

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} = -6V		-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

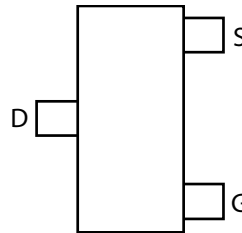
- Fast Switching Speed
- Low Input Capacitance
- Low Gate Charge
- Low Threshold
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

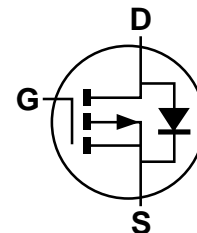
- Case: SOT-23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)



Top View



Top View
Pin Out



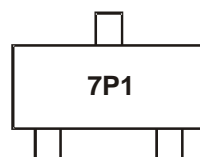
Equivalent Circuit

Ordering Information

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP10A13FTA	7P1	7	8	3000
ZXMP10A13FTC	7P1	13	8	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> 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>.

Marking Information



7P1 = Product Type Marking Code

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

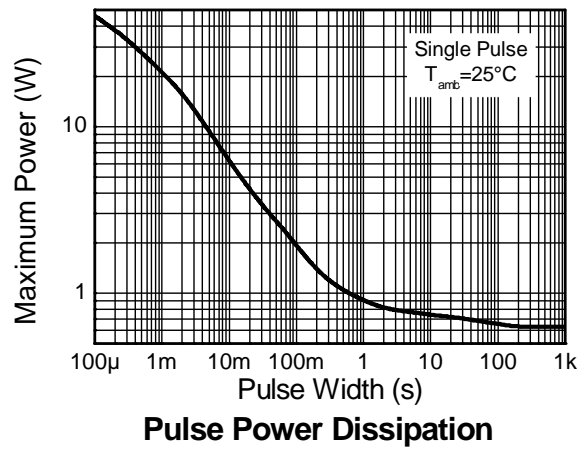
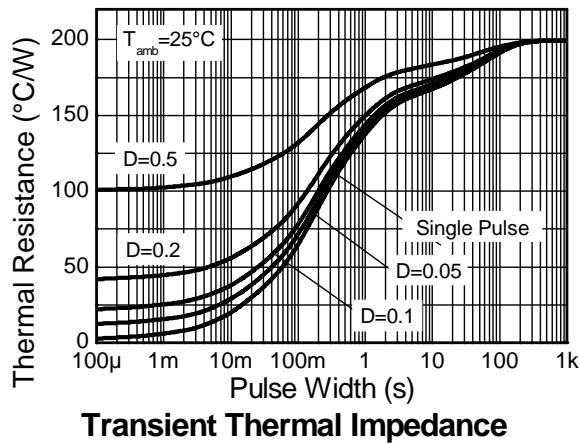
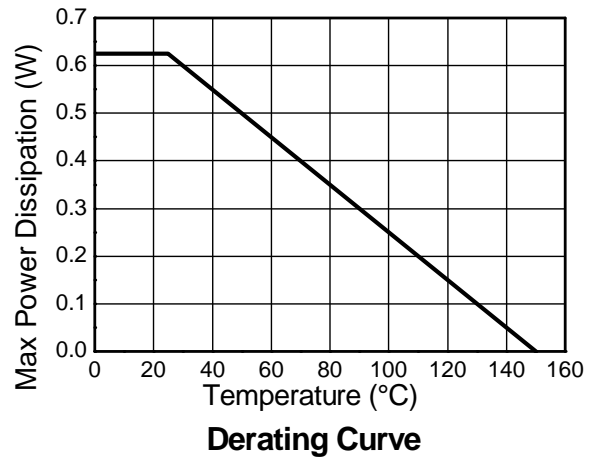
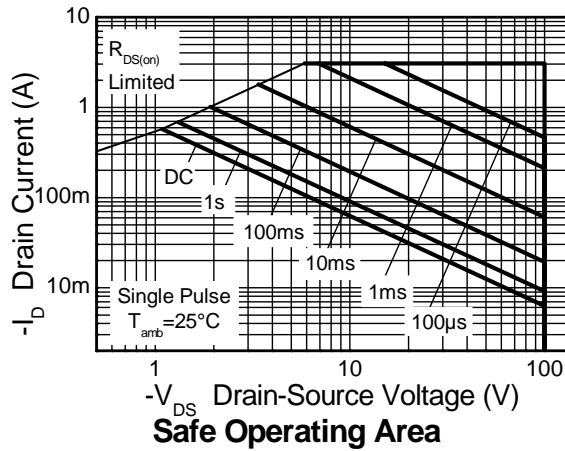
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current	$V_{GS} = 10\text{V}$	$T_A = +70^\circ\text{C}$ (Note 6)	I_D	-0.7	A
		(Note 6)		-0.5	
		(Note 5)		-0.6	
Pulsed Drain Current (Note 7)			I_{DM}	-3.1	A
Continuous Source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

