

ZXTP05120HFF

120V, SOT23F, PNP medium power Darlington transistor

Summary

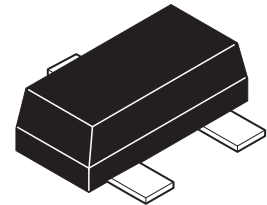
$BV_{CEO} > -120V$

$I_{C(cont)} = -1A$

$V_{CE(sat)} < 1.1V @ 1A$

$P_D = 1.5W$

Complementary part number ZXTN04120HFF



Description

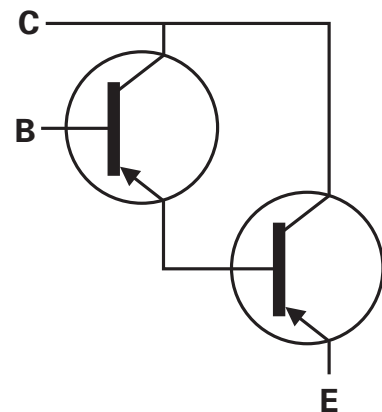
This high performance PNP Darlington transistor is housed in the small outline SOT23 flat package for applications where space is at a premium.

Features

- Darlington transistor
- 120 volt
- 1 amp continuous rating
- Small outline surface mount SOT23 flat package

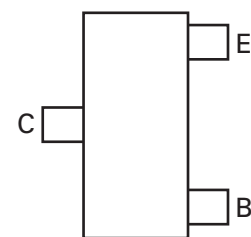
Applications

- High side drivers



Ordering information

| DEVICE | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------------------|-----------------|-------------------|
| ZXTP05120HFFTA | 7 | 8 | 3000 |



Pinout - top view

Device marking

1F7

ZXTP05120HFF

Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|-------|
| Collector-base voltage | V_{CBO} | -140 | V |
| Collector-emitter voltage | V_{CEO} | -120 | V |
| Emitter-base voltage | V_{EBO} | -10 | V |
| Continuous collector current (c) | I_C | -1 | A |
| Peak pulse current | I_{CM} | -4 | A |
| Base current | I_B | -0.5 | A |
| Power dissipation @ $T_{amb} = 25^\circ\text{C}^{(a)}$ | P_D | 0.84 | W |
| Linear derating factor | | 6.72 | mW/°C |
| Power dissipation @ $T_{amb} = 25^\circ\text{C}^{(b)}$ | P_D | 1.34 | W |
| Linear derating factor | | 10.72 | mW/°C |
| Power dissipation @ $T_{amb} = 25^\circ\text{C}^{(c)}$ | P_D | 1.50 | W |
| Linear derating factor | | 12.0 | mW/°C |
| Power dissipation @ $T_{amb} = 25^\circ\text{C}^{(d)}$ | P_D | 2.0 | W |
| Linear derating factor | P_D | 16.0 | mW/°C |
| Operating and storage temperature range | T_j, T_{stg} | -55 to 150 | °C |

Thermal resistance

| Parameter | Symbol | Limit | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 149 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 93 | °C/W |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 83 | °C/W |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 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.

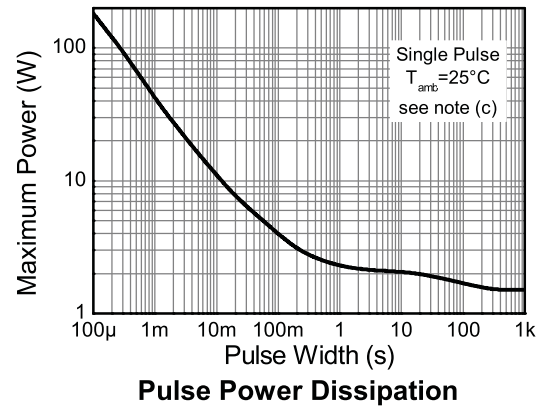
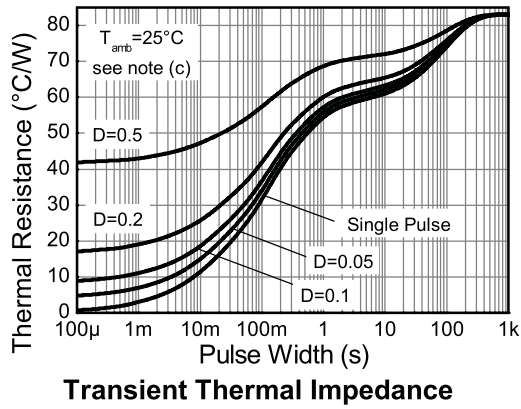
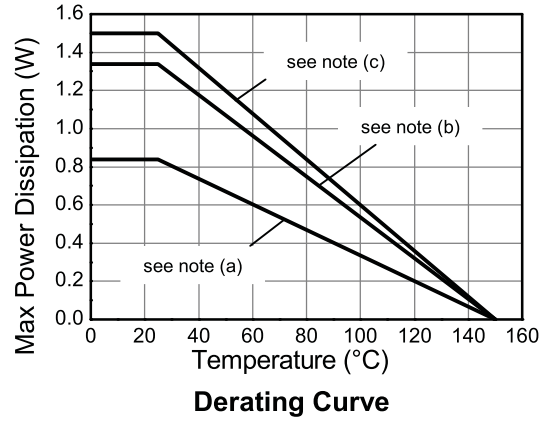
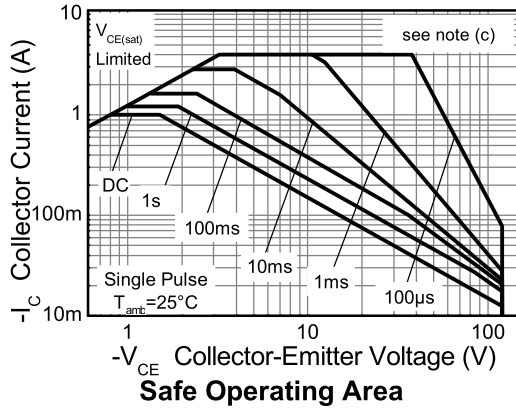
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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 $t < 5$ secs.

