

# ZXTP25020DFL

## 20V, SOT23, PNP low power transistor

### Summary

$BV_{CEO} > -20V$

$BV_{ECO} > -4V$

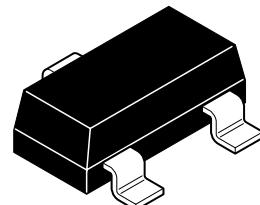
$I_C(\text{cont}) = 1.5A$

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

$R_{CE(\text{sat})} = 54m\Omega$

$P_D = 350\text{mW}$

Complementary part number ZXTN25020DFL

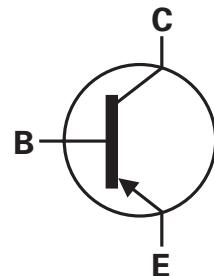


### Description

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

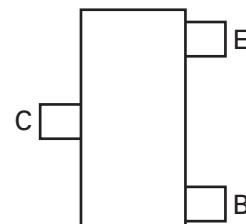
### Features

- High peak current
- Low saturation voltage



### Applications

- DC-DC converters
- MOSFET and IGBT gate driving



Pinout - top view

### Ordering information

| Device         | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------------------|-----------------|-------------------|
| ZXTP25020DFLTA | 7                  | 8               | 3000              |

### Device marking

1F2

# ZXTP25020DFL

## Absolute maximum ratings

| Parameter  | Symbol         | Limit      | Unit                       |
|--|----------------|------------|----------------------------|
| Collector-base voltage   | $V_{CBO}$      | -25        | V                          |
| Collector-emitter voltage (forward blocking)                     | $V_{CEO}$      | -20        | V                          |
| Emitter-collector voltage (reverse blocking)                     | $V_{ECO}$      | -4         | V                          |
| Emitter-base voltage   | $V_{EBO}$      | -7         | V                          |
| Continuous collector current                                     | $I_C$          | -1.5       | A                          |
| Base current   | $I_B$          | -500       | mA                         |
| Peak pulse current   | $I_{CM}$       | -6         | A                          |
| Power dissipation at $T_{amb} = 25^\circ\text{C}$ <sup>(a)</sup> | $P_D$          | 350        | mW                         |
| Linear derating factor   |                | 2.8        | $\text{mW}/^\circ\text{C}$ |
| Operating and storage temperature range                          | $T_j, T_{stg}$ | -55 to 150 | $^\circ\text{C}$           |

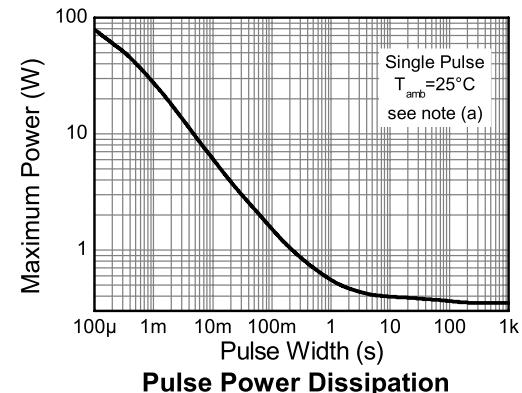
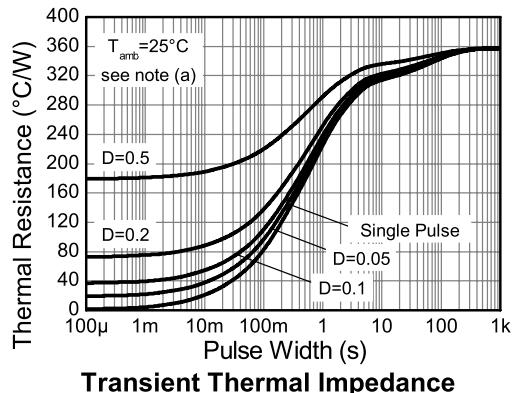
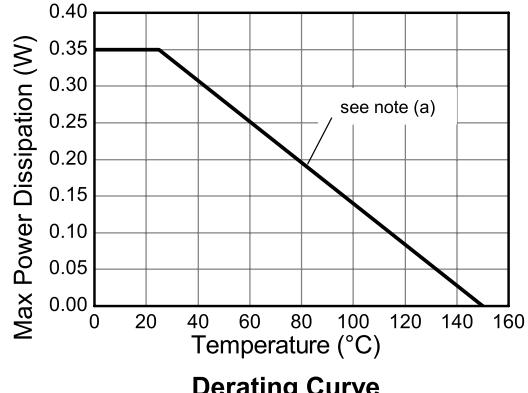
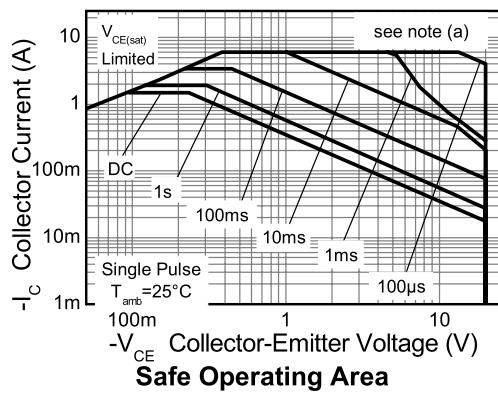
## Thermal resistance

| 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 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

