

ZXTP25040DZ

40V PNP medium power transistor in SOT89

Summary

$BV_{CEO} > -40V$

$BV_{ECO} > -3V$

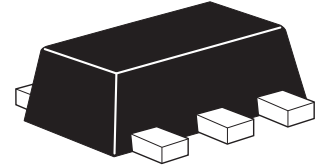
$I_{C(cont)} = -3.5A$

$R_{CE(sat)} = 55m\Omega$

$V_{CE(sat)} < -90mV @ 1A$

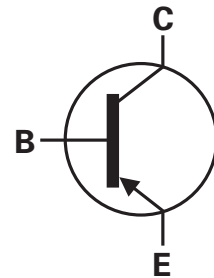
$P_D = 2.4W$

Complementary part number ZXTN25040DZ



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.

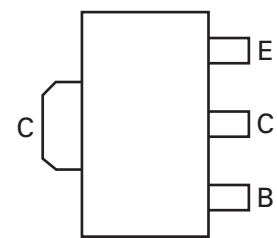


Features

- High power dissipation SOT89 package
- High peak current
- Low saturation voltage
- 3V reverse blocking voltage

Applications

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



Pinout - top view

Ordering information

| Device | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|--------------------|-----------------|-------------------|
| ZXTP25040DZTA | 7 | 12 | 1000 |

Device marking

- 1L6

ZXTP25040DZ

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 ^(c) | I_C | -3 | A |
| Base current | I_B | -1 | A |
| Peak pulse current | I_{CM} | -9 | A |
| Power dissipation at $T_A = 25^\circ\text{C}^{(a)}$ | P_D | 1.1 | W |
| Linear derating factor | | 8.8 | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(b)}$ | P_D | 1.8 | W |
| Linear derating factor | | 14.4 | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(c)}$ | P_D | 2.4 | W |
| Linear derating factor | | 19.2 | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$ | P_D | 4.46 | W |
| Linear derating factor | | 35.7 | mW/°C |
| Power dissipation at $T_C = 25^\circ\text{C}^{(e)}$ | P_D | 15.7 | W |
| Linear derating factor | | 126 | 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) | $R_{\theta JA}$ | 117 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 68 | °C/W |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 51 | °C/W |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 28 | °C/W |
| Junction to case ^(e) | $R_{\theta JC}$ | 7.95 | °C/W |

NOTES:

(a) For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

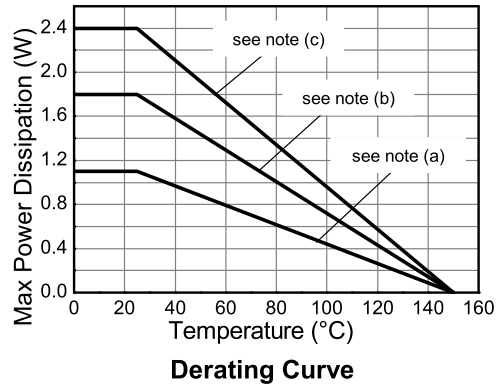
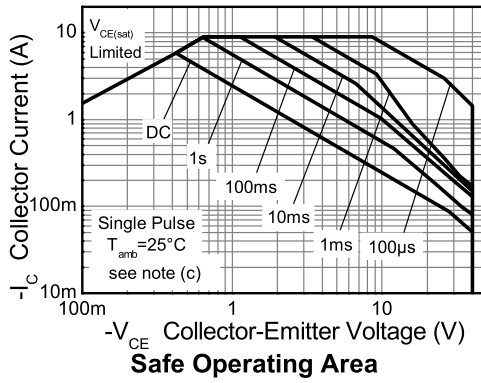
(c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