ZXTP05120HFF

Characteristics



ZXTP05120HFF

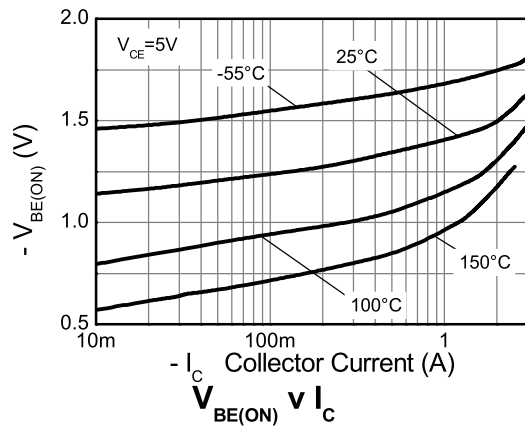
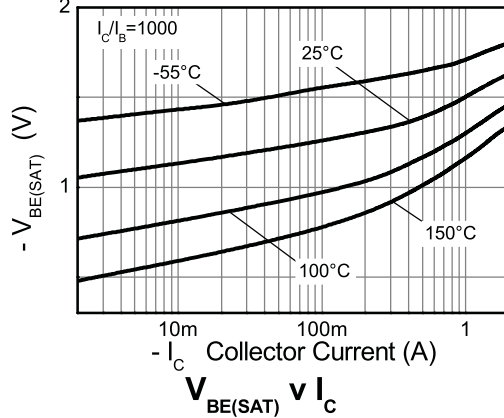
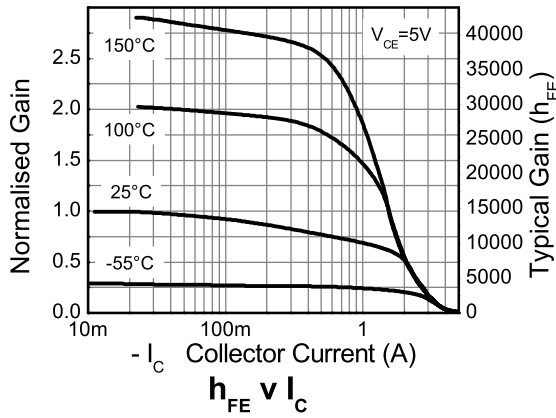
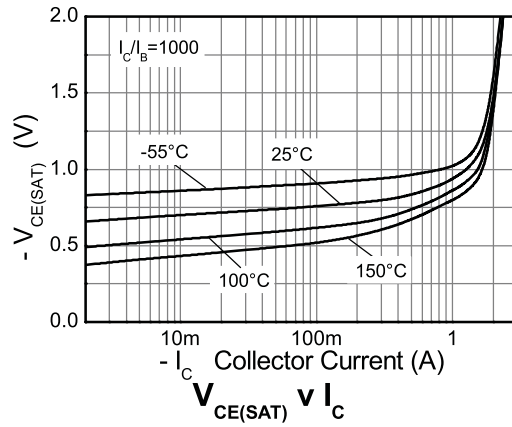
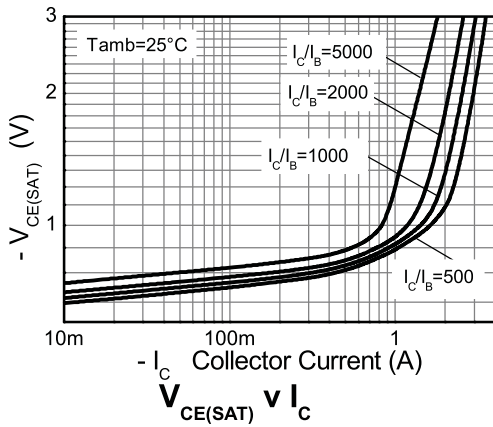
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---------------|----------------------|-------------------------|----------------------|---------------------|---|
| Collector-base breakdown voltage | BV_{CBO} | -140 | -170 | | V | $I_C = -100\mu\text{A}$ |
| Collector-emitter breakdown voltage (base open) | BV_{CEO} | -120 | -140 | | V | $I_C = -10\text{mA}^{(*)}$ |
| Emitter-base breakdown voltage | BV_{EBO} | -10 | -16 | | V | $I_E = -100\mu\text{A}$ |
| Collector-base cut-off current | I_{CBO} | | <-1 | -100 -10 | nA μA | $V_{CB} = -120\text{V}$ $V_{CB} = -120\text{V}, T_{amb} = 100^{\circ}\text{C}$ |
| Collector-emitter cut-off current | I_{CES} | | <-0.1 | -10 | μA | $V_{CB} = -120\text{V}$ |
| Emitter-base cut-off current | I_{EBO} | | <-1 | -100 | nA | $V_{EB} = -8\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | -0.77 -0.9 -1.3 | -0.9 -1.1 -2.0 | V V V | $I_C = 250\text{mA}, I_B = 0.25\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -1\text{mA}^{(*)}$ $I_C = -2\text{A}, I_B = -2\text{mA}^{(*)}$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | | -1.5 | -1.7 | V | $I_C = -1\text{A}, I_B = -1\text{mA}^{(*)}$ |
| Base-emitter turn-on voltage | $V_{BE(on)}$ | | -1.4 | -1.7 | V | $I_C = -1\text{A}, V_{CE} = -5\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 3K 3K 3K 2K | 14k 11k 10k 8k | 30K | | $I_C = -50\text{mA}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -500\text{mA}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -2\text{A}, V_{CE} = -5\text{V}^{(*)}$ |
| Transition frequency | f_T | | 150 | | MHz | $I_C = -100\text{mA}, V_{CE} = -10\text{V}$ $f = 20\text{MHz}$ |
| Output capacitance | C_{ibo} | | 67 | 90 | pF | $V_{EB} = -0.5\text{V}, f = 1\text{MHz}^{(*)}$ |
| Output capacitance | C_{obo} | | 22 | 40 | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$ |
| Delay time | t_d | | 556 | | ns | $V_{CC} = -10\text{V}.$ |
| Rise time | t_r | | 212 | | ns | $I_C = -0.5\text{A},$ |
| Storage time | t_s | | 681 | | ns | $I_{B1} = I_{B2} = -0.5\text{mA}.$ |
| Fall time | t_f | | 304 | | ns | |

