

PNP SILICON PLANAR MEDIUM POWER DARLINGTON TRANSISTORS

ZTX704 ZTX705

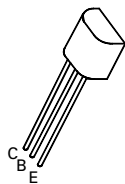
ISSUE 3 – MAY 94

FEATURES

- * 120 Volt V_{CE0}
- * 1 Amp continuous current
- * Gain of 3K at $I_C=1$ Amp
- * $P_{tot}=1$ Watt

APPLICATIONS

- * Lamp, solenoid and relay drivers



**E-Line
TO92 Compatible**

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | ZTX704 | ZTX705 | UNIT |
|--|----------------|--------|-------------|------------|
| Collector-Base Voltage | V_{CBO} | -120 | -140 | V |
| Collector-Emitter Voltage | V_{CEO} | -100 | -120 | V |
| Emitter-Base Voltage | V_{EBO} | | -10 | V |
| Peak Pulse Current | I_{CM} | | -4 | A |
| Continuous Collector Current | I_C | | -1 | A |
| Power Dissipation at $T_{amb} = 25^\circ\text{C}$ derate above 25°C | P_{tot} | | 1 5.7 | W mW/°C |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | | -55 to +200 | °C |

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

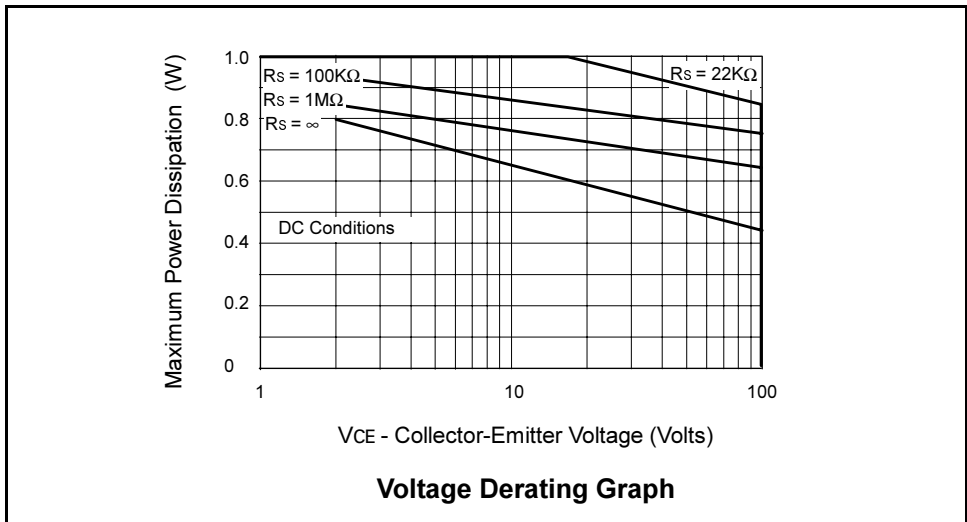
| PARAMETER | SYMBOL | ZTX704 | | ZTX705 | | UNIT | CONDITIONS. |
|--------------------------------------|----------------|--------|--------------|--------|--------------|--------------------------------|--|
| | | MIN. | MAX. | MIN. | MAX. | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -120 | | -140 | | V | $I_C=-100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{CEO(SUS)}$ | -100 | | -120 | | V | $I_C=-10\text{mA}^*$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -10 | | -10 | | V | $I_E=-100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | | -0.1 -10 | | -0.1 -10 | μA μA | $V_{CB}=-100\text{V}$ $V_{CB}=-120\text{V}$ $V_{CB}=-100\text{V}, T_{amb}=100^\circ\text{C}$ $V_{CB}=-120\text{V}, T_{amb}=100^\circ\text{C}$ |
| Collector Cut-Off Current | I_{CES} | | -10 | | -10 | μA | $V_{CES}=-80\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | | -0.1 | | -0.1 | μA | $V_{EB}=-8\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | -1.3 -2.5 | | -1.3 -2.5 | V V | $I_C=-1\text{A}, I_B=-1\text{mA}^*$ $I_C=-2\text{A}, I_B=-2\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | -1.8 | | -1.8 | V | $I_C=-1\text{A}, I_B=-10\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | -1.7 | | -1.7 | V | $I_C=-1\text{A}, V_{CE}=-5\text{V}^*$ |

