

ZXTN04120HFF

120V, SOT23F, NPN medium power Darlington transistor

Summary

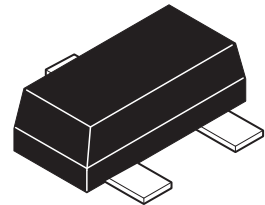
$BV_{CEO} > 120V$

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

$V_{CE(sat)} < 1.5V @ 1A$

$P_D = 1.5W$

Complementary part number ZXTP05120HFF

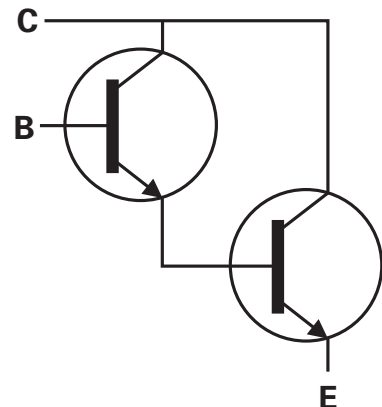


Description

This high performance NPN 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

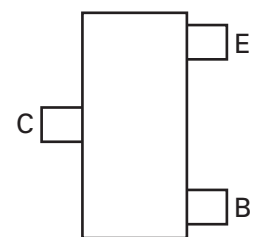


Applications

- Lamp, relay and solenoid drive
- Lighting

Ordering information

| Device | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------------------|-----------------|-------------------|
| ZXTN04120HFFTA | 7 | 8 | 3000 |



Pinout - top view

Device marking

1F6

ZXTN04120HFF

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 @ $T_{amb} = 25^{\circ}C^{(a)}$ | P_D | 0.84 | W |
| Linear derating factor | | 6.72 | mW/ $^{\circ}C$ |
| Power dissipation @ $T_{amb} = 25^{\circ}C^{(b)}$ | P_D | 1.34 | W |
| Linear derating factor | | 10.72 | mW/ $^{\circ}C$ |
| Power dissipation @ $T_{amb} = 25^{\circ}C^{(c)}$ | P_D | 1.5 | W |
| Linear derating factor | | 12.0 | mW/ $^{\circ}C$ |
| Power dissipation @ $T_{amb} = 25^{\circ}C^{(d)}$ | P_D | 2.0 | W |
| Linear derating factor | | 16.0 | mW/ $^{\circ}C$ |
| Operating and storage temperature range | T_j, T_{stg} | - 55 to 150 | $^{\circ}C$ |

Thermal resistance

| Parameter | Symbol | Limit | Unit |
|------------------------------------|-----------------|-------|---------------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 149 | $^{\circ}C/W$ |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 93 | $^{\circ}C/W$ |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 83 | $^{\circ}C/W$ |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 60 | $^{\circ}C/W$ |

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.

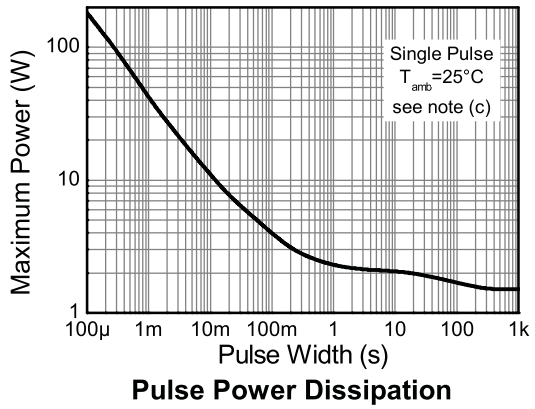
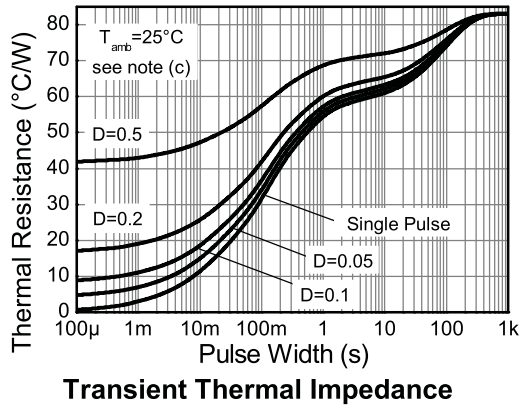
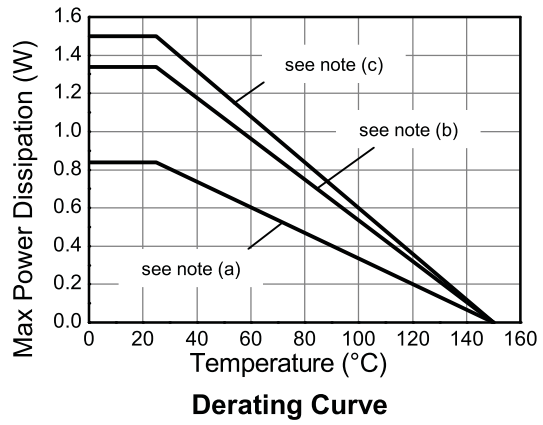
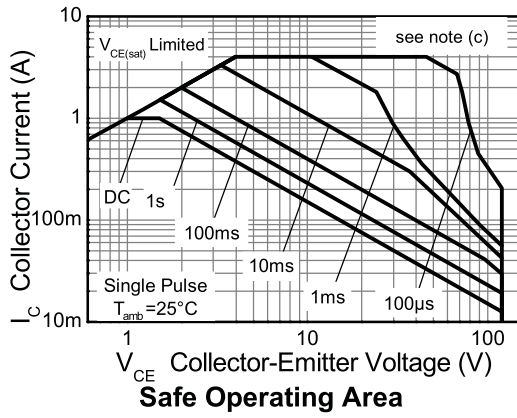
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2oz copper in still air conditions.

