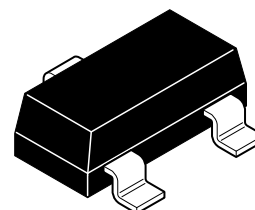


# ZXMN2B14FH

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

### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (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

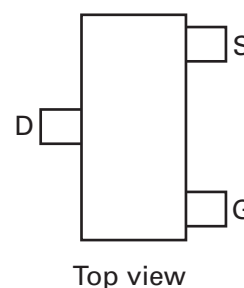
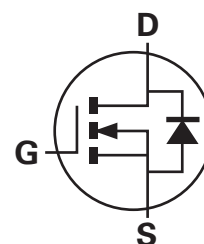
- Low on-resistance
- Fast switching speed
- Low gate drive capability
- SOT23 package

### 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	$V_{GS}$	$\pm 8$	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

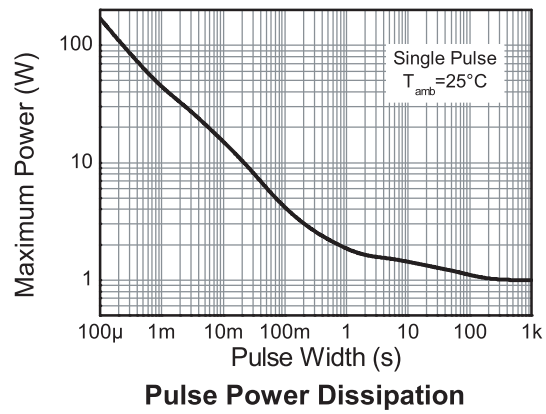
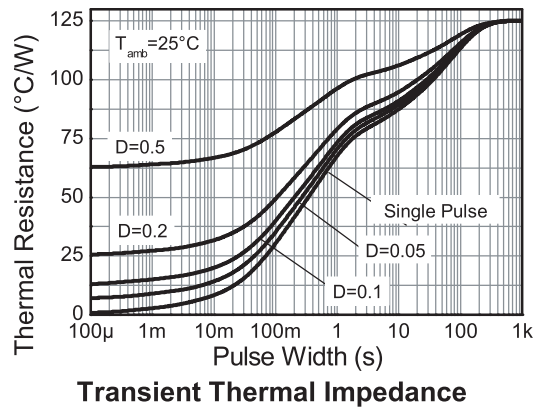
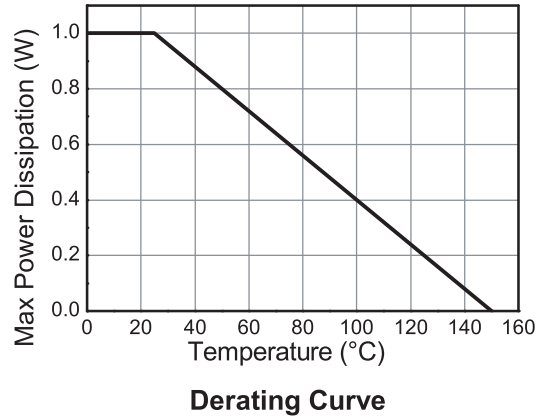
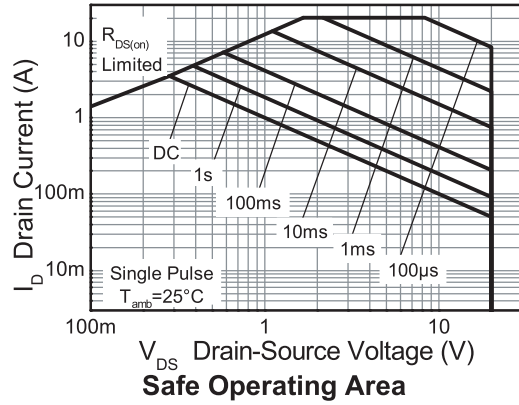
Parameter	Symbol	Limit	Unit
Junction to ambient	$R_{\theta JA}$	125	$^{\circ}C/W$
Junction to ambient	$R_{\theta JA}$	82	$^{\circ}C/W$

### 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 $\mu s$  - pulse width limited by maximum junction temperature.

