

ZXTN25020DFH

20V SOT23 NPN medium power transistor

Summary

$BV_{CEX} > 100V$; $BV_{(BR)CEO} > 20V$

$BV_{ECO} > 5V$;

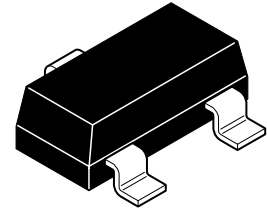
$I_{C(Cont)} = 4.5A$

$R_{CE(sat)} = 28\ m\Omega$ typical

$V_{CE(sat)} < 43\ mV$ @ 1A;

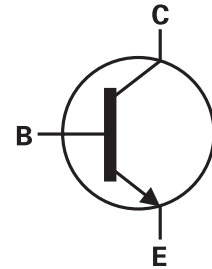
$P_D = 1.25W$

Complementary part number ZXTP25020DFH



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.

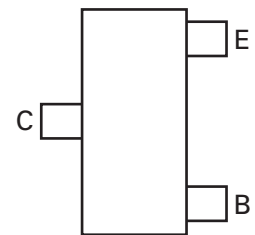


Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 100V forward blocking voltage
- 5V reverse blocking voltage

Applications

- DC - DC converters
- MOSFET and IGBT gate driving
- LED driver
- Motor drive
- Relay, lamp and solenoid drive



Pinout - top view

Ordering information

| Device | Reel size (inches) | Tape width | Quantity per reel |
|----------------|--------------------|------------|-------------------|
| ZXTN25020DFHTA | 7 | 8mm | 3000 |

Device marking

016

ZXTN25020DFH

Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|--|----------------|--------------|------------|
| Collector-base voltage | V_{CBO} | 100 | V |
| Collector-emitter voltage (forward blocking) | V_{CEX} | 100 | 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 ^(c) | I_C | 4.5 | A |
| Peak pulse current | I_{CM} | 15 | A |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(a) Linear Derating Factor | P_D | 0.73 5.84 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(b) Linear derating factor | P_D | 1.05 8.4 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(c) Linear derating factor | P_D | 1.25 9.6 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(d) Linear derating factor | P_D | 1.81 14.5 | W 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) | $R_{\theta JA}$ | 171 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 119 | °C/W |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 100 | °C/W |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 69 | °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.

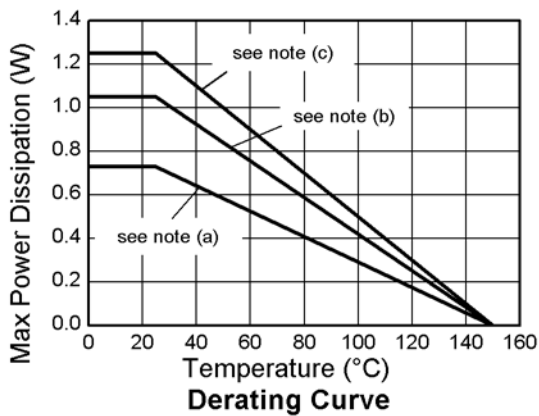
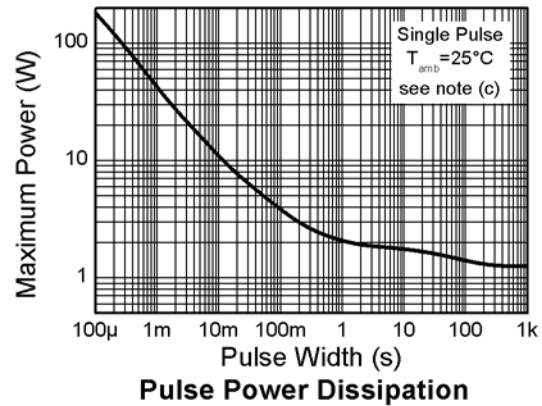
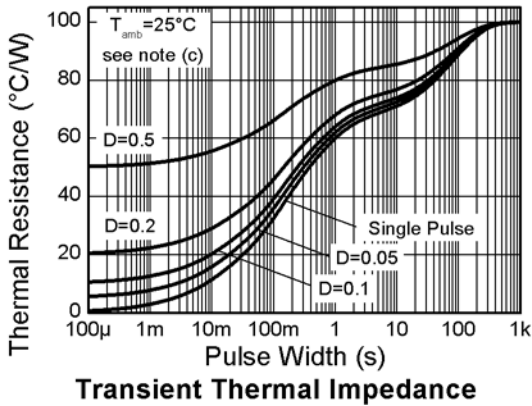
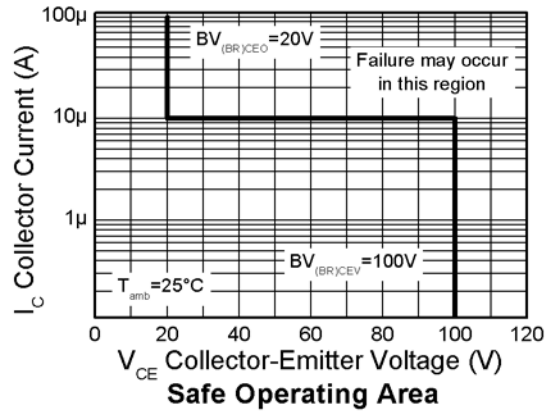
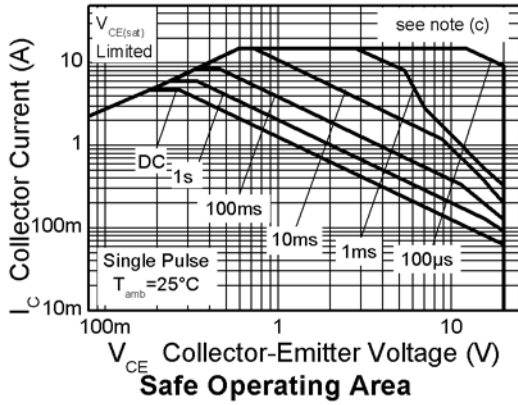
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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.

