

# ZXTN25040DFL

## 40V, SOT23, NPN low power transistor

### Summary

$BV_{CEX} > 130V$

$BV_{CEO} > 40V$

$BV_{ECO} > 6V$

$I_{C(cont)} = 1.5A$

$V_{CE(sat)} < 85mV @ 1A$

$R_{CE(sat)} = 59m\Omega$

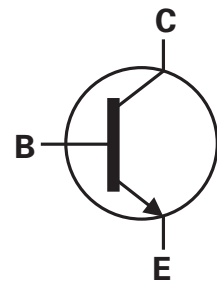
$P_D = 350mW$

Complementary part number ZXTP25040DFL



### Description

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

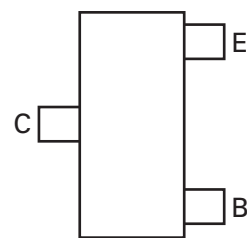


### Features

- High peak current
- Low saturation voltage
- 130V forward blocking voltage
- 6V reverse 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
ZXTN25040DFLTA	7	8	3000

### Device marking

1B7

# ZXTN25040DFL

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	130	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	130	V
Collector-emitter voltage	$V_{CEO}$	40	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	6	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(a)</sup>	$I_C$	1.5	A
Base current	$I_B$	0.5	A
Peak pulse current	$I_{CM}$	6	A
Power dissipation at $T_{amb} = 25^{\circ}\text{C}^{(a)}$	$P_D$	350	mW
Linear derating factor		2.8	mW/ $^{\circ}\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	$^{\circ}\text{C}$

## Thermal resistance

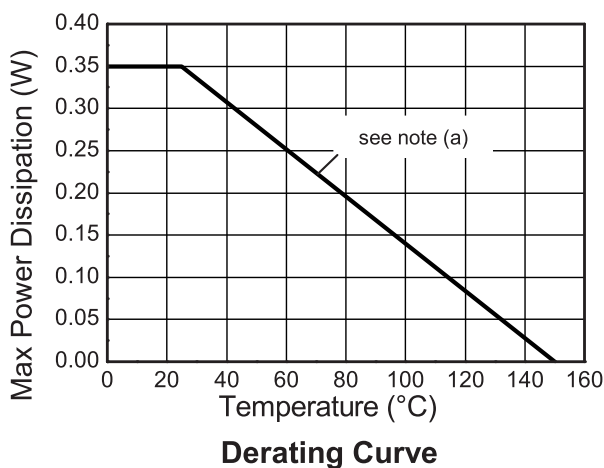
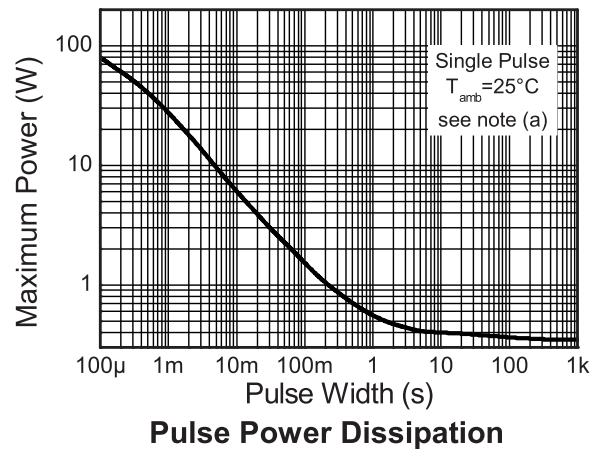
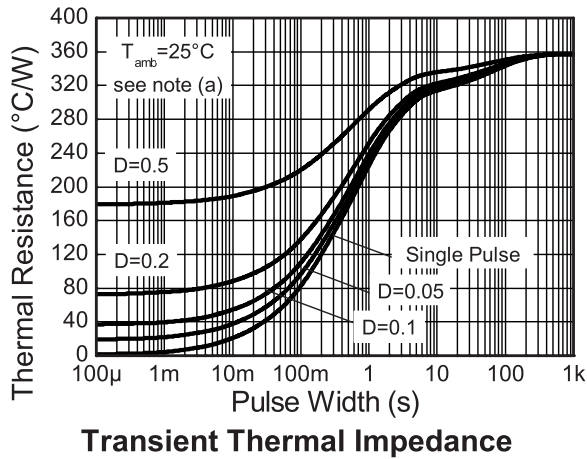
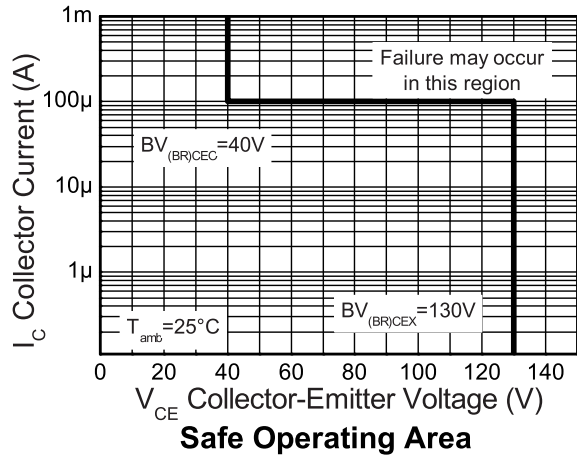
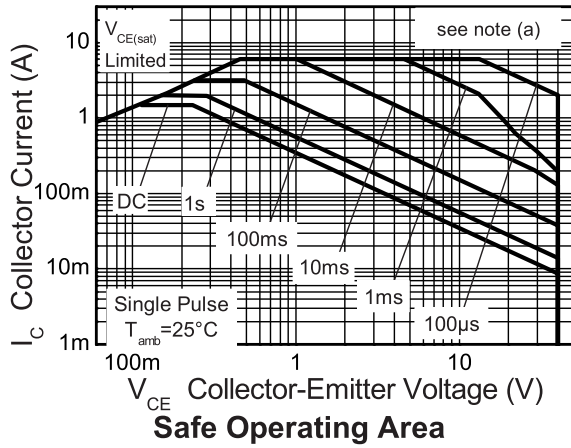
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	357	$^{\circ}\text{C}/\text{W}$

