

12V PNP SILICON LOW SATURATION SWITCHING TRANSISTOR AND SCHOTTKY DIODE

SUMMARY

Transistor: $V_{CE0} = -12V$, $I_C = -1.25A$

Schottky Diode: $V_R = 40V$; $I_C = 0.5A$

DESCRIPTION

A PNP transistor and a Schottky Barrier diode contained in a single 6 leaded SOT23 package.

FEATURES

- Low Saturation Transistor
- High Gain - 300 minimum
- Low V_F , fast switching Schottky

APPLICATIONS

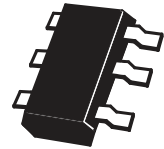
- Mobile telecomms, PCMCIA & SCSI
- DC-DC Conversion

ORDERING INFORMATION

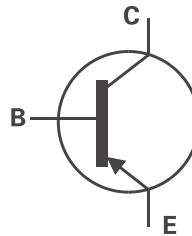
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|--------------|--------------------|-----------------|-------------------|
| ZXTS1000E6TA | 7 | 8mm embossed | 3000 units |
| ZXTS1000E6TC | 13 | 8mm embossed | 10000 units |

DEVICE MARKING

1000



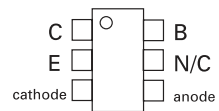
SOT23-6



Cathode



Anode



Top View

ZXTS1000E6

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------|----------------|------------|
| Transistor | | | |
| Collector-Base Voltage | V_{CBO} | -12 | V |
| Collector-Emitter Voltage | V_{CEO} | -12 | V |
| Emitter-Base Voltage | V_{EBO} | -5 | V |
| Continuous Collector Current | I_C | -1.25 | A |
| Schottky Diode | | | |
| Continuous Reverse Voltage | V_R | 40 | V |
| Forward Current | I_F | 0.5 | A |
| Non Repetitive Forward Current $t \leq 100\mu s$ $t \leq 10ms$ | I_{FSM} | 6.75 3 | A A |
| Package | | | |
| Power Dissipation at $T_{amb}=25^\circ C$ single die "on" both die "on" | P_D | 0.725 0.885 | W W |
| Storage Temperature Range | T_{stg} | -55 to +150 | $^\circ C$ |
| Junction Temperature | T_j | 125 | $^\circ C$ |