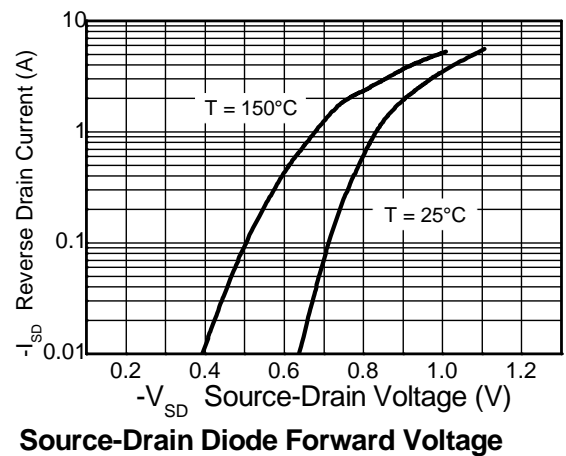
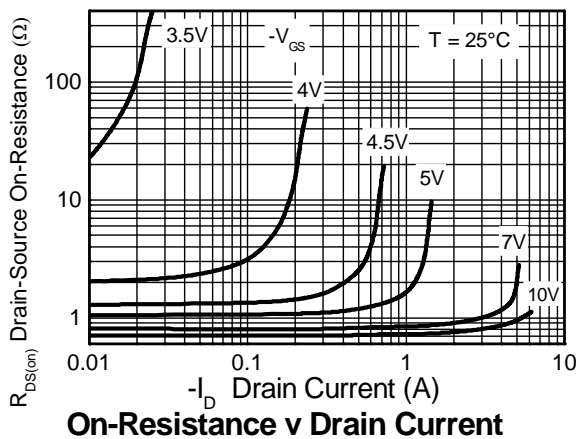
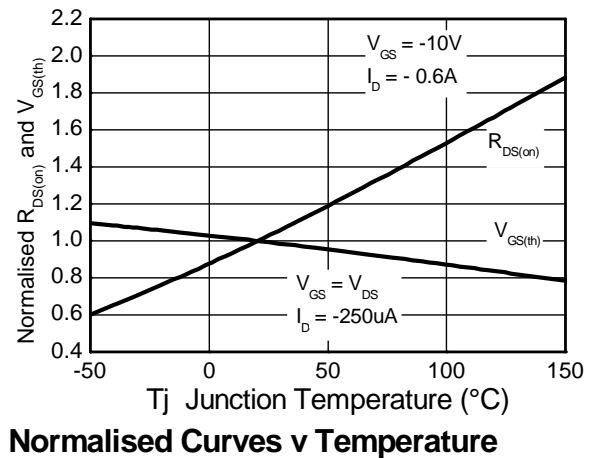
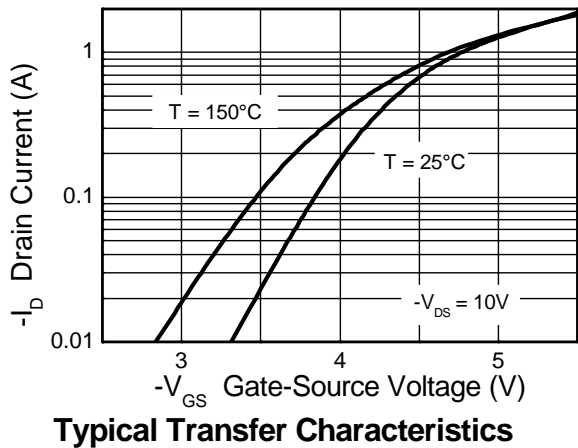
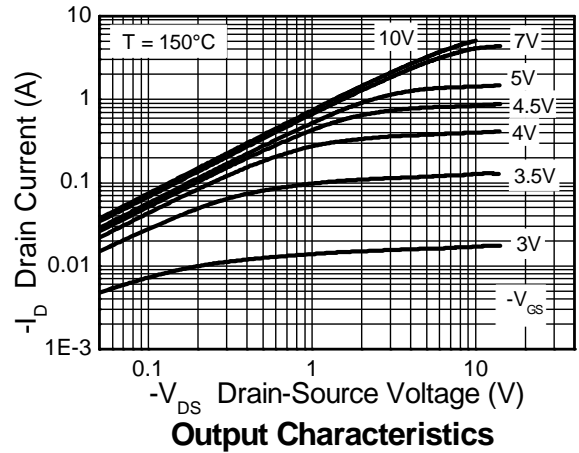
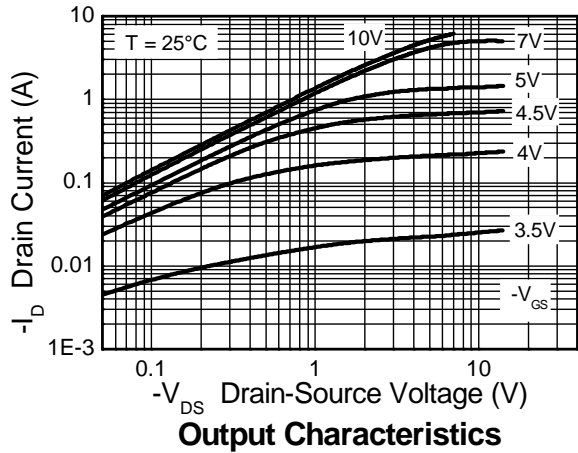


