

ZXTP25012EFH

12V, SOT23, PNP medium power transistor

Summary

$BV_{CEO} > -12V$

$h_{FE} > 500$

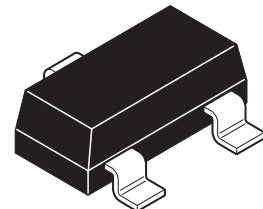
$I_{C(cont)} = 4A$

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

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

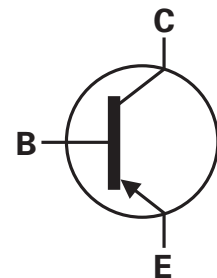
$P_D = 1.25W$

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.

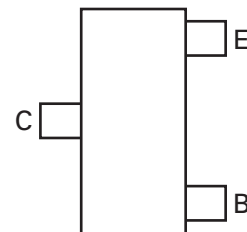


Features

- 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



Pinout - top view

Ordering information

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

Device marking

1E8

ZXTP25012EFH

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 | A |
| Base current | I_B | -1 | A |
| Peak pulse current | I_{CM} | -10 | A |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(a)}$ | P_D | 0.73 | W |
| Linear derating factor | | 5.84 | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(b)}$ | P_D | 1.05 | W |
| Linear derating factor | | 8.4 | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(c)}$ | P_D | 1.25 | W |
| Linear derating factor | | 9.6 | mW/°C |
| Power dissipation at $T_{amb} = 25^\circ\text{C}^{(d)}$ | 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.

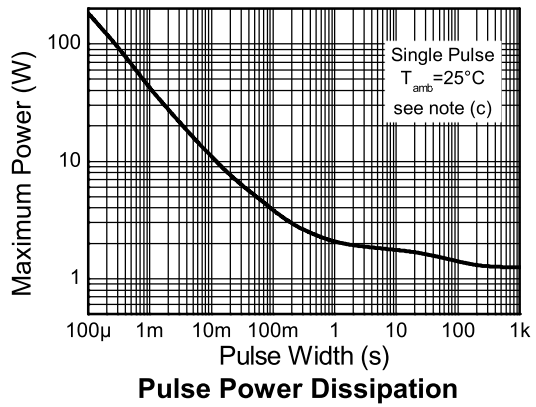
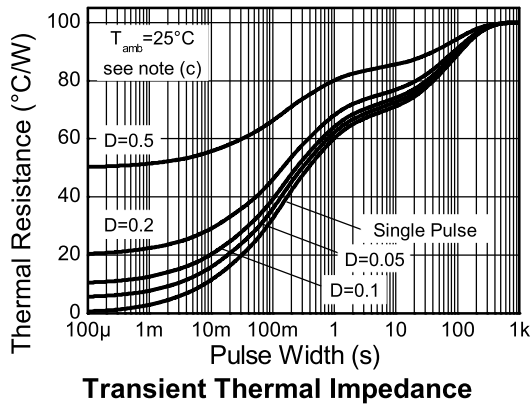
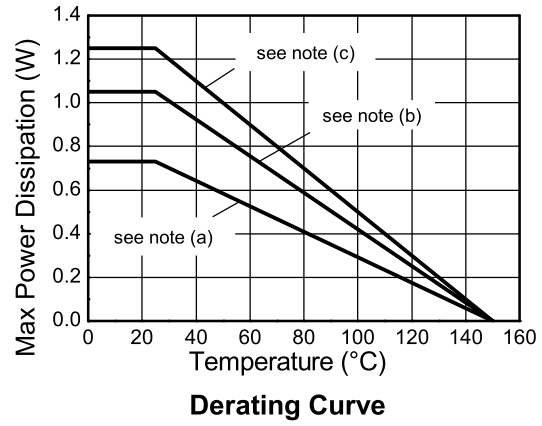
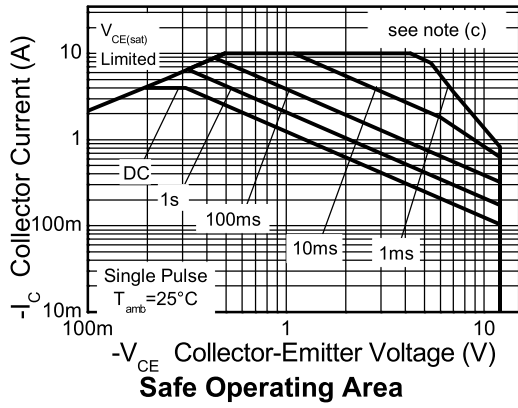
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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 $t < 5\text{secs}$

