

# ZXTP25040DFL

## 40V, SOT23, PNP low power transistor

### Summary

$BV_{CEO} > -40V$

$BV_{ECO} > -3V$

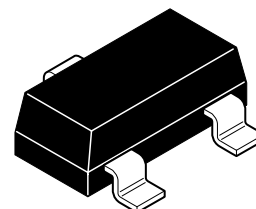
$I_{C(cont)} = -1.5A$

$V_{CE(sat)} < -115mV @ 1A$

$R_{CE(sat)} = 82m\Omega$

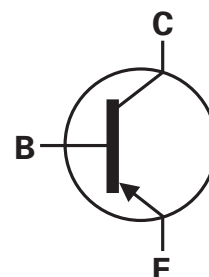
$P_D = 350mW$

Complementary part number ZXTN25040DFL



### Description

Advanced process capability has been used to achieve high current gain hold up making this device ideal for applications requiring high pulse currents.



### Features

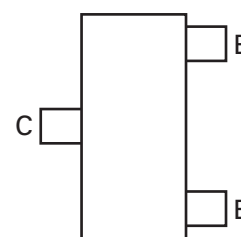
- High peak current
- Low saturation voltage
- 40V forward blocking voltage

### Applications

- MOSFET and IGBT gate driving
- Low power DC-DC conversion

### Ordering information

| Device         | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|--------------------|-----------------|-------------------|
| ZXTP25040DFLTA | 7                  | 8               | 3,000             |



Pinout - top view

### Device marking

1A2

# ZXTP25040DFL

## Absolute maximum ratings

| Parameter                                               | Symbol         | Limit      | Unit  |
|---------------------------------------------------------|----------------|------------|-------|
| Collector-base voltage                                  | $V_{CBO}$      | -45        | V     |
| Collector-emitter voltage (forward blocking)            | $V_{CEO}$      | -40        | V     |
| Emitter-collector voltage (reverse blocking)            | $V_{ECO}$      | -3         | V     |
| Emitter-base voltage                                    | $V_{EBO}$      | -7         | V     |
| Continuous collector current <sup>(a)</sup>             | $I_C$          | -1.5       | A     |
| Base current                                            | $I_B$          | -0.5       | A     |
| Peak pulse current                                      | $I_{CM}$       | -5         | A     |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(a)}$ | $P_D$          | 350        | mW    |
| Linear derating factor                                  |                | 2.8        | mW/°C |
| Operating and storage temperature range                 | $T_j, T_{stg}$ | -55 to 150 | °C    |

