

# ZXTN25020DFL

## 20V, SOT23, NPN low power transistor

### Summary

$BV_{CEX} > 100V$

$BV_{CEO} > 20V$

$BV_{ECO} > 5V$

$I_{C(cont)} = 2A$

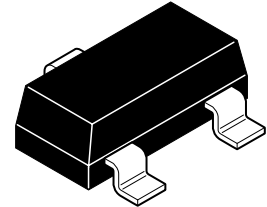
$I_{CM} = 8A$

$V_{CE(sat)} < 70mV @ 1A$

$R_{CE(sat)} = 55m\Omega$

$P_D = 350mW$

Complementary part number ZXTP25020DFL



### Description

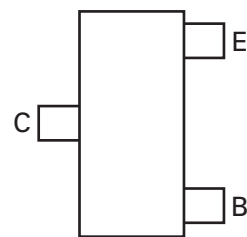
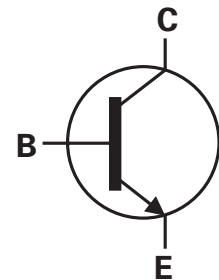
Advanced process capability has been used to achieve high current gain hold up making this device ideal for applications requiring high pulse currents.

### Features

- High peak current
- Low saturation voltage
- 100V forward blocking voltage

### Applications

- MOSFET and IGBT gate driving
- DC-DC conversion
- LED driving
- Interface between low voltage IC's and loads



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25020DFLTA	7	8	3,000

### Device marking

1A1

# ZXTN25020DFL

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	100	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	100	V
Collector-emitter voltage	$V_{CEO}$	20	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	5	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(a)</sup>	$I_C$	2	A
Base current	$I_B$	500	mA
Peak pulse current	$I_{CM}$	8	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	350	mW
Linear derating factor		2.8	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

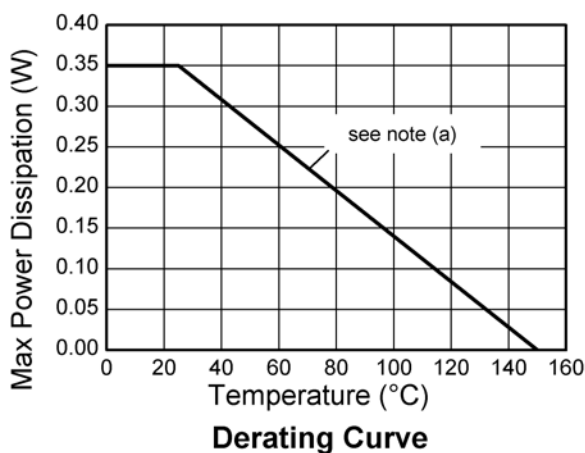
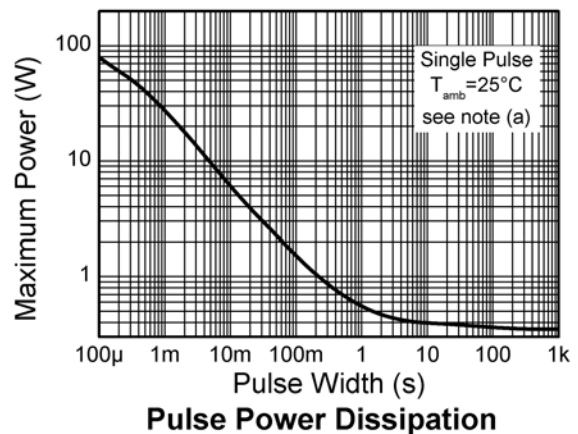
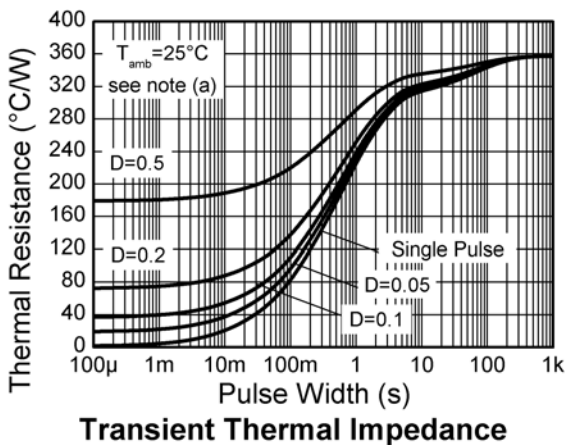
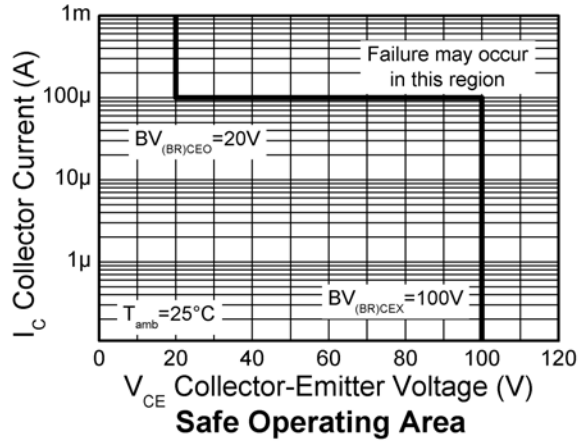
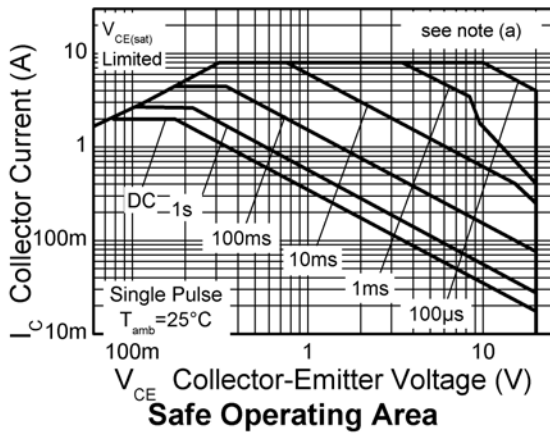
## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	357	°C/W