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Characteristics



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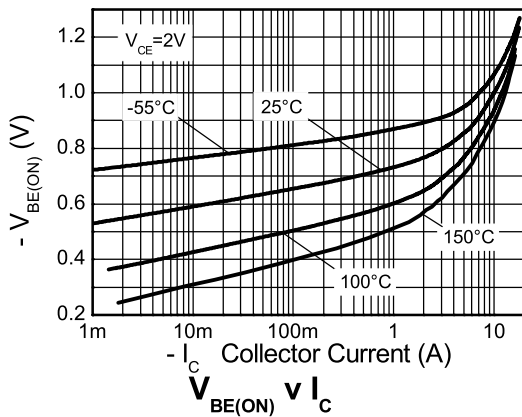
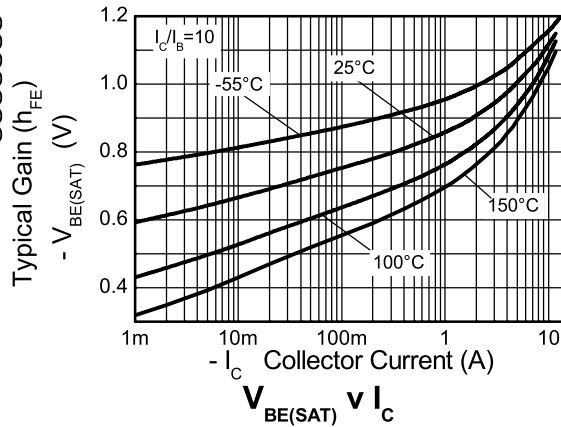
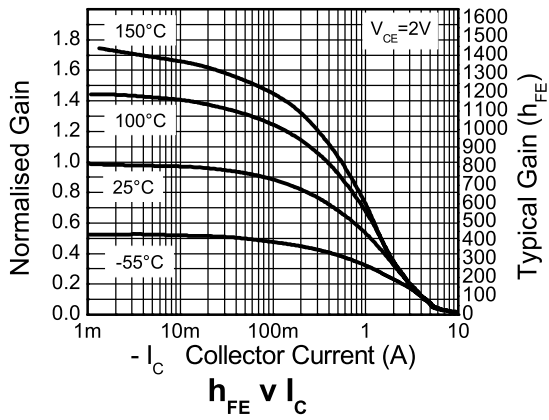
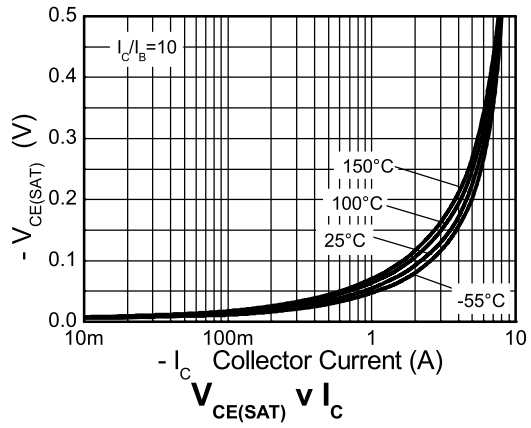
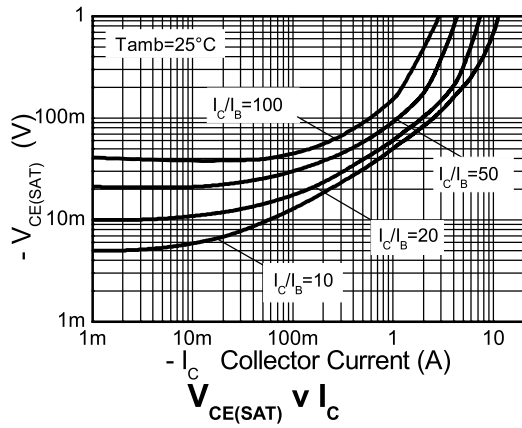
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

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

NOTES:

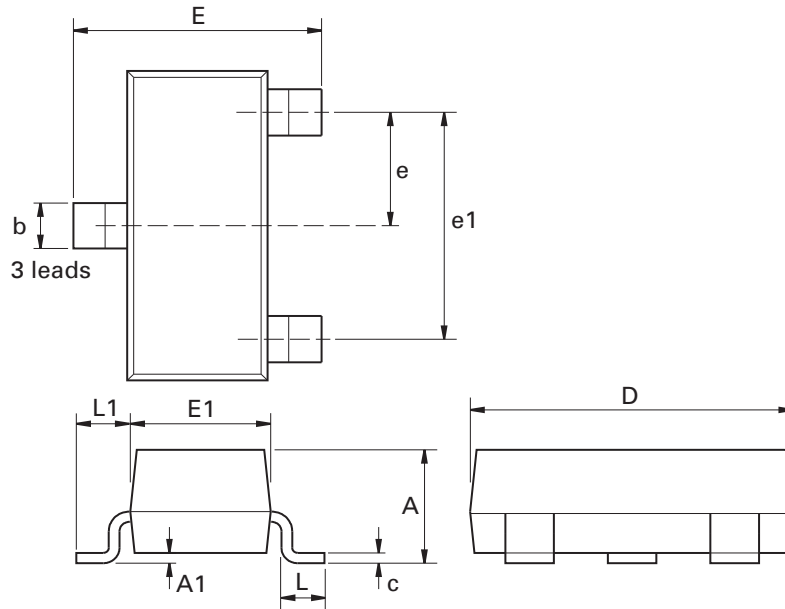
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

Typical characteristics



ZXTP25012EFH

Package outline - SOT23



| Dim. | Millimeters | | Inches | | Dim. | Millimeters | | Inches | |
|------|-------------|-------|------------|-------|------|-------------|------|-----------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Max. | 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 | 0.120 | 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 |
| e | 0.95 NOM | | 0.0375 NOM | | - | - | - | - | - |

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

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