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

| PARAMETER | SYMBOL | ZTX704 | | ZTX705 | | UNIT | CONDITIONS. |
|---------------------------------------|-----------|----------------------|------|----------------------|------|---------------|---|
| | | MIN. | MAX. | MIN. | MAX. | | |
| Static Forward Current Transfer Ratio | h_{FE} | 3K 3K 3K 2K | 30K | 3K 3K 3K 2K | 30K | | $I_C = -10\text{mA}, V_{CE} = -5\text{V}^*$ $I_C = -100\text{mA}, V_{CE} = -5\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -5\text{V}^*$ $I_C = -2\text{A}, V_{CE} = -5\text{V}^*$ |
| Transition Frequency | f_T | 160 Typical | | 160 Typical | | MHz | $I_C = -100\text{mA}, V_{CE} = -10\text{V}$ $f = 20\text{MHz}$ |
| Input Capacitance | C_{ibo} | 90 Typical | | 90 Typical | | pF | $V_{EB} = -0.5\text{V}, f = 1\text{MHz}$ |
| Output Capacitance | C_{obo} | 15 Typical | | 15 Typical | | pF | $V_{CE} = -10\text{V}, f = 1\text{MHz}$ |
| Switching Times | t_{on} | 0.6 Typical | | 0.6 Typical | | μs | $I_C = -0.5\text{A}, V_{CE} = -10\text{V}$ $I_{B1} = I_{B2} = -0.5\text{mA}$ |
| | t_{off} | 0.8 Typical | | 0.8 Typical | | μs | |

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$



The maximum permissible operational temperature can be obtained from this graph using the following equation

$$T_{amb(max)} = \frac{Power(max) - Power(act)}{0.0057} + 25^{\circ}\text{C}$$

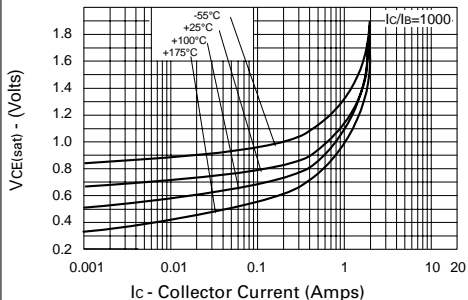
$T_{amb(max)}$ = Maximum operating ambient temperature

Power(max) = Maximum power dissipation figure, obtained from the above graph for a given V_{CE} and source resistance (R_S)

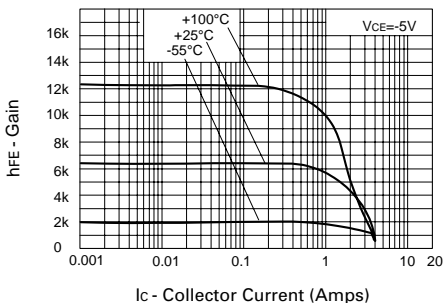
Power(actual) = Actual power dissipation in users circuit

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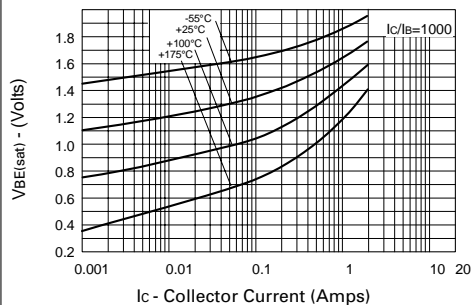
TYPICAL CHARACTERISTICS



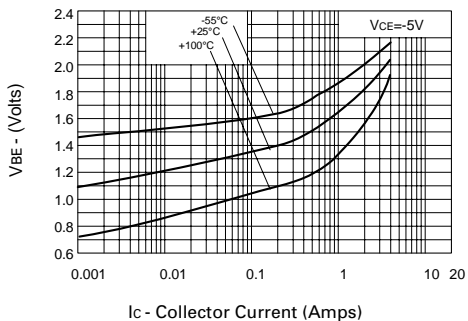
$V_{CE(sat)}$ v I_C



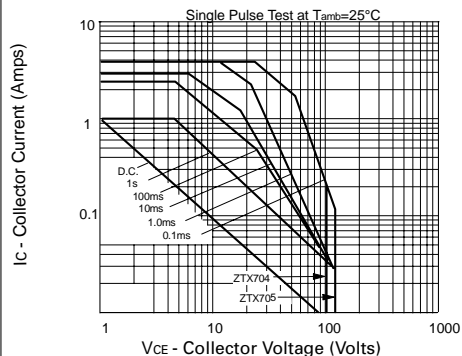
hFE v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C



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