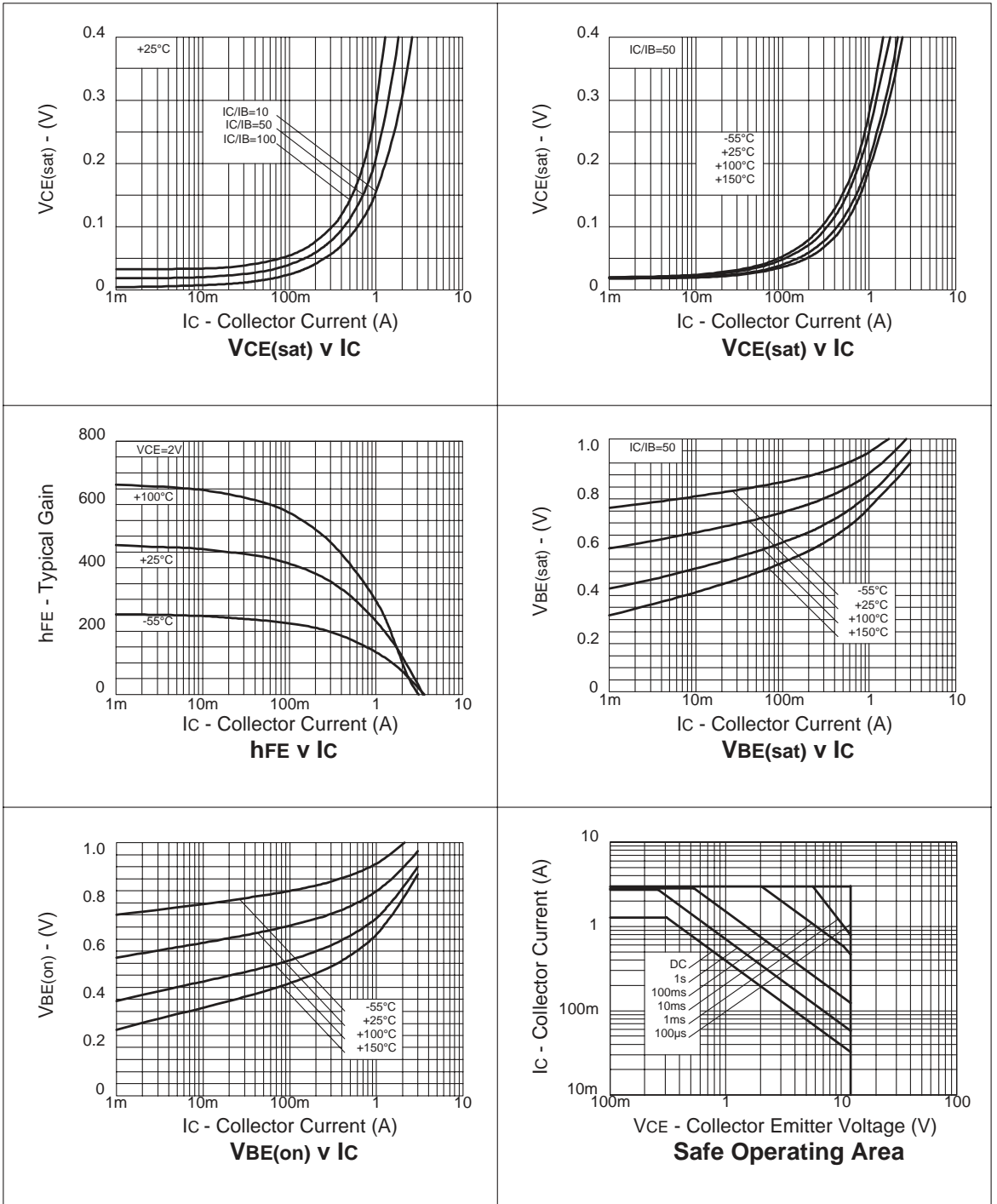
THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|------------------------------------|------------|------------------------------|
| Junction to Ambient (a) single die "on" both die "on" | $R_{\theta JA}$ $R_{\theta JA}$ | 138 113 | $^\circ C/W$ $^\circ C/W$ |