### NOTES:

(a) For a device surface mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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## Characteristics



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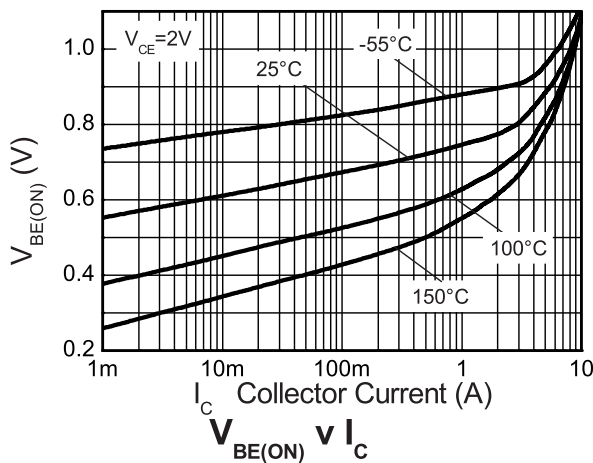
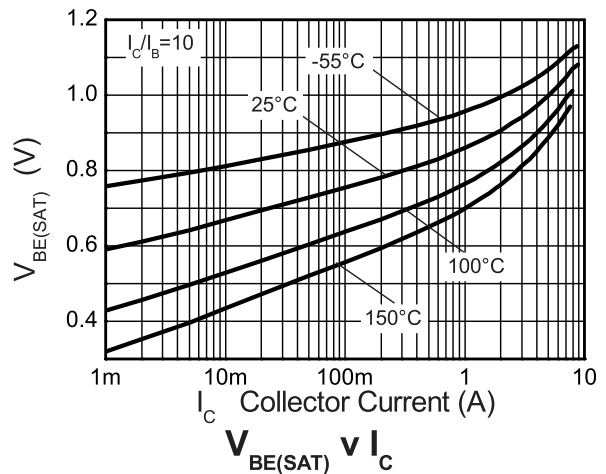
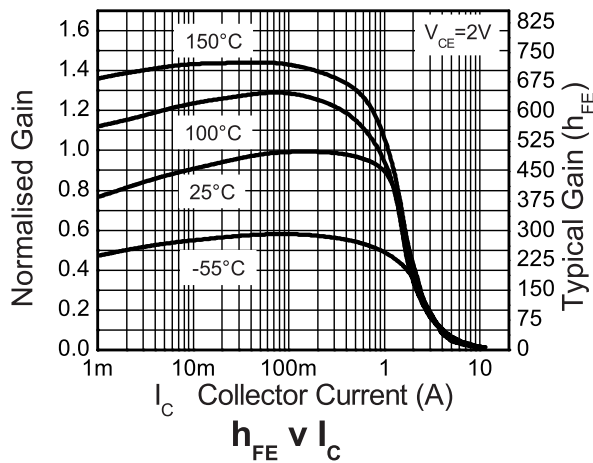
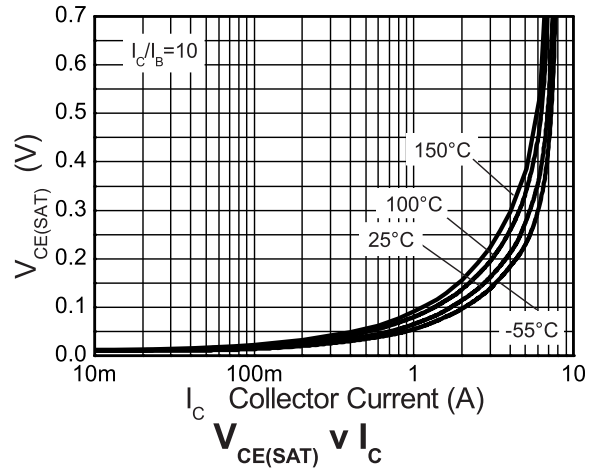
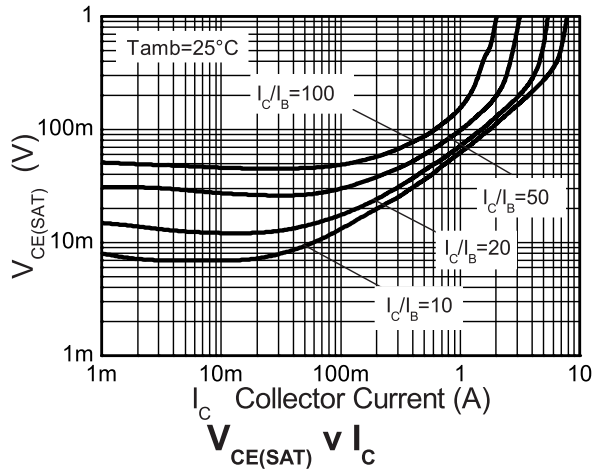
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	130	170		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	130	170		V	$I_C = 100\mu\text{A}$ ; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	40	63		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.3		V	$I_E = 100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	7.4		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)	$BV_{ECO}$	6	7.4		V	$I_E = 100\mu\text{A}$ ,
Collector cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 100\text{V}$ $V_{CB} = 100\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector emitter cut-off current	$I_{CEX}$		<1	100	nA	$V_{CE} = 100\text{V}$ ; $R_{BE} < 1\text{k}\Omega$ 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	$V_{CE(sat)}$		35 60 70 145 235	50 80 85 185 285	mV mV mV mV mV	$I_C = 0.5\text{A}$ , $I_B = 50\text{mA}^{(*)}$ $I_C = 0.5\text{A}$ , $I_B = 10\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 100\text{mA}$ $I_C = 1.5\text{A}$ , $I_B = 30\text{mA}^{(*)}$ $I_C = 4\text{A}$ , $I_B = 400\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		840	950	mV	$I_C = 1.5\text{A}$ , $I_B = 30\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		770	850	mV	$I_C = 1.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300 300 170 25	450 400 250 40	900		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 1\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 1.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 4\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		190		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{obo}$		11.7	20	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_{(d)}$		64		ns	$V_{CC} = 10\text{V}$ , $I_C = 1\text{A}$ , $I_{B1} = I_{B2} = 10\text{mA}$ .
Rise time	$t_{(r)}$		108		ns	
Storage time	$t_{(s)}$		428		ns	
Fall time	$t_{(f)}$		130		ns	

