

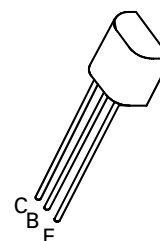
NPN SILICON PLANAR MEDIUM POWER DARLINGTON TRANSISTORS

ZTX604 ZTX605

ISSUE 1 – MARCH 94

FEATURES

- * 120 Volt V_{CEO}
- * 1 Amp continuous current
- * Gain of 2K at $I_C=1$ Amp
- * $P_{tot}=1$ Watt



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | ZTX604 | ZTX605 | 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).

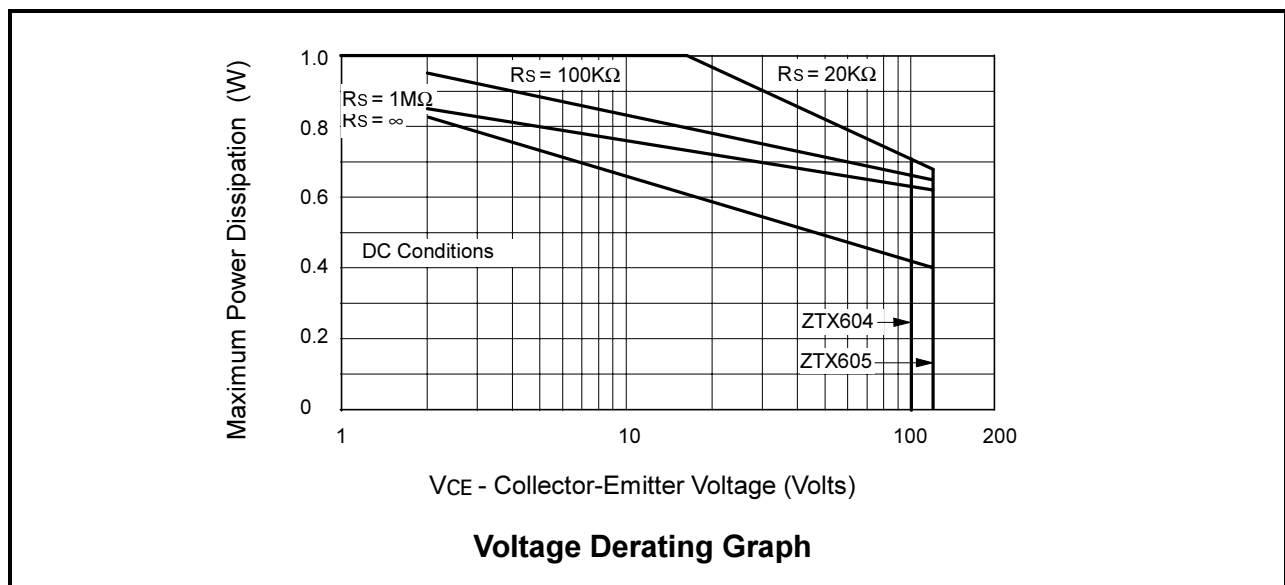
| PARAMETER | SYMBOL | ZTX604 | | ZTX605 | | UNIT | CONDITIONS. |
|--------------------------------------|---------------|--------|------------|--------|------------|--|--|
| | | MIN. | MAX. | MIN. | MAX. | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 120 | | 140 | | V | $I_C=100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 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} | | 0.01 10 | | 0.01 10 | μA μA μA μA | $V_{CB}=100\text{V}$ $V_{CB}=120\text{V}$ $V_{CB}=100\text{V}, T_{amb}=100^\circ\text{C}$ $V_{CB}=120\text{V}, T_{amb}=100^\circ\text{C}$ |
| Emitter Cut-Off Current | I_{EBO} | | 0.1 | | 0.1 | μA | $V_{EB}=8\text{V}$ |
| Collector-Emitter Cut-Off Current | I_{CES} | | 10 | | 10 | μA | $V_{CES}=100\text{V}$ $V_{CES}=120\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | 1.0 1.5 | | 1.0 1.5 | V V | $I_C=250\text{mA}, I_B=0.25\text{mA}^*$ $I_C=1\text{A}, I_B=1\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | 1.8 | | 1.8 | V | $I_C=1\text{A}, I_B=1\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | 1.7 | | 1.7 | V | $I_C=1\text{A}, V_{CE}=5\text{V}^*$ |

ZTX604 ZTX605

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

| PARAMETER | SYMBOL | ZTX604 | | ZTX605 | | UNIT | CONDITIONS. |
|---------------------------------------|-----------|------------------------|------|------------------------|------|---------------|---|
| | | MIN. | MAX. | MIN. | MAX. | | |
| Static Forward Current Transfer Ratio | h_{FE} | 2K 5K 2K 0.5K | 100K | 2K 5K 2K 0.5K | 100K | | $I_C=50\text{mA}, V_{CE}=5\text{V}$ $I_C=500\text{mA}, V_{CE}=5\text{V}^*$ $I_C=1\text{A}, V_{CE}=5\text{V}^*$ $I_C=2\text{A}, V_{CE}=5\text{V}^*$ |
| Transition Frequency | f_T | 150 | | 150 | | MHz | $I_C=100\text{mA}, V_{CE}=10\text{V}$ $f=20\text{MHz}$ |
| Input Capacitance | C_{ibo} | 90 Typical | | | | pF | $V_{EB}=500\text{mV}, f=1\text{MHz}$ |
| Output Capacitance | C_{obo} | 15 Typical | | | | pF | $V_{CB}=10\text{V}, f=1\text{MHz}$ |
| Switching Times | t_{on} | 0.5 Typical | | | | μs | $I_C=500\text{mA}, V_{CE}=10\text{V}$ $I_{B1}=I_{B2}=0.5\text{mA}$ |
| | t_{off} | 1.6 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