# ZXMN2B14FH

## Thermal characteristics



# ZXMN2B14FH

## 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 <sub>(BR)DSS</sub>	20			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>			1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V
Gate-body leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V
Gate-source threshold voltage	V <sub>GS(th)</sub>	0.4		1.0	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> =V <sub>GS</sub>
Static drain-source on-state resistance (*)	R <sub>DS(on)</sub>			0.055	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.5A
				0.075	Ω	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3A
				0.100	Ω	V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 2.6A
Forward transconductance(*) (‡)	g <sub>fs</sub>		11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.5A
Dynamic(‡)						
Input capacitance	C <sub>iss</sub>		872		pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> =0V f=1MHz
Output capacitance	C <sub>oss</sub>		145		pF	
Reverse transfer capacitance	C <sub>rss</sub>		90		pF	
Switching (†) (‡)						
Turn-on-delay time	t <sub>d(on)</sub>		3.7		ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 1A R <sub>G</sub> ≈ 6.0Ω
Rise time	t <sub>r</sub>		5.2		ns	
Turn-off delay time	t <sub>d(off)</sub>		30		ns	
Fall time	t <sub>f</sub>		5.5		ns	
Total gate charge	Q <sub>g</sub>		11		nC	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 4.0A
Gate-source charge	Q <sub>gs</sub>		1.4		nC	
Gate drain charge	Q <sub>gd</sub>		2.1		nC	
Source-drain diode						
Diode forward voltage(*)	V <sub>SD</sub>		0.69	0.95	V	T <sub>j</sub> =25°C, I <sub>S</sub> = 1.45A, V <sub>GS</sub> =0V
Reverse recovery time(‡)	t <sub>rr</sub>		9.4		ns	T <sub>j</sub> =25°C, I <sub>F</sub> = 2.4A, di/dt=100A/μs
Reverse recovery charge(‡)	Q <sub>rr</sub>		2.8		nC	

