

ZXTP19020DFF

20V, SOT23F, PNP medium power transistor

Summary

$BV_{CEO} > -20V$

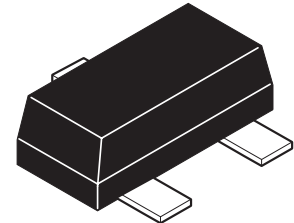
$BV_{ECO} > -4V$

$I_{C(cont)} = 5.5A$

$V_{CE(sat)} < 44mV @ 1A$

$R_{CE(sat)} = 26m\Omega$

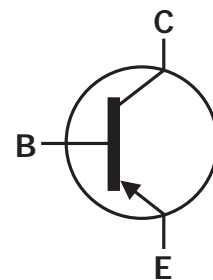
$P_D = 1.5W$



Complementary part number: ZXTN19020DFF

Description

Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium



Features

- High power dissipation SOT23 package
- 15A peak current
- Guaranteed gain at a collector current of 10A
- Very low saturation voltage

Applications

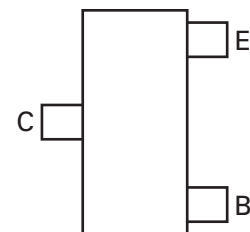
- MOSFET and IGBT gate driving
- Power switches
- Motor control

Ordering information

| Device | Reel size (inches) | Tape width | Quantity per reel |
|----------------|--------------------|------------|-------------------|
| ZXTP19020DFFTA | 7 | 8 | 3000 |

Device marking

1D8



Pinout - top view

ZXTP19020DFF

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} | -4 | V |
| Emitter-base voltage | V_{EBO} | -7 | V |
| Continuous collector current ^(c) | I_C | -5.5 | A |
| Peak pulse current | I_{CM} | -15 | A |
| Base current | I_B | -1 | A |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$ | P_D | 0.84 | W |
| Linear derating factor | | 6.72 | mW/°C |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$ | P_D | 1.34 | W |
| Linear derating factor | | 10.72 | mW/°C |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(c)}$ | P_D | 1.5 | W |
| Linear derating factor | | 12 | mW/°C |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$ | P_D | 2 | W |
| linear derating factor | | 16 | mW/°C |
| Operating and storage temperature range | T_j, T_{stg} | -55 to 150 | °C |

Thermal resistance

| Parameter | Symbol | Value | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 149.3 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 93.4 | °C/W |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 83.3 | °C/W |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 60 | °C/W |
| Junction to case ^(e) | $R_{\theta JC}$ | 38 | °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.

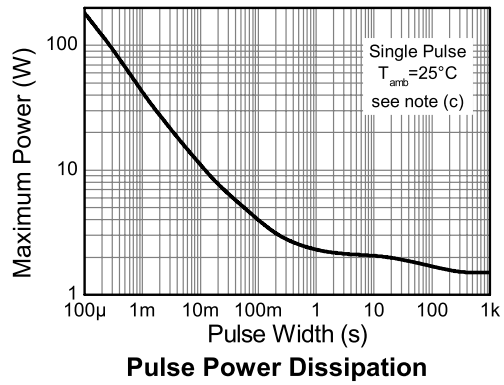
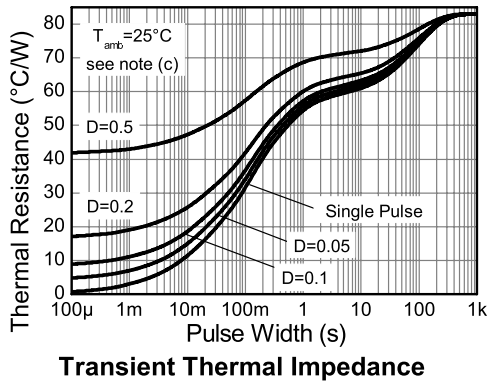
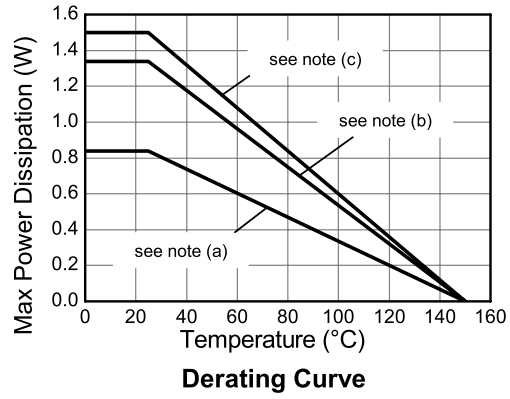
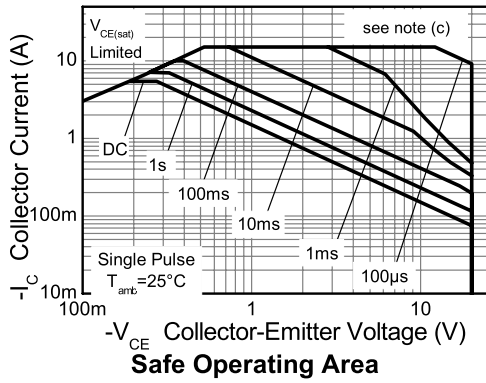
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(d) As (c) above measured at $t < 5$ secs

