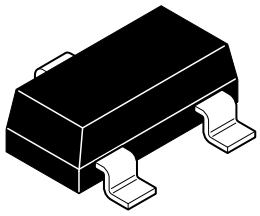
ZXMN2B01F
20V SOT23 N-channel enhancement mode MOSFET with low gate drive capability

Summary

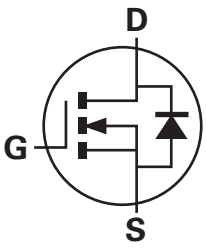


$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.100 @ V_{GS}= 4.5V	2.4
	0.150 @ V_{GS}= 2.5V	2.0
	0.200 @ V_{GS}= 1.8V	1.7

Description

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

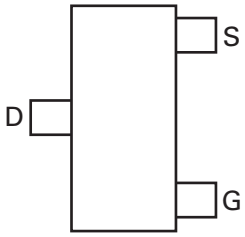
Features



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

Applications

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



Top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2B01FTA	7	8	3,000

Device marking

2B1

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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°C(b)	I_D	2.4	A
	@ V_{GS}= 4.5V; T_{amb}=70°C(b)		1.9	A
	@ V_{GS}= 4.5V; T_{amb}=25°C(a)		2.1	A
Pulsed drain current(c)		I_{DM}	11.8	A
Continuous source current (body diode)(b)		I_S	1.4	A
Pulsed source current (body diode)(c)		I_{SM}	11.8	A
Power dissipation at T_{amb} =25°C(a)		P_D	625	mW
Linear derating factor			5	mW/°C
Power dissipation at T_{amb} =25°C(b)		P_D	806	mW
Linear derating factor			6.4	mW/°C
Operating and storage temperature range		T_j, T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient(a)	$R_{\Theta JA}$	200	°C/W
Junction to ambient(b)	$R_{\Theta JA}$	155	°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 ≤5 sec.

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

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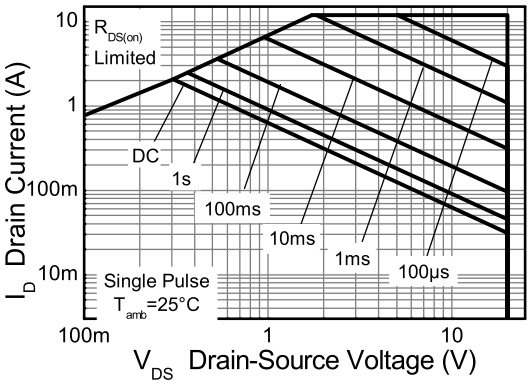
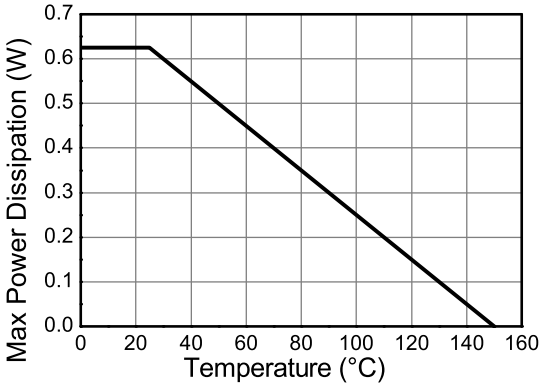
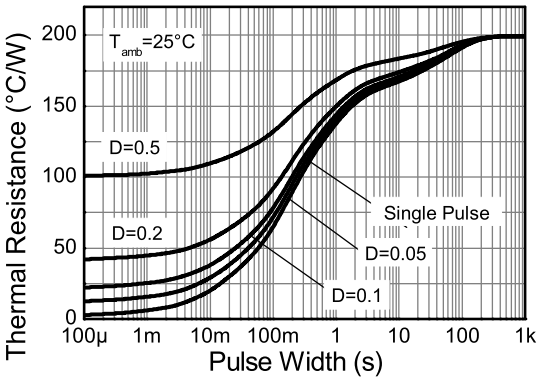
Thermal characteristics