## Thermal resistance

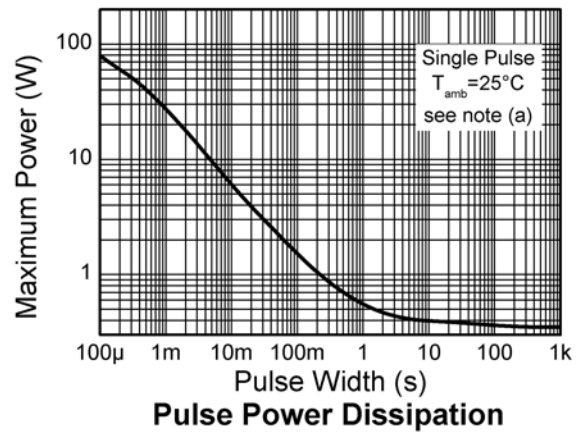
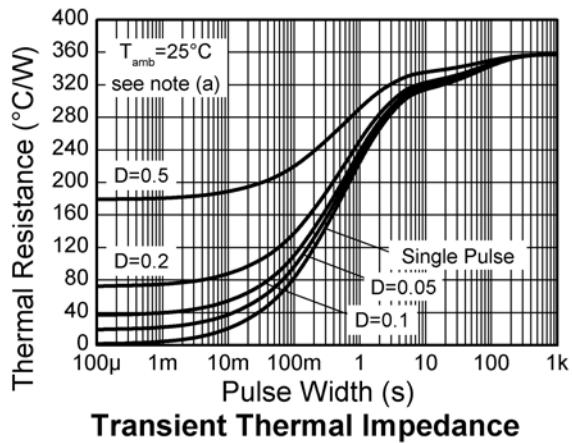
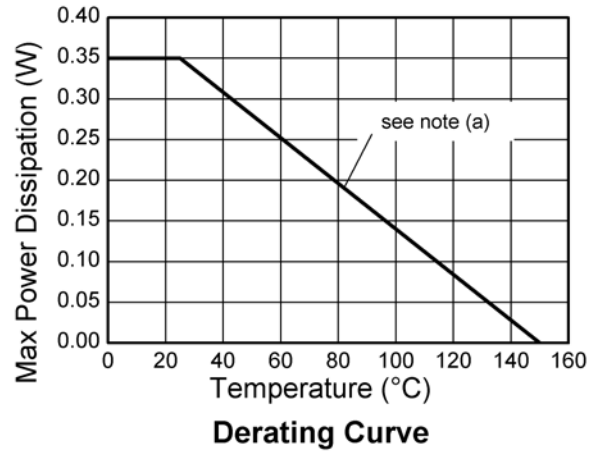
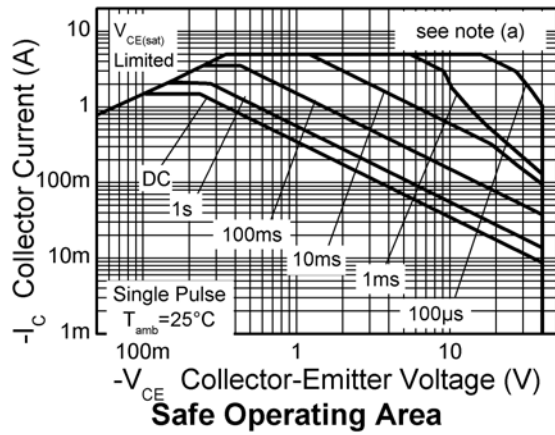
| Parameter                          | Symbol          | Limit | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 357   | °C/W |

