

# ZXTP2029F

## 100V, SOT23, PNP medium power transistor

### Summary

$V_{(BR)CEV} > -130V$ ,  $V_{(BR)CEO} > -100V$

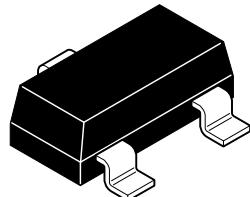
$I_C(\text{cont}) = -3A$

$R_{CE(\text{sat})} = 45m\Omega$  typical

$V_{CE(\text{sat})} < -80mV$  @ -1A

$P_D = 1.2W$

Complementary part number ZXTN2020F

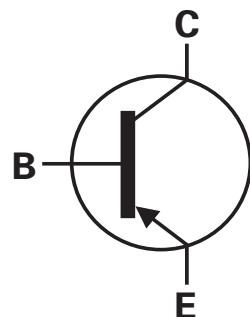


### Description

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.

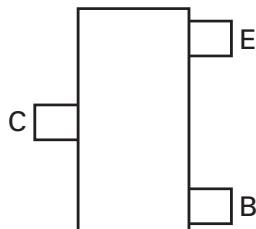
### Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 130V forward blocking voltage



### Applications

- MOSFET and IGBT gate driving
- Motor drive
- DC-DC converters
- High side switches



Pinout - top view

### Ordering information

| Device      | Reel size (inches) | Tape width | Quantity per reel |
|-------------|--------------------|------------|-------------------|
| ZXTP2029FTA | 7                  | 8mm        | 3,000             |

### Device marking

953

**Absolute maximum ratings**

| Parameter   | Symbol        | Limit       | Unit                       |
|---|---------------|-------------|----------------------------|
| Collector-base voltage                                    | $V_{CBO}$     | -130        | V                          |
| Collector-emitter voltage                                 | $V_{(BR)CEV}$ | -130        | V                          |
| Collector-emitter voltage                                 | $V_{CEO}$     | -100        | V                          |
| Emitter-base voltage                                      | $V_{EBO}$     | -7.0        | V                          |
| Peak pulse current  | $I_{CM}$      | -5          | A                          |
| Continuous collector current <sup>(a)</sup>               | $I_C$         | -3          | A                          |
| Base current  | $I_B$         | -1          | A                          |
| Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(a)</sup> | $P_D$         | 1.0         | W                          |
| Linear derating factor                                    |               | 8.0         | $\text{mW}/^\circ\text{C}$ |
| Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(b)</sup> | $P_D$         | 1.2         | W                          |
| Linear derating factor                                    |               | 9.6         | $\text{mW}/^\circ\text{C}$ |
| Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(c)</sup> | $P_D$         | 1.56        | W                          |
| Linear derating factor                                    |               | 12.5        | $\text{mW}/^\circ\text{C}$ |
| Operating and storage temperature                         | $T_J;T_{stg}$ | -55 to +150 | $^\circ\text{C}$           |

