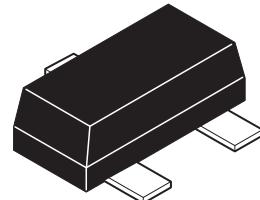


ZXMP2120FF

200V SOT23F P-channel enhancement mode MOSFET

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (mA)
-200	28 @ $V_{GS} = -10V$	-137



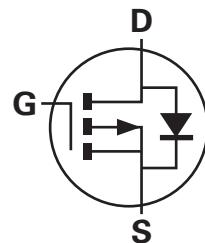
Description

This 200V enhancement mode P-channel MOSFET provides users with a competitive specification offering efficient power handling capability, high impedance and freedom from thermal runaway and thermally induced secondary breakdown.

Applications benefiting from this device include a variety of telecom and general high voltage circuits.

Features

- High voltage
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- SOT23 FLAT package

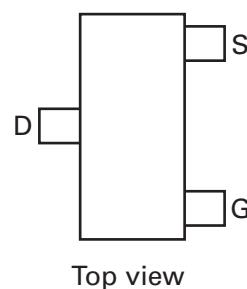


Applications

- Active clamping of primary side MOSFETs in 48 volt DC-DC converters

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP2120FFTA	7	8	3,000



Device marking

1C4

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	-200	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current @ $V_{GS} = 10V$; $T_{amb} = 25^\circ C$ ^(a)	I_D	-137	mA
Pulsed drain current ^(c)	I_{DM}	-0.8	A
Pulsed source current (body diode) ^(c)	I_{SM}	-0.8	A
Power dissipation at $T_{amb} = 25^\circ C$ ^(a)	P_D	1	W
Linear derating factor		8	$mW/^\circ C$
Power dissipation at $T_{amb} = 25^\circ C$ ^(b)	P_D	1.5	W
Linear derating factor		12.3	$mW/^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient ^(a)	$R_{\Theta JA}$	125	$^\circ C/W$
Junction to ambient ^(b)	$R_{\Theta JA}$	81	$^\circ C/W$

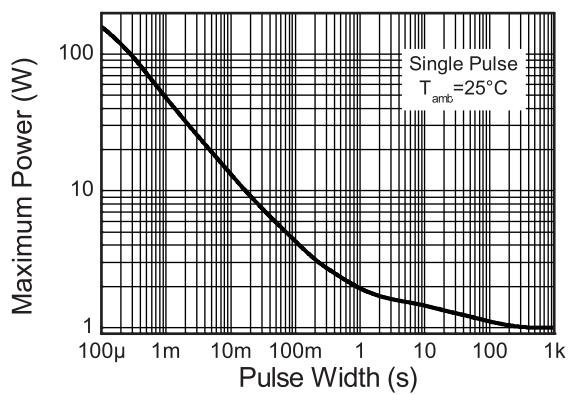
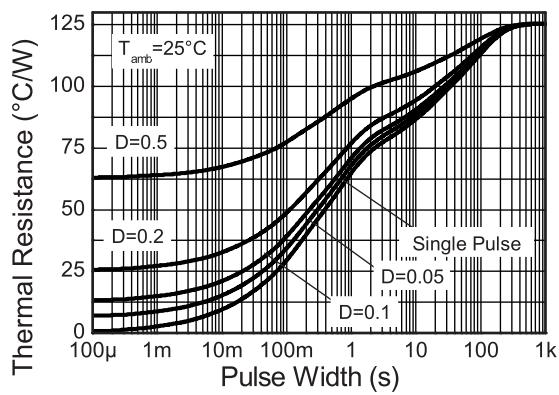
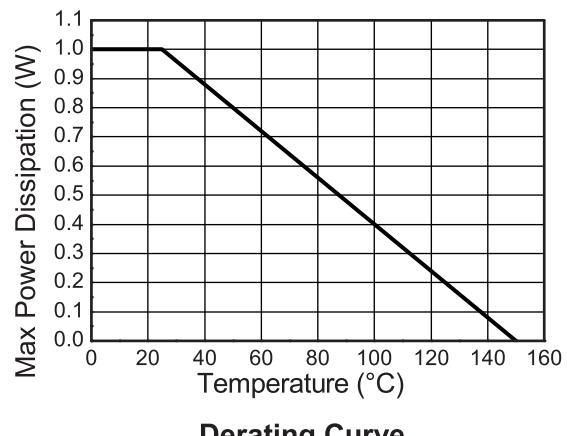
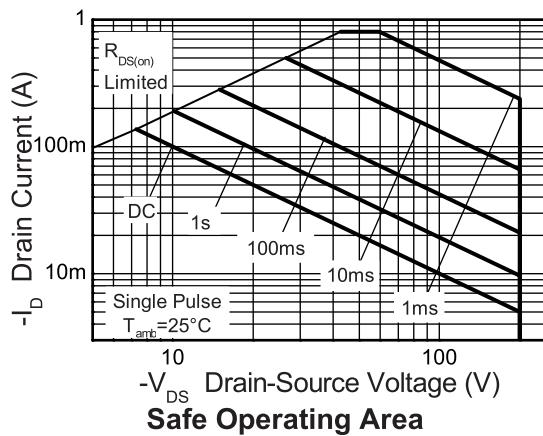
NOTES:

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 pcb measured at $t \leq 5$ sec.

(c) Repetitive rating - 25mm x 25mm FR4 PCB, $D=0.02$, pulse width 300 μ s - pulse width limited by maximum junction temperature.

Thermal characteristics



ZXMP2120FF

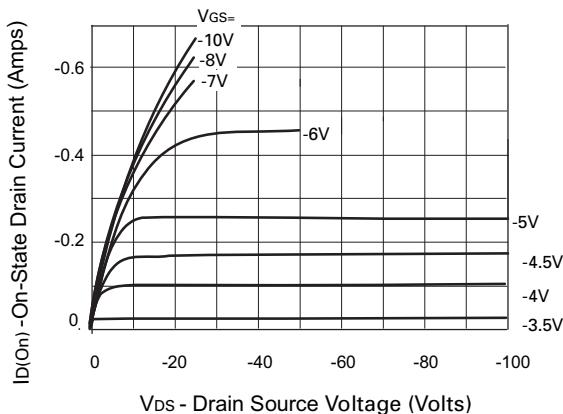
Electrical characteristics (at $T_{amb} = 25^\circ C$ unless otherwise stated)

Parameter	Symbol	Min.	Max.	Unit	Conditions
Static					
Drain-source breakdown voltage	$V_{(BR)DSS}$	-200		V	$I_D = 1\text{mA}$, $V_{GS} = 0\text{V}$
Zero gate voltage drain current	I_{DSS}		-10 -100	μA	$V_{DS} = -200\text{V}$, $V_{GS} = 0\text{V}$ $V_{DS} = -160\text{V}$, $V_{GS} = 0\text{V}$, $T = 125^\circ\text{C}$ ([#])
Gate-body leakage	I_{GSS}		20	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-source threshold voltage	$V_{GS(\text{th})}$	-1.5	-3.5	V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static drain-source on-state resistance (*)	$R_{DS(\text{on})}$		28	Ω	$V_{GS} = -10\text{V}$, $I_D = -150\text{mA}$
On-state drain current(*)	$I_{D(\text{on})}$	-300		mA	$V_{DS} = -25\text{V}$, $V_{GS} = -10\text{V}$
Forward transconductance(*) ([#])	g_{fs}	50		mS	$V_{DS} = -25\text{V}$, $I_D = -150\text{mA}$
Dynamic([#])					
Input capacitance	C_{iss}		100	pF	$V_{DS} = -25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output capacitance	C_{oss}		25	pF	
Reverse transfer capacitance	C_{rss}		7	pF	
Switching ([†]) ([#])					
Turn-on-delay time	$t_{d(on)}$		7	ns	$V_{DD} = -25\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -150\text{mA}$ $R_{\text{SOURCE}} \approx 50\Omega$
Rise time	t_r		15	ns	
Turn-off delay time	$t_{d(off)}$		12	ns	
Fall time	t_f		15	ns	

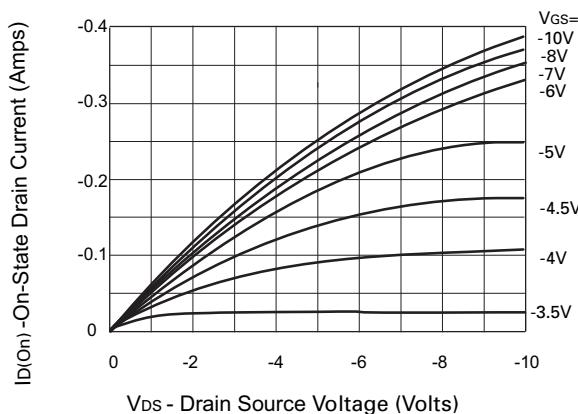
NOTES:

- (*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- (†) Switching characteristics are independent of operating junction temperature.
- ([#]) For design aid only, not subject to production testing.