### NOTES:

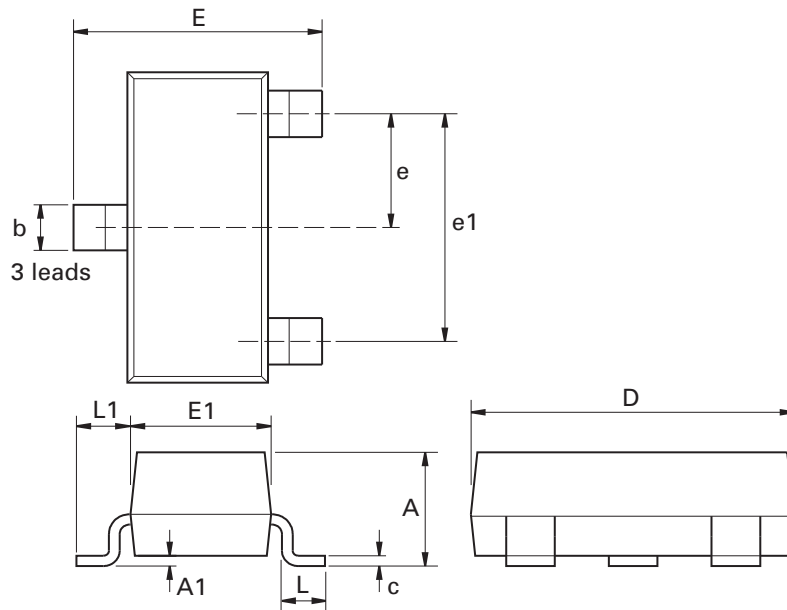
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTN25040DFL

## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	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	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

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

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