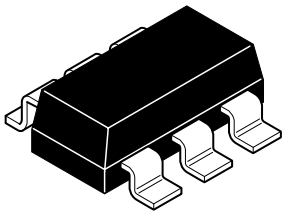
ZXMN2B03E6
20V SOT23-6 N-channel enhancement mode MOSFET with low gate drive capability

Summary

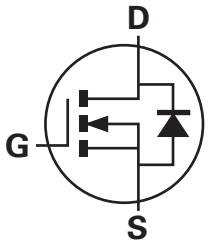


$V_{(BR)DSS}$	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.040 @ V_{GS}= 4.5V	5.4
	0.055 @ V_{GS}= 2.5V	4.6
	0.075 @ V_{GS}= 1.8V	4.0

Description

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

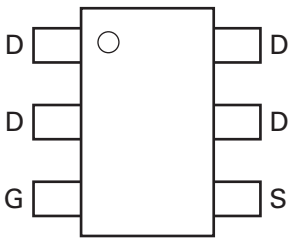
Features



- Low on-resistance
- Fast switching speed
- Low gate drive capability
- SOT23-6 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
ZXMN2B03E6TA	7	8	3,000

Device marking

2B3

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	5.4	A
@ V_{GS}= 4.5V; T_{amb}=70°C(b)		4.3	
@ V_{GS}= 4.5V; T_{amb}=25°C(a)		4.3	
Pulsed drain current(c)	I_{DM}	26	A
Continuous source current (body diode)(b)	I_S	2.8	A
Pulsed source current (body diode)(c)	I_{SM}	26	A
Power dissipation at T_{amb} =25°C(a)	P_D	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at T_{amb} =25°C(b)	P_D	1.7	W
Linear derating factor		13.7	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)	$R_{\Theta JA}$	113	°C/W
Junction to ambient(b)	$R_{\Theta JA}$	73	°C/W

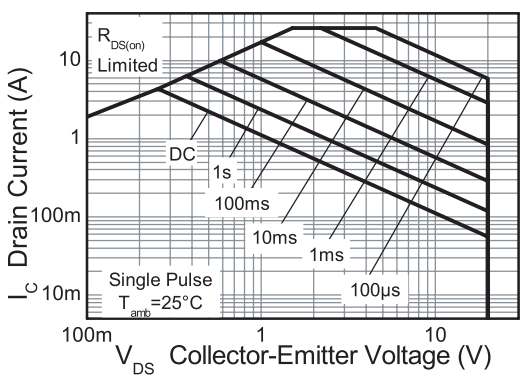
NOTES:

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

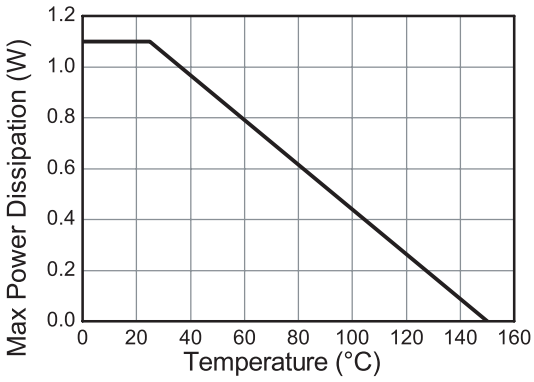
(b) For a device surface mounted on FR4 PCB measured at t ≤5 sec.