**Thermal resistance**

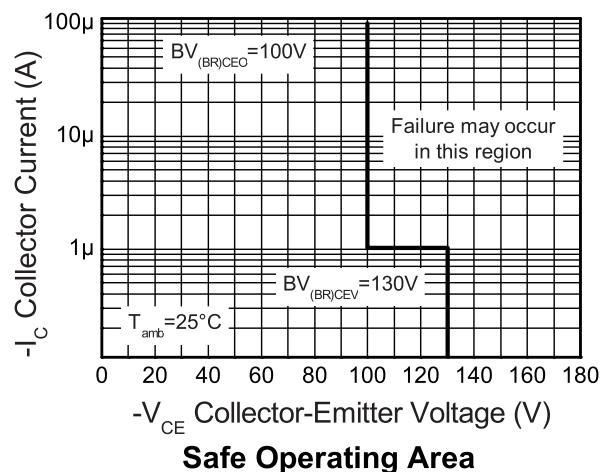
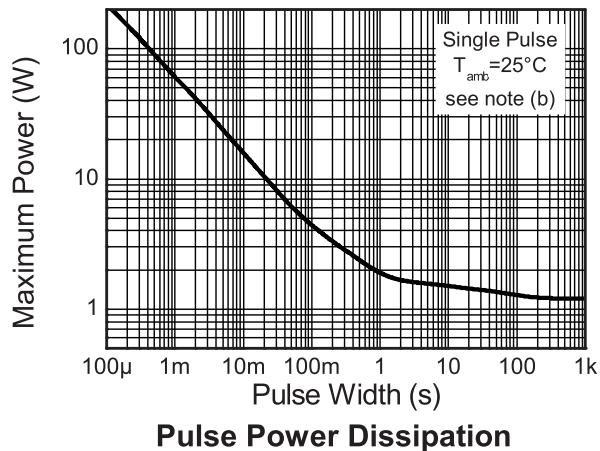
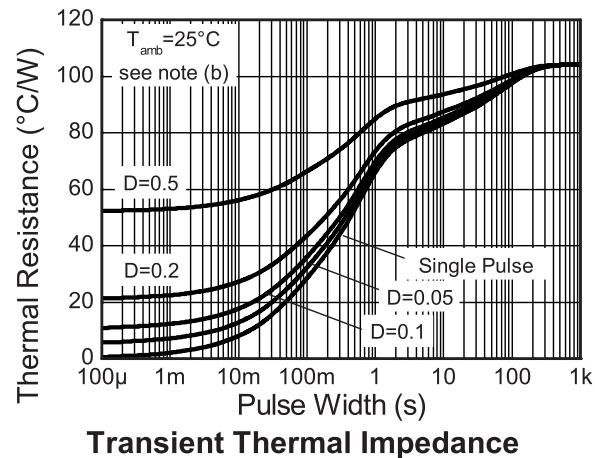
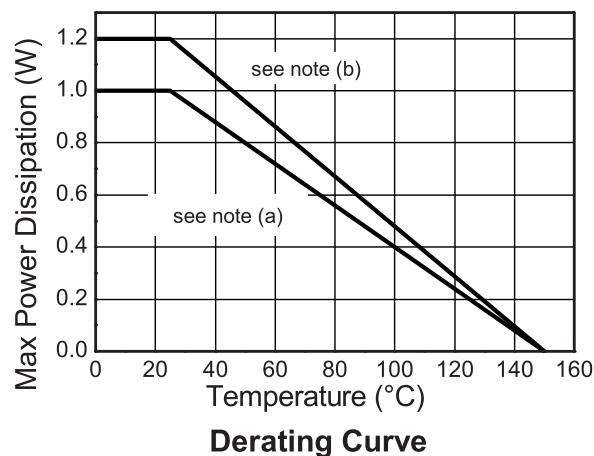
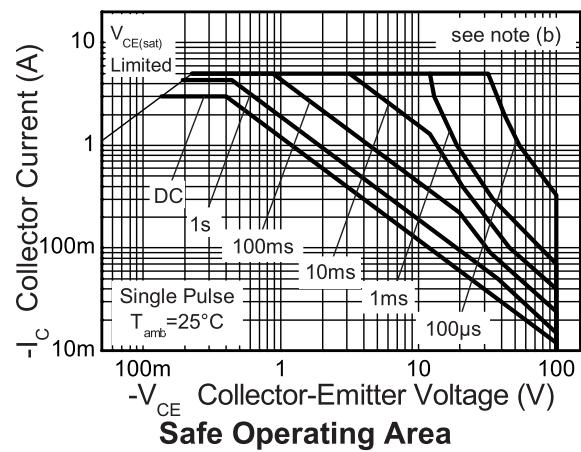
| Parameter                          | Symbol         | Value | Unit                      |
|------------------------------------|----------------|-------|---------------------------|
| Junction to ambient <sup>(a)</sup> | $R\theta_{JA}$ | 125   | $^\circ\text{C}/\text{W}$ |
| Junction to ambient <sup>(b)</sup> | $R\theta_{JA}$ | 104   | $^\circ\text{C}/\text{W}$ |
| Junction to ambient <sup>(c)</sup> | $R\theta_{JA}$ | 80    | $^\circ\text{C}/\text{W}$ |

**NOTES:**

(a) Mounted on 18mm x 18mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.