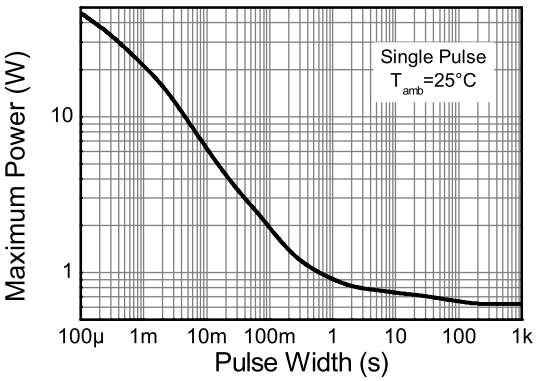
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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Electrical characteristics (at T_{amb} = 25°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 (*)	$R_{DS(on)}$			0.100	Ω	V_{GS}= 4.5V, I_D= 2.4A
				0.150	Ω	V_{GS}= 2.5V, I_D= 2.0A
				0.200	Ω	V_{GS}= 1.8V, I_D= 1.7A
Forward transconductance(*)(‡)	g_{fs}		6.1		S	V_{DS}= 10V, I_D= 2.4A
Dynamic(‡)						
Input capacitance	C_{iss}		370		pF	V_{DS}= 10V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		81		pF	
Reverse transfer capacitance	C_{rss}		46		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		2.2		ns	V_{DD}= 10V, V_{GS}= 4.5V I_D= 1A $R_G \approx 6.0\Omega$
Rise time	t_r		3.6		ns	
Turn-off delay time	$t_{d(off)}$		17.8		ns	
Fall time	t_f		10.5		ns	
Total gate charge	Q_g		4.8		nC	V_{DS}= 10V, V_{GS}= 4.5V I_D= 2.4A
Gate-source charge	Q_{gs}		0.6		nC	
Gate drain charge	Q_{gd}		1.0		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.73	0.95	V	T_j=25°C, I_S= 1.2A, V_{GS}=0V
Reverse recovery time(‡)	t_{rr}		6.7		ns	T_j=25°C, I_F= 1.1A, di/dt=100A/ms
Reverse recovery charge(‡)	Q_{rr}		1.3		nC	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.
(†) Switching characteristics are independent of operating junction temperature.
(‡) For design aid only, not subject to production testing.

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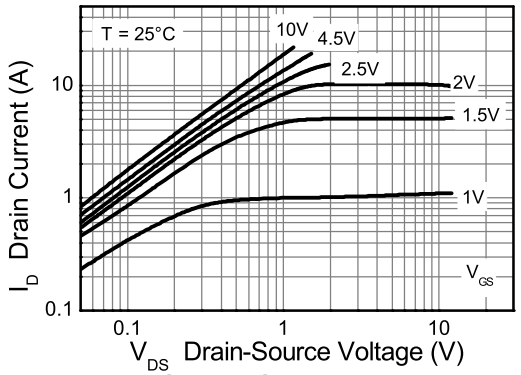
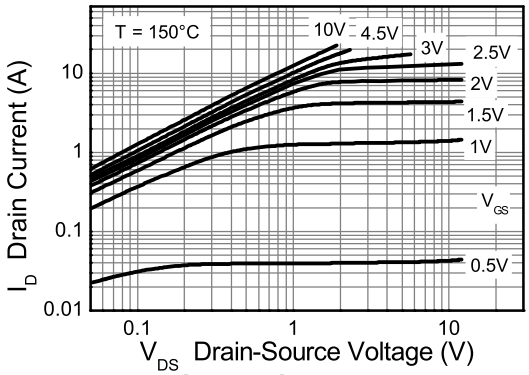
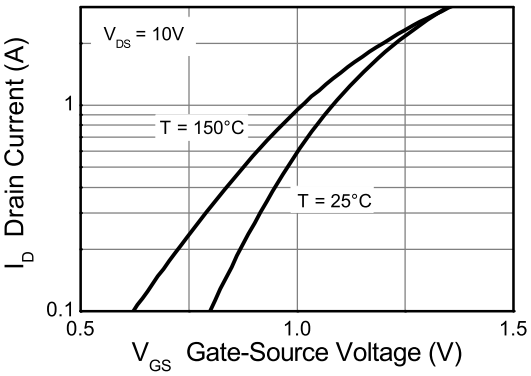
Typical characteristics