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

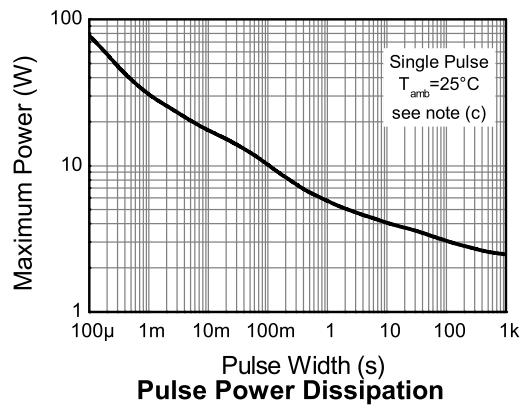
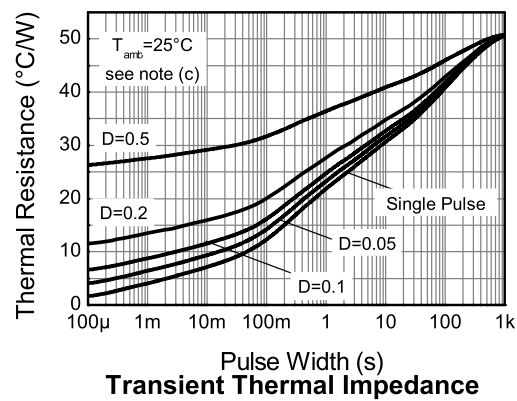
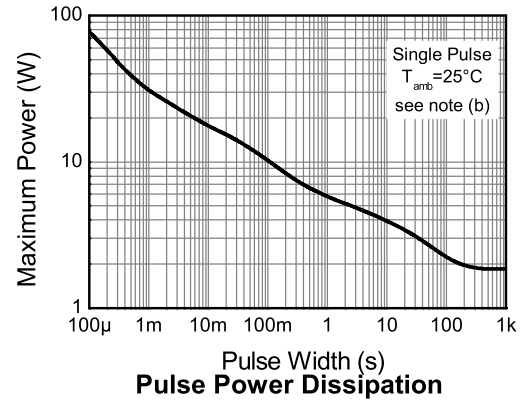
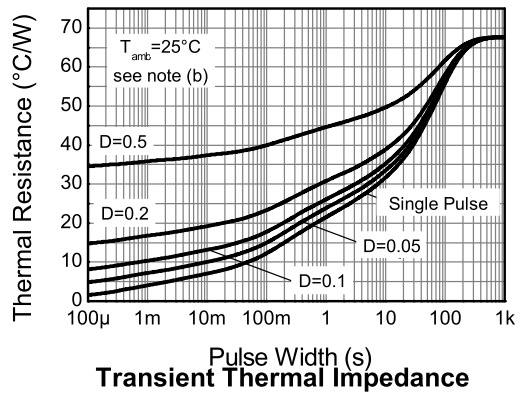
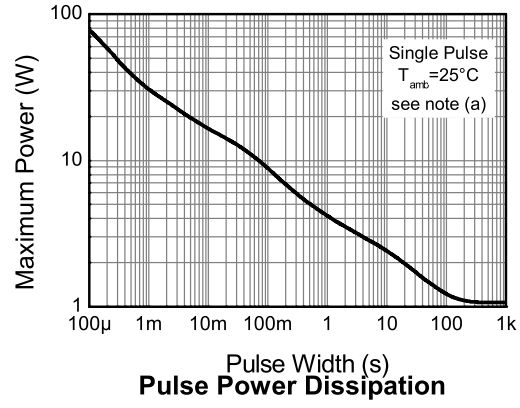
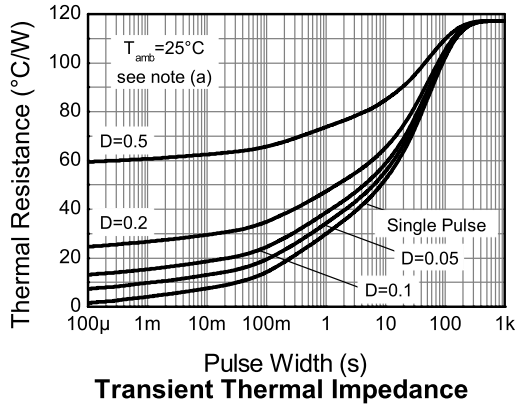
(e) Junction to case (collector tab). Typical