### NOTES:

(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

## Characteristics



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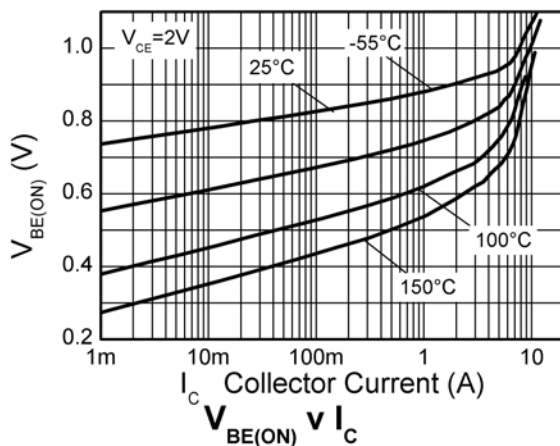
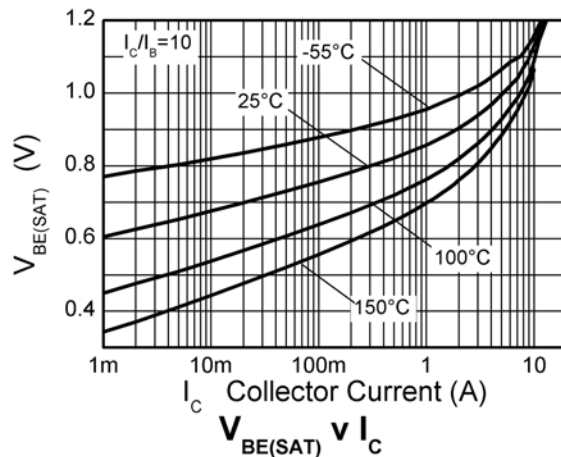
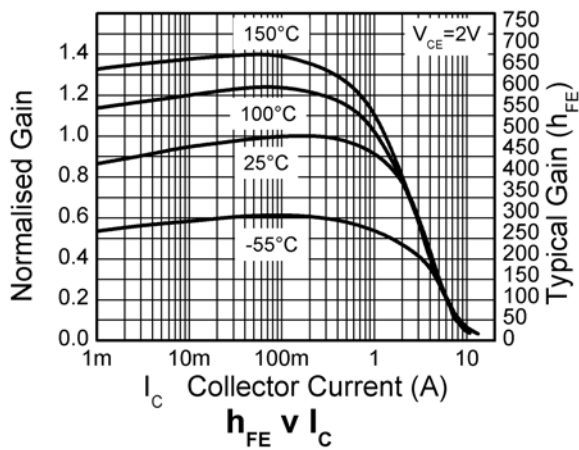
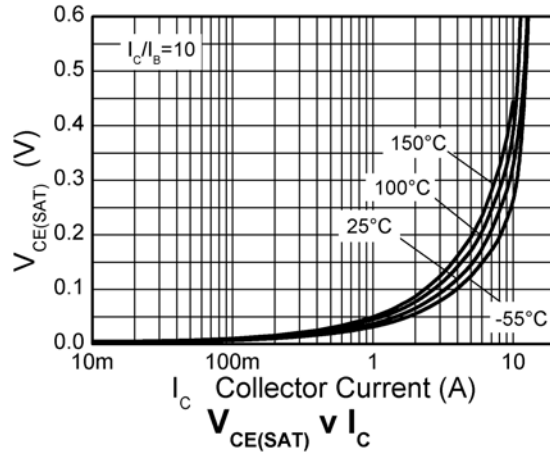
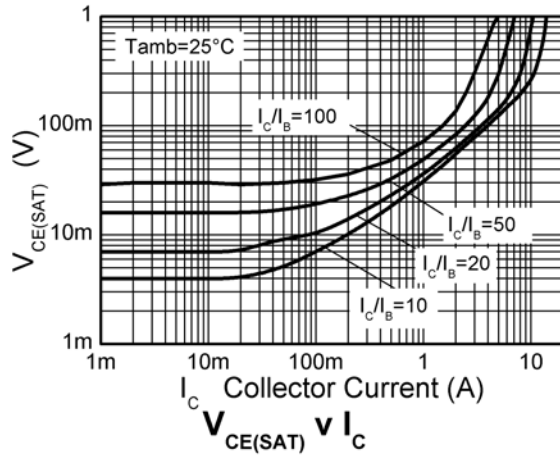
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	100	125		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	100	120		V	$I_C = 100\text{A}$ ; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	20	35		V	$I_C = 10\text{mA}^{(*)}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	8		V	$I_E = 100\mu\text{A}$ , $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	5	6		V	$I_E = 100\mu\text{A}$ ,
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.3		V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 80\text{V}$ $V_{CB} = 80\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		-	100	nA	$V_{CE} = 80\text{V}$ ; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter cut-off current	$I_{EBO}$		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(SAT)}$		60	70	mV	$I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$
			85	100	mV	$I_C = 1\text{A}$ , $I_B = 20\text{mA}^{(*)}$
			140	160	mV	$I_C = 2\text{A}$ , $I_B = 40\text{mA}^{(*)}$
			180	225	mV	$I_C = 2\text{A}$ , $I_B = 20\text{mA}^{(*)}$
			245	270	mV	$I_C = 4.5\text{A}$ , $I_B = 450\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(SAT)}$		895	1000	mV	$I_C = 2\text{A}$ , $I_B = 40\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(ON)}$		825	900	mV	$I_C = 2\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300	450	900		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$
		220	350			$I_C = 2\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
		80	120			$I_C = 4.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		215		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{OBO}$		16.5	25	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_{(d)}$		67.7		ns	$V_{CC} = 10\text{V}$ . $I_C = 1\text{A}$ , $I_{B1} = I_{B2} = 10\text{mA}$ .
Rise time	$t_{(r)}$		72.2		ns	
Storage time	$t_{(s)}$		361		ns	
Fall time	$t_{(f)}$		63.9		ns	