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

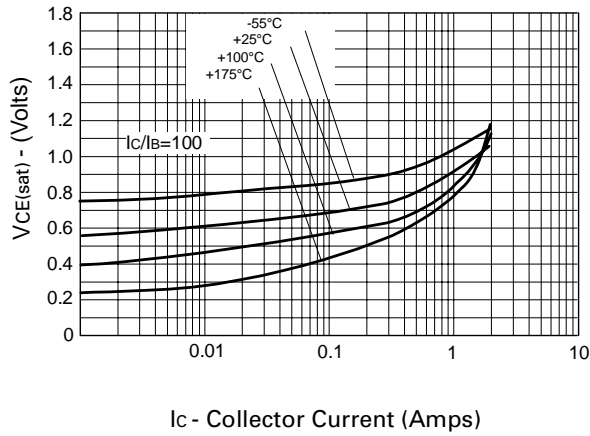
$T_{amb(max)}$ = Maximum operating ambient temperature

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

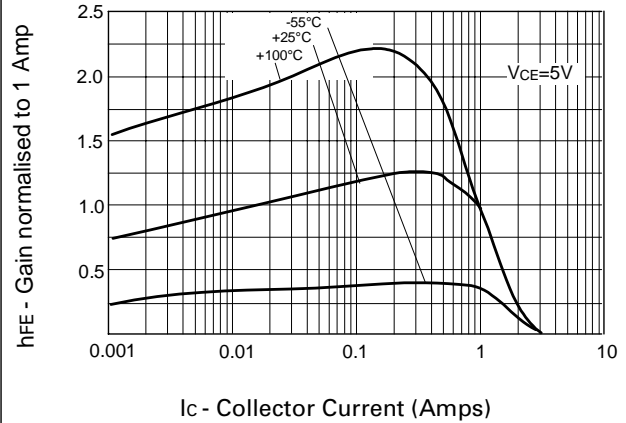
Power(actual) = Actual power dissipation in users circuit

ZTX604 ZTX605

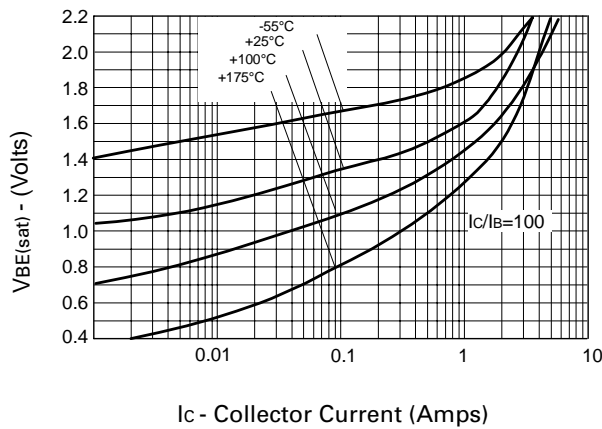
TYPICAL CHARACTERISTICS



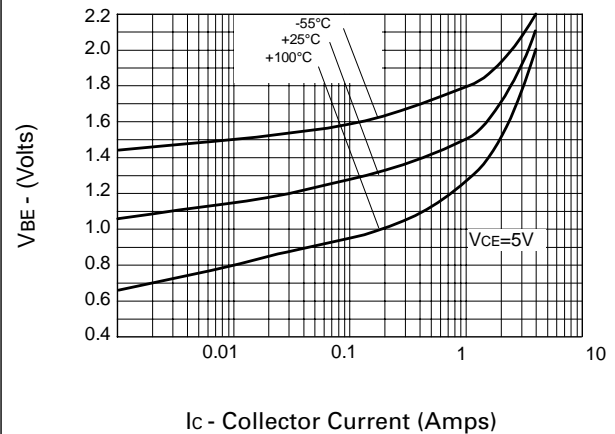
$V_{CE(sat)}$ v I_C



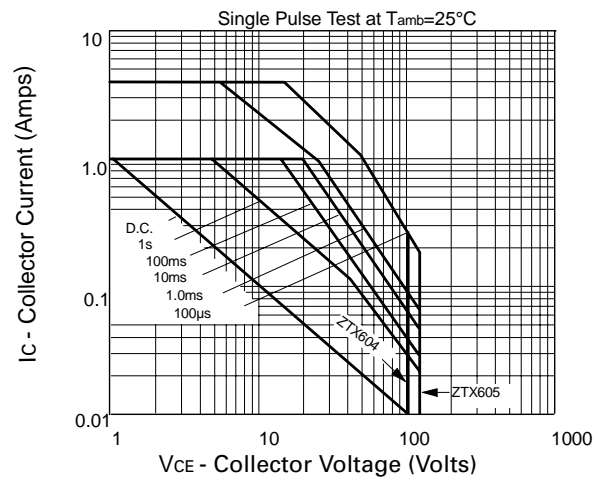
hFE v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C



Safe Operating Area