

ZXTP25012EFH 12V, SOT23, PNP medium power transistor

Summary

 $BV_{CEO} > -12V$

 $h_{FE} > 500$

 $I_{C(cont)} = 4A$

 $R_{CE(sat)} = 40 m\Omega$

V_{CE(sat)} < -65mV @ 1A

 $P_{D} = 1.25W$

Complementary part number ZXTN25012EFH

Description

Advanced process capability and package design have been used to maximise 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 SOT23 package
- · High peak current
- · Very high gain, 500 minimum
- · Low saturation voltage

Applications

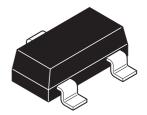
- · MOSFET and IGBT gate driving
- DC DC converters
- · Motor drive
- · High side driver
- · Line disconnect switch

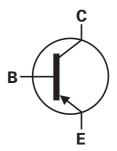
Ordering information

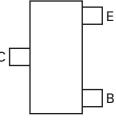
| Device | Reel size | Tape width | Quantity |
|----------------|-----------|------------|----------|
| | (inches) | (mm) | per reel |
| ZXTP25012EFHTA | 7 | 8 | 3000 |

Device marking

1E8







Pinout - top view

Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|--|-----------------------------------|------------|-------|
| Collector-base voltage | V _{CBO} | -12 | V |
| Collector-emitter voltage | V _{CEO} | -12 | V |
| Emitter-base voltage | V _{EBO} | -7 | V |
| Continuous collector current ^(b) | I _C | -4 | Α |
| Base current | I _B | -1 | Α |
| Peak pulse current | I _{CM} | -10 | Α |
| Power dissipation at T _{amb} =25°C ^(a) | P _D | 0.73 | W |
| Linear derating factor | | 5.84 | mW/°C |
| Power dissipation at T _{amb} =25°C ^(b) | P _D | 1.05 | W |
| Linear derating factor | | 8.4 | mW/°C |
| Power dissipation at T _{amb} =25°C ^(c) | P _D | 1.25 | W |
| Linear derating factor | | 9.6 | mW/°C |
| Power dissipation at T _{amb} =25°C ^(d) | P _D | 1.81 | W |
| Linear derating factor | | 14.5 | 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:

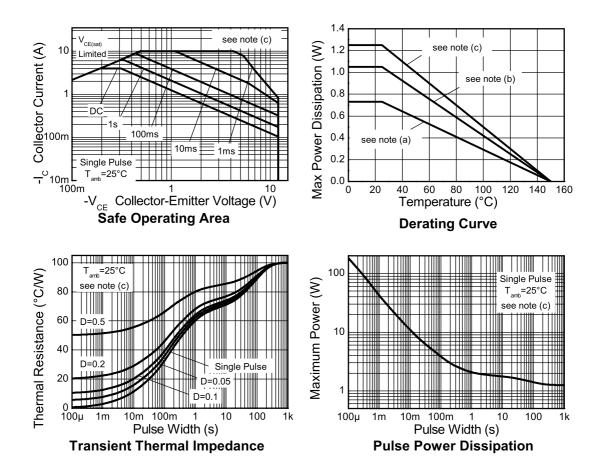
⁽a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

⁽b) Mounted on 25mm \times 25mm \times 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<5secs

Characteristics



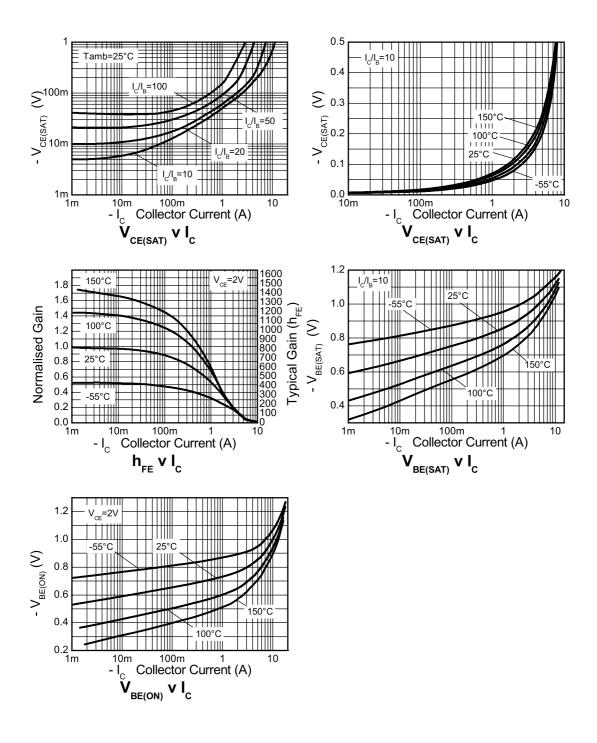
Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

