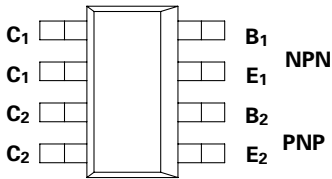


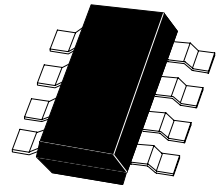
# SM-8 COMPLEMENTARY MEDIUM POWER HIGH GAIN TRANSISTORS

ISSUE 1 - NOVEMBER 1995

## ZDT6790



PARTMARKING DETAIL – T6790



SM-8  
(8 LEAD SOT223)

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                               | SYMBOL         | NPN         | PNP | UNIT |
|---|----------------|-------------|-----|------|
| Collector-Base Voltage                  | $V_{CBO}$      | 45          | -50 | V    |
| Collector-Emitter Voltage               | $V_{CEO}$      | 45          | -40 | V    |
| Emitter-Base Voltage                    | $V_{EBO}$      | 5           | -5  | V    |
| Peak Pulse Current                      | $I_{CM}$       | 6           | -6  | A    |
| Continuous Collector Current            | $I_C$          | 2           | -2  | A    |
| Operating and Storage Temperature Range | $T_J; T_{stg}$ | -55 to +150 |     | °C   |

### THERMAL CHARACTERISTICS

| PARAMETER   | SYMBOL    | VALUE        | UNIT           |
|---|-----------|--------------|----------------|
| Total Power Dissipation at $T_{amb} = 25^\circ\text{C}^*$<br>Any single die "on"<br>Both die "on" equally | $P_{tot}$ | 2.25<br>2.75 | W<br>W         |
| Derate above $25^\circ\text{C}^*$<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.

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

| PARAMETER                             | SYMBOL                | MIN.              | TYP.       | MAX.       | UNIT          | CONDITIONS.  |
|---------------------------------------|-----------------------|-------------------|------------|------------|---------------|--|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$         | 45                |            |            | V             | $I_C=100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$         | 45                |            |            | V             | $I_C=10\text{mA}^*$  |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$         | 5                 |            |            | V             | $I_E=100\mu\text{A}$   |
| Collector Cutoff Current              | $I_{CBO}$             |                   |            | 0.1        | $\mu\text{A}$ | $V_{CB}=35\text{V}$  |
| Emitter Cutoff Current                | $I_{EBO}$             |                   |            | 0.1        | $\mu\text{A}$ | $V_{EB}=4\text{V}$   |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$         |                   |            | 0.1<br>0.5 | V<br>V        | $I_C=0.1\text{A}, I_B=0.5\text{mA}^*$<br>$I_C=1\text{A}, I_B=5\text{mA}^*$   |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$         |                   |            | 0.9        | V             | $I_C=1\text{A}, I_B=10\text{mA}^*$   |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$          |                   |            | 0.9        | V             | $I_C=1\text{A}, V_{CE}=2\text{V}^*$  |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 500<br>400<br>150 |            |            |               | $I_C=100\text{mA}, V_{CE}=2\text{V}^*$<br>$I_C=1\text{A}, V_{CE}=2\text{V}^*$<br>$I_C=2\text{A}, V_{CE}=2\text{V}^*$ |
| Transition Frequency                  | $f_T$                 | 150               |            |            | MHz           | $I_C=50\text{mA}, V_{CE}=5\text{V}$<br>$f=50\text{MHz}$  |
| Input Capacitance                     | $C_{ibo}$             |                   | 200        |            | pF            | $V_{EB}=0.5\text{V}, f=1\text{MHz}$  |
| Output Capacitance                    | $C_{obo}$             |                   | 16         |            | pF            | $V_{CB}=10\text{V}, f=1\text{MHz}$   |
| Switching Times                       | $t_{on}$<br>$t_{off}$ |                   | 33<br>1300 |            | ns            | $I_C=500\text{mA}, I_{B1}=50\text{mA}$<br>$I_{B2}=50\text{mA}, V_{CC}=10\text{V}$                                    |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$   
For typical characteristics graphs see FZT690 datasheet.

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

| PARAMETER                             | SYMBOL                | MIN.                     | TYP.      | MAX.                    | UNIT          | CONDITIONS.   |
|---------------------------------------|-----------------------|--------------------------|-----------|-------------------------|---------------|---|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$         | -50                      |           |                         | V             | $I_C = -100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$         | -40                      |           |                         | V             | $I_C = -10\text{mA}^*$  |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$         | -5                       |           |                         | V             | $I_E = -100\mu\text{A}$   |
| Collector Cutoff Current              | $I_{CBO}$             |                          |           | -0.1                    | $\mu\text{A}$ | $V_{CB} = -30\text{V}$  |
| Emitter Cutoff Current                | $I_{EBO}$             |                          |           | -0.1                    | $\mu\text{A}$ | $V_{EB} = -4\text{V}$   |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$         |                          |           | -0.25<br>-0.45<br>-0.75 | V             | $I_C = -500\text{mA}, I_B = -5\text{mA}^*$<br>$I_C = -1\text{A}, I_B = -10\text{mA}^*$<br>$I_C = -2\text{A}, I_B = -50\text{mA}^*$  |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$         |                          |           | -1.0                    | V             | $I_C = -1\text{A}, I_B = -10\text{mA}^*$  |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$          |                          | -0.75     |                         | V             | $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$   |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 300<br>250<br>200<br>150 |           | 800                     |               | $I_C = -10\text{mA}, V_{CE} = -2\text{V}$<br>$I_C = -500\text{mA}, V_{CE} = -2\text{V}^*$<br>$I_C = -1\text{A}, V_{CE} = -2\text{V}^*$<br>$I_C = -2\text{A}, V_{CE} = -2\text{V}^*$ |
| Transition Frequency                  | $f_T$                 | 100                      |           |                         | MHz           | $I_C = -50\text{mA}, V_{CE} = -5\text{V}$<br>$f = 50\text{MHz}$   |
| Input Capacitance                     | $C_{ibo}$             |                          | 225       |                         | pF            | $V_{EB} = -0.5\text{V}, f = 1\text{MHz}$  |
| Output Capacitance                    | $C_{obo}$             |                          | 24        |                         | pF            | $V_{CB} = -10\text{V}, f = 1\text{MHz}$   |
| Switching Times                       | $t_{on}$<br>$t_{off}$ |                          | 35<br>600 |                         | ns            | $I_C = -500\text{mA},$<br>$I_{B1} = -50\text{mA}$<br>$I_{B2} = -50\text{mA}, V_{CC} = -10\text{V}$  |

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

For typical characteristics graphs see FZT90 datasheet.