NOTES:

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

Typical characteristics

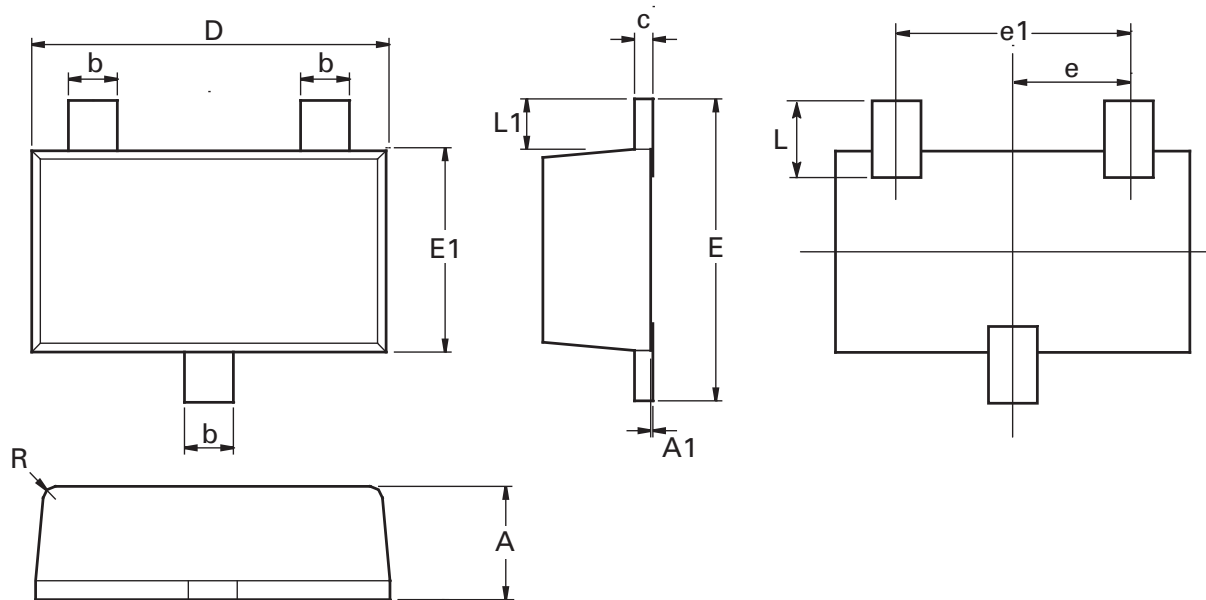


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Package outline - SOT23F



| 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

ZXTP05120HFF

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