



**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                                                                                      | Symbol              | Value                                                                            | Unit |
|---------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------|------|
| Supply Voltage <Pin: (3) to (2)>                                                                                    | V <sub>CC</sub>     | 50                                                                               | V    |
| Input Voltage <Pin: (1) to (2)><br>DDTC123EUA<br>DDTC143EUA<br>DDTC114EUA<br>DDTC124EUA<br>DDTC144EUA<br>DDTC115EUA | V <sub>IN</sub>     | -10 to +12<br>-10 to +30<br>-10 to +40<br>-10 to +40<br>-10 to +40<br>-10 to +40 | V    |
| Output Current<br>DDTC123EUA<br>DDTC143EUA<br>DDTC114EUA<br>DDTC124EUA<br>DDTC144EUA<br>DDTC115EUA                  | I <sub>O</sub>      | 100<br>100<br>50<br>30<br>100<br>20                                              | mA   |
| Output Current All                                                                                                  | I <sub>C(MAX)</sub> | 100                                                                              | mA   |

**Thermal Characteristics**

| Characteristic                                       | Symbol                            | Value       | Unit |
|------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Notes 5 & 6)                      | P <sub>D</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R <sub>θJA</sub>                  | 625         | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                                                                                     | Symbol                         | Min                                    | Typ | Max                                        | Unit | Test Condition                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------|-----|--------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage                                                                                                      | V <sub>I(OFF)</sub>            | 0.5                                    | 1.1 | —                                          | V    | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                    | V <sub>I(ON)</sub>             | —                                      | 1.9 | 3                                          | V    | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC123EUA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC143EUA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA, DDTC114EUA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA, DDTC124EUA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA, DDTC144EUA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA, DDTC115EUA |
| Output Voltage                                                                                                     | V <sub>O(ON)</sub>             | —                                      | 0.1 | 0.3                                        | V    | I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC123EUA<br>I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC143EUA<br>I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC114EUA<br>I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC124EUA<br>I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC144EUA<br>I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA, DDTC115EUA    |
| Input Current<br>DDTC123EUA<br>DDTC143EUA<br>DDTC114EUA<br>DDTC124EUA<br>DDTC144EUA<br>DDTC115EUA                  | I <sub>I</sub>                 | —                                      | —   | 3.8<br>1.8<br>0.88<br>0.36<br>0.18<br>0.15 | mA   | V <sub>I</sub> = 5V                                                                                                                                                                                                                                                                                                                                               |
| Output Current                                                                                                     | I <sub>O(OFF)</sub>            | —                                      | —   | 0.5                                        | μA   | V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V                                                                                                                                                                                                                                                                                                                        |
| DC Current Gain<br>DDTC123EUA<br>DDTC143EUA<br>DDTC114EUA<br>DDTC124EUA<br>DDTC144EUA<br>DDTC144EUAQ<br>DDTC115EUA | G <sub>I</sub>                 | 20<br>20<br>30<br>56<br>68<br>80<br>82 | —   | —                                          | —    | V <sub>O</sub> = 5V, I <sub>O</sub> = 20mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA<br>V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA                                         |
| Input Resistor (R <sub>1</sub> ) Tolerance                                                                         | ΔR <sub>1</sub>                | -30                                    | —   | +30                                        | %    | —                                                                                                                                                                                                                                                                                                                                                                 |
| Resistance Ratio                                                                                                   | R <sub>2</sub> /R <sub>1</sub> | 0.8                                    | 1   | 1.2                                        | —    | —                                                                                                                                                                                                                                                                                                                                                                 |
| Gain-Bandwidth Product*                                                                                            | f <sub>T</sub>                 | —                                      | 250 | —                                          | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA,<br>f = 100MHz                                                                                                                                                                                                                                                                                                        |

\* Transistor - For Reference Only

Notes: 5. Mounted on FR4 PC Board with recommended pad layout as shown on Diodes Inc., suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com>.  
6. 150mW per element must not be exceeded.

**Typical Curves – DDTC143EUA** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

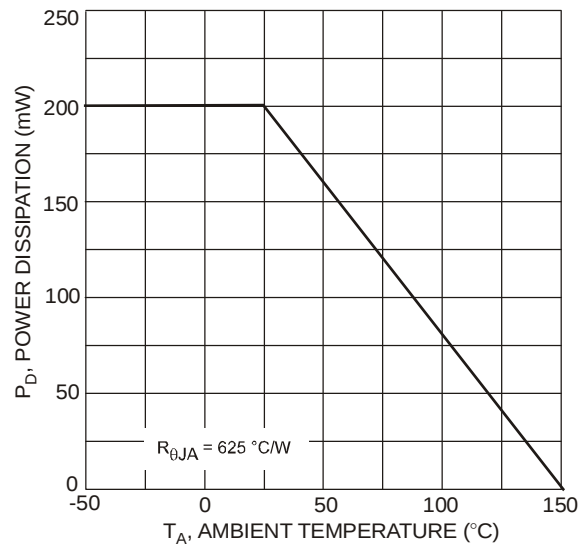


Fig. 1 Power Dissipation vs. Ambient Temperature