NOTES

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

TRANSISTOR TYPICAL CHARACTERISTICS



ZXTS1000E6

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

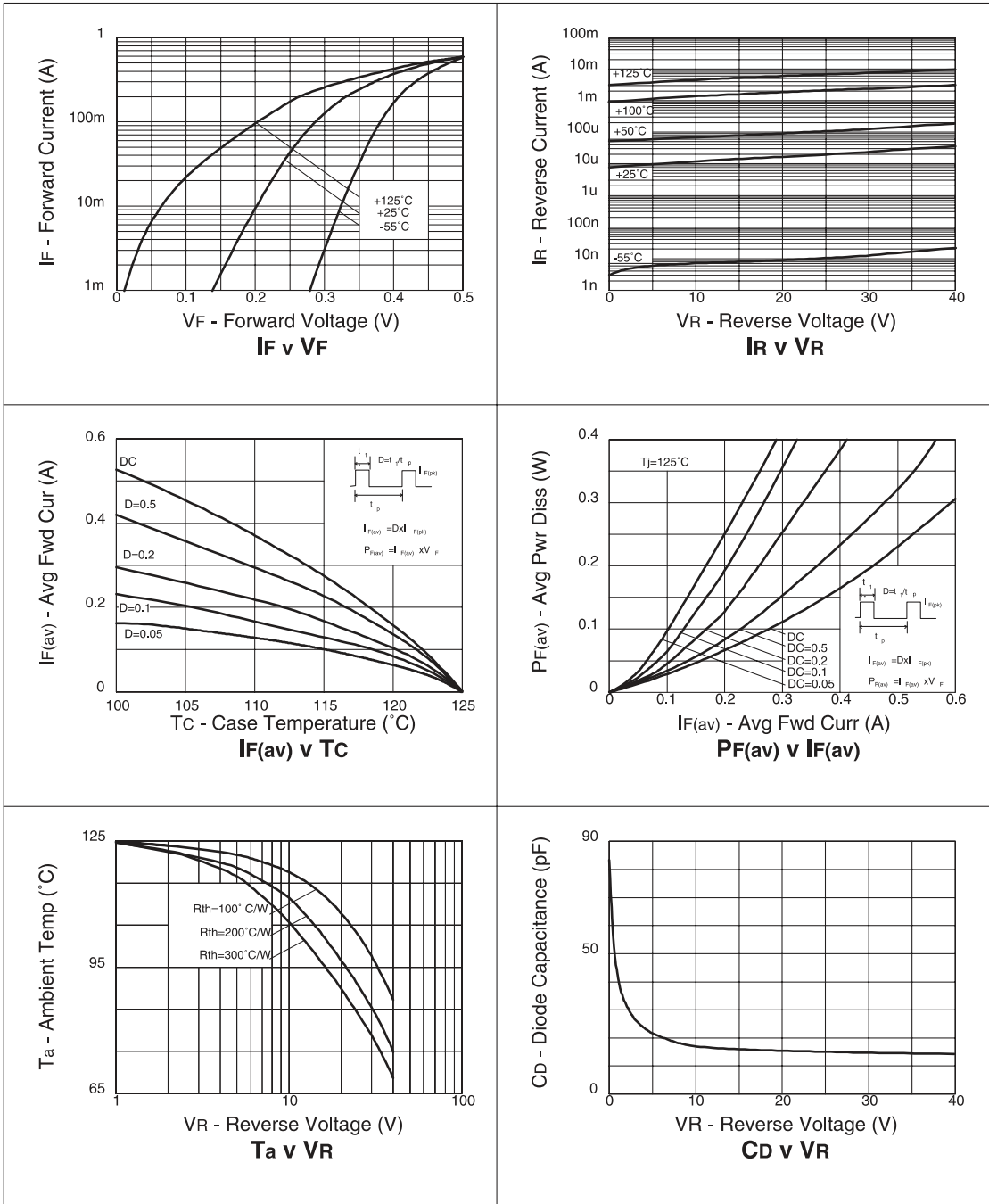
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|--|---------------|--------------------------------------|---------------------------------------|-------------------------------------|----------------------------|---|
| TRANSISTOR ELECTRICAL CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -12 | | | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -12 | | | V | $I_C = -10\text{mA}^*$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -5 | | | V | $I_E = -100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | | | -10 | nA | $V_{CB} = -10\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | | | -10 | nA | $V_{EB} = -4\text{V}$ |
| Collector Emitter Cut-Off Current | I_{CES} | | | -10 | nA | $V_{CES} = -10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | -25 -55 -110 -160 -185 | -40 -100 -175 -215 -240 | mV mV mV mV mV | $I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -0.25\text{A}, I_B = -10\text{mA}^*$ $I_C = -0.5\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.25\text{A}, I_B = -100\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | -990 | -1100 | mV | $I_C = -1.25\text{A}, I_B = -100\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | -850 | -1000 | mV | $I_C = -1.25\text{A}, V_{CE} = 2\text{V}^*$ |
| Static Forward Current Transfer Ratio | h_{FE} | 300 300 200 125 75 30 | 490 450 340 250 140 80 | | | $I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -0.1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -0.5\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1.25\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -2\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$ |
| Transition Frequency | f_T | | 220 | | MHz | $I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$ |
| Output Capacitance | C_{obo} | | 15 | | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}$ |
| Turn-On Time | $t_{(on)}$ | | 50 | | ns | $V_{CC} = -10\text{V}, I_C = -1\text{A}$ $I_{B1} = I_{B2} = -100\text{mA}$ |
| Turn-Off Time | $t_{(off)}$ | | 135 | | ns | |