(b) Mounted on 30mm x 30mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.

(c) As (b) above measured at  $t < 5\text{secs}$ .

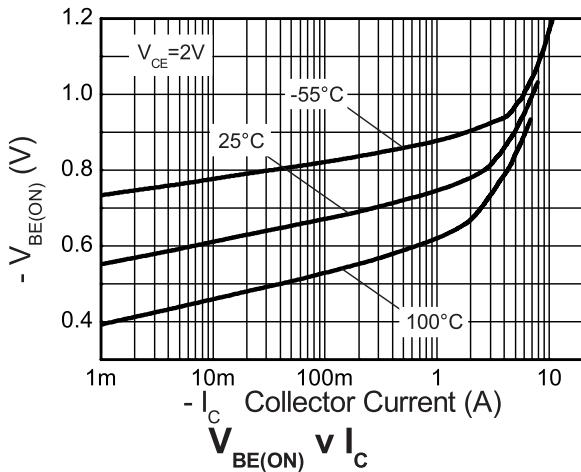
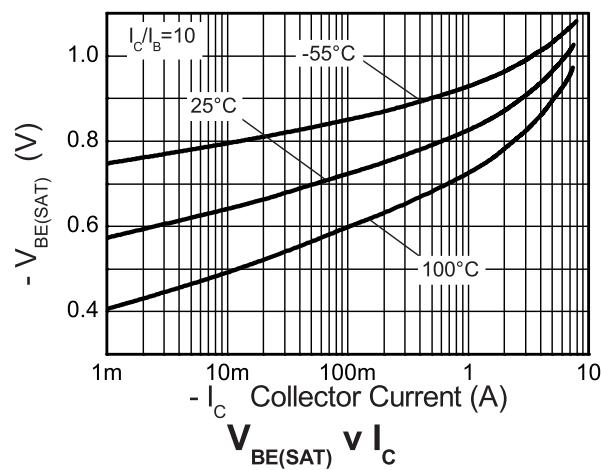
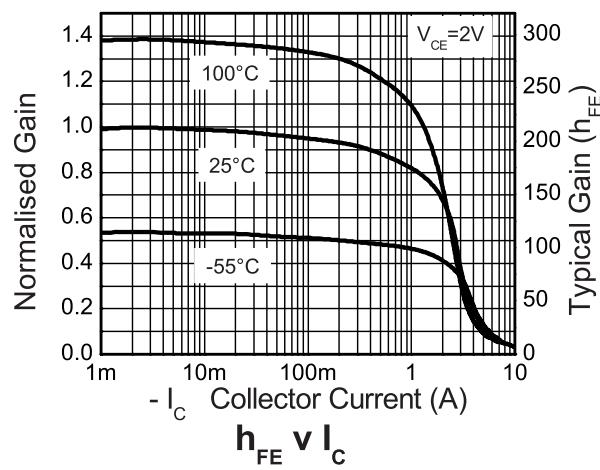
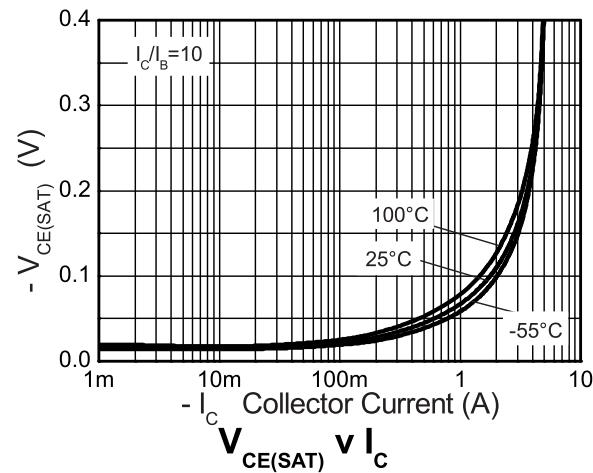
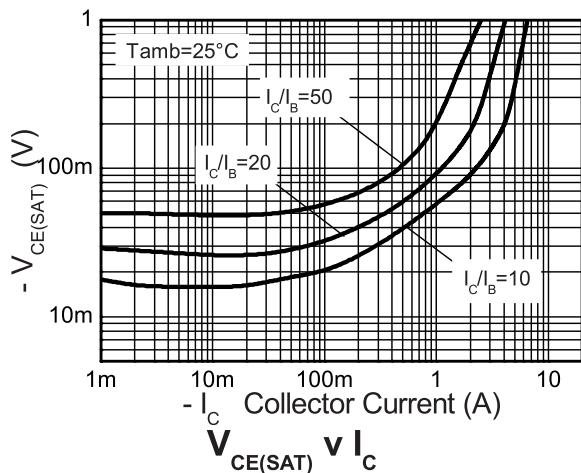
**Characteristics**