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Thermal characteristics



Thermal characteristics



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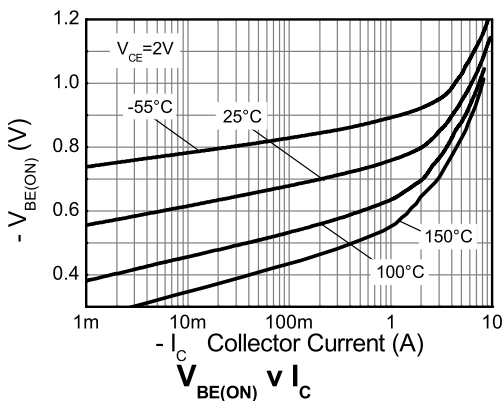
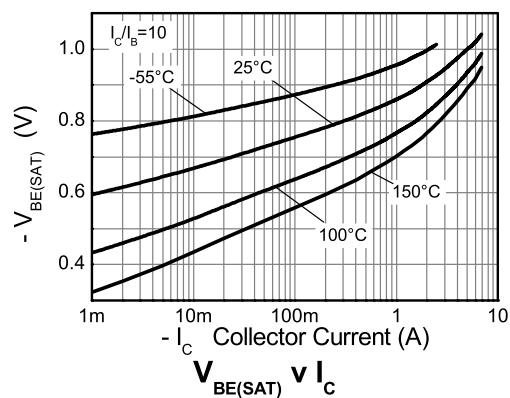
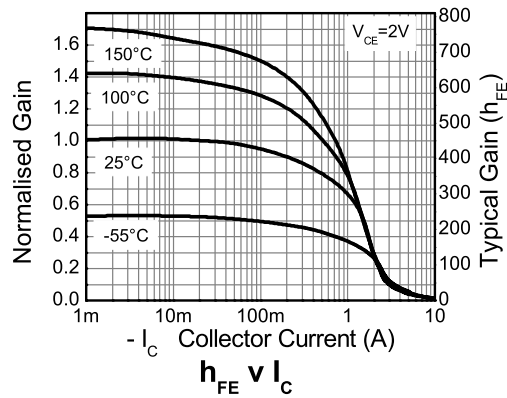
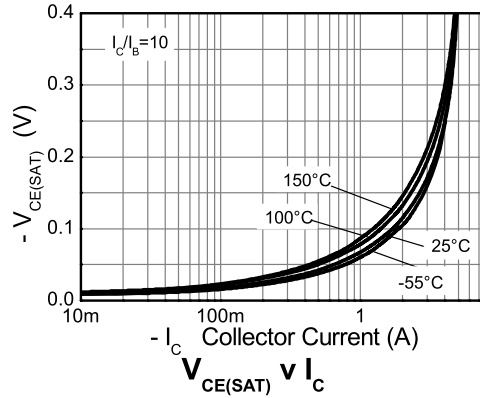
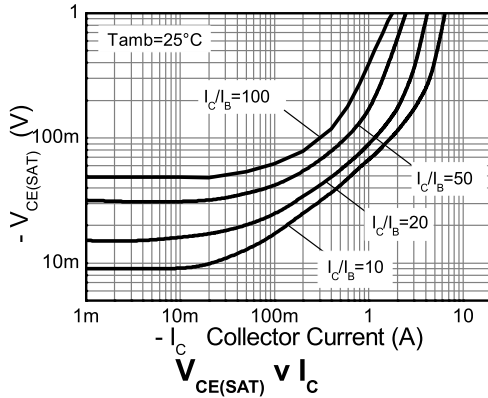
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| 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 -0.5 | nA μA | $V_{CB} = -45\text{V}$ $V_{CB} = -45\text{V}, T_{amb} = 100^{\circ}\text{C}$ |
| Emitter cut-off current | I_{EBO} | | <-1 | -50 | nA | $V_{EB} = -5.6\text{V}$ |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | | -170 -70 -215 | -265 -90 -350 | mV mV mV | $I_C = -1\text{A}, I_B = -20\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -100\text{mA}^{(*)}$ $I_C = -3.5\text{A}, I_B = -350\text{mA}^{(*)}$ |
| Base-Emitter saturation voltage | $V_{BE(sat)}$ | | -970 | -1050 | mV | $I_C = -3.5\text{A}, I_B = -350\text{mA}^{(*)}$ |
| Base-emitter turn-on voltage | $V_{BE(on)}$ | | -870 | -950 | mV | $I_C = -3.5\text{A}, V_{CE} = -2\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 300 200 20 | 450 300 50 | 900 | | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -3.5\text{A}, V_{CE} = -2\text{V}^{(*)}$ |
| Transition frequency | f_T | | 270 | | MHz | $I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$ |
| Input capacitance | C_{ibo} | | 142 | | pF | $V_{EB} = -0.5\text{V}, f = 1\text{MHz}^{(*)}$ |
| Output capacitance | C_{obo} | | 17.4 | | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$ |
| Turn-on time | $t_{(on)}$ | | 75.5 | | ns | $V_{CC} = -15\text{V}, I_C = -750\text{mA},$ |
| Turn-off time | $t_{(off)}$ | | 320 | | ns | $I_{B1} = -I_{B2} = -15\text{mA},$ |