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS

| | | | | | | |
|---------------------------|-------------|----|---|--|--|---|
| Reverse Breakdown Voltage | $V_{(BR)R}$ | 40 | 60 | | V | $I_R = 200\mu\text{A}$ |
| Forward Voltage | V_F | | 270 300 370 425 550 640 810 | 300 350 460 550 670 780 1050 | mV mV mV mV mV mV mV | $I_F = 50\text{mA}^*$ $I_F = 100\text{mA}^*$ $I_F = 250\text{mA}^*$ $I_F = 500\text{mA}^*$ $I_F = 750\text{mA}^*$ $I_F = 1000\text{mA}^*$ $I_F = 1500\text{mA}^*$ |
| Reverse Current | I_R | | 15 | 40 | μA | $V_R = 30\text{V}$ |
| Diode Capacitance | C_D | | 20 | | pF | $f = 1\text{MHz}, V_R = 30\text{V}$ |
| Reverse Recovery Time | t_{rr} | | 10 | | ns | switched from $I_F = 500\text{mA}$ to $I_R = 500\text{mA}$ Measured at $I_R = 50\text{mA}$ |

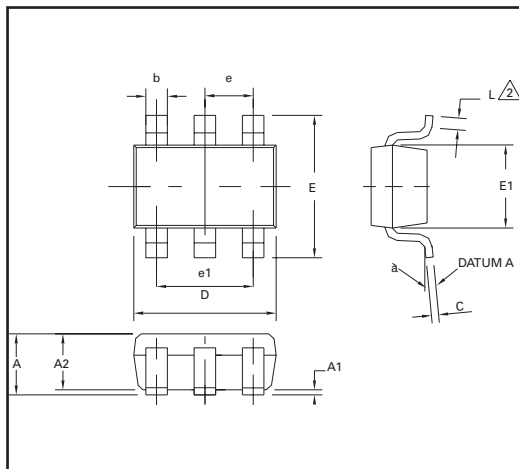
*Measured under pulsed conditions.

DIODE TYPICAL CHARACTERISTICS

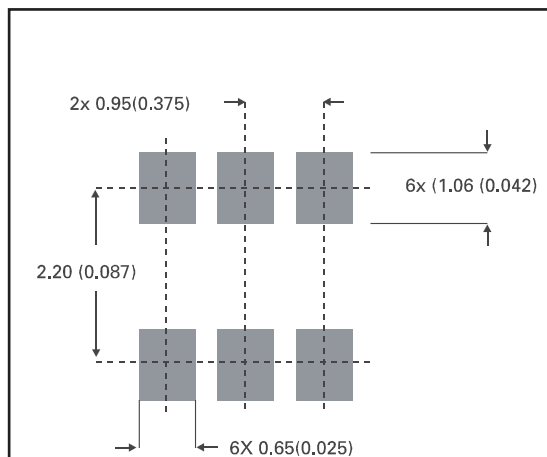


ZXTS1000E6

PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



| DIM | Millimetres | | Inches | |
|-----|-------------|------|-----------|-------|
| | Min | Max | Min | Max |
| A | 0.90 | 1.45 | 0.35 | 0.057 |
| A1 | 0.00 | 0.15 | 0 | 0.006 |
| A2 | 0.90 | 1.30 | 0.035 | 0.051 |
| b | 0.35 | 0.50 | 0.014 | 0.019 |
| C | 0.09 | 0.20 | 0.0035 | 0.008 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 2.60 | 3.00 | 0.102 | 0.118 |
| E1 | 1.50 | 1.75 | 0.059 | 0.069 |
| L | 0.10 | 0.60 | 0.004 | 0.002 |
| e | 0.95 REF | | 0.037 REF | |
| e1 | 1.90 REF | | 0.074 REF | |
| L | 0° | 10° | 0° | 10° |

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