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

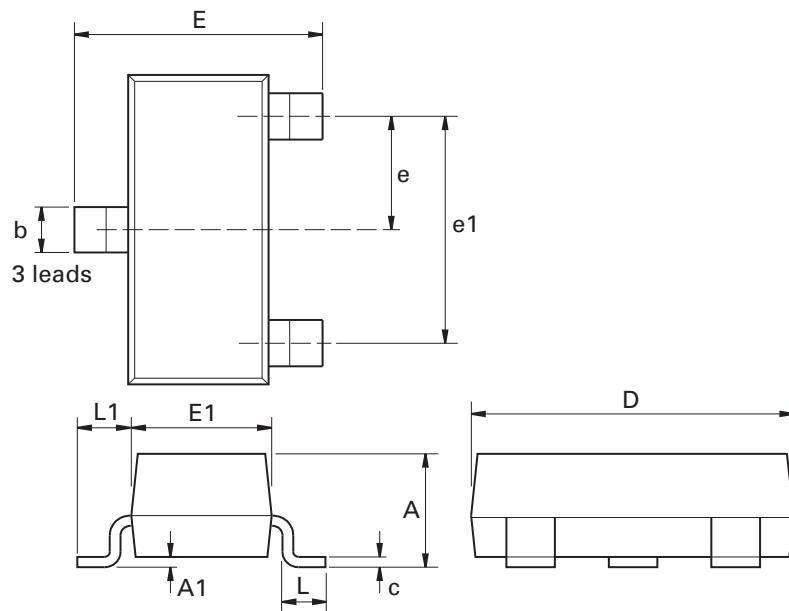
| Parameter                             | Symbol        | Min.             | Typ.                       | Max.                       | Unit | Conditions   |
|---------------------------------------|---------------|------------------|----------------------------|----------------------------|------|--|
| Collector-base breakdown voltage      | $V_{(BR)CBO}$ | -130             | -160                       |                            | V    | $I_C=-100\mu A$  |
| Collector-emitter breakdown voltage   | $V_{(BR)CEV}$ | -130             | -160                       |                            | V    | $I_C=-1\mu A, 1V > V_{BE} > -0.3V$   |
| Collector-emitter breakdown voltage   | $V_{(BR)CEO}$ | -100             | -120                       |                            | V    | $I_C=-10mA^{(a)}$  |
| Emitter-base breakdown voltage        | $V_{(BR)EBO}$ | -7.0             | -8.3                       |                            | V    | $I_E=-100\mu A$  |
| Collector-emitter cut-off current     | $I_{CEV}$     |                  |                            | -20                        | nA   | $V_{CE}=-100V, V_{BE} = 1V$  |
| Collector-base cut-off current        | $I_{CBO}$     |                  |                            | -20                        | nA   | $V_{CB}=-100V$   |
| Emitter-base cut-off current          | $I_{EBO}$     |                  |                            | -10                        | nA   | $V_{EB}=-6V$   |
| Static forward current transfer ratio | $H_{FE}$      | 100<br>100<br>40 | 220<br>200<br>75           | 300                        |      | $I_C=-10mA, V_{CE}=-2V^{(a)}$<br>$I_C=-1A, V_{CE}=-2V^{(a)}$<br>$I_C=-3A, V_{CE}=-2V$                                      |
| Collector-emitter saturation voltage  | $V_{CE(sat)}$ |                  | -20<br>-60<br>-135<br>-180 | -30<br>-80<br>-180<br>-250 | mV   | $I_C=-100mA, I_B=-10mA^{(a)}$<br>$I_C=-1A, I_B=-100mA^{(a)}$<br>$I_C=-3A, I_B=-300mA^{(a)}$<br>$I_C=-4A, I_B=-400mA^{(a)}$ |
| Base-emitter saturation voltage       | $V_{BE(sat)}$ |                  | -0.90                      | -1.00                      | V    | $I_C=-3A, I_B=-300mA^{(a)}$  |
| Base-emitter turn-on voltage          | $V_{BE(on)}$  |                  | -0.81                      | -0.90                      | V    | $I_C=-3A, V_{CE}=-2V^{(a)}$  |