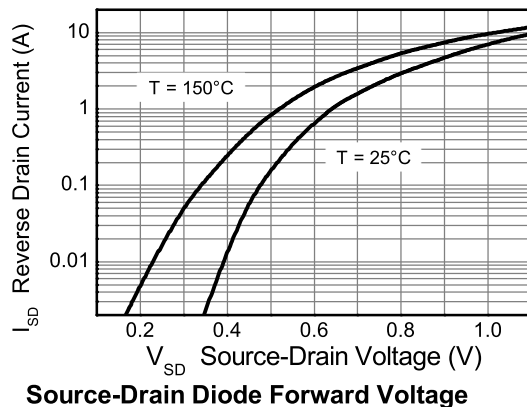
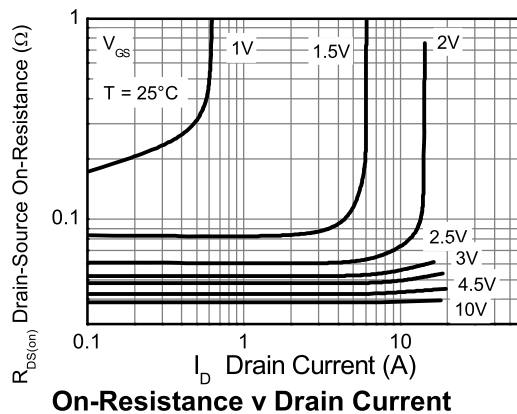
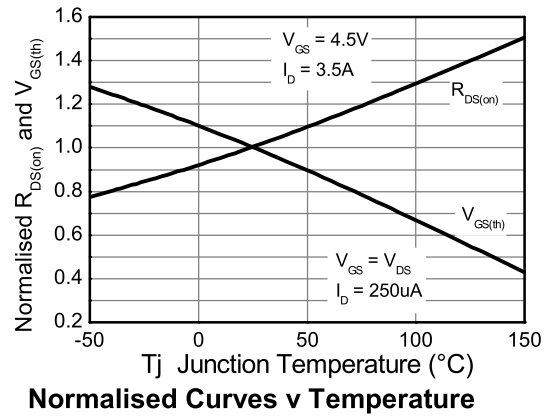
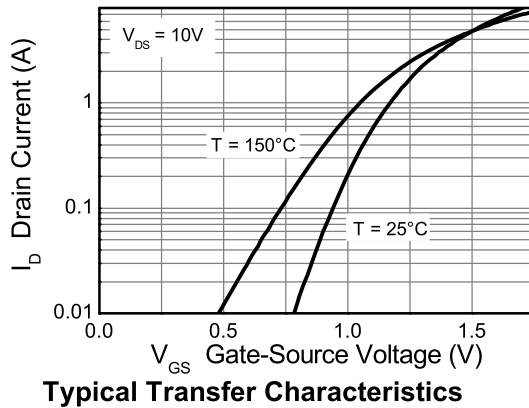
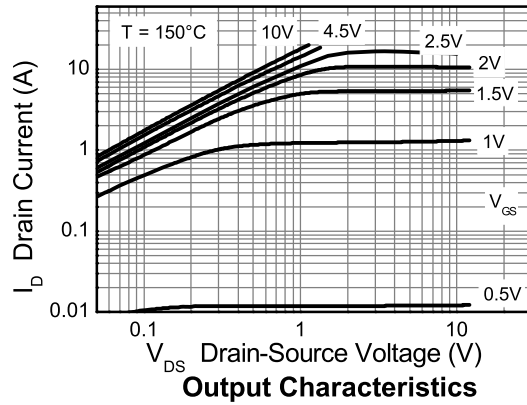
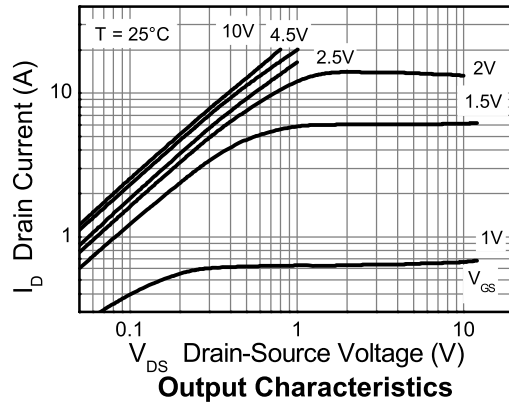
### NOTES:

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

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

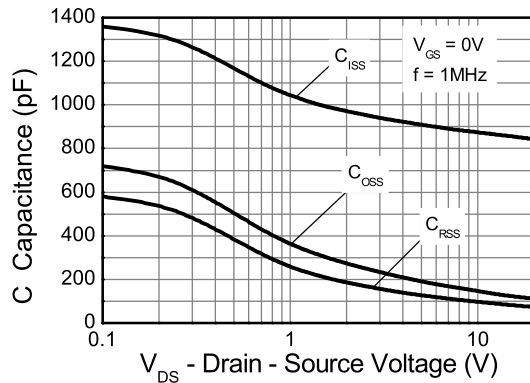
(‡) For design aid only, not subject to production testing.