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

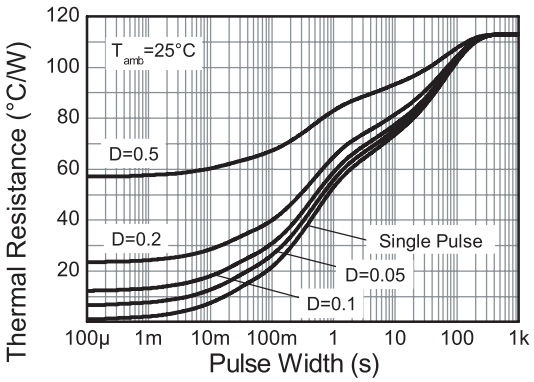
Thermal characteristics



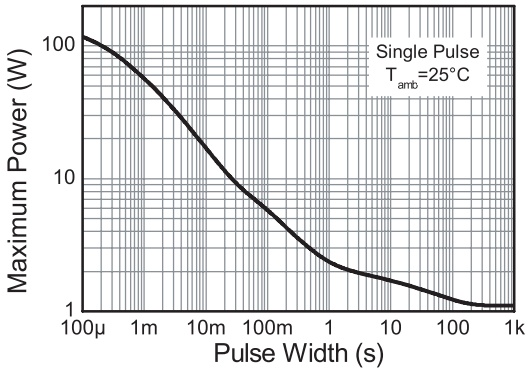
Safe Operating Area



Derating Curve



Transient Thermal Impedance



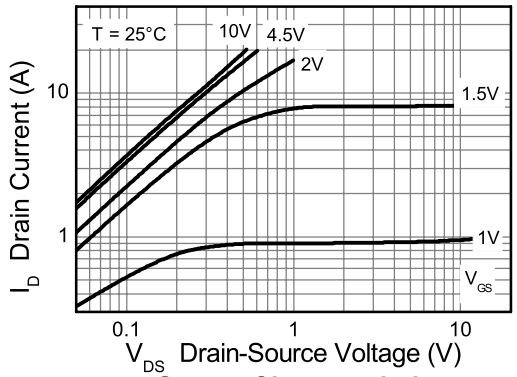
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

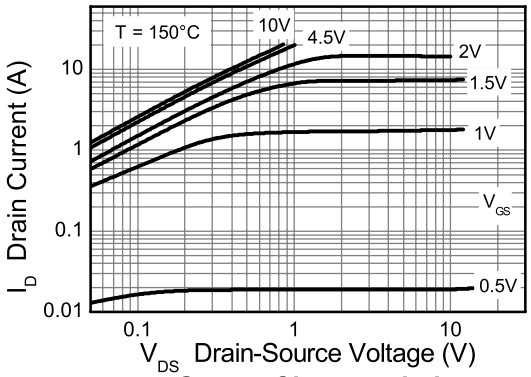
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	20			V	I_D= 250μA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS}= 20V, V_{GS}=0V
Gate-body leakage	I_{GSS}			100	nA	V_{GS}=±8V, V_{DS}=0V
Gate-source threshold voltage	$V_{GS(th)}$	0.4		1.0	V	I_D= 250μA, V_{DS}=V_{GS}
Static drain-source on-state resistance (*)	$R_{DS(on)}$			0.040 0.055 0.075	Ω Ω Ω	V_{GS}= 4.5V, I_D= 4.3A V_{GS}= 2.5V, I_D= 3.7A V_{GS}= 1.8V, I_D= 3.2A
Forward transconductance(*) (‡)	g_{fs}		13.5		S	V_{DS}= 10V, I_D= 4.3A
Dynamic(‡)						
Input capacitance	C_{iss}		1160		pF	V_{DS}= 10V, V_{GS}=0V f=1MHz
Output capacitance	C_{oss}		210		pF	
Reverse transfer capacitance	C_{rss}		136		pF	
Switching (†) (‡)						
Turn-on-delay time	$t_{d(on)}$		4.2		ns	V_{DD}= 10V, V_{GS}= 4.5V I_D= 1A $R_G \approx 6.0\Omega$
Rise time	t_r		6.2		ns	
Turn-off delay time	$t_{d(off)}$		33.9		ns	
Fall time	t_f		12.4		ns	
Total gate charge	Q_g		14.5		nC	V_{DS}= 10V, V_{GS}= 4.5V I_D= 4.3A
Gate-source charge	Q_{gs}		2		nC	
Gate drain charge	Q_{gd}		2.8		nC	
Source-drain diode						
Diode forward voltage(*)	V_{SD}		0.67	0.95	V	T_j=25°C, I_S= 1.8A, V_{GS}=0V
Reverse recovery time(‡)	t_{rr}		10.8		ns	T_j=25°C, I_F= 2.8A, di/dt=100A/μs
Reverse recovery charge(‡)	Q_{rr}		3.4		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.