### NOTES:

(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

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## Characteristics



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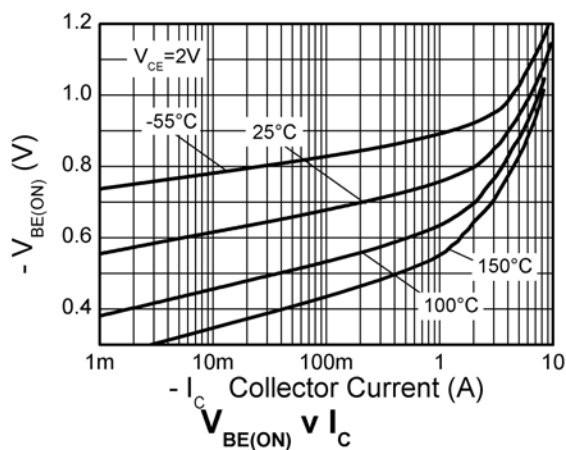
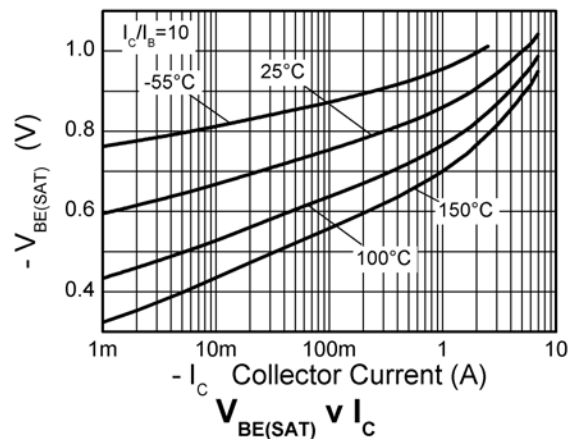
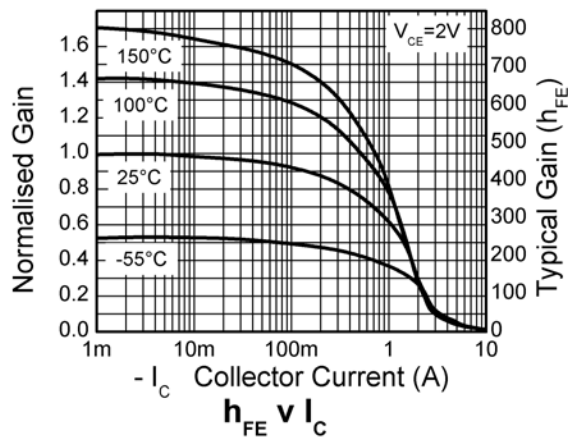
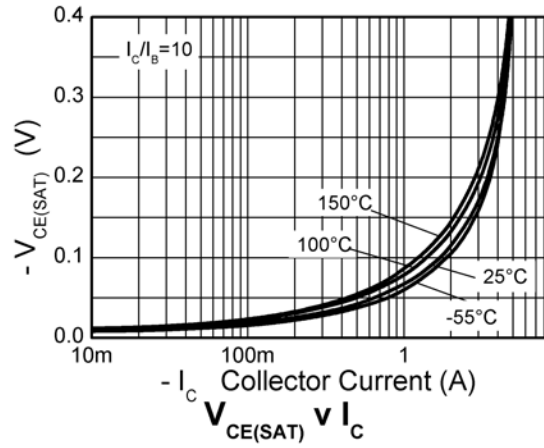
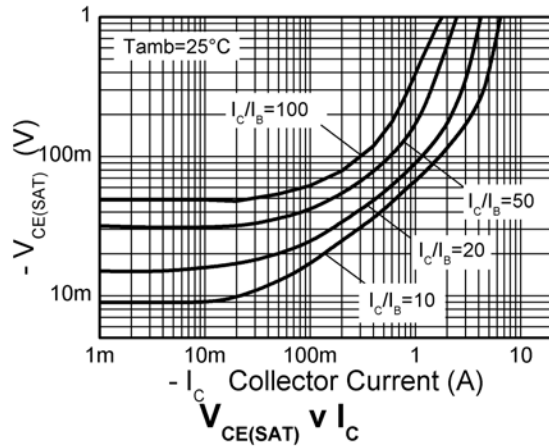
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| Parameter                                              | Symbol        | Min. | Typ. | Max.       | Unit                | Conditions                                                                        |
|--------------------------------------------------------|---------------|------|------|------------|---------------------|-----------------------------------------------------------------------------------|
| Collector-base breakdown voltage                       | $BV_{CBO}$    | -45  | -75  |            | V                   | $I_C = -100\mu\text{A}$                                                           |
| Collector-emitter breakdown voltage (base open)        | $BV_{CEO}$    | -40  | -65  |            | V                   | $I_C = -10\text{mA}^{(*)}$                                                        |
| Emitter-collector breakdown voltage (reverse blocking) | $BV_{ECO}$    | -3   | -8.7 |            | V                   | $I_E = -100\mu\text{A}^{(*)}$                                                     |
| Emitter-base breakdown voltage                         | $BV_{EBO}$    | -7   | -8.2 |            | V                   | $I_E = -100\mu\text{A}$                                                           |
| Collector cut-off current                              | $I_{CBO}$     |      | <-1  | -50<br>-20 | nA<br>$\mu\text{A}$ | $V_{CB} = -36\text{V}$<br>$V_{CB} = -36\text{V}, T_{amb} = 100^{\circ}\text{C}$   |
| Emitter cut-off current                                | $I_{EBO}$     |      | <-1  | -50        | nA                  | $V_{EB} = -5.6\text{V}$                                                           |
| Collector-emitter saturation voltage                   | $V_{CE(sat)}$ |      | -75  | -95        | mV                  | $I_C = -0.5\text{A}, I_B = -20\text{mA}^{(*)}$                                    |
|                                                        |               |      | -200 | -290       | mV                  | $I_C = -1\text{A}, I_B = -20\text{mA}^{(*)}$                                      |
|                                                        |               |      | -95  | -115       | mV                  | $I_C = -1\text{A}, I_B = -100\text{mA}^{(*)}$                                     |
|                                                        |               |      | -160 | -190       | mV                  | $I_C = -1.5\text{A}, I_B = -75\text{mA}^{(*)}$                                    |
|                                                        |               |      | -245 | -300       | mV                  | $I_C = -3\text{A}, I_B = -300\text{mA}^{(*)}$                                     |
| Base-emitter saturation voltage                        | $V_{BE(sat)}$ |      | -915 | -1000      | mV                  | $I_C = -1.5\text{A}, I_B = -75\text{mA}^{(*)}$                                    |
| Base-emitter turn-on voltage                           | $V_{BE(on)}$  |      | -825 | -900       | mV                  | $I_C = -1.5\text{A}, V_{CE} = -2\text{V}^{(*)}$                                   |
| Static forward current transfer ratio                  | $h_{FE}$      | 300  | 450  | 900        |                     | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^{(*)}$                                   |
|                                                        |               | 120  | 200  |            |                     | $I_C = -1.5\text{A}, V_{CE} = -2\text{V}^{(*)}$                                   |
|                                                        |               | 15   | 40   |            |                     | $I_C = -3\text{A}, V_{CE} = -2\text{V}^{(*)}$                                     |
| Transition frequency                                   | $f_T$         |      | 270  |            | MHz                 | $I_C = -50\text{mA}, V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                  |
| Output capacitance                                     | $C_{obo}$     |      | 17.4 | 25         | pF                  | $V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$                                     |
| Delay time                                             | $t_{(d)}$     |      | 34   |            | ns                  | $V_{CC} = -15\text{V}, I_C = -750\text{mA},$<br>$I_{B1} = I_{B2} = -15\text{mA}.$ |
| Rise time                                              | $t_{(r)}$     |      | 41   |            | ns                  |                                                                                   |
| Storage time                                           | $t_{(s)}$     |      | 266  |            | ns                  |                                                                                   |
| Fall time                                              | $t_{(f)}$     |      | 53   |            | ns                  |                                                                                   |