## Typical characteristics

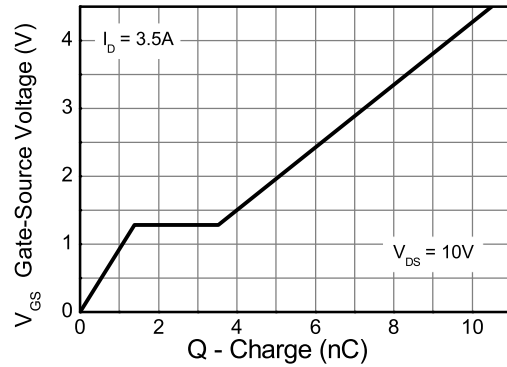


# ZXMN2B14FH

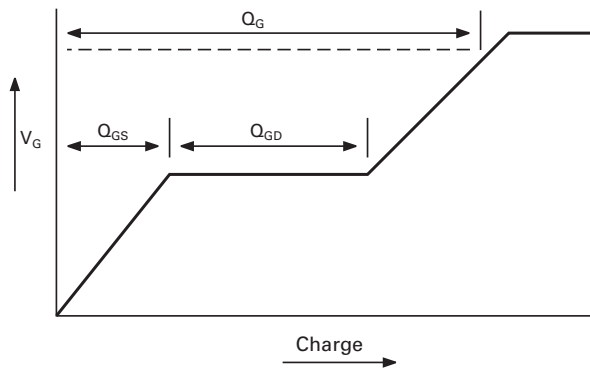
## Typical characteristics



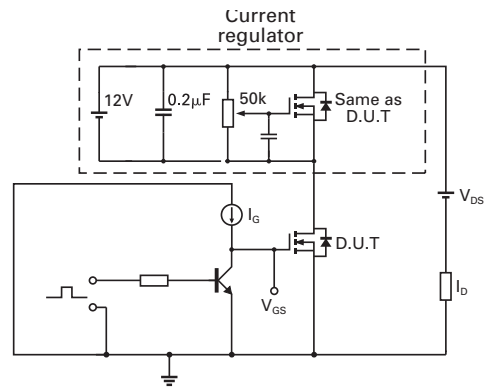
Capacitance v Drain-Source Voltage



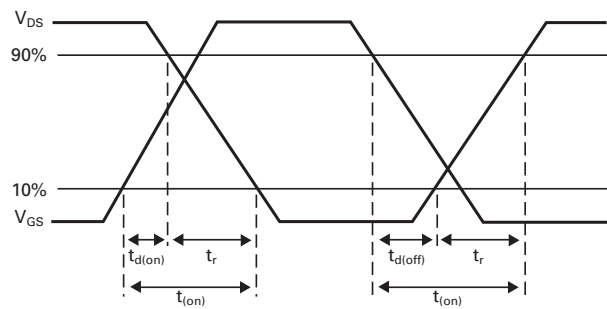
Gate-Source Voltage v Gate Charge



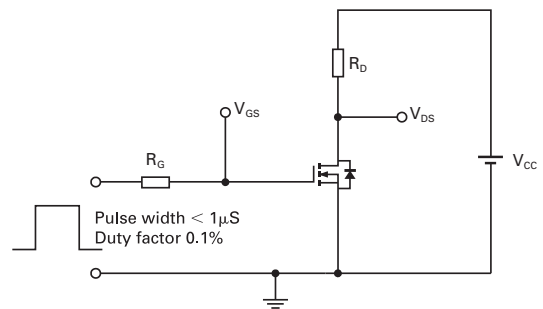
Basic gate charge waveform



Gate charge test circuit



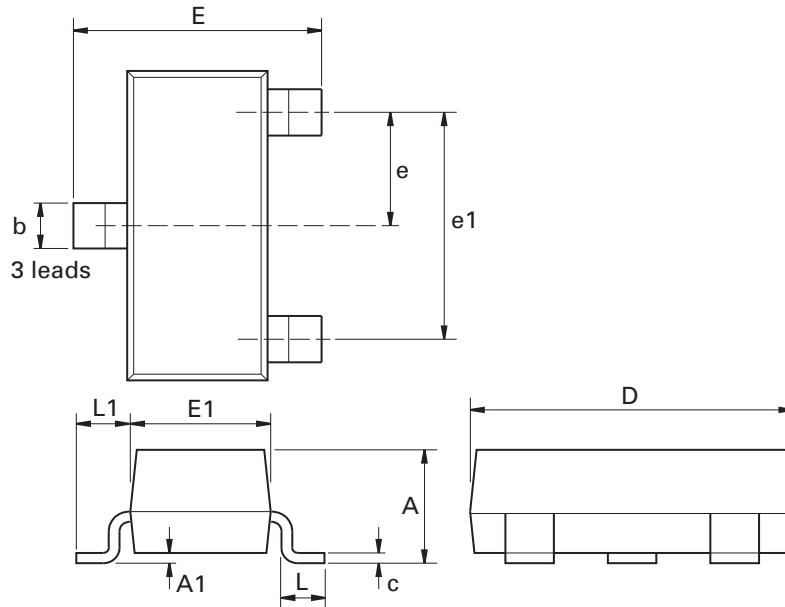
Switching time waveforms



Switching time test circuit

# ZXMN2B14FH

## 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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