

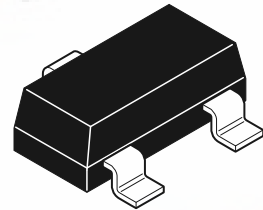


ZXMN2B14FH

20V SOT23 N-channel enhancement mode MOSFET with low gate drive capability

Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.055 @ $V_{GS} = 4.5V$	4.3
	0.075 @ $V_{GS} = 2.5V$	3.7
	0.100 @ $V_{GS} = 1.8V$	3.2



Description

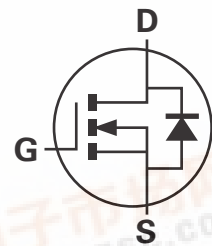
This new generation of trench MOSFETs from Zetex features low on-resistance achievable with low gate drive.

Features

- Low on-resistance
- Fast switching speed
- Low gate drive capability
- SOT23 package

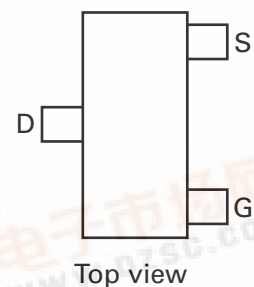
Applications

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control



Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2B14FHTA	7	8	3,000



Device marking

2B4

ZXMN2B14FH

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DSS}	20	V
Gate-source voltage	V_{GS}	± 8	V
Continuous drain current @ $V_{GS} = 4.5V$; $T_{amb} = 25^{\circ}C$ (b) @ $V_{GS} = 4.5V$; $T_{amb} = 70^{\circ}C$ (b) @ $V_{GS} = 4.5V$; $T_{amb} = 25^{\circ}C$ (a)	I_D	4.3 3.5 3.5	A
Pulsed drain current (c)	I_{DM}	21	A
Continuous source current (body diode) (b)	I_S	2.4	A
Pulsed source current (body diode) (c)	I_{SM}	21	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	mW/ $^{\circ}C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^{\circ}C$

Thermal resistance

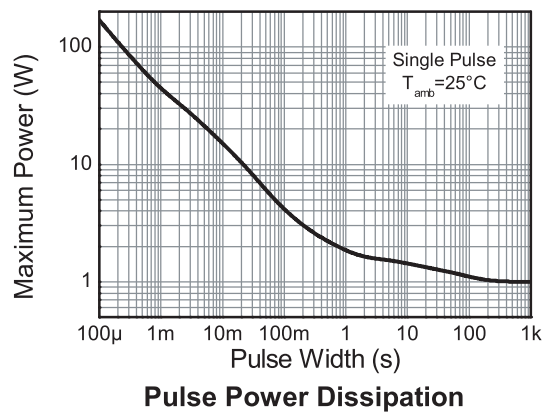
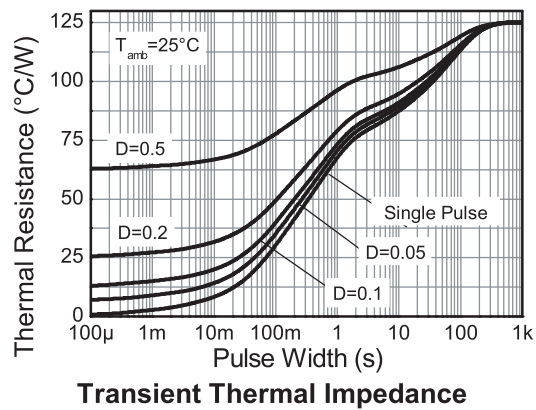
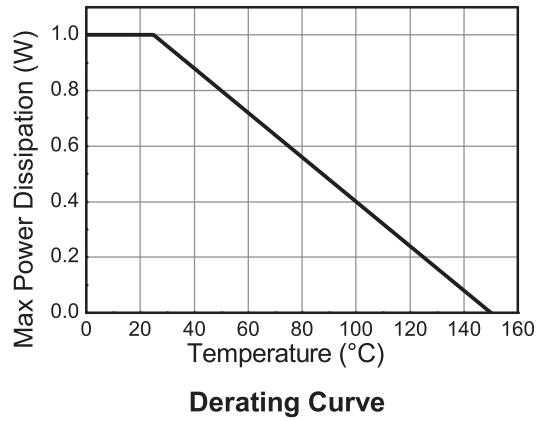
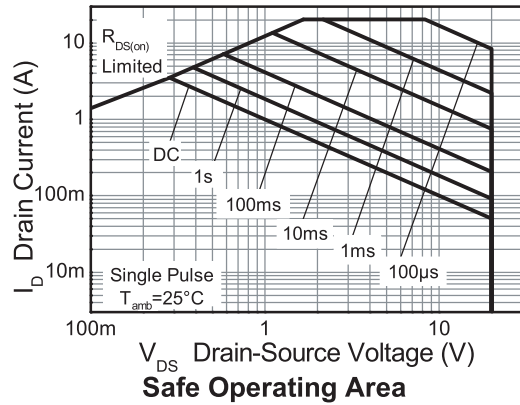
Parameter	Symbol	Limit	Unit
Junction to ambient	$R_{\theta JA}$	125	$^{\circ}C/W$
Junction to ambient	$R_{\theta JA}$	82	$^{\circ}C/W$

