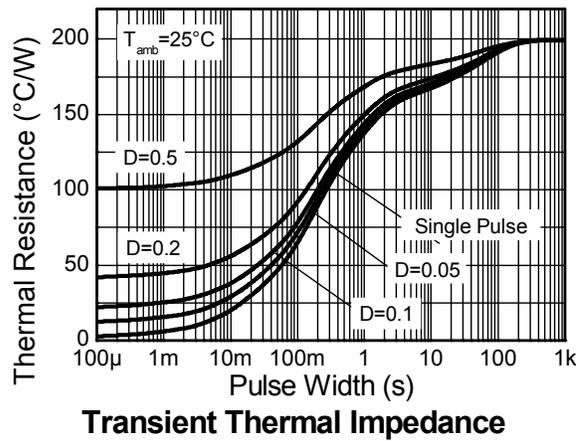
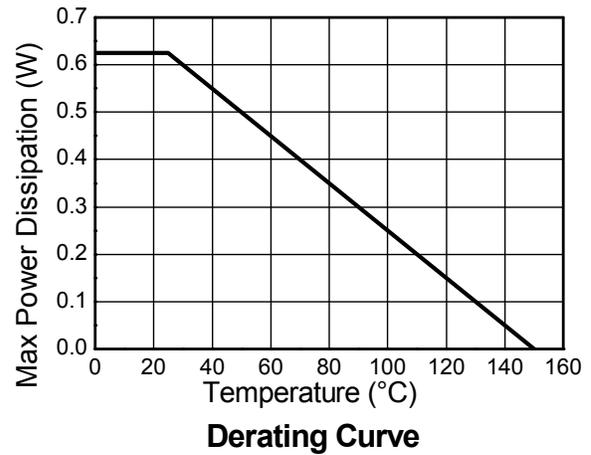
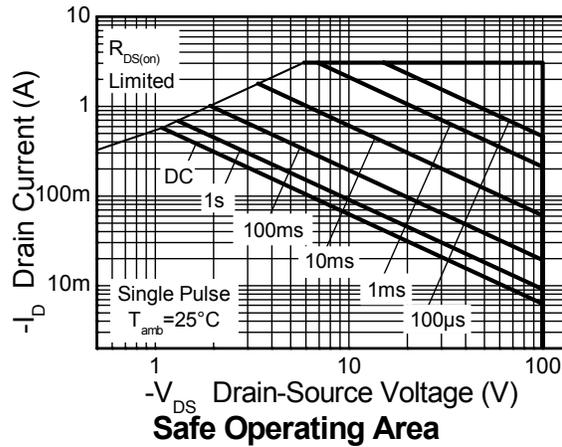
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-100	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	T _A = +70°C (Note 6)	I _D	-0.7	A
		(Note 6)		-0.5	
		(Note 5)		-0.6	
Pulsed Drain Current (Note 7)			I _{DM}	-3.1	A
Continuous Source Current (Body Diode) (Note 6)			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/°C
Power Dissipation (Note 6)	P _D	806	mW
Linear Derating Factor		6.4	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	155	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R _{θJL}	194	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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 ≤ 5 secs.
 7. Repetitive rating 25mm x 25mm FR4 PCB, D=0.05 pulse width=10µs - pulse current limited by maximum junction temperature.
 8. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

