

ZTX953

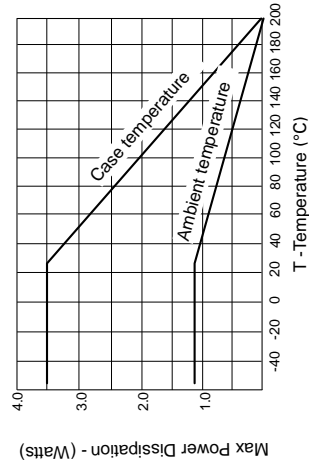
**ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C)**

| PARAMETER                       | SYMBOL                              | MIN. | TYP. | MAX.  | UNIT | CONDITIONS.  |
|---------------------------------|-------------------------------------|------|------|-------|------|--|
| Base-Emitter Turn-On Voltage    | V <sub>BE(on)</sub>                 |      | -880 | -1100 | mV   | I <sub>C</sub> =-4A, V <sub>CE</sub> =-1V*             |
| Static Forward Current Transfer | h <sub>FE</sub>                     | 100  | 200  | 300   |      | I <sub>C</sub> =-10mA, V <sub>CE</sub> =-1V*           |
|                                 |                                     | 100  | 200  |       |      | I <sub>C</sub> =-1A, V <sub>CE</sub> =-1V*             |
|                                 |                                     | 50   | 90   |       |      | I <sub>C</sub> =-3A, V <sub>CE</sub> =-1V*             |
|                                 |                                     | 30   | 50   |       |      | I <sub>C</sub> =-4A, V <sub>CE</sub> =-1V*             |
| Transition Frequency            | f <sub>T</sub>                      |      | 125  |       | MHz  | I <sub>C</sub> =-100mA, V <sub>CE</sub> =-10V, f=50MHz |
|                                 |                                     |      | 65   |       | pF   | V <sub>CE</sub> =-10V, f=1MHz                          |
| Output Capacitance              | C <sub>obo</sub>                    |      | 110  |       | ns   | I <sub>C</sub> =-2A, I <sub>B</sub> =-200mA            |
| Switching Times                 | t <sub>on</sub><br>t <sub>off</sub> |      | 460  |       | ns   | I <sub>B</sub> =-200mA, V <sub>CE</sub> =-10V          |

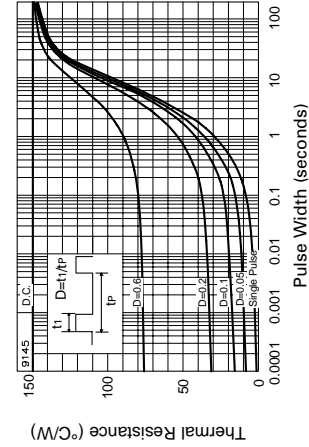
\*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤2%

**THERMAL CHARACTERISTICS**

| PARAMETER   | SYMBOL                  | MAX. | UNIT |
|---|-------------------------|------|------|
| Thermal Resistance: Junction to Ambient<br>Junction to Case | R <sub>th(j-amb)</sub>  | 150  | °C/W |
|   | R <sub>th(j-case)</sub> | 50   | °C/W |



**Derating curve**



**Maximum transient thermal impedance**

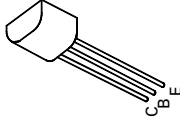
**PNP SILICON PLANAR MEDIUM POWER HIGH CURRENT TRANSISTOR**

ISSUE 4 – JUNE 94

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**FEATURES**

- \* 3.5 Amps continuous current
- \* Up to 10 Amps peak current
- \* Very low saturation voltage
- \* Excellent gain up to 10 Amps
- \* Spice model available



E-Line  
TO92 Compatible

**ABSOLUTE MAXIMUM RATINGS.**

| PARAMETER                                   | SYMBOL                            | VALUE       | UNIT |
|---|-----------------------------------|-------------|------|
| Collector-Base Voltage                      | V <sub>CB0</sub>                  | -140        | V    |
| Collector-Emitter Voltage                   | V <sub>CE0</sub>                  | -100        | V    |
| Emitter-Base Voltage                        | V <sub>EBO</sub>                  | -6          | V    |
| Peak Pulse Current                          | I <sub>CM</sub>                   | -10         | A    |
| Continuous Collector Current                | I <sub>C</sub>                    | -3.5        | A    |
| Practical Power Dissipation*                | P <sub>totp</sub>                 | 1.58        | W    |
| Power Dissipation at T <sub>amb</sub> =25°C | P <sub>tot</sub>                  | 1.2         | W    |
| Operating and Storage Temperature Range     | T <sub>J</sub> ; T <sub>stg</sub> | -55 to +200 | °C   |