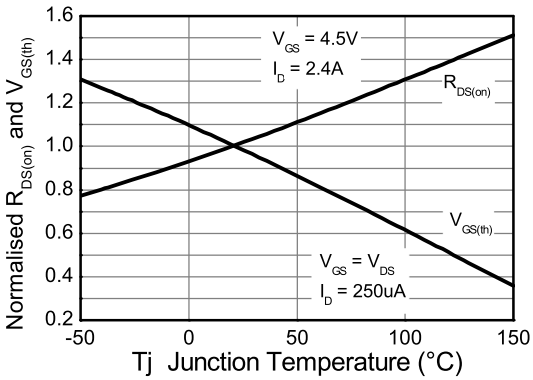
Output Characteristics



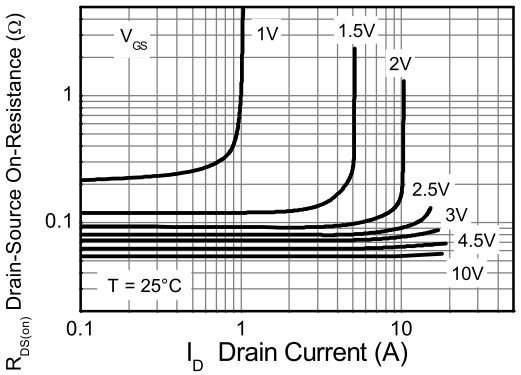
Output Characteristics



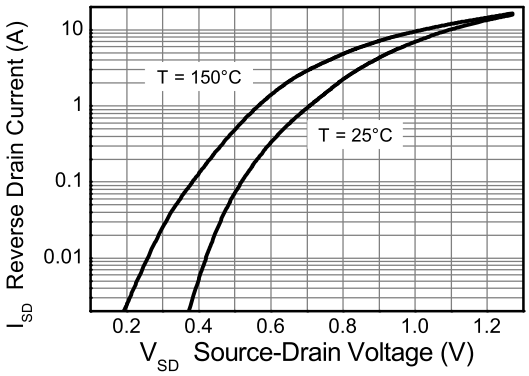
Typical Transfer Characteristics



Normalised Curves v Temperature



On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

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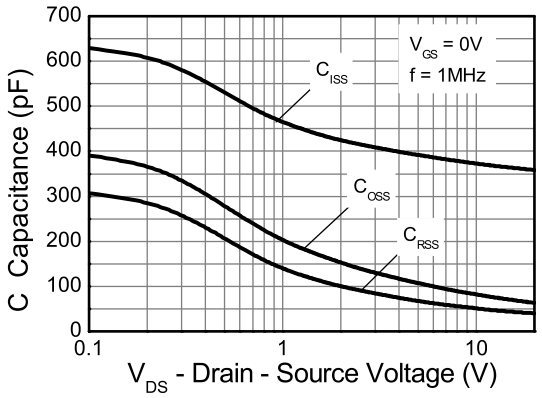
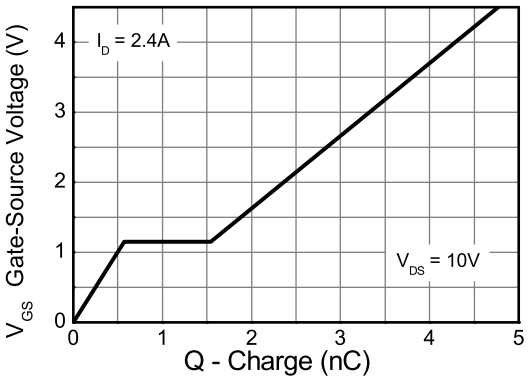
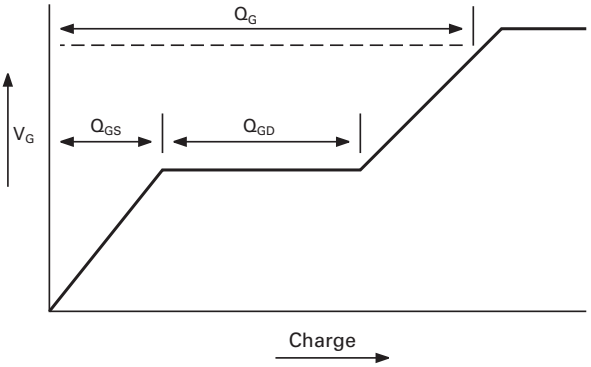
Typical characteristics



