

# ZXTP19020CFF

## 20V, SOT23F, PNP medium power transistor

### Summary:

$BV_{CEO} > -20V$

$BV_{ECO} > -5V$

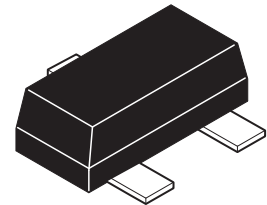
$I_{C(cont)} = -5A$

$V_{CE(sat)} < 40mV @ 100mA$

$R_{CE(sat)} = 21m\Omega$

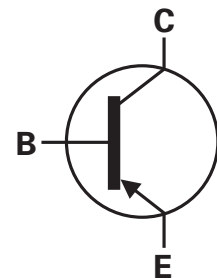
$P_D = 1.5W$

Complementary part number ZXTN19020CFF



### Description

Advanced process capability has been used to maximize the performance of this transistor. The SOT23F package is compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.

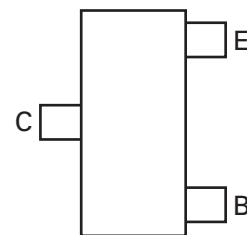


### Features

- High gain
- Low saturation voltage
- Low profile high dissipation package

### Applications

- Battery charging
- Load switch
- DC-DC converters



Pinout - top view

### Ordering information

| Device         | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------------------|-----------------|-------------------|
| ZXTP19020CFFTA | 7                  | 8               | 3000              |

### Device marking

1D7

# ZXTP19020CFF

## Absolute maximum ratings

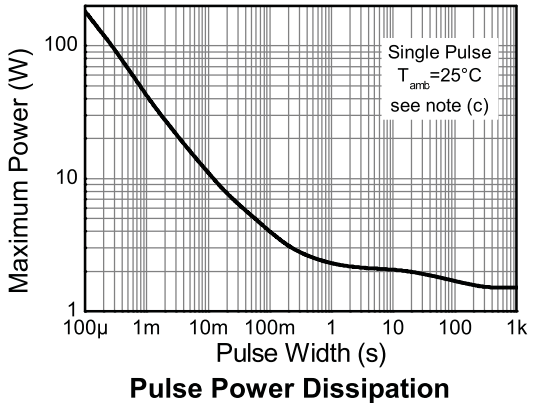
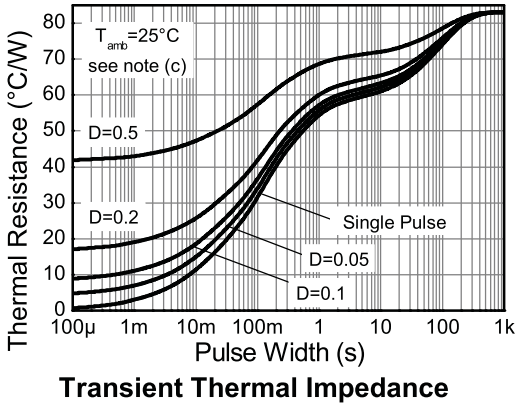
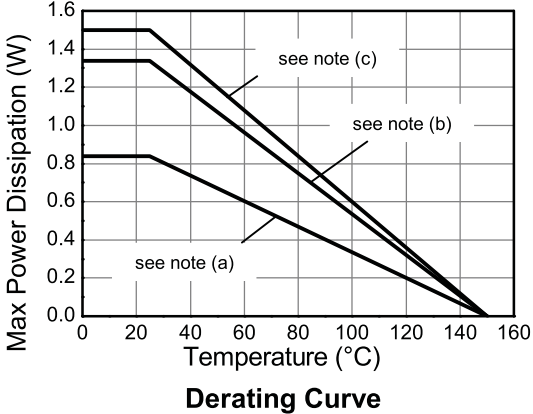
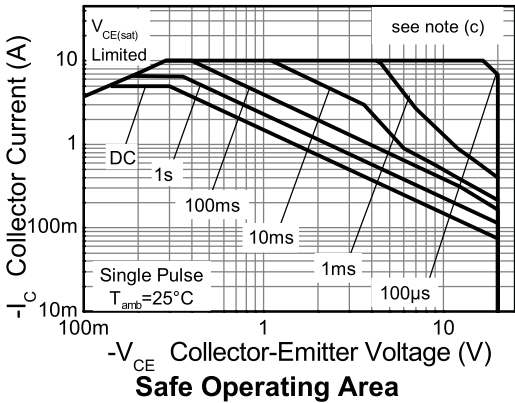
| Parameter   | Symbol          | Limit      | Unit  |
|---|-----------------|------------|-------|
| Collector-base voltage                                  | $V_{CBO}$       | -25        | V     |
| Collector-emitter voltage                               | $V_{CEO}$       | -20        | V     |
| Emitter-collector voltage (reverse blocking)            | $V_{ECO}$       | -5         | V     |
| Emitter-base voltage                                    | $V_{EBO}$       | -7         | V     |
| Continuous collector current <sup>(c)</sup>             | $I_C$           | -5         | A     |
| Peak pulse current                                      | $I_{CM}$        | -10        | A     |
| Base current  | $I_B$           | -1         | A     |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(a)}$ | $P_D$           | 0.84       | W     |
| Linear derating factor                                  |                 | 6.72       | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(b)}$ | $P_D$           | 1.34       | W     |
| Linear derating factor                                  |                 | 10.72      | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(c)}$ | $P_D$           | 1.5        | W     |
| Linear derating factor                                  |                 | 12.0       | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(d)}$ | $P_D$           | 2.0        | W     |
| Linear derating factor                                  |                 | 16.0       | mW/°C |
| Operating and storage temperature range                 | $T_j, T_{stg}$  | -55 to 150 | °C    |
| <b>Thermal resistance</b>                               |                 |            |       |
| Parameter   | Symbol          | Value      | Unit  |
| Junction to ambient <sup>(a)</sup>                      | $R_{\theta JA}$ | 149.3      | °C/W  |
| Junction to ambient <sup>(b)</sup>                      | $R_{\theta JA}$ | 93.4       | °C/W  |
| Junction to ambient <sup>(c)</sup>                      | $R_{\theta JA}$ | 83.3       | °C/W  |
| Junction to ambient <sup>(d)</sup>                      | $R_{\theta JA}$ | 60         | °C/W  |