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 μs - pulse width limited by maximum junction temperature.

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Thermal characteristics



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	V _{(BR)DSS}	20			V	I _D = 250μA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}			1	μA	V _{DS} = 20V, V _{GS} =0V
Gate-body leakage	I _{GSS}			100	nA	V _{GS} =±8V, V _{DS} =0V
Gate-source threshold voltage	V _{GS(th)}	0.4		1.0	V	I _D = 250μA, V _{DS} =V _{GS}
Static drain-source on-state resistance ^(*)	R _{DS(on)}			0.055	Ω	V _{GS} = 4.5V, I _D = 3.5A
				0.075	Ω	V _{GS} = 2.5V, I _D = 3A
				0.100	Ω	V _{GS} = 1.8V, I _D = 2.6A
Forward transconductance ^(*) (‡)	g _{fs}		11		S	V _{DS} = 10V, I _D = 3.5A
Dynamic ^(‡)						
Input capacitance	C _{iSS}		872		pF	V _{DS} = 10V, V _{GS} =0V f=1MHz
Output capacitance	C _{oSS}		145		pF	
Reverse transfer capacitance	C _{rSS}		90		pF	
Switching ^(†) (‡)						
Turn-on-delay time	t _{d(on)}		3.7		ns	V _{DD} = 10V, V _{GS} = 4.5V I _D = 1A R _G ≈ 6.0Ω
Rise time	t _r		5.2		ns	
Turn-off delay time	t _{d(off)}		30		ns	
Fall time	t _f		5.5		ns	
Total gate charge	Q _g		11		nC	V _{DS} = 10V, V _{GS} = 4.5V I _D = 4.0A
Gate-source charge	Q _{gs}		1.4		nC	
Gate drain charge	Q _{gd}		2.1		nC	
Source-drain diode						
Diode forward voltage ^(*)	V _{SD}		0.69	0.95	V	T _j =25°C, I _S = 1.45A, V _{GS} =0V
Reverse recovery time ^(‡)	t _{rr}		9.4		ns	T _j =25°C, I _F = 2.4A, di/dt=100A/μs
Reverse recovery charge ^(‡)	Q _{rr}		2.8		nC	

NOTES:

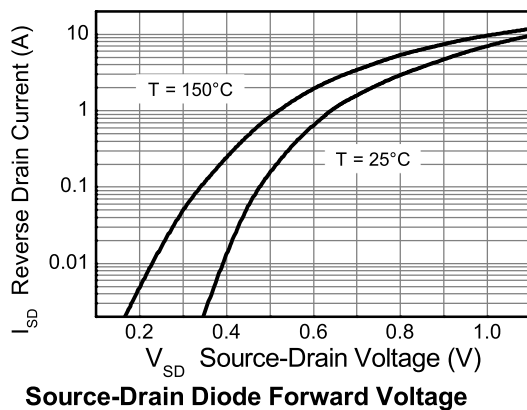
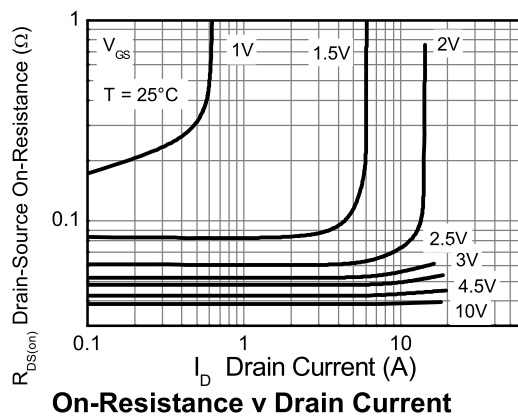
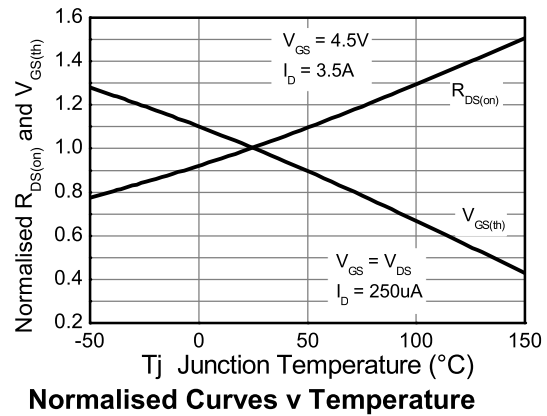
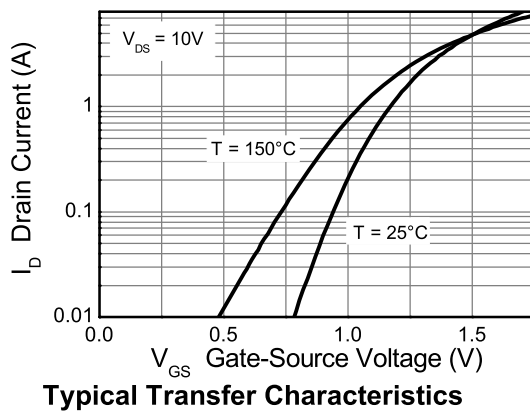
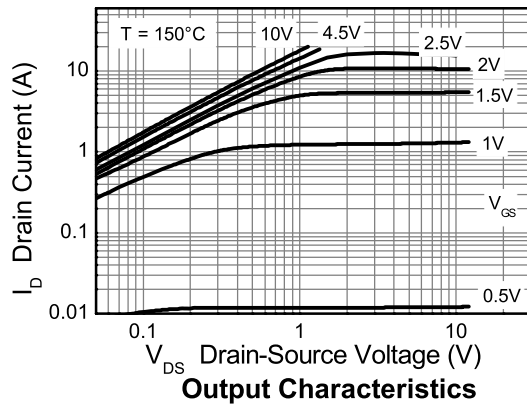
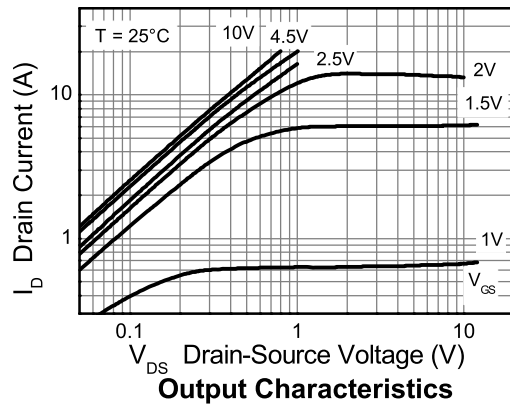
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

(†) Switching characteristics are independent of operating junction temperature.

(‡) For design aid only, not subject to production testing.

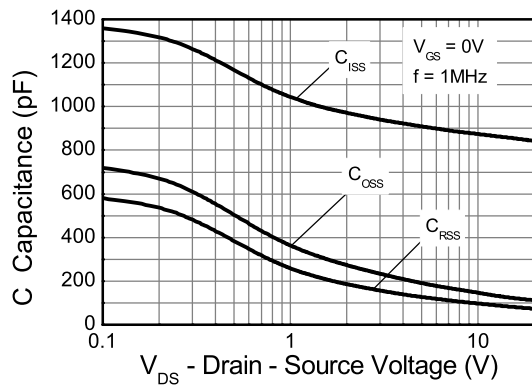
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Typical characteristics