| Transition frequency                  | $f_T$         |                  | 150                        |                            | MHz  | $I_C=-100mA, V_{CE}=-10V, f=50MHz$   |
| Output capacitance                    | $C_{obo}$     |                  | 39                         |                            | pF   | $V_{CB}=-10V, f=1MHz$  |
| Delay timetime                        | $t_{(d)}$     |                  | 21                         |                            | ns   | $V_{CC}=-10V, I_C=-1A, I_B1=I_B2=-100mA$   |
| Rise time                             | $t_{(r)}$     |                  | 12                         |                            | ns   |  |
| Storage time                          | $t_{(stg)}$   |                  | 410                        |                            | ns   |  |
| Fall time                             | $t_{(f)}$     |                  | 35                         |                            | ns   |  |

### NOTES:

(a) Measured under pulsed conditions. Pulse width=300 $\mu S$ . Duty cycle  $\leq 2\%$ .

**Typical characteristics**


Intentionally left blank

**Package outline - SOT23**

| Dim. | Millimeters |      | Inches    |       | Dim. | Millimeters |      | Inches    |        |
|------|-------------|------|-----------|-------|------|-------------|------|-----------|--------|
|      | Min.        | Max. | Min.      | Max.  |      | Min.        | Max. | Min.      | Max.   |
| A    | -           | 1.12 | -         | 0.044 | e1   | 1.90 NOM    |      | 0.075 NOM |        |
| A1   | 0.01        | 0.10 | 0.0004    | 0.004 | E    | 2.10        | 2.64 | 0.083     | 0.104  |
| b    | 0.30        | 0.50 | 0.012     | 0.020 | E1   | 1.20        | 1.40 | 0.047     | 0.055  |
| c    | 0.085       | 0.20 | 0.003     | 0.008 | L    | 0.25        | 0.60 | 0.0098    | 0.0236 |
| D    | 2.80        | 3.04 | 0.110     | 0.120 | L1   | 0.45        | 0.62 | 0.018     | 0.024  |
| e    | 0.95 NOM    |      | 0.037 NOM |       | -    | -           | -    | -         | -      |

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

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|                                   |  |
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| "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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|                       |   |
|-----------------------|---|
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