### NOTES:

- (a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.
- (c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.
- (d) As (c) above measured at  $t < 5\text{secs}$ .

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## Characteristics



# ZXTP19020CFF

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

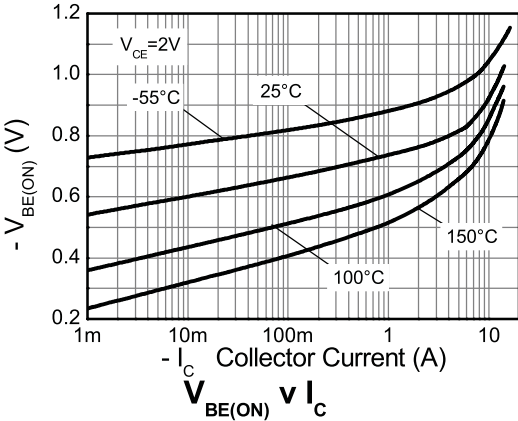
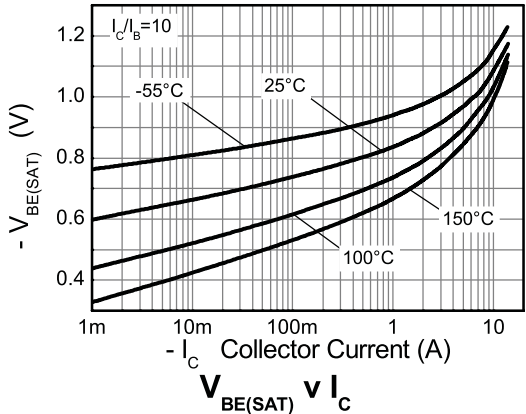
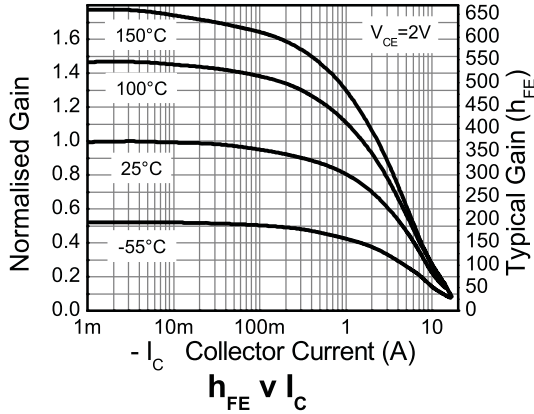
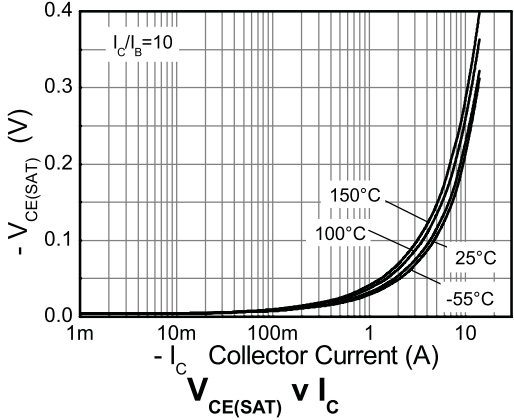
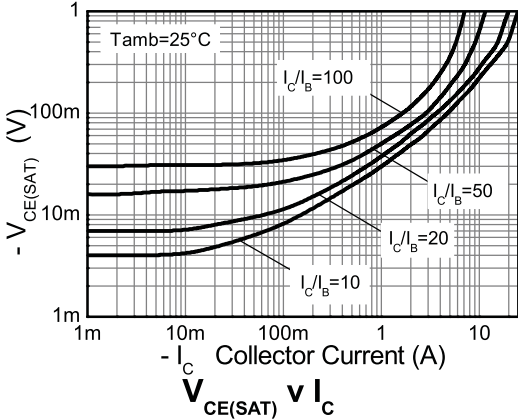
| Parameter  | Symbol        | Min.              | Typ.                      | Max.                       | Unit                 | Conditions   |
|--|---------------|-------------------|---------------------------|----------------------------|----------------------|--|
| Collector-base breakdown voltage                       | $BV_{CBO}$    | -25               | -45                       |                            | V                    | $I_C = -100\mu\text{A}$  |
| Collector-emitter breakdown voltage (base open)        | $BV_{CEO}$    | -20               | -30                       |                            | 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                | -8.3                      |                            | V                    | $I_E = -100\mu\text{A}$ , $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} < V_{BC} < -0.25\text{V}$   |
| Emitter-collector breakdown voltage (base open)        | $BV_{ECO}$    | -5                | -8.5                      |                            | V                    | $I_E = -100\mu\text{A}$ ,  |
| Collector-base cut-off current                         | $I_{CBO}$     |                   | <-1                       | -50<br>-20                 | nA<br>$\mu\text{A}$  | $V_{CB} = -20\text{V}$<br>$V_{CB} = -20\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$   |
| Emitter-base cut-off current                           | $I_{EBO}$     |                   | <-1                       | -50                        | nA                   | $V_{EB} = -5.6\text{V}$  |