## Characteristics



# ZXTP25020DFL

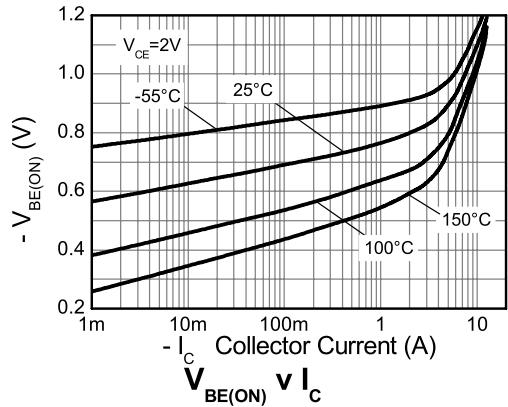
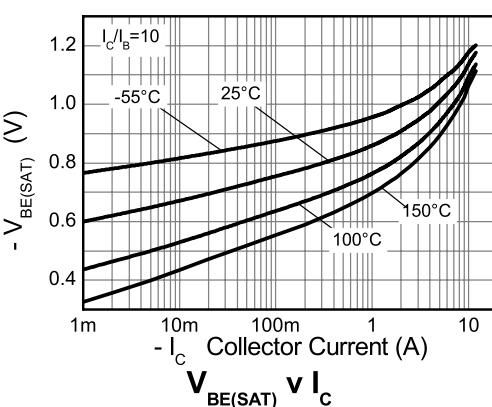
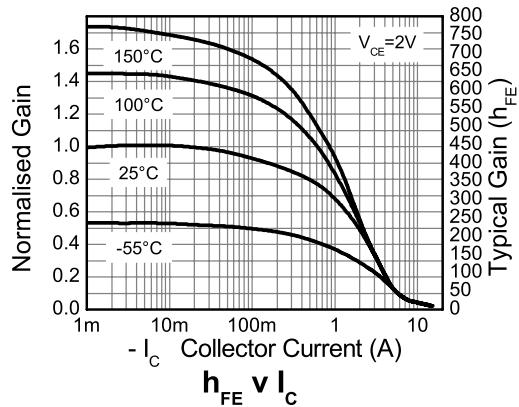
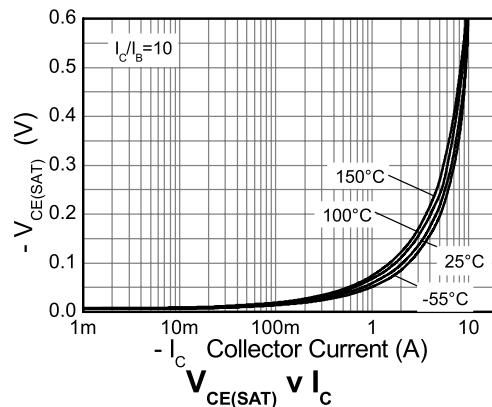
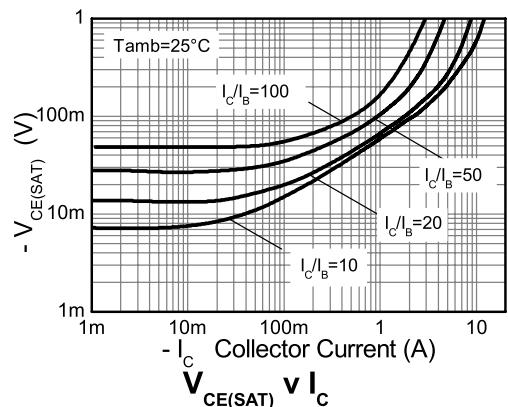
## Electrical characteristics (at $T_{amb} = 25^\circ\text{C}$ unless otherwise stated)