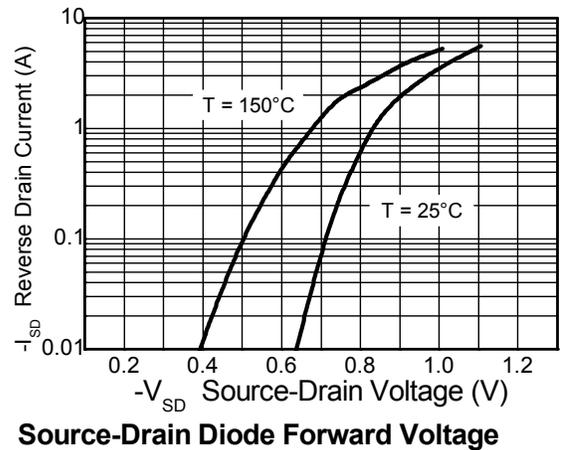
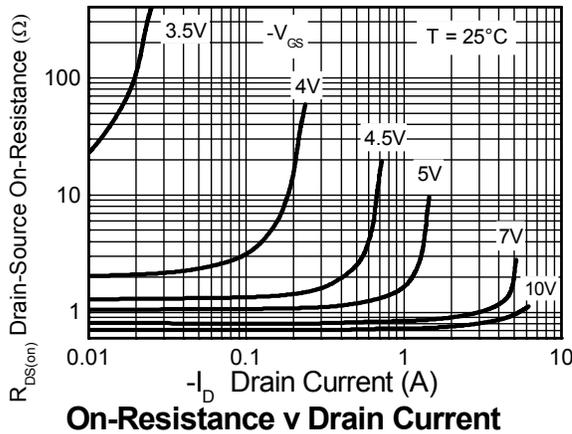
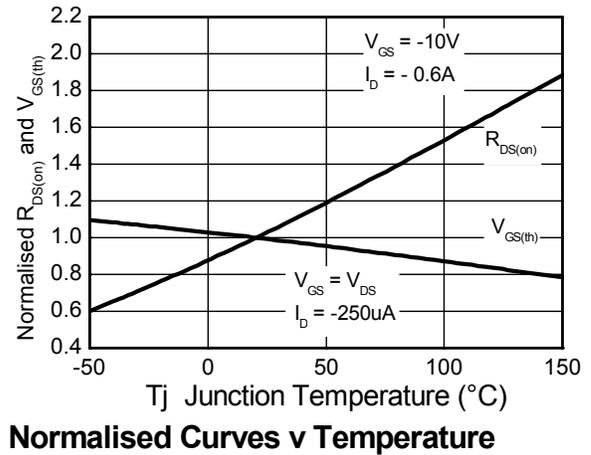
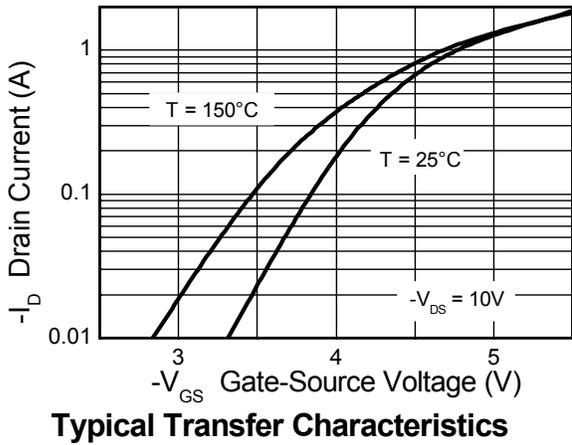
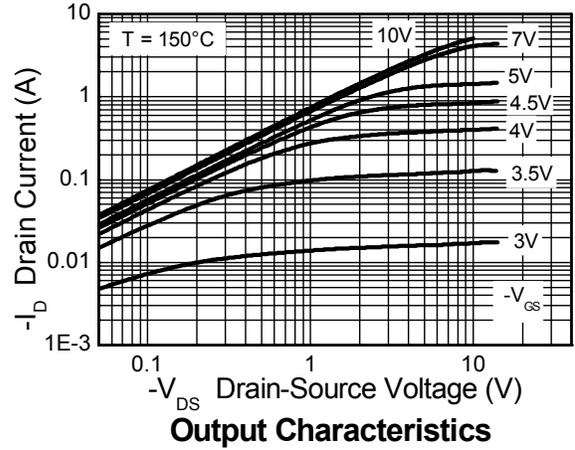
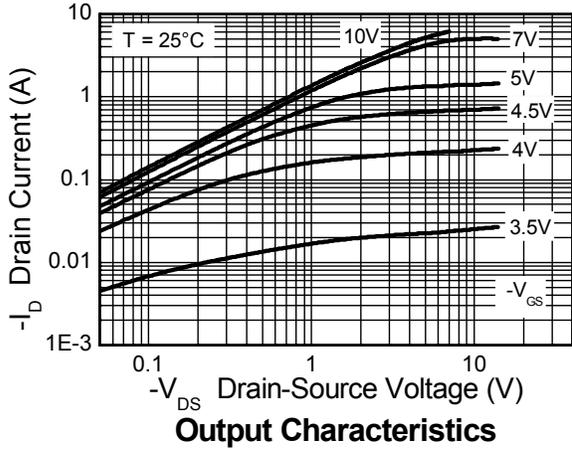


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

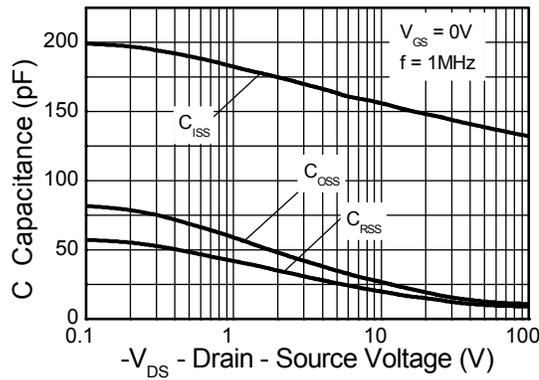
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{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 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 and 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,
Reverse Recovery Charge (Note 11)	Q _{rr}	—	31	—	nC	di/dt = 100A/μs
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.