| Collector-emitter saturation voltage                   | $V_{CE(sat)}$ |                   | -30<br>-50<br>-75<br>-105 | -40<br>-70<br>-120<br>-135 | mV<br>mV<br>mV<br>mV | $I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$<br>$I_C = -1\text{A}$ , $I_B = -20\text{mA}^{(*)}$<br>$I_C = -2\text{A}$ , $I_B = -40\text{mA}^{(*)}$<br>$I_C = -5\text{A}$ , $I_B = -500\text{mA}^{(*)}$ |
| Base-emitter saturation voltage                        | $V_{BE(sat)}$ |                   | -925                      | -1050                      | mV                   | $I_C = -5\text{A}$ , $I_B = -500\text{mA}^{(*)}$   |
| Base-emitter turn-on voltage                           | $V_{BE(on)}$  |                   | -815                      | -950                       | mV                   | $I_C = -5\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$   |
| Static forward current transfer ratio                  | $h_{FE}$      | 200<br>170<br>110 | 350<br>300<br>180         | 500                        |                      | $I_C = -100\text{mA}$ , $V_{CE} = -2\text{V}^{(*)}$<br>$I_C = -1\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$<br>$I_C = -5\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$  |
| Transition frequency                                   | $f_T$         |                   | 200                       |                            | MHz                  | $I_C = -50\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 100\text{MHz}$   |
| Output capacitance                                     | $C_{obo}$     |                   | 52                        | 70                         | pF                   | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}^{(*)}$   |
| Delay time   | $t_d$         |                   | 66.8                      |                            | ns                   | $V_{CC} = -15\text{V}$ .<br>$I_C = -750\text{mA}$ ,<br>$I_{B1} = 15\text{mA}$ , $I_{B2} = -15\text{mA}$ .  |
| Rise time  | $t_r$         |                   | 74.9                      |                            | ns                   |  |
| Storage time   | $t_s$         |                   | 226                       |                            | ns                   |  |
| Fall time  | $t_f$         |                   | 85.5                      |                            | ns                   |  |

