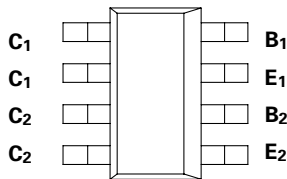


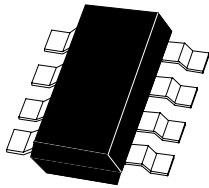
**SM-8 DUAL NPN MEDIUM POWER  
DARLINGTON TRANSISTORS**

ISSUE 1 - NOVEMBER 1995

**ZDT605**



**PARTMARKING DETAIL - T605**



**SM-8  
(8 LEAD SOT223)**

**ABSOLUTE MAXIMUM RATINGS.**

| PARAMETER                               | SYMBOL         | VALUE       | UNIT |
|-----------------------------------------|----------------|-------------|------|
| Collector-Base Voltage                  | $V_{CBO}$      | 140         | V    |
| Collector-Emitter Voltage               | $V_{CEO}$      | 120         | V    |
| Emitter-Base Voltage                    | $V_{EBO}$      | 10          | V    |
| Peak Pulse Current                      | $I_{CM}$       | 4           | A    |
| Continuous Collector Current            | $I_C$          | 1           | A    |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | -55 to +150 | °C   |

**THERMAL CHARACTERISTICS**

| PARAMETER                                                                                            | SYMBOL    | VALUE        | UNIT             |
|------------------------------------------------------------------------------------------------------|-----------|--------------|------------------|
| Total Power Dissipation at $T_{amb} = 25^{\circ}C^*$<br>Any single die "on"<br>Both die "on" equally | $P_{tot}$ | 2.25<br>2.75 | W<br>W           |
| Derate above $25^{\circ}C^*$<br>Any single die "on"<br>Both die "on" equally                         |           | 18<br>22     | mW/ °C<br>mW/ °C |
| Thermal Resistance - Junction to Ambient*<br>Any single die "on"<br>Both die "on" equally            |           | 55.6<br>45.5 | °C/ W<br>°C/ W   |

\* The power which can be dissipated assuming the device is mounted in a typical manner on a PCB with copper equal to 2 inches square.

# ZDT605

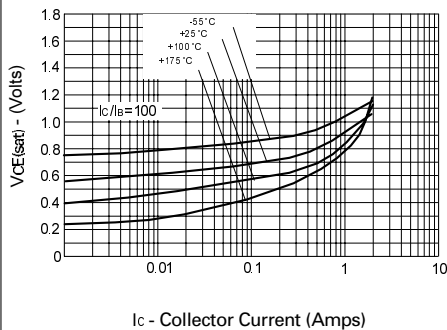
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER                             | SYMBOL        | MIN.                   | MAX.       | UNIT                           | CONDITIONS.                                                                                                                                                               |
|---------------------------------------|---------------|------------------------|------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | 140                    |            | V                              | $I_C=100\mu\text{A}$                                                                                                                                                      |
| Collector-Emitter Breakdown Voltage   | $V_{CE(SUS)}$ | 120                    |            | V                              | $I_C=10\text{mA}^*$                                                                                                                                                       |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 10                     |            | V                              | $I_E=100\mu\text{A}$                                                                                                                                                      |
| Collector Cutoff Current              | $I_{CBO}$     |                        | 0.01<br>10 | $\mu\text{A}$<br>$\mu\text{A}$ | $V_{CB}=120\text{V}$<br>$V_{CB}=120\text{V}$ , $T_{amb}=100^{\circ}\text{C}$                                                                                              |
| Collector Cutoff Current              | $I_{CES}$     |                        | 10         | $\mu\text{A}$                  | $V_{CES}=120\text{V}$                                                                                                                                                     |
| Emitter Cutoff Current                | $I_{EBO}$     |                        | 0.1        | $\mu\text{A}$                  | $V_{EB}=8\text{V}$                                                                                                                                                        |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                        | 1.0<br>1.5 | V<br>V                         | $I_C=250\text{mA}$ , $I_B=0.25\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=1\text{mA}^*$                                                                                        |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                        | 1.8        | V                              | $I_C=1\text{A}$ , $I_B=1\text{mA}^*$                                                                                                                                      |
| Base-Emitter TurnOn Voltage           | $V_{BE(on)}$  |                        | 1.7        | V                              | $I_C=1\text{A}$ , $V_{CE}=5\text{V}^*$                                                                                                                                    |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 2K<br>5K<br>2K<br>0.5K | 100K       |                                | $I_C=50\text{mA}$ , $V_{CE}=5\text{V}^*$<br>$I_C=500\text{mA}$ , $V_{CE}=5\text{V}^*$<br>$I_C=1\text{A}$ , $V_{CE}=5\text{V}^*$<br>$I_C=2\text{A}$ , $V_{CE}=5\text{V}^*$ |
| Transition Frequency                  | $f_T$         | 150                    |            | MHz                            | $I_C=100\text{mA}$ , $V_{CE}=10\text{V}$<br>$f=20\text{MHz}$                                                                                                              |
| Input Capacitance                     | $C_{ibo}$     | 90 Typical             |            | pF                             | $V_{EB}=0.5\text{V}$ , $f=1\text{MHz}$                                                                                                                                    |
| Output Capacitance                    | $C_{obo}$     | 15 Typical             |            | pF                             | $V_{CE}=10\text{V}$ , $f=1\text{MHz}$                                                                                                                                     |
| Switching Times                       | $t_{on}$      | 0.5 Typical            |            | $\mu\text{s}$                  | $I_C=0.5\text{A}$ , $V_{CE}=10\text{V}$<br>$I_{B1}=I_{B2}=0.5\text{mA}$                                                                                                   |
|                                       | $t_{off}$     | 1.6 Typical            |            | $\mu\text{s}$                  |                                                                                                                                                                           |

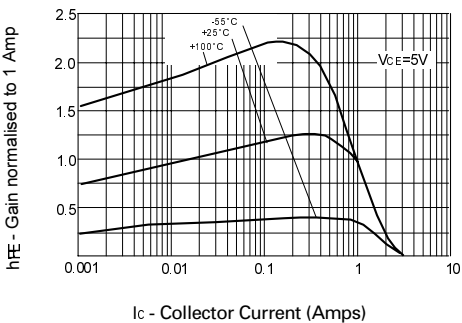
\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

# ZDT605

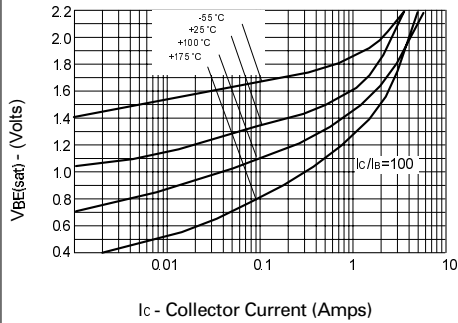
## TYPICAL CHARACTERISTICS



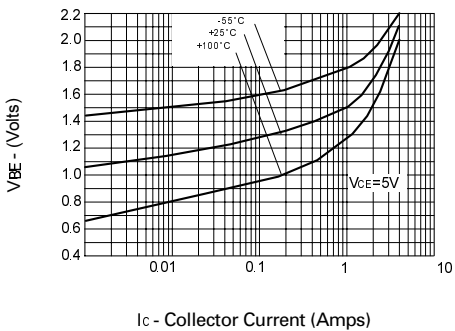
**$V_{CE(sat)}$  v  $I_C$**



**$h_{FE}$  v  $I_C$**



**$V_{BE(sat)}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**