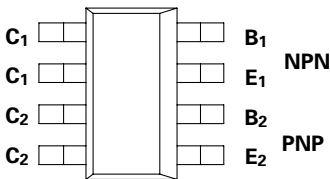


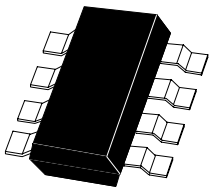
# SM-8 COMPLEMENTARY MEDIUM POWER TRANSISTORS

ISSUE 1 – JANUARY 1996

ZDT6753



PARTMARKING DETAIL – T6753



SM-8  
(8 LEAD SOT223)

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                               | SYMBOL        | NPN         | PNP  | UNIT |
|-----------------------------------------|---------------|-------------|------|------|
| Collector-Base Voltage                  | $V_{CBO}$     | 120         | -120 | V    |
| Collector-Emitter Voltage               | $V_{CEO}$     | 100         | -100 | 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 $T_{amb} = 25^{\circ}C^*$<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.

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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      | $V_{(BR)CBO}$ | 120                   |                         |            | V                              | $I_C=100\mu\text{A}$ , $I_E=0$                                                                                                                                          |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$ | 100                   |                         |            | V                              | $I_C=10\text{mA}$ , $I_B=0^*$                                                                                                                                           |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 5                     |                         |            | V                              | $I_E=100\mu\text{A}$ , $I_C=0$                                                                                                                                          |
| Collector Cutoff Current              | $I_{CBO}$     |                       |                         | 0.1<br>10  | $\mu\text{A}$<br>$\mu\text{A}$ | $V_{CB}=100\text{V}$<br>$V_{CB}=100\text{V}$ , $T_{amb}=100^{\circ}\text{C}$                                                                                            |
| Emitter Cutoff Current                | $I_{EBO}$     |                       |                         | 0.1        | $\mu\text{A}$                  | $V_{EB}=4\text{V}$ , $I_C=0$                                                                                                                                            |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                       | 0.13<br>0.23            | 0.3<br>0.5 | V                              | $I_C=1\text{A}$ , $I_B=100\text{mA}^*$<br>$I_C=2\text{A}$ , $I_B=200\text{mA}^*$                                                                                        |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                       | 0.9                     | 1.25       | V                              | $I_C=1\text{A}$ , $I_B=100\text{mA}^*$                                                                                                                                  |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |                       | 0.8                     | 1          | V                              | $I_C=1\text{A}$ , $V_{CE}=2\text{V}^*$                                                                                                                                  |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 70<br>100<br>55<br>25 | 200<br>200<br>110<br>55 | 300        |                                | $I_C=50\text{mA}$ , $V_{CE}=2\text{V}$<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                  | $f_T$         | 140                   | 175                     |            | MHz                            | $I_C=100\text{mA}$ , $V_{CE}=5\text{V}$<br>$f=100\text{MHz}$                                                                                                            |
| Output Capacitance                    | $C_{obo}$     |                       |                         | 30         | pF                             | $V_{CB}=10\text{V}$ , $f=1\text{MHz}$                                                                                                                                   |
| Switching Times                       | $t_{on}$      |                       | 80                      |            | ns                             | $I_C=500\text{mA}$ , $V_{CE}=10\text{V}$<br>$I_{B1}=I_{B2}=50\text{mA}$                                                                                                 |
|                                       | $t_{off}$     |                       | 1200                    |            | ns                             |                                                                                                                                                                         |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$   
For typical characteristics graphs see FZT653 datasheet.

# ZDT6753

## 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      | $V_{(BR)CBO}$  | -120                  |                         |              | V                              | $I_C = -100\mu\text{A}$                                                                                                                                                                        |
| Collector-Emitter Breakdown Voltage   | $V_{CEO(SUS)}$ | -100                  |                         |              | 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<br>-10  | $\mu\text{A}$<br>$\mu\text{A}$ | $V_{CB} = -100\text{V}$<br>$V_{CB} = -100\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$                                                                                                           |
| Emitter Cutoff Current                | $I_{EBO}$      |                       |                         | -0.1         | $\mu\text{A}$                  | $V_{EB} = -4\text{V}$                                                                                                                                                                          |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$  |                       | -0.17<br>-0.30          | -0.3<br>-0.5 | V<br>V                         | $I_C = -1\text{A}$ , $I_B = -100\text{mA}^*$<br>$I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$                                                                                                   |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$  |                       | -0.90                   | -1.25        | V                              | $I_C = -1\text{A}$ , $I_B = -100\text{mA}^*$                                                                                                                                                   |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$   |                       | -0.8                    | -1.0         | V                              | $I_C = -1\text{A}$ , $V_{CE} = -2\text{V}^*$                                                                                                                                                   |
| Static Forward Current Transfer Ratio | $h_{FE}$       | 70<br>100<br>55<br>25 | 200<br>200<br>170<br>55 | 300          |                                | $I_C = -50\text{mA}$ , $V_{CE} = -2\text{V}$<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                   | 140                     |              | MHz                            | $I_C = -100\text{mA}$ , $V_{CE} = 5\text{V}$<br>$f = 100\text{MHz}$                                                                                                                            |
| Output Capacitance                    | $C_{obo}$      |                       |                         | 30           | pF                             | $V_{CE} = -10\text{V}$ , $f = 1\text{MHz}$                                                                                                                                                     |
| Switching Times                       | $t_{on}$       |                       | 40                      |              | ns                             | $I_C = -500\text{mA}$ , $V_{CC} = -10\text{V}$<br>$I_{B1} = I_{B2} = 50\text{mA}$                                                                                                              |
|                                       | $t_{off}$      |                       | 600                     |              | ns                             |                                                                                                                                                                                                |

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

For typical characteristics graphs see FZT753 datasheet.