(e) Junction to case from collector tab

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Characteristics



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

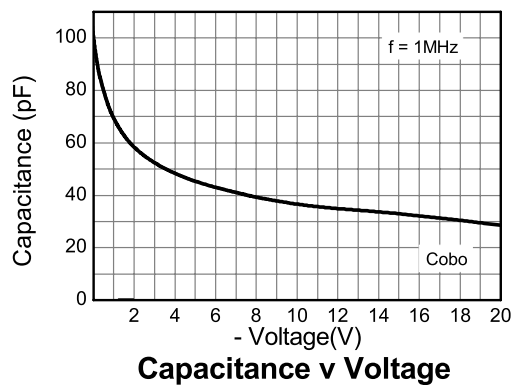
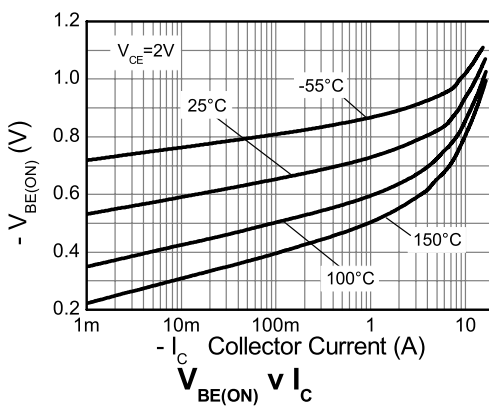
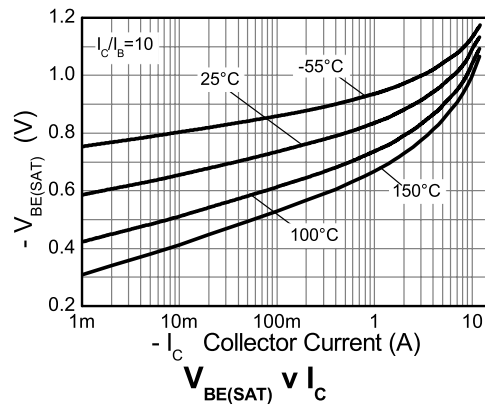
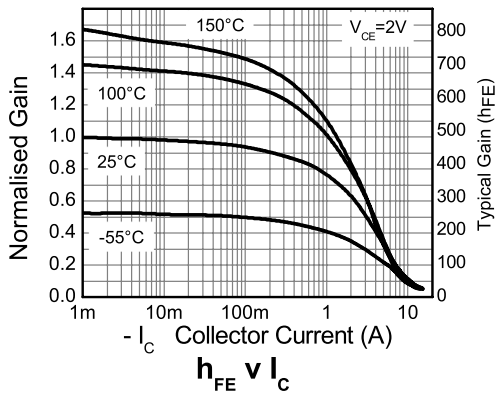
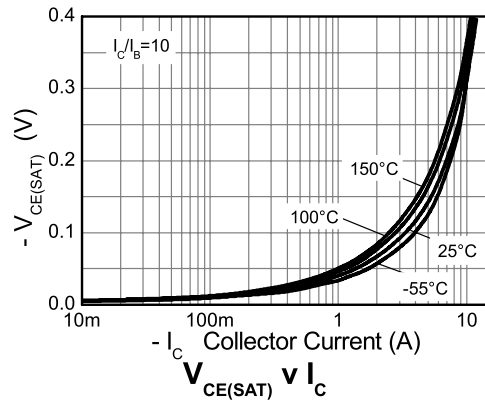
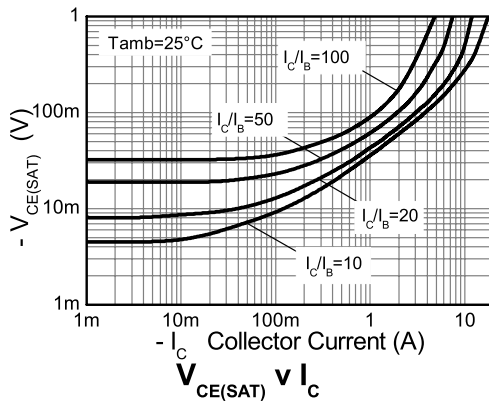
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------|------|------|-------------|---------------------|---|
| Collector-base breakdown voltage | BV_{CBO} | -25 | -55 | | V | $I_C = -100\mu\text{A}$ |
| Collector-emitter breakdown voltage (base open) | BV_{CEO} | -20 | -50 | | V | $I_C = -10\text{mA}^{(*)}$ |
| Emitter-collector breakdown voltage (reverse blocking) | BV_{ECX} | -4 | -8.6 | | 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} | -4 | -8.6 | | V | $I_E = -100\mu\text{A}$ |
| Emitter-base breakdown voltage | BV_{EBO} | -7 | -8.2 | | V | $I_E = -100\mu\text{A}$ |
| Collector-base cut-off current | I_{CBO} | | <-1 | -50 -0.5 | nA μA | $V_{CB} = -25\text{V}$ $V_{CB} = -25\text{V}$, $T_{amb} = 100^{\circ}\text{C}$ |
| Emitter-base cut-off current | I_{EBO} | | <-1 | -50 | nA | $V_{EB} = -5.6\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | -37 | -44 | mV | $I_C = -1\text{A}$, $I_B = -100\text{mA}^{(*)}$ |
| | | | -90 | -125 | mV | $I_C = -1\text{A}$, $I_B = -10\text{mA}^{(*)}$ |