\*The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 1 inch square minimum

**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>        | -140 | -170 |      | V    | I <sub>C</sub> =-100μA                          |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEr</sub>        | -140 | -170 |      | V    | I <sub>C</sub> =-1μA, R <sub>B</sub> ≤ 1KΩ      |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub>        | -100 | -120 |      | V    | I <sub>C</sub> =-10mA*                          |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub>        | -6   | -8   |      | V    | I <sub>E</sub> =-100μA                          |
| Collector Cut-Off Current            | I <sub>CBO</sub>            |      |      | -50  | nA   | V <sub>CB</sub> =-100V                          |
|                                      |                             |      |      | -1   | μA   | V <sub>CB</sub> =-100V, T <sub>amb</sub> =100°C |
| Collector Cut-Off Current            | I <sub>GER</sub><br>R ≤ 1KΩ |      |      | -50  | nA   | V <sub>CB</sub> =-100V                          |
|                                      |                             |      |      | -1   | μA   | V <sub>CB</sub> =-100V, T <sub>amb</sub> =100°C |
| Emitter Cut-Off Current              | I <sub>EBO</sub>            |      |      | -10  | nA   | V <sub>EB</sub> =-6V                            |
|                                      |                             |      |      | -50  | mV   | I <sub>C</sub> =-100mA, I <sub>B</sub> =-10mA*  |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub>        |      | -20  |      | mV   | I <sub>C</sub> =-1A, I <sub>B</sub> =-100mA*    |
|                                      |                             |      | -80  |      | mV   | I <sub>C</sub> =-2A, I <sub>B</sub> =-200mA*    |
|                                      |                             |      | -140 |      | mV   | I <sub>C</sub> =-3A, I <sub>B</sub> =-300mA*    |
|                                      |                             |      | -250 |      | mV   | I <sub>C</sub> =-4A, I <sub>B</sub> =-400mA*    |
| Base-Emitter Saturation Voltage      | V <sub>BE(sat)</sub>        |      | -960 |      | mV   | I <sub>C</sub> =-4A, I <sub>B</sub> =-400mA*    |

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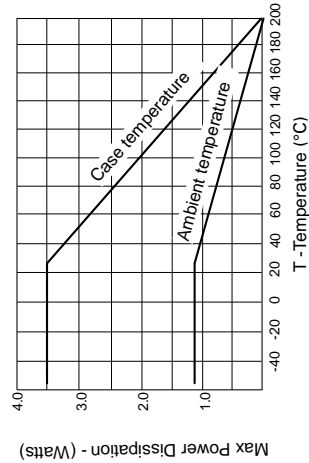
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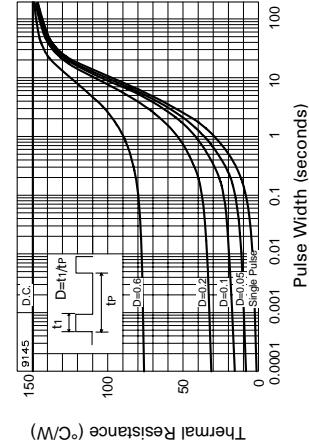
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**Derating curve**