ZXTN25020DFH

Characteristics



ZXTN25020DFH

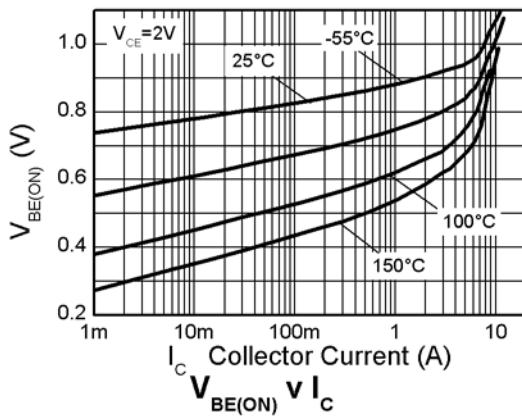
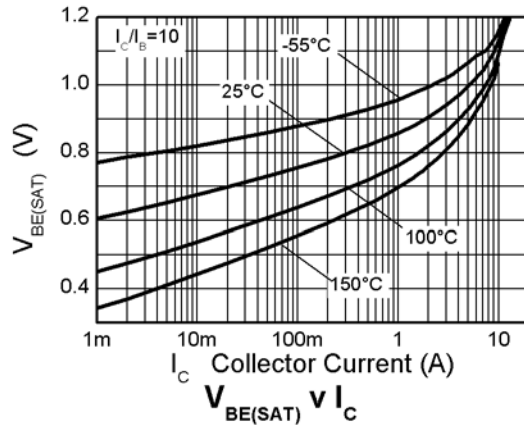
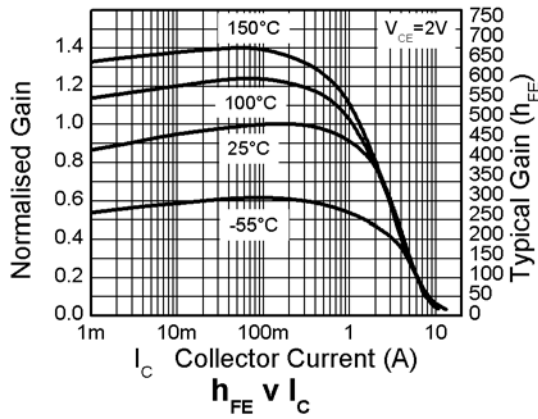
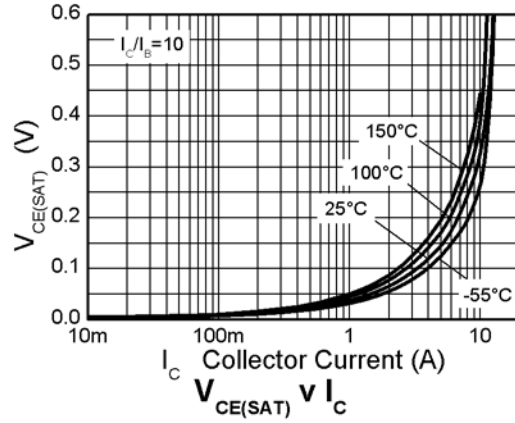
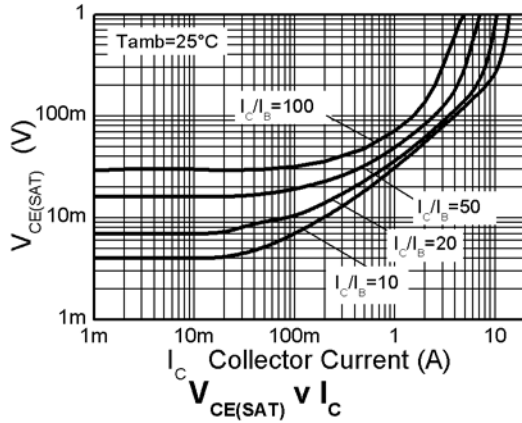
Electrical characteristics (at $T_{AMB} = 25^{\circ}\text{C}$ unless otherwise stated)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------|-------------------|-------------------------------------|--------------------------------------|----------------------------------|--|
| Collector base breakdown voltage | BV_{CBO} | 100 | 125 | | V | $I_C = 100\mu\text{A}$ |
| Collector emitter breakdown voltage (forward blocking) | BV_{CEX} | 100 | 120 | | | $I_C = 100\mu\text{A}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Collector emitter breakdown voltage (base open) | BV_{CEO} | 20 | 35 | | V | $I_C = 10\text{mA}^{(*)}$ |
| Emitter-collector breakdown voltage (reverse blocking) | BV_{ECX} | 6 | 8 | | 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 | 6 | | V | $I_E = 100\text{mA}$, |
| Emitter base breakdown voltage | BV_{EBO} | 7 | 8.3 | | V | $I_E = 100\text{mA}$ |
| Collector cut-off current | I_{CBO} | | <1 | 50 20 | nA μA | $V_{CB} = 80\text{V}$ $V_{CB} = 80\text{V}$, $T_{AMB} = 100^{\circ}\text{C}$ |
| Collector emitter cut-off current | I_{CEX} | | - | 100 | nA | $V_{CE} = 80\text{V}$; $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Emitter cut-off current | I_{EBO} | | <1 | 50 | nA | $V_{EB} = 5.6\text{V}$ |
| Collector emitter saturation voltage | $V_{CE(sat)}$ | | 35 55 90 125 125 205 | 43 70 110 170 150 265 | mV mV mV mV mV mV | $I_C = 1\text{A}$, $I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 4.5\text{A}$, $I_B = 450\text{mA}^{(*)}$ $I_C = 4.5\text{A}$, $I_B = 90\text{mA}^{(*)}$ |
| Base emitter saturation voltage | $V_{BE(sat)}$ | | 900 | 1000 | mV | $I_C = 4.5\text{A}$, $I_B = 90\text{mA}^{(*)}$ |
| Base emitter turn-on voltage | $V_{BE(on)}$ | | 820 | 900 | mV | $I_C = 4.5\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 300 250 120 | 450 380 170 15 | 900 | | $I_C = 10\text{mA}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 4.5\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ |
| Transition frequency | f_T | | 215 | | MHz | $I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$ |
| Output capacitance | C_{OBO} | | 16.5 | | pF | $V_{CB} = 10\text{V}$, $f = 1\text{MHz}^{(*)}$ |
| Turn-on time | $t_{(on)}$ | | 140 | | ns | $V_{CC} = 10\text{V}$. $I_C = 1\text{A}$, $I_{B1} = I_{B2} = 10\text{mA}$. |
| Turn-off time | $t_{(off)}$ | | 425 | | ns | |