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

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

ZXTN04120HFF

Characteristics



ZXTN04120HFF

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

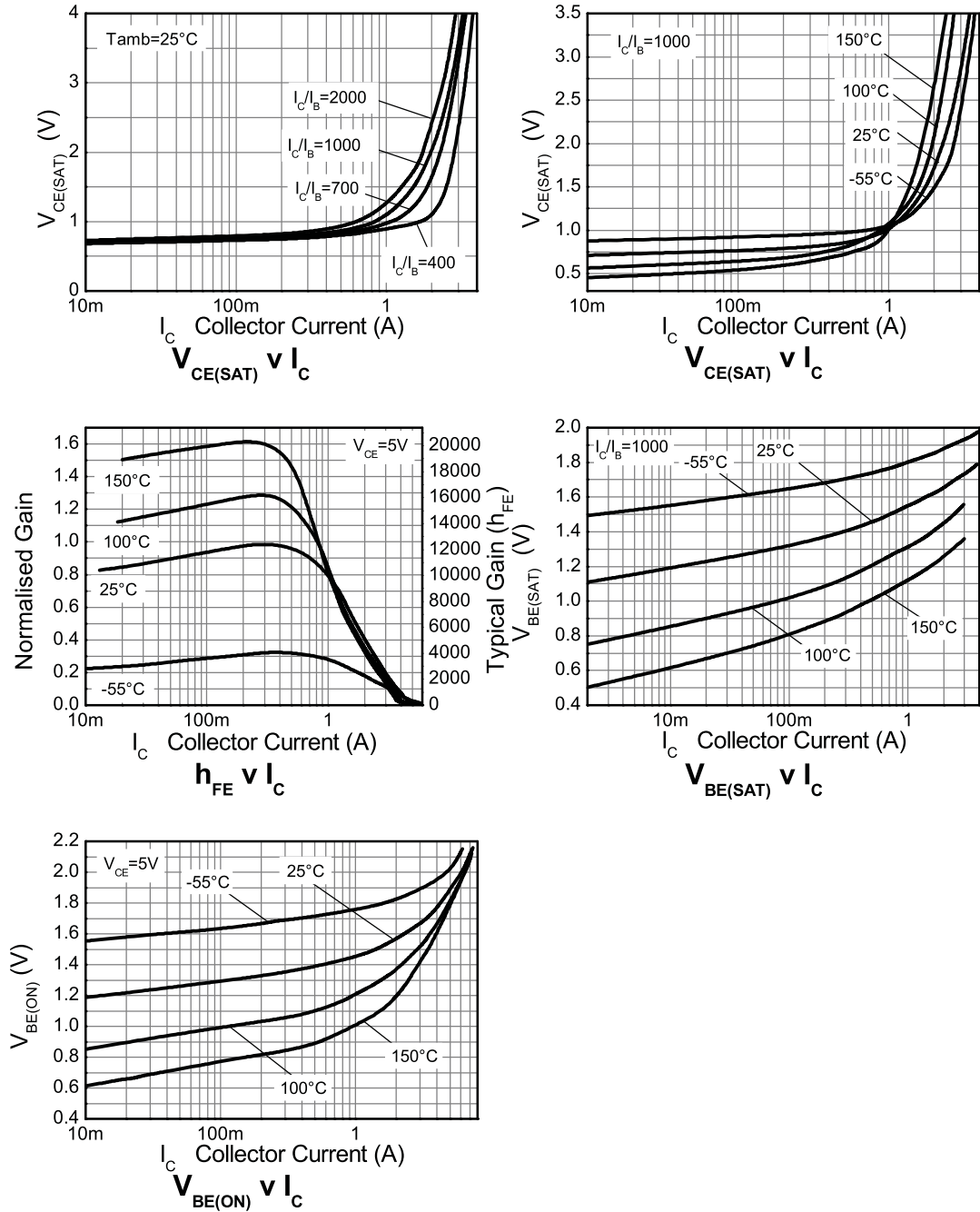
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---------------|----------------------|-------------------------|-------------------|---------------------|---|
| Collector-base breakdown voltage | BV_{CBO} | 140 | 300 | | V | $I_C = 100\mu\text{A}$ |
| Collector-emitter breakdown 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 | $V_{CE} = 120\text{V}$ |
| Emitter-base cut-off current | I_{EBO} | | <1 | 100 | nA | $V_{EB} = 8\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 0.8 1.1 1.1 | 0.9 1.5 1.5 | V V V | $I_C = 250\text{mA}, I_B = 0.25\text{mA}^{(*)}$ $I_C = 1\text{A}, I_B = 1\text{mA}^{(*)}$ $I_C = 2\text{A}, I_B = 5\text{mA}^{(*)}$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | | 1.55 | 1.70 | V | $I_C = 1\text{A}, I_B = 1\text{mA}^{(*)}$ |
| Base-emitter turn-on voltage | $V_{BE(on)}$ | | 1.45 | 1.70 | V | $I_C = 1\text{A}, V_{CE} = 5\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 3K 3K 3K 1K | 11k 12k 10k 5k | 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 | | 120 | | MHz | $I_C = 100\text{mA}, V_{CE} = 10\text{V}$ $f = 20\text{MHz}$ |
| Input capacitance | C_{ibo} | | 68 | 90 | pF | $V_{EB} = 500\text{mV}, f = 1\text{MHz}^{(*)}$ |
| Output capacitance | C_{obo} | | 12.8 | 25 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}^{(*)}$ |
| Delay time | t_d | | 507 | | ns | $V_{CC} = 10\text{V}$ |
| Rise time | t_r | | 136 | | ns | $I_C = 500\text{mA},$ |
| Storage time | t_s | | 910 | | ns | $I_{B1} = I_{B2} = 0.5\text{mA}$ |
| Fall time | t_f | | 369 | | ns | |

