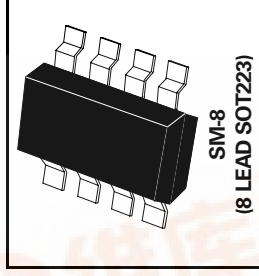
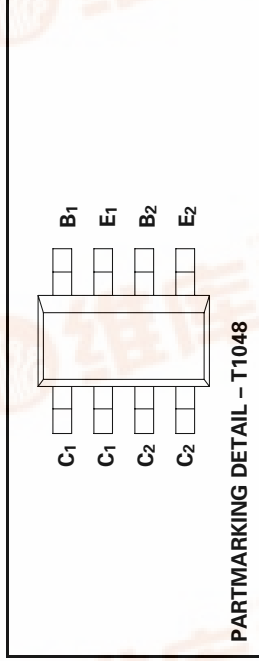


# SM-8 DUAL NPN MEDIUM POWER HIGH GAIN TRANSISTORS

ISSUE 2 - FEBRUARY 1996

## ZDT1048



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### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                               | SYMBOL         | VALUE       | UNIT        |
|---|----------------|-------------|-------------|
| Collector-Base Voltage                  | $V_{CB0}$      | 50          | V           |
| Collector-Emitter Voltage               | $V_{CE0}$      | 17.5        | V           |
| Emitter-Base Voltage                    | $V_{EB0}$      | 5           | V           |
| Peak Pulse Current                      | $I_{CM}$       | 20          | A           |
| Continuous Collector Current            | $I_C$          | 5           | A           |
| Base Current                            | $I_B$          | 500         | mA          |
| Operating and Storage Temperature Range | $T_j, T_{stg}$ | -55 to +150 | $^{\circ}C$ |

### 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/ $^{\circ}C$<br>mW/ $^{\circ}C$ |
| Thermal Resistance - Junction to Ambient*<br>Any single die "on"<br>Both die "on" equally            |           | 55.6<br>45.5 | $^{\circ}C/W$<br>$^{\circ}C/W$     |

\* 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.

[捷多邦, 专业PCB打样工厂, 24小时加急出货](#)