NOTES:

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

Characteristics



ZXTN25020DFH

Package outline - SOT23



| Dim. | Millimeters | | Inches | | Dim. | Millimeters | | Inches | |
|------|-------------|------|-----------|--------|------|-------------|------|------------|--------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Max. | Max. |
| A | 2.67 | 3.05 | 0.105 | 0.120 | H | 0.33 | 0.51 | 0.013 | 0.020 |
| B | 1.20 | 1.40 | 0.047 | 0.055 | K | 0.01 | 0.10 | 0.0004 | 0.004 |
| C | - | 1.10 | - | 0.043 | L | 2.10 | 2.50 | 0.083 | 0.0985 |
| D | 0.37 | 0.53 | 0.015 | 0.021 | M | 0.45 | 0.64 | 0.018 | 0.025 |
| F | 0.085 | 0.15 | 0.0034 | 0.0059 | N | 0.95 NOM | | 0.0375 NOM | |
| G | 1.90 NOM | | 0.075 NOM | | - | - | - | - | - |

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

| Europe | Americas | Asia Pacific | Corporate Headquarters |
|---|---|--|--|
| Zetex GmbH Streitfeldstraße 19 D-81673 München Germany | Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA | Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong | Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom |
| Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com | Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com | Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com | Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com |

For international sales offices visit www.zetex.com/offices

Zetex products are distributed worldwide. For details, see www.zetex.com/salesnetwork

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contact or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.