### NOTES:

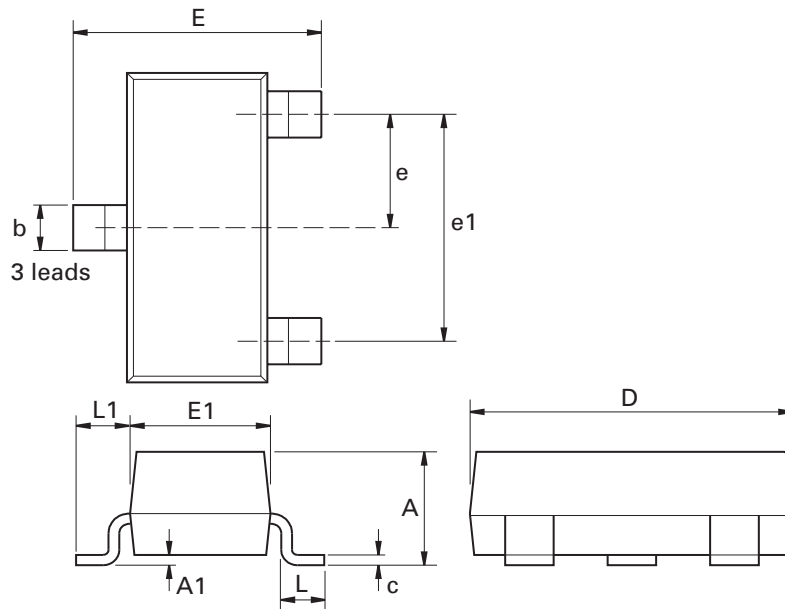
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTN25020DFL

## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

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

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#### ESD (Electrostatic discharge)

Semiconductor devices are susceptible to damage by ESD. Suitable precautions should be taken when handling and transporting devices. The possible damage to devices depends on the circumstances of the handling and transporting, and the nature of the device. The extent of damage can vary from immediate functional or parametric malfunction to degradation of function or performance in use over time. Devices suspected of being affected should be replaced.

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"Preview"	Future device intended for production at some point. Samples may be available
"Active"	Product status recommended for new designs
"Last time buy (LTB)"	Device will be discontinued and last time buy period and delivery is in effect
"Not recommended for new designs"	Device is still in production to support existing designs and production
"Obsolete"	Production has been discontinued

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"Draft version"	This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.
"Provisional version"	This term denotes a pre-release datasheet. It provides a clear indication of anticipated performance. However, changes to the test conditions and specifications may occur, at any time and without notice.
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#### Zetex sales offices

##### Europe

Zetex GmbH  
Kustermann-park  
Balanstraße 59  
D-81541 München  
Germany  
Telephone: (49) 89 45 49 49 0  
Fax: (49) 89 45 49 49 49  
europe.sales@zetex.com

##### Americas

Zetex Inc  
700 Veterans Memorial Highway  
Hauppauge, NY 11788  
USA  
Telephone: (1) 631 360 2222  
Fax: (1) 631 360 8222  
usa.sales@zetex.com

##### Asia Pacific

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

##### Corporate Headquarters

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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