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

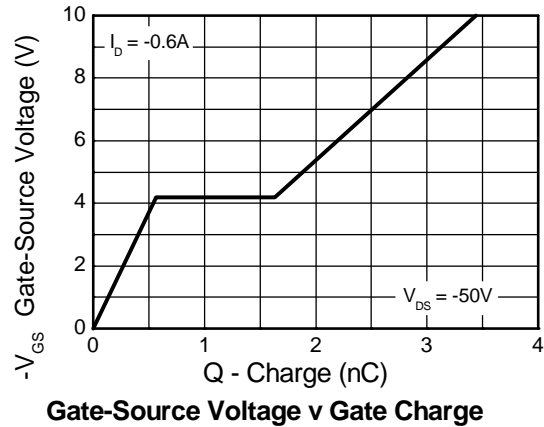
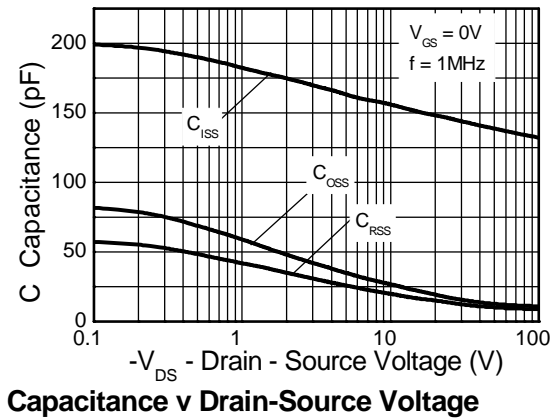
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{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	Ω	V _{GS} = -10V, I _D = -0.6A
				1.45		V _{GS} = -6V, 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 = -1A, 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} = -5V, 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.