### NOTES:

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

# ZXTP19020CFF

## Typical characteristics

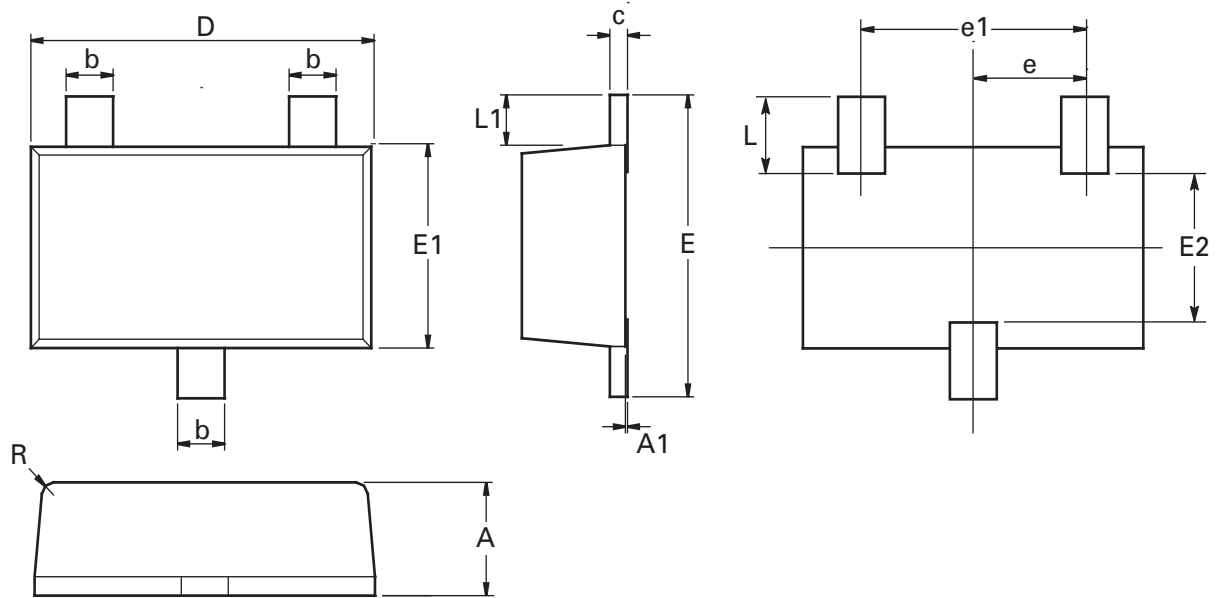


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# ZXTP19020CFF

## Package outline - SOT23F



| Dim. | Millimeters |      | Inches     |        | Dim. | Millimeters |      | Inches |        |
|------|-------------|------|------------|--------|------|-------------|------|--------|--------|
|      | Min.        | Max. | Min.       | Max.   |      | Min.        | Max. | Max.   | Max.   |
| A    | 0.80        | 1.00 | 0.0315     | 0.0394 | E    | 2.30        | 2.50 | 0.0906 | 0.0984 |
| A1   | 0.00        | 0.10 | 0.00       | 0.0043 | E1   | 1.50        | 1.70 | 0.0590 | 0.0669 |
| b    | 0.35        | 0.45 | 0.0153     | 0.0161 | E2   | 1.10        | 1.26 | 0.0433 | 0.0496 |
| c    | 0.10        | 0.20 | 0.0043     | 0.0079 | L    | 0.48        | 0.68 | 0.0189 | 0.0268 |
| D    | 2.80        | 3.00 | 0.1102     | 0.1181 | L1   | 0.30        | 0.50 | 0.0153 | 0.0161 |
| e    | 0.95 ref    |      | 0.0374 ref |        | R    | 0.05        | 0.15 | 0.0019 | 0.0059 |
| e1   | 1.80        | 2.00 | 0.0709     | 0.0787 | O    | 0°          | 12°  | 0°     | 12°    |

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

# ZXTP19020CFF

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### Product status key:

|                                   |  |
|-----------------------------------|--|
| "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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### Datasheet status key:

|                       |   |
|-----------------------|---|
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