| | | | -105 | -140 | mV | $I_C = -2\text{A}$, $I_B = -40\text{mA}^{(*)}$ |
| | | | -160 | -210 | mV | $I_C = -5\text{A}$, $I_B = -250\text{mA}^{(*)}$ |
| | | | -145 | -175 | mV | $I_C = -5.5\text{A}$, $I_B = -550\text{mA}^{(*)}$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | | -975 | -1050 | mV | $I_C = -5.5\text{A}$, $I_B = -550\text{mA}^{(*)}$ |
| Base-emitter turn-on voltage | $V_{BE(on)}$ | | -830 | -900 | mV | $I_C = -5.5\text{A}$, $V_{CE} = -2\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 300 | 450 | 900 | | $I_C = -100\text{mA}$, $V_{CE} = -2\text{V}^{(*)}$ |
| | | 200 | 310 | | | $I_C = -2\text{A}$, $V_{CE} = -2\text{V}^{(*)}$ |
| | | 85 | 130 | | | $I_C = -5.5\text{A}$, $V_{CE} = -2\text{V}^{(*)}$ |
| | | 25 | 50 | | | $I_C = -10\text{A}$, $V_{CE} = -2\text{V}^{(*)}$ |
| | | | 20 | | | $I_C = -15\text{A}$, $V_{CE} = -2\text{V}^{(*)}$ |
| Transition frequency | f_T | | 176 | | MHz | $I_C = -50\text{mA}$, $V_{CE} = -10\text{V}$ $f = 50\text{MHz}$ |
| Input capacitance | C_{ibo} | | | 400 | pF | $V_{EB} = -0.5\text{V}$, $f = 1\text{MHz}^{(*)}$ |
| Output capacitance | C_{obo} | | 36 | 45 | pF | $V_{CB} = -10\text{V}$, $f = 1\text{MHz}^{(*)}$ |
| Delay time | t_d | | 23 | | ns | $I_C = -1\text{A}$, $V_{CC} = -10\text{V}$ $I_{B1} = -I_{B2} = -50\text{mA}$. |
| Rise time | t_r | | 18.4 | | ns | |
| Storage time | t_s | | 266 | | ns | |
| Fall time | t_f | | 49.6 | | ns | |