| Parameter  | Symbol                   | Min.             | Typ.                               | Max.                               | Unit                | Conditions   |
|--|--------------------------|------------------|------------------------------------|------------------------------------|---------------------|--|
| Collector-base breakdown voltage                       | $\text{BV}_{\text{CBO}}$ | -25              | -55                                |                                    | V                   | $I_C = -100\mu\text{A}$  |
| Collector-emitter breakdown voltage (base open)        | $\text{BV}_{\text{CEO}}$ | -20              | -45                                |                                    | V                   | $I_C = -10\text{mA}$ (*)   |
| Emitter-base breakdown voltage                         | $\text{BV}_{\text{EBO}}$ | -7               | -8.3                               |                                    | V                   | $I_E = -100\mu\text{A}$  |
| Emitter-collector breakdown voltage (reverse blocking) | $\text{BV}_{\text{ECO}}$ | -4               | -8.5                               |                                    | V                   | $I_E = -100\mu\text{A}$ (*)  |
| Collector cut-off current                              | $I_{\text{CBO}}$         |                  | <-1                                | -50<br>-20                         | nA<br>$\mu\text{A}$ | $V_{\text{CB}} = -20\text{V}$<br>$V_{\text{CB}} = -20\text{V}, T_{amb} = 100^\circ\text{C}$  |
| Emitter cut-off current                                | $I_{\text{EBO}}$         |                  | <-1                                | -50                                | nA                  | $V_{\text{EB}} = -5.6\text{V}$   |
| Collector-emitter saturation voltage                   | $V_{\text{CE(sat)}}$     |                  | -65<br>-160<br>150<br>-210<br>-215 | -85<br>-225<br>-195<br>-275<br>260 | mV                  | $I_C = -1\text{A}, I_B = -100\text{mA}$ (*)<br>$I_C = -1\text{A}, I_B = -10\text{mA}$ (*)<br>$I_C = -1.5\text{A}, I_B = -30\text{mA}$ (*)<br>$I_C = -2\text{A}, I_B = -40\text{mA}$ (*)<br>$I_C = -4\text{A}, I_B = -400\text{mA}$ (*) |
| Base-emitter saturation voltage                        | $V_{\text{BE(sat)}}$     |                  | -845                               | -950                               | mV                  | $I_C = -1.5\text{A}, I_B = -30\text{mA}$ (*)   |
| Base-emitter turn-on voltage                           | $V_{\text{BE(on)}}$      |                  | -785                               | -900                               | mV                  | $I_C = -1.5\text{A}, V_{\text{CE}} = -2\text{V}$ (*)   |
| Static forward current transfer ratio                  | $h_{\text{FE}}$          | 300<br>160<br>60 | 450<br>250<br>90<br>15             | 900                                |                     | $I_C = -10\text{mA}, V_{\text{CE}} = -2\text{V}$ (*)<br>$I_C = -1.5\text{A}, V_{\text{CE}} = -2\text{V}$ (*)<br>$I_C = -4\text{A}, V_{\text{CE}} = -2\text{V}$ (*)<br>$I_C = -10\text{A}, V_{\text{CE}} = -2\text{V}$ (*)              |
| Transition frequency                                   | $f_T$                    |                  | 290                                |                                    | MHz                 | $I_C = -50\text{mA}, V_{\text{CE}} = -10\text{V}$<br>$f = 50\text{MHz}$  |
| Output capacitance                                     | $C_{\text{obo}}$         |                  | 21                                 | 30                                 | pF                  | $V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$ (*)   |
| Delay time   | $t_{(d)}$                |                  | 14.2                               |                                    |                     | $V_{\text{CC}} = -10\text{V}, I_C = -1\text{A}, I_{B1} = I_{B2} = -50\text{mA}$ .  |
| Rise time  | $t_{(r)}$                |                  | 16.3                               |                                    |                     |  |
| Storage time   | $t_{(s)}$                |                  | 186                                |                                    |                     |  |
| Fall time  | $t_{(f)}$                |                  | 32.7                               |                                    |                     |  |

### NOTES:

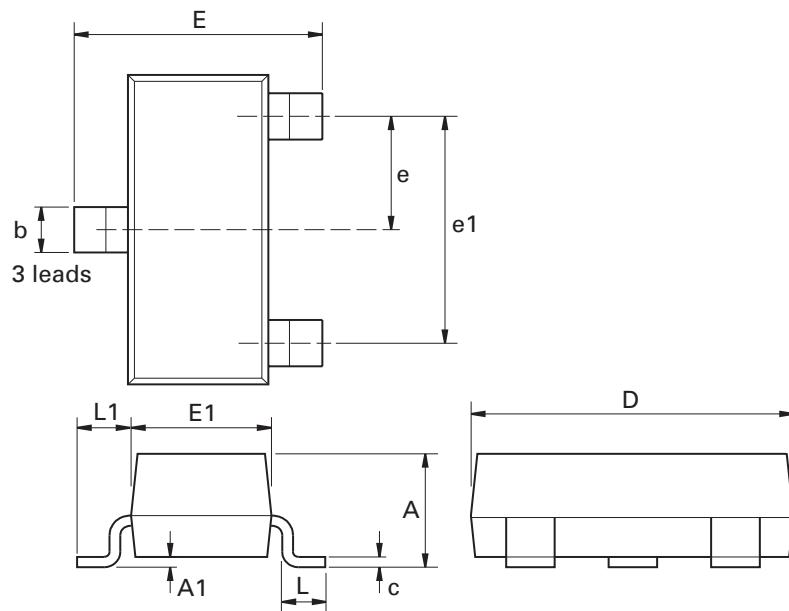
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTP25020DFL

## 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

# **ZXTP25020DFL**

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|                                   |  |
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| "Not recommended for new designs" | Device is still in production to support existing designs and production       |
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|                       |   |
|-----------------------|---|
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