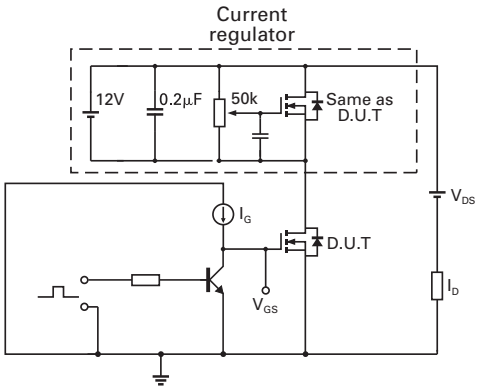
Capacitance v Drain-Source Voltage



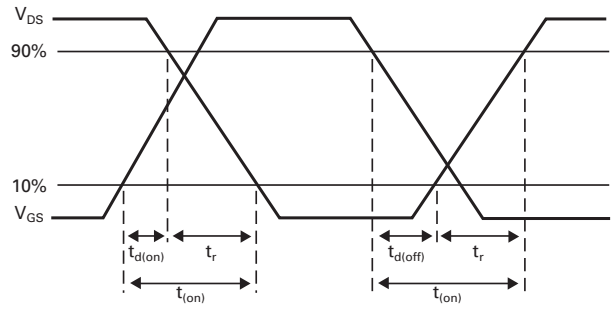
Gate-Source Voltage v Gate Charge



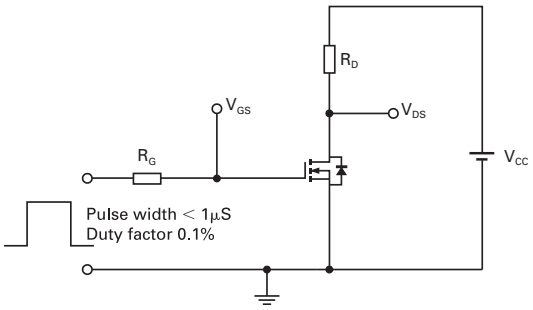
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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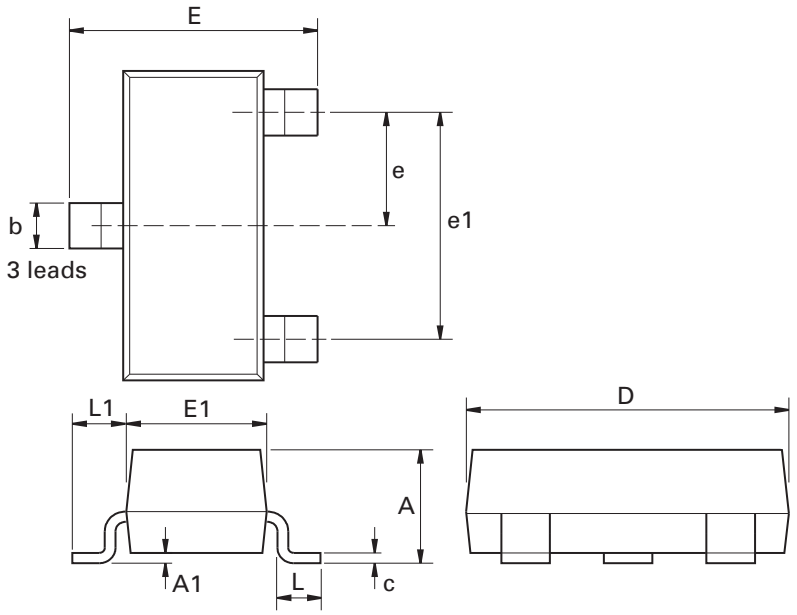
Package outline - SOT23



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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