NOTES:

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

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Typical characteristics

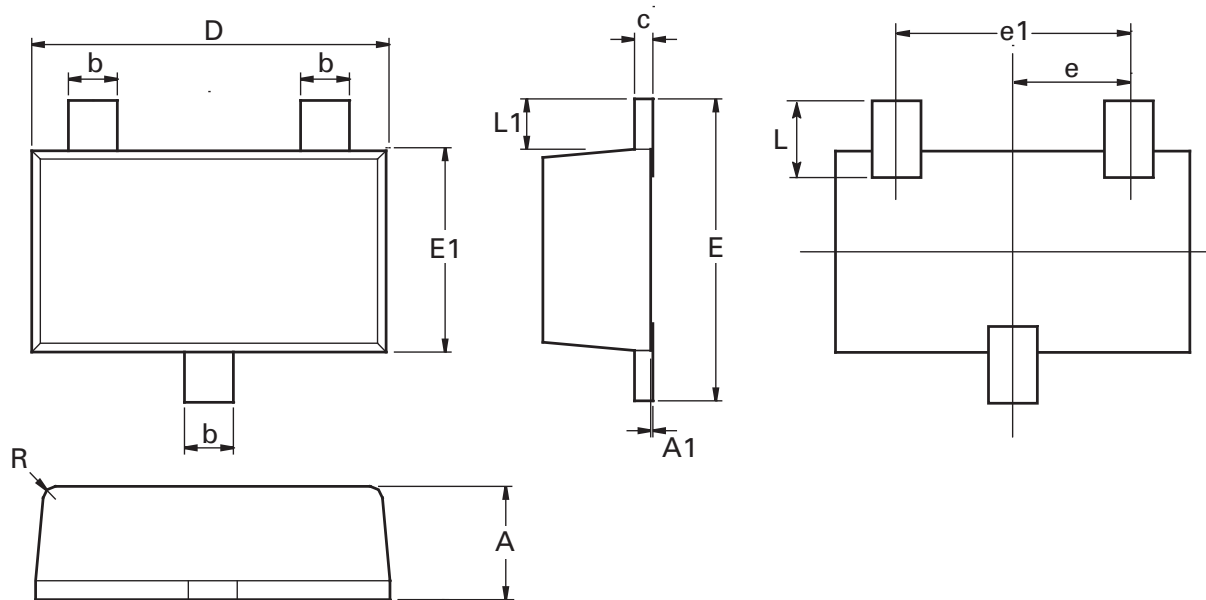


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Package outline - SOT23F



| 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

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| | |
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