| Parameter | Symbol | Min. | Тур. | Max. | Unit | Conditions |
|---|----------------------|------|------|-------|------|--|
| Collector-base breakdown voltage | BV _{CBO} | -12 | -35 | | V | $I_C = -100 \mu A$ |
| Collector-emitter breakdown voltage (base open) | BV _{CEO} | -12 | -25 | | V | I _C = -10mA (*) |
| Emitter-base breakdown voltage | BV _{EBO} | -7 | -8.5 | | V | $I_E = -100 \mu A$ |
| Collector-base cut-off | I _{CBO} | | <-1 | -50 | nA | V _{CB} = -12V |
| current | | | | -0.5 | μΑ | $V_{CB} = -12V, T_{amb} = 100^{\circ}C$ |
| Emitter-base cut-off current | I _{EBO} | | <-1 | -50 | nA | V _{EB} = -5.6V |
| Collector-emitter saturation | V _{CE(sat)} | | -50 | -65 | mV | $I_C = -1A$, $I_B = -100 \text{mA}^{(*)}$ |
| voltage | | | -150 | -260 | mV | $I_C = -1A$, $I_B = -10 \text{mA}^{(*)}$ |
| | | | -175 | -350 | mV | $I_C = -2A$, $I_B = -40 \text{mA}^{(*)}$ |
| | | | -160 | -210 | mV | $I_C = -4A$, $I_B = -400 \text{mA}^{(*)}$ |
| Base-emitter saturation voltage | V _{BE(sat)} | | -970 | -1050 | mV | $I_C = -4A$, $I_B = -400 \text{mA}^{(*)}$ |
| Base-emitter turn-on voltage | V _{BE(on)} | | -825 | -950 | mV | $I_C = -4A$, $V_{CE} = -2V^{(*)}$ |
| Static forward current transfer ratio | h _{FE} | 500 | 800 | 1500 | | I _C = -10mA, V _{CE} = -2V ^(*) |
| transfer ratio | | 300 | 450 | | | $I_C = -1A$, $V_{CE} = -2V^{(*)}$ |
| | | 50 | 100 | | | $I_C = -4A$, $V_{CE} = -2V^{(*)}$ |
| Transition frequency | f _T | | 310 | | MHz | I _C = -50mA, V _{CE} = -10V f = 100MHz |
| Output capacitance | C _{obo} | | 16.9 | | pF | V _{CB} = -10V, f = 1MHz ^(*) |
| Delay time | t _d | | 41 | | ns | V _{CC} = -10V |
| Rise time | t _r | | 62 | | ns | I _C = -1A, I _{B1} = I _{B2} = -10mA |
| Storage time | t _s | | 179 | | ns | 1.01 .87 .2 |
| Fall time | t _f | | 65 | | ns | |

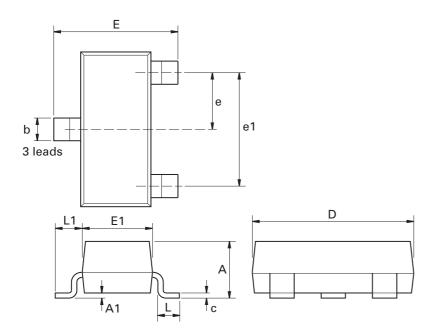
NOTES:

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

Typical characteristics



Package outline - SOT23



| Dim. | Millin | neters | Inc | hes | Dim. | Millimeters | | Inches | |
|------|--------|--------|--------|-------|------|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Max. | Max. |
| Α | - | 1.12 | - | 0.044 | e1 | 1.90 | NOM | 0.075 | NOM |
| A1 | 0.01 | 0.10 | 0.0004 | 0.004 | Е | 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 |
| С | 0.085 | 0.120 | 0.003 | 0.008 | L | 0.25 | 0.62 | 0.018 | 0.024 |
| D | 2.80 | 3.04 | 0.110 | 0.120 | L1 | 0.45 | 0.62 | 0.018 | 0.024 |
| е | 0.95 | NOM | 0.0375 | NOM | - | - | - | - | - |

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

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