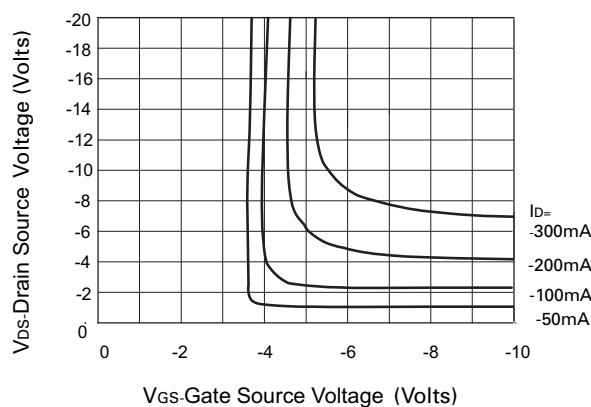
Typical characteristics



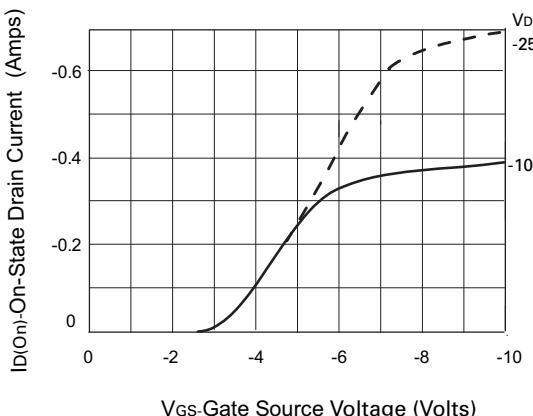
Output Characteristics



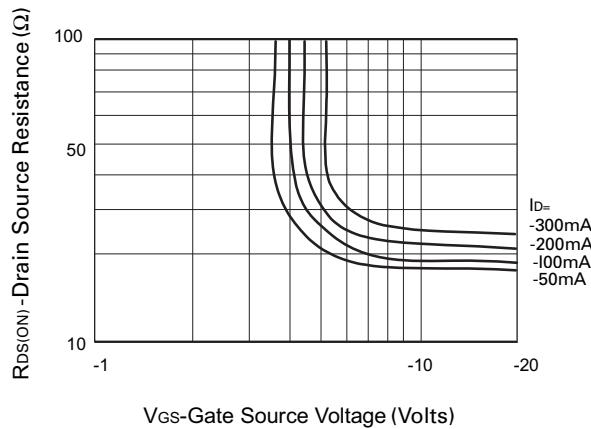
Saturation Characteristics



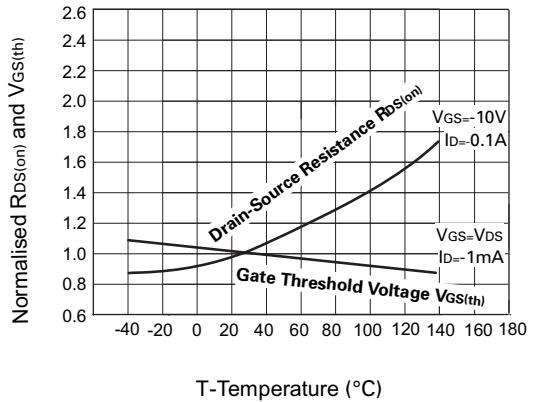
Voltage Saturation Characteristics



Transfer Characteristics

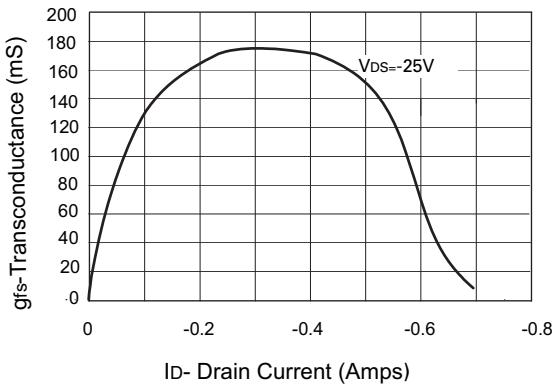


On-resistance vs gate-source voltage

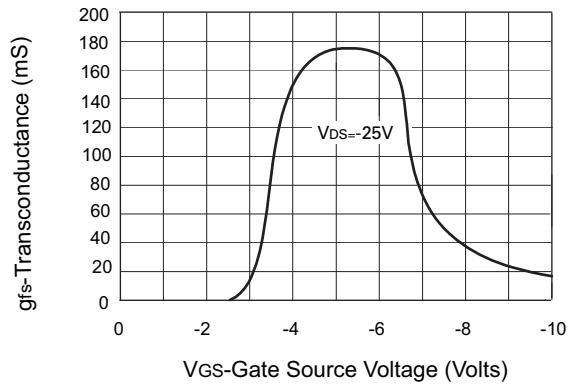


Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature

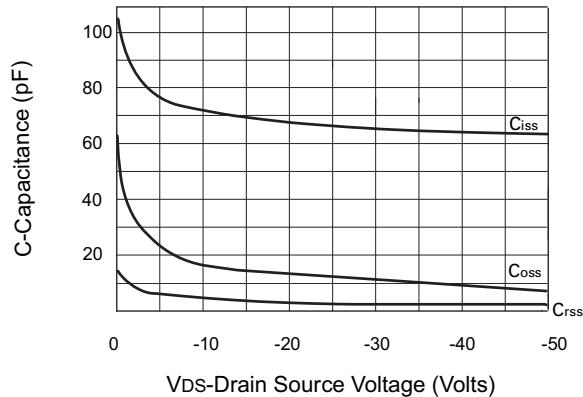
Typical characteristics



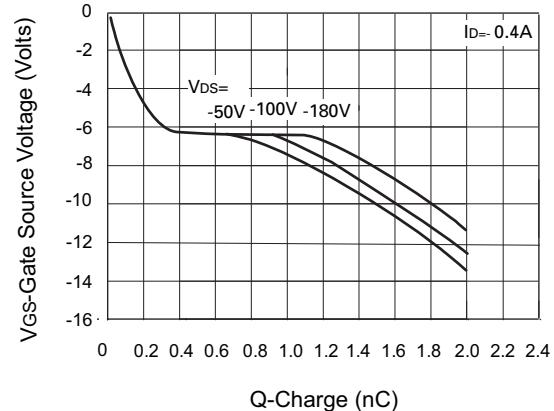