NOTES:

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

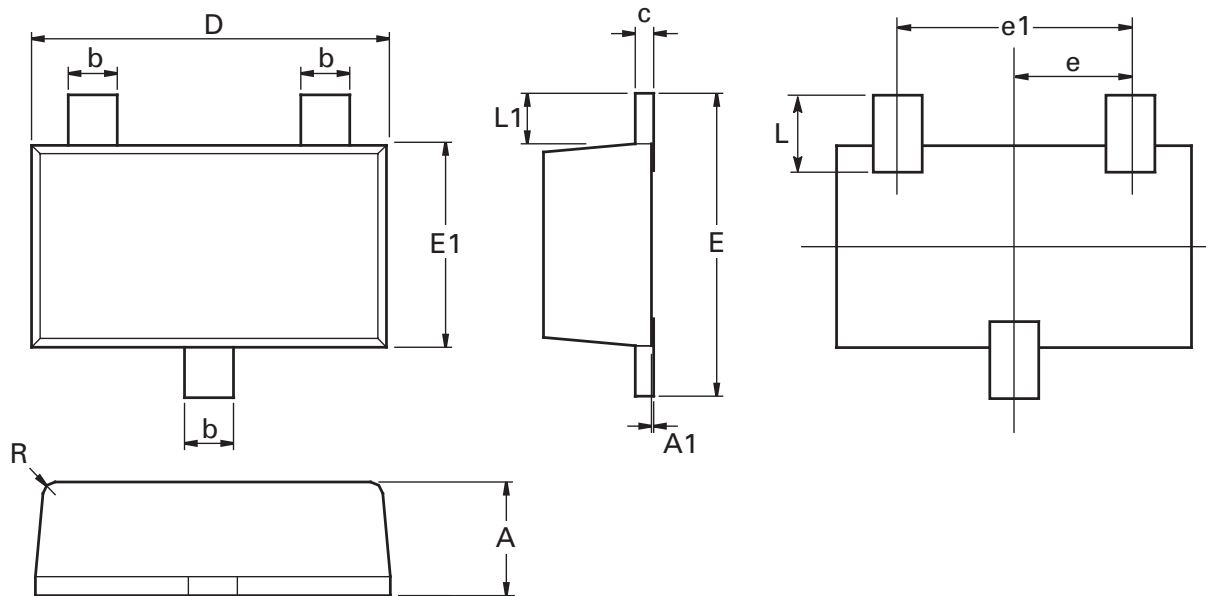
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Typical characteristics



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SOT23F Package outline



| Dim. | Millimeters | | Inches | | Dim. | Millimeters | | Inches | |
|------|-------------|------|------------|--------|------|-------------|------|--------|--------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | 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 | L | 0.48 | 0.68 | 0.0189 | 0.0268 |
| c | 0.10 | 0.20 | 0.0043 | 0.0079 | L1 | 0.30 | 0.50 | 0.0153 | 0.0161 |
| D | 2.80 | 3.00 | 0.1102 | 0.1181 | R | 0.05 | 0.15 | 0.0019 | 0.0059 |
| e | 0.95 ref | | 0.0374 ref | | O | 0° | 12° | 0° | 12° |
| e1 | 1.80 | 2.00 | 0.0709 | 0.0787 | - | - | - | - | - |

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

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ZXTP19020DFF

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