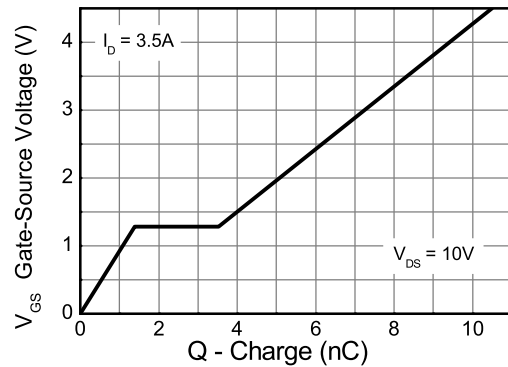


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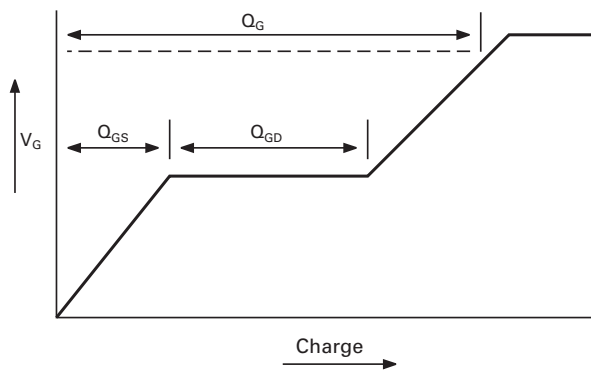
Typical characteristics



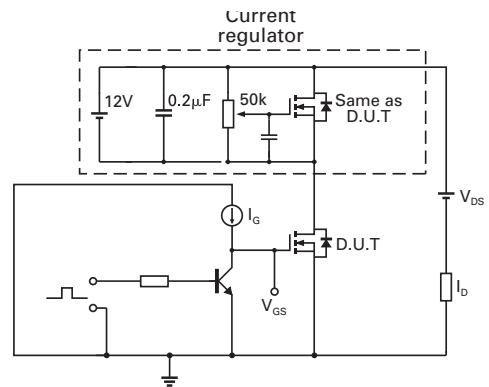
Capacitance v Drain-Source Voltage



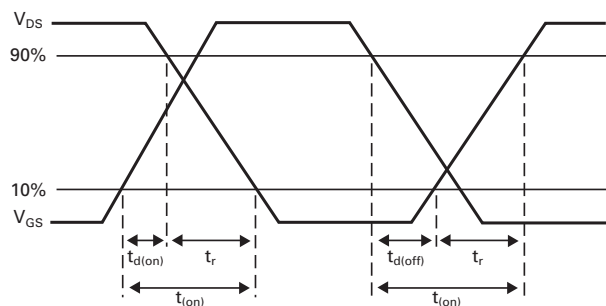
Gate-Source Voltage v Gate Charge



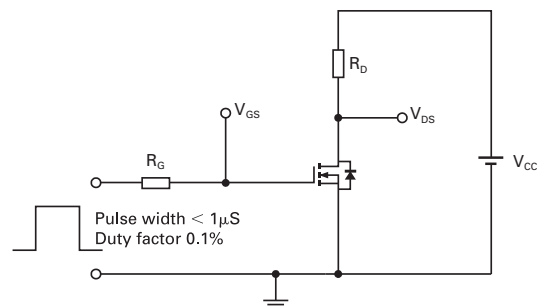
Basic gate charge waveform



Gate charge test circuit



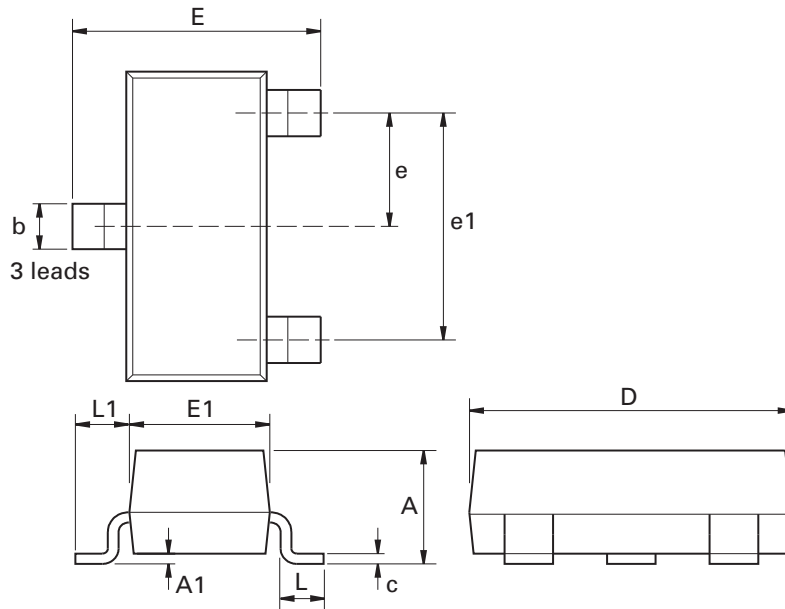
Switching time waveforms



Switching time test circuit

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Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
C	0.085	0.120	0.003	0.008	L	0.25	0.62	0.018	0.024
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.0375 NOM		-	-	-	-	-

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

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