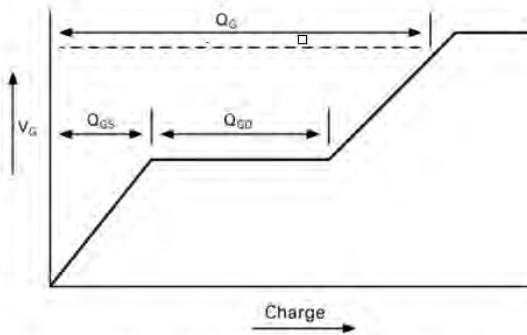
Typical Characteristics



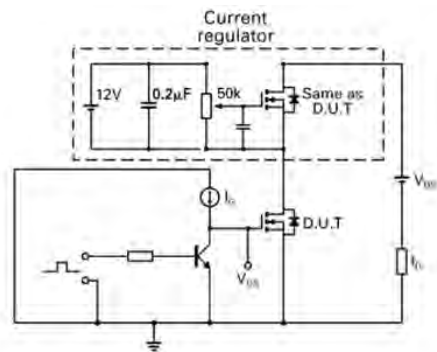
Typical Characteristics (cont.)



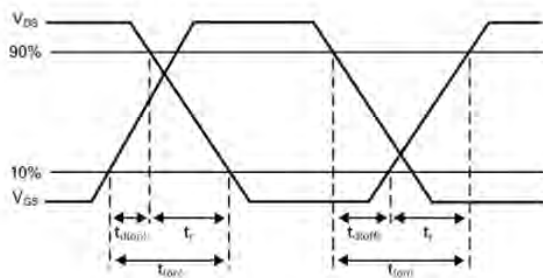
Test Circuits



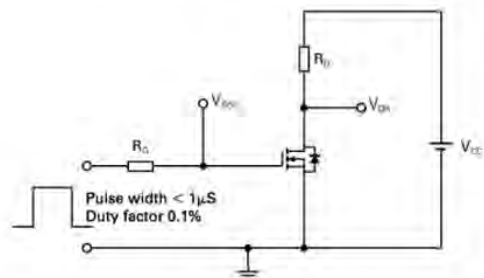
Basic gate charge waveform



Gate charge test circuit



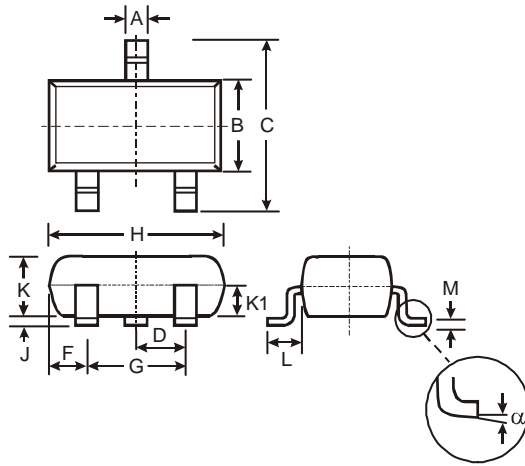
Switching time waveforms



Switching time test circuit

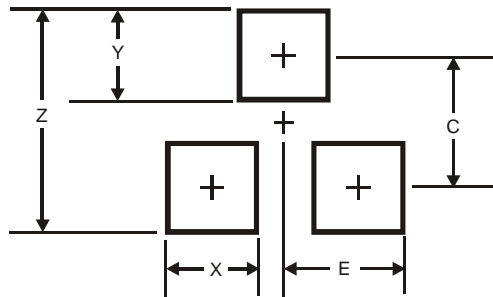
ZXMP10A13F

Package Outline Dimensions



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



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9