### NOTES:

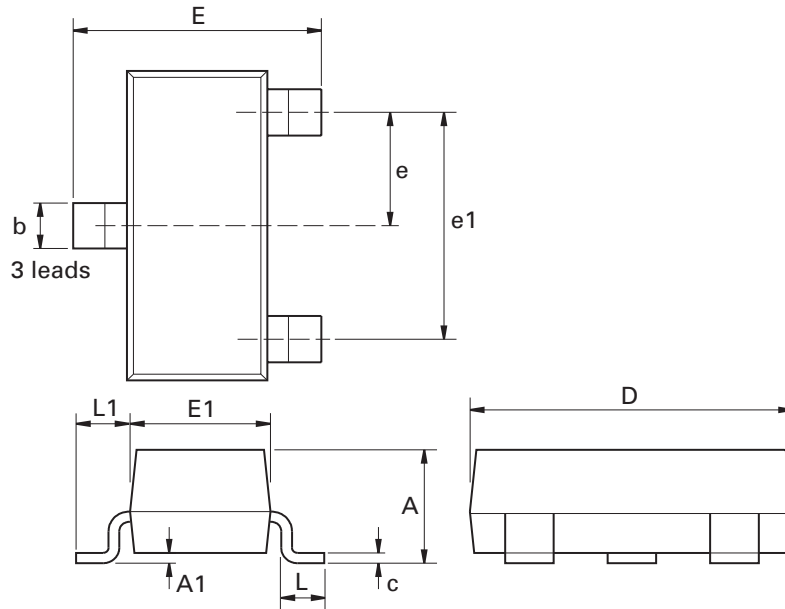
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTP25040DFL

## 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

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# ZXTP25040DFL

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|                                   |                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------|
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| "Active"                          | Product status recommended for new designs                                     |
| "Last time buy (LTB)"             | Device will be discontinued and last time buy period and delivery is in effect |
| "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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