Transconductance v drain current



Transconductance v gate-source voltage

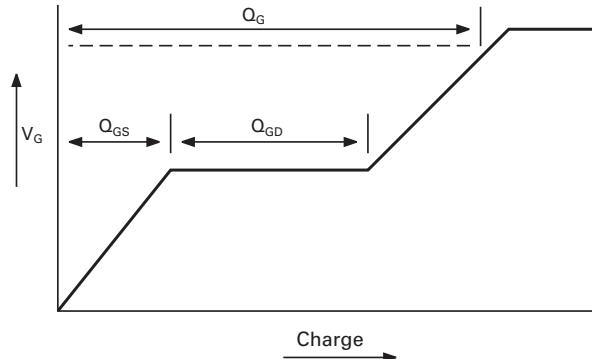


Capacitance v drain-source voltage

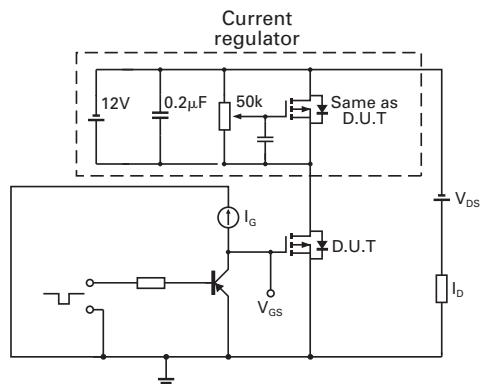


Gate charge v gate-source voltage

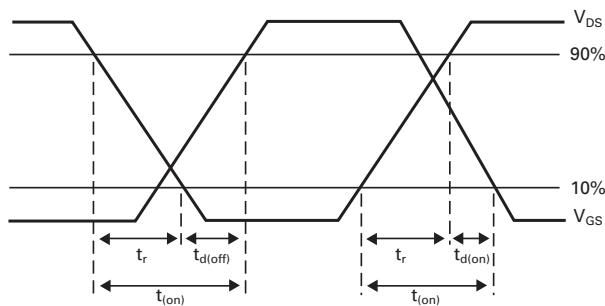
Typical characteristics



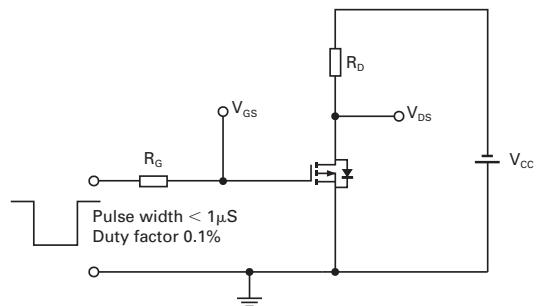
Basic gate charge waveform



Gate charge test circuit



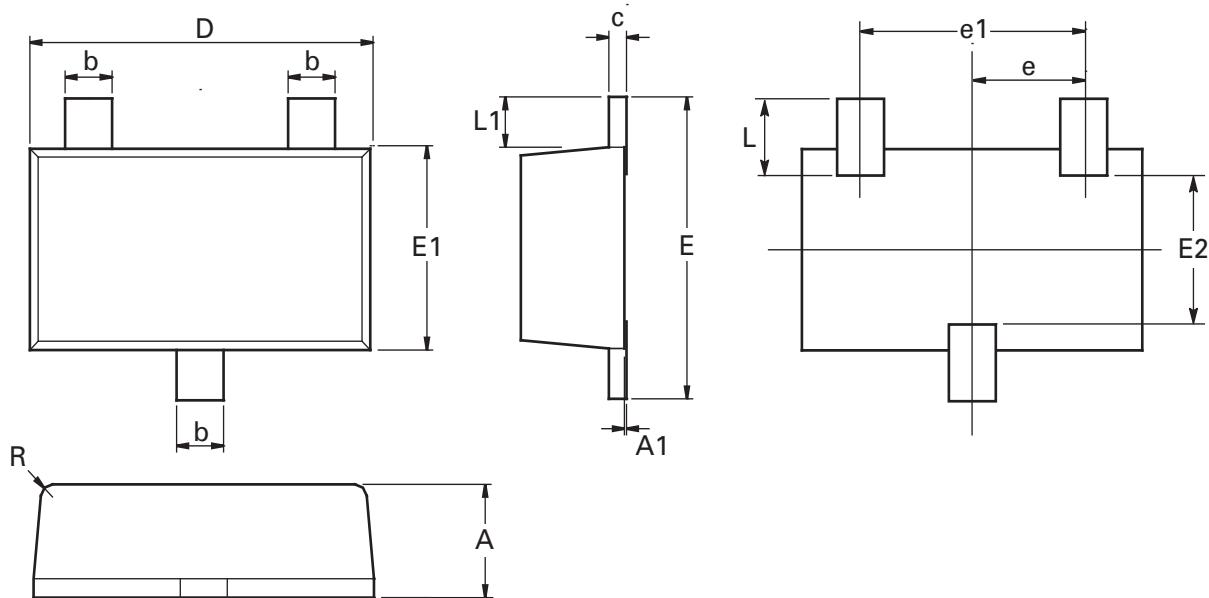
Switching time waveforms



Switching time test circuit

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Package outline - SOT23F



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	0.80	1.00	0.0315	0.0394	E	2.30	2.50	0.0906	0.0984
A1	0.00	0.10	0.00	0.0043	E1	1.50	1.70	0.0590	0.0669
b	0.35	0.45	0.0153	0.0161	E2	1.10	1.26	0.0433	0.0496
c	0.10	0.20	0.0043	0.0079	L	0.48	0.68	0.0189	0.0268
D	2.80	3.00	0.1102	0.1181	L1	0.30	0.50	0.0153	0.0161
e	0.95 ref		0.0374 ref		R	0.05	0.15	0.0019	0.0059
e1	1.80	2.00	0.0709	0.0787	O	0°	12°	0°	12°

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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Zetex sales offices

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

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