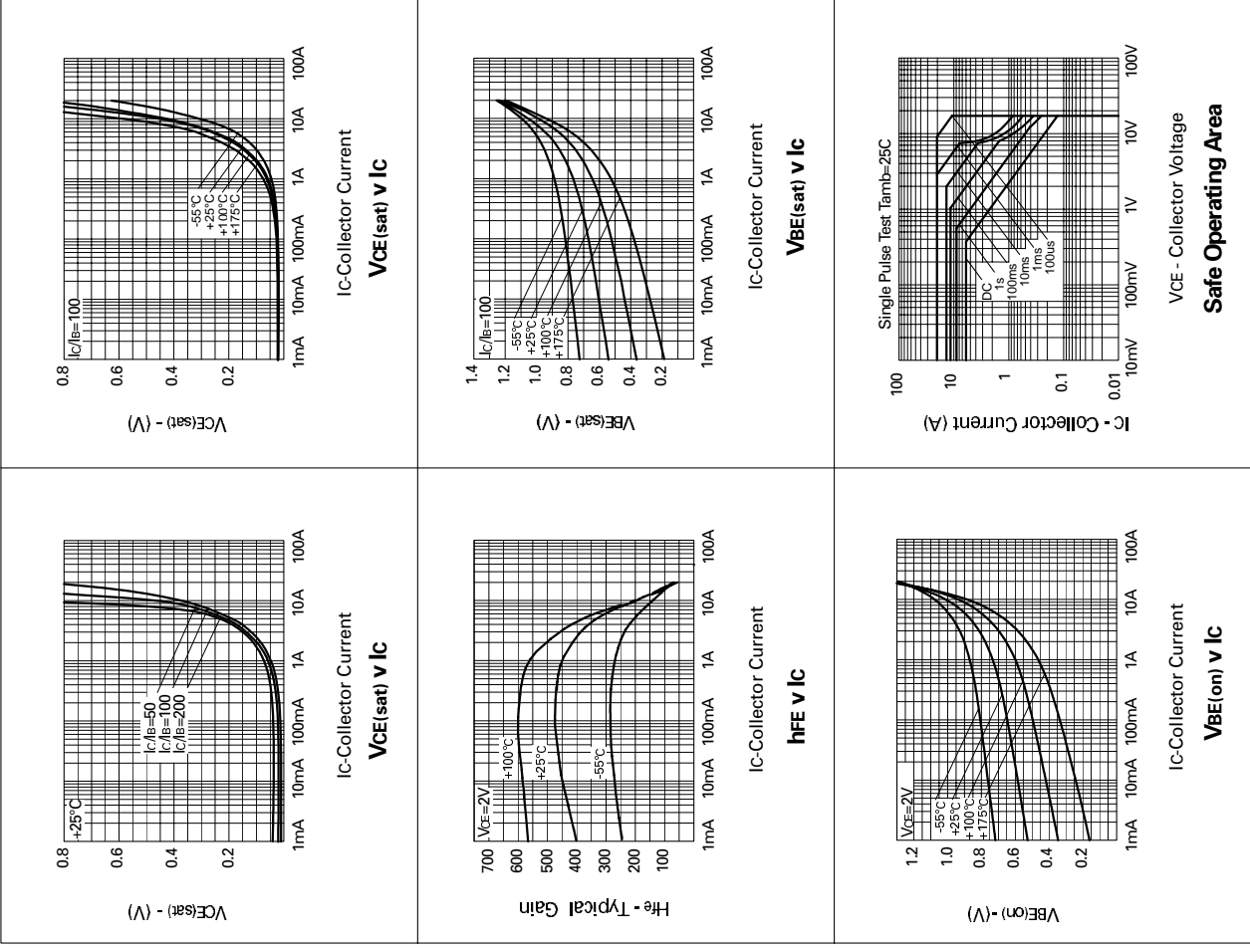


**ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C unless otherwise stated).**

| PARAMETER                             | SYMBOL                | MIN. | TYP. | MAX. | UNIT | CONDITIONS.   |
|---------------------------------------|-----------------------|------|------|------|------|---|
| Collector-Base Breakdown Voltage      | V <sub>BR</sub> (CBO) | 50   | 85   |      | V    | I <sub>C</sub> =100μA   |
| Collector-Emitter Breakdown Voltage   | V <sub>CE</sub> (S)   | 50   | 85   |      | V    | I <sub>C</sub> =100μA   |
| Collector-Emitter Breakdown Voltage   | V <sub>CE0</sub>      | 17.5 | 24   |      | V    | I <sub>C</sub> =10mA  |
| Collector-Emitter Breakdown Voltage   | V <sub>CEV</sub>      | 50   | 85   |      | V    | I <sub>C</sub> =100μA, V <sub>EB</sub> =1V                      |
| Emitter-Base Breakdown Voltage        | V <sub>BR</sub> (EBO) | 5    | 8.7  |      | V    | I <sub>E</sub> =100μA   |
| Collector Cutoff Current              | I <sub>CBO</sub>      |      | 0.3  | 10   | nA   | V <sub>CB</sub> =35V  |
| Emitter Cutoff Current                | I <sub>EBO</sub>      |      | 0.3  | 10   | nA   | V <sub>EB</sub> =4V   |
| Collector Emitter Cutoff Current      | I <sub>CES</sub>      |      | 0.3  | 10   | nA   | V <sub>CE</sub> (S)=35V   |
| Collector-Emitter Saturation Voltage  | V <sub>CE</sub> (sat) | 27   | 45   |      | mV   | I <sub>C</sub> =0.5A, I <sub>B</sub> =10mA*                     |
|                                       |                       | 55   | 75   |      | mV   | I <sub>C</sub> =1A, I <sub>B</sub> =10mA*                       |
|                                       |                       | 120  | 160  |      | mV   | I <sub>C</sub> =2A, I <sub>B</sub> =10mA*                       |
|                                       |                       | 200  | 240  |      | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =100mA*                      |
|                                       |                       | 200  | 300  |      | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =50mA*                       |
| Base-Emitter Saturation Voltage       | V <sub>BE</sub> (sat) |      | 1000 |      | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =100mA*                      |
| Base-Emitter Turn-On Voltage          | V <sub>BE</sub> (on)  |      | 900  | 1000 | mV   | I <sub>C</sub> =5A, V <sub>CE</sub> =2V*                        |
| Static Forward Current Transfer Ratio | h <sub>FE</sub>       | 280  | 440  |      |      | I <sub>C</sub> =10mA, V <sub>CE</sub> =2V*                      |
|                                       |                       | 300  | 450  |      |      | I <sub>C</sub> =0.5A, V <sub>CE</sub> =2V*                      |
|                                       |                       | 300  | 450  | 1200 |      | I <sub>C</sub> =1A, V <sub>CE</sub> =2V*                        |
|                                       |                       | 250  | 300  |      |      | I <sub>C</sub> =5A, V <sub>CE</sub> =2V*                        |
|                                       |                       | 50   | 80   |      |      | I <sub>C</sub> =20A, V <sub>CE</sub> =2V*                       |
| Transition Frequency                  | f <sub>T</sub>        |      | 150  |      | MHz  | I <sub>C</sub> =50mA, V <sub>CE</sub> =10V<br>f=50MHz           |
| Output Capacitance                    | C <sub>obo</sub>      |      | 60   | 80   | pF   | V <sub>CB</sub> =10V, f=1MHz                                    |
| Switching Times                       | t <sub>on</sub>       |      | 120  |      | ns   | I <sub>C</sub> =4A, I <sub>B</sub> =40mA, V <sub>CC</sub> =10V  |
|                                       | t <sub>off</sub>      |      | 250  |      | ns   | I <sub>C</sub> =4A, I <sub>B</sub> =±40mA, V <sub>CC</sub> =10V |