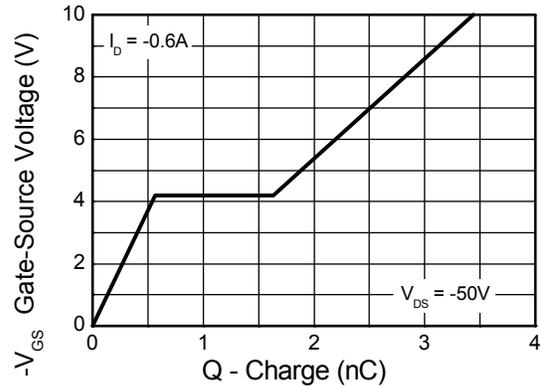
Typical Characteristics



Typical Characteristics (cont.)

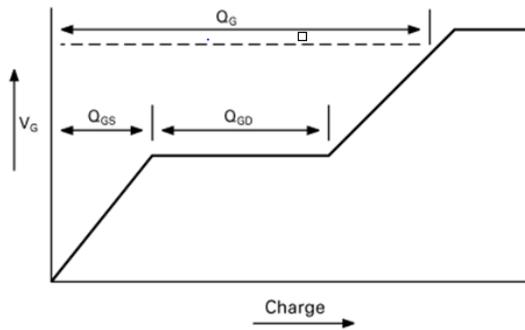


Capacitance v Drain-Source Voltage

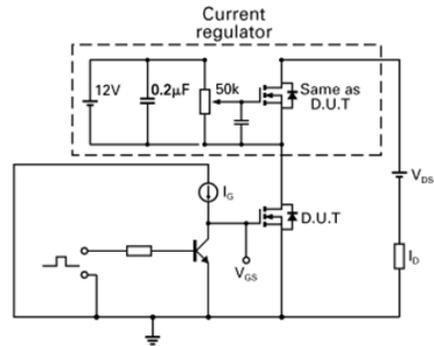


Gate-Source Voltage v Gate Charge

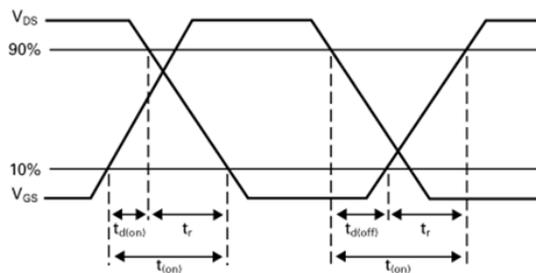
Test Circuits



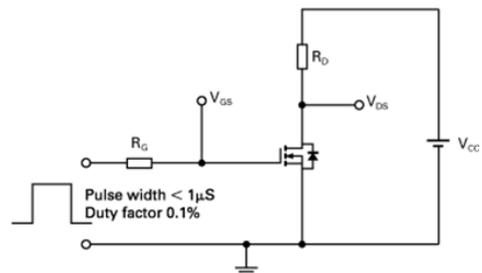
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

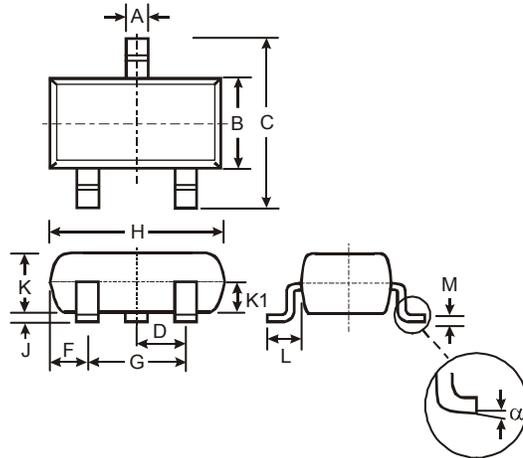


Switching time test circuit

ZXMP10A13F

Package Outline Dimensions

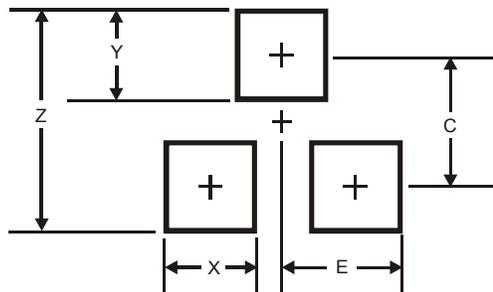
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	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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