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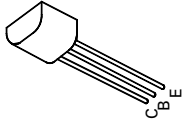
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| Emitter-Base Voltage                        | V <sub>EBO</sub>                  | -6          | V    |
| Peak Pulse Current                          | I <sub>CM</sub>                   | -10         | A    |
| Continuous Collector Current                | I <sub>C</sub>                    | -3.5        | A    |
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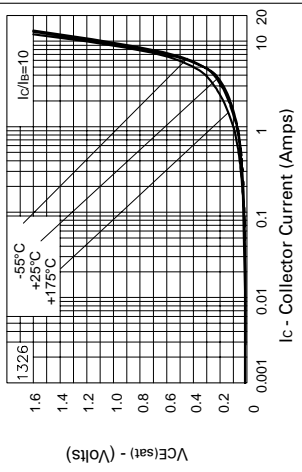
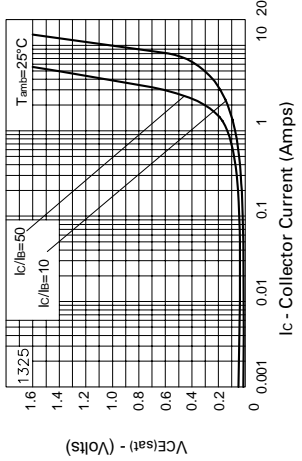
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| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub>        | -100 | -120 |           | V        | I <sub>C</sub> =-10mA*  |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub>        | -6   | -8   |           | V        | I <sub>E</sub> =-100μA  |
| Collector Cut-Off Current            | I <sub>CBO</sub>            |      |      | -50<br>-1 | nA<br>μA | V <sub>CB</sub> =-100V<br>V <sub>CB</sub> =-100V, T <sub>amb</sub> =100°C |
| Collector Cut-Off Current            | I <sub>CER</sub><br>R ≤ 1KΩ |      |      | -50<br>-1 | nA<br>μA | V <sub>CB</sub> =-100V<br>V <sub>CB</sub> =-100V, T <sub>amb</sub> =100°C |
| Emitter Cut-Off Current              | I <sub>EBO</sub>            |      |      | -10       | nA       | V <sub>EB</sub> =-6V  |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub>        | -20  |      |           | mV       | I <sub>C</sub> =-100mA, I <sub>B</sub> =-10mA*                            |
|                                      |                             | -80  |      |           | mV       | I <sub>C</sub> =-1A, I <sub>B</sub> =-100mA*                              |
|                                      |                             | -140 |      |           | mV       | I <sub>C</sub> =-2A, I <sub>B</sub> =-200mA*                              |
|                                      |                             | -250 |      |           | mV       | I <sub>C</sub> =-4A, I <sub>B</sub> =-400mA*                              |
| Base-Emitter Saturation Voltage      | V <sub>BE(sat)</sub>        |      | -960 | -1100     | mV       | I <sub>C</sub> =-4A, I <sub>B</sub> =-400mA*                              |

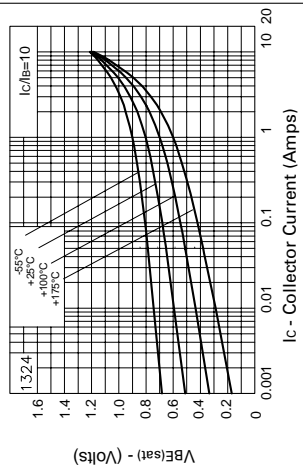
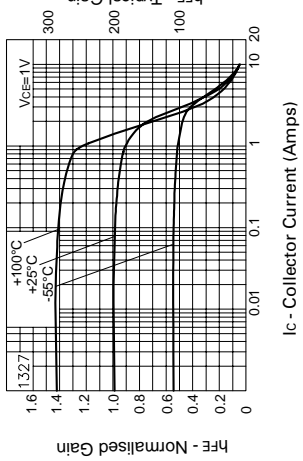
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## TYPICAL CHARACTERISTICS



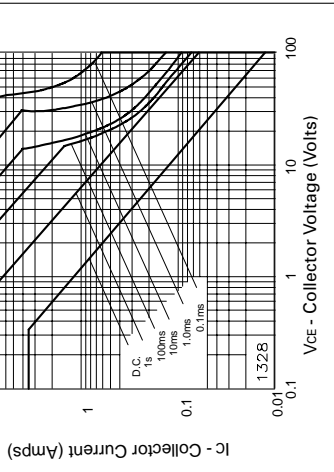
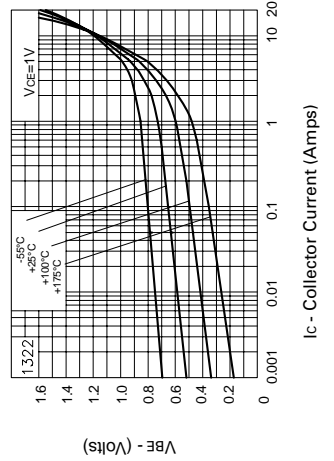
VCE(sat) v IC

VCE(sat) v IC



hFE v IC

VBE(sat) v IC



VBE(on) v IC

Safe Operating Area