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

**TYPICAL CHARACTERISTICS**



**ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C unless otherwise stated).**

| PARAMETER                             | SYMBOL   | MIN. | TYP. | MAX. | UNIT | CONDITIONS.   |
|---------------------------------------|--|------|------|------|------|---|
| Collector-Base Breakdown Voltage      | V <sub>(BR)CBO</sub>   | 50   | 85   |      | V    | I <sub>C</sub> =100μA   |
| Collector-Emitter Breakdown Voltage   | V <sub>CEs</sub>   | 50   | 85   |      | V    | I <sub>C</sub> =100μA   |
| Collector-Emitter Breakdown Voltage   | V <sub>CE0</sub>   | 17.5 | 24   |      | V    | I <sub>C</sub> =10mA  |
| Collector-Emitter Breakdown Voltage   | V <sub>CEV</sub>   | 50   | 85   |      | V    | I <sub>C</sub> =100μA, V <sub>EB</sub> =1V                      |
| Emitter-Base Breakdown Voltage        | V <sub>(BR)EBO</sub>   | 5    | 8.7  |      | V    | I <sub>E</sub> =100μA   |
| Collector Cutoff Current              | I <sub>CBO</sub>   |      | 0.3  | 10   | nA   | V <sub>CB</sub> =35V  |
| Emitter Cutoff Current                | I <sub>EBO</sub>   |      | 0.3  | 10   | nA   | V <sub>EB</sub> =4V   |
| Collector Emitter Cutoff Current      | I <sub>CES</sub>   |      | 0.3  | 10   | nA   | V <sub>CEs</sub> =35V   |
| Collector-Emitter Saturation Voltage  | V <sub>CE(sat)</sub>   | 27   | 45   |      | mV   | I <sub>C</sub> =0.5A, I <sub>B</sub> =10mA*                     |
|                                       |  | 55   | 75   |      | mV   | I <sub>C</sub> =1A, I <sub>B</sub> =10mA*                       |
|                                       |  | 120  | 160  |      | mV   | I <sub>C</sub> =2A, I <sub>B</sub> =10mA*                       |
|                                       |  | 200  | 240  |      | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =100mA*                      |
|                                       |  | 200  | 300  |      | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =50mA*                       |
| Base-Emitter Saturation Voltage       | V <sub>BE(sat)</sub>   |      | 1000 | 1100 | mV   | I <sub>C</sub> =5A, I <sub>B</sub> =100mA*                      |
| Base-Emitter Turn-On Voltage          | V <sub>BE(on)</sub>  |      | 900  | 1000 | mV   | I <sub>C</sub> =5A, V <sub>CE</sub> =2V*                        |
| Static Forward Current Transfer Ratio | h <sub>FE</sub>  | 280  | 440  |      |      | I <sub>C</sub> =10mA, V <sub>CE</sub> =2V*                      |
|                                       |  | 300  | 450  |      |      | I <sub>C</sub> =0.5A, V <sub>CE</sub> =2V*                      |
|                                       |  | 300  | 450  | 1200 |      | I <sub>C</sub> =1A, V <sub>CE</sub> =2V*                        |
|                                       |  | 250  | 300  |      |      | I <sub>C</sub> =5A, V <sub>CE</sub> =2V*                        |
|                                       |  | 50   | 80   |      |      | I <sub>C</sub> =20A, V <sub>CE</sub> =2V*                       |
| Transition Frequency                  | f <sub>T</sub>   |      | 150  |      | MHz  | I <sub>C</sub> =50mA, V <sub>CE</sub> =10V<br>f=50MHz           |
| Output Capacitance                    | C <sub>obo</sub>   |      | 60   | 80   | pF   | V <sub>CB</sub> =10V, f=1MHz                                    |
| Switching Times                       | t <sub>on</sub>  |      | 120  |      | ns   | I <sub>C</sub> =4A, I <sub>B</sub> =40mA, V <sub>CC</sub> =10V  |
|                                       | t <sub>off</sub>   |      | 250  |      | ns   | I <sub>C</sub> =4A, I <sub>B</sub> =±40mA, V <sub>CC</sub> =10V |
|                                       | Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2% |      |      |      |      |   |

**TYPICAL CHARACTERISTICS**