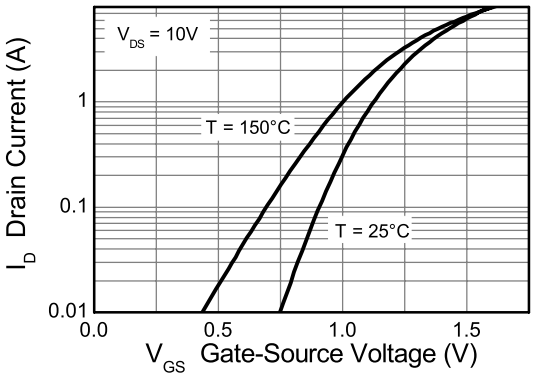
Typical characteristics



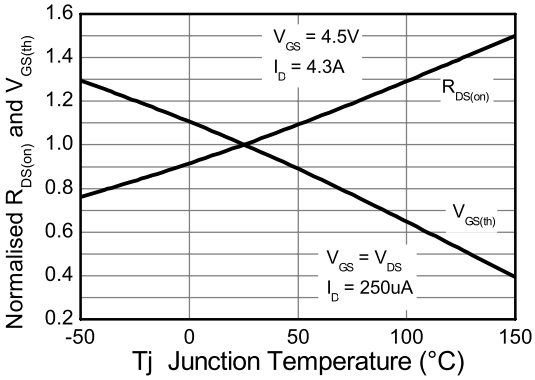
Output Characteristics



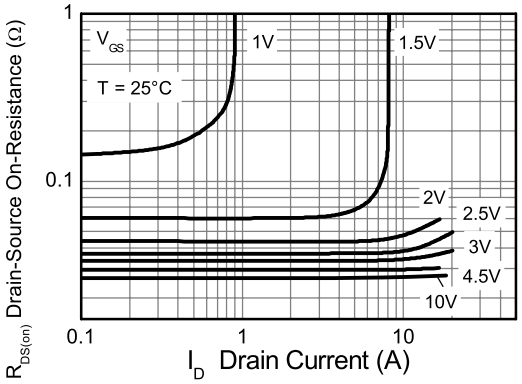
Output Characteristics



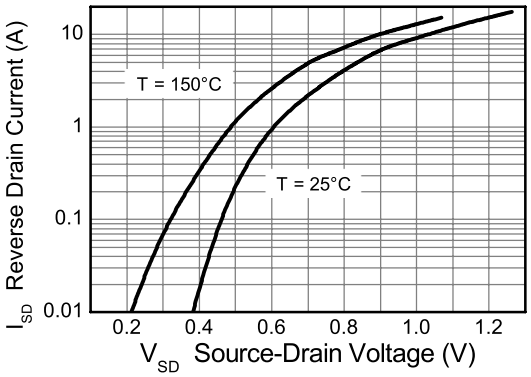
Typical Transfer Characteristics



Normalised Curves v Temperature

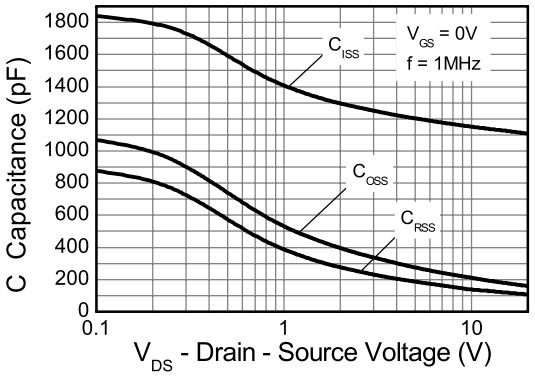


On-Resistance v Drain Current

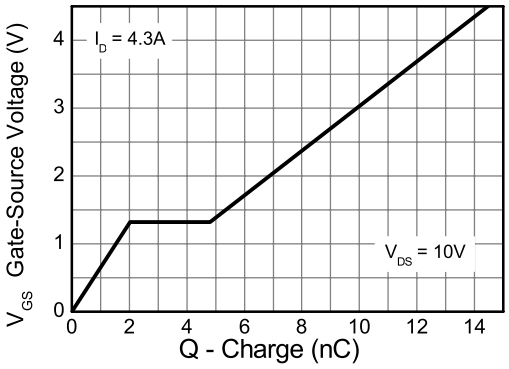


Source-Drain Diode Forward Voltage

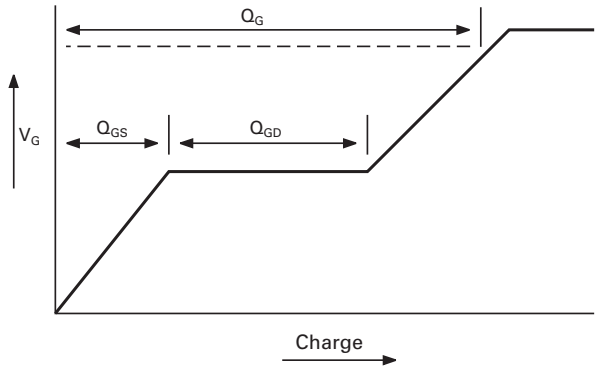
Typical characteristics



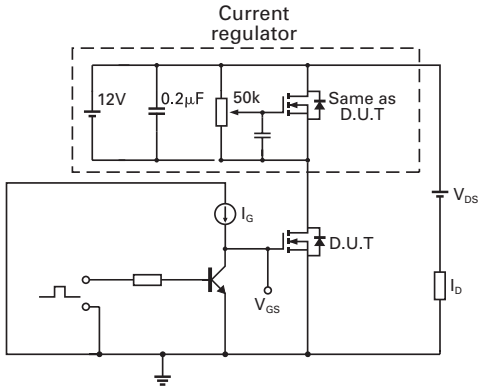
Capacitance v Drain-Source Voltage