NOTES:

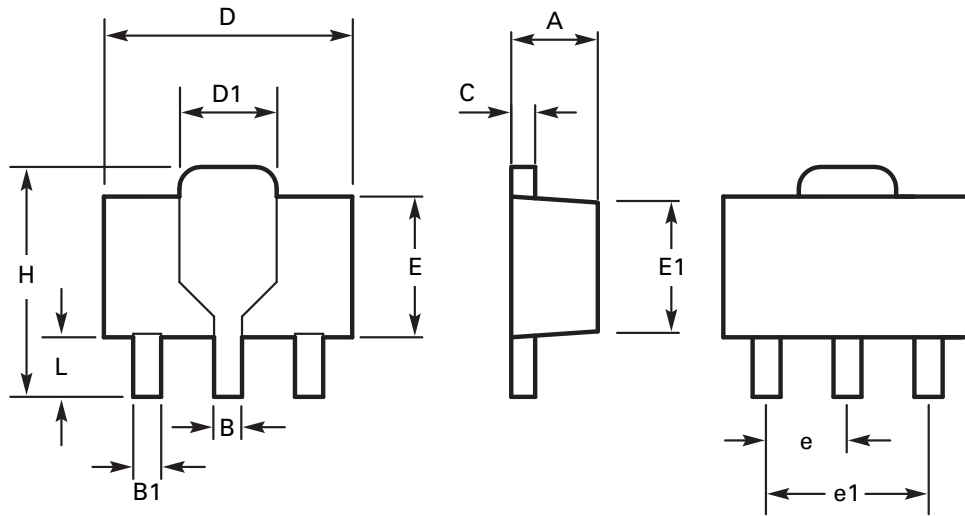
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

Typical characteristics



ZXTP25040DZ

Package outline - SOT89



| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|-----|-------------|------|-----------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 1.40 | 1.60 | 0.550 | 0.630 | E | 2.29 | 2.60 | 0.090 | 0.102 |
| B | 0.44 | 0.56 | 0.017 | 0.022 | E1 | 2.13 | 2.29 | 0.084 | 0.090 |
| B1 | 0.36 | 0.48 | 0.014 | 0.019 | e | 1.50 BSC | | 0.059 BSC | |
| C | 0.35 | 0.44 | 0.014 | 0.017 | e1 | 3.00 BSC | | 0.118 BSC | |
| D | 4.40 | 4.60 | 0.173 | 0.181 | H | 3.94 | 4.25 | 0.155 | 0.167 |
| D1 | 1.52 | 1.83 | 0.064 | 0.072 | L | 0.89 | 1.20 | 0.035 | 0.047 |

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

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| | |
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