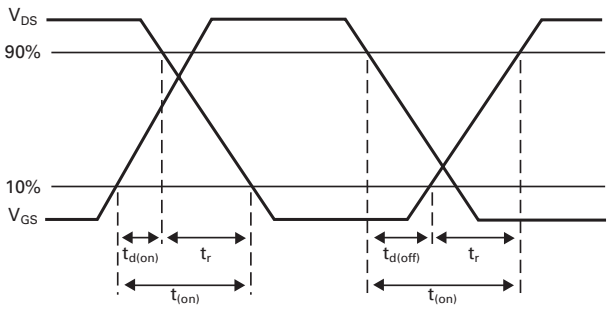
Gate-Source Voltage v Gate Charge



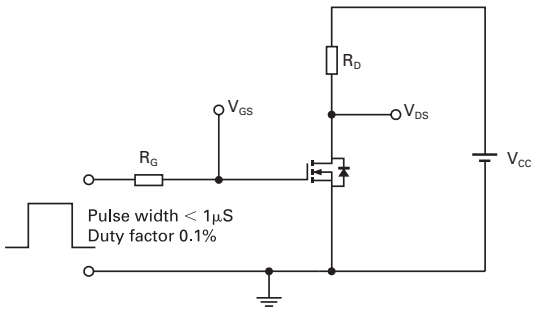
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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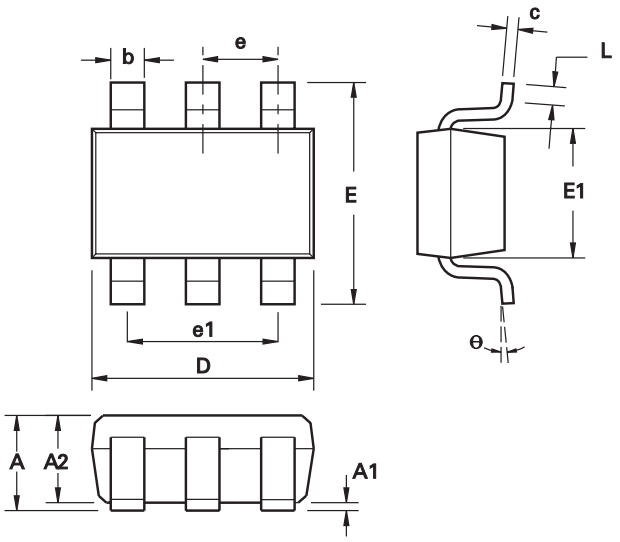
Package outline - SOT23-6



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.35	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
L	0.10	0.60	0.0039	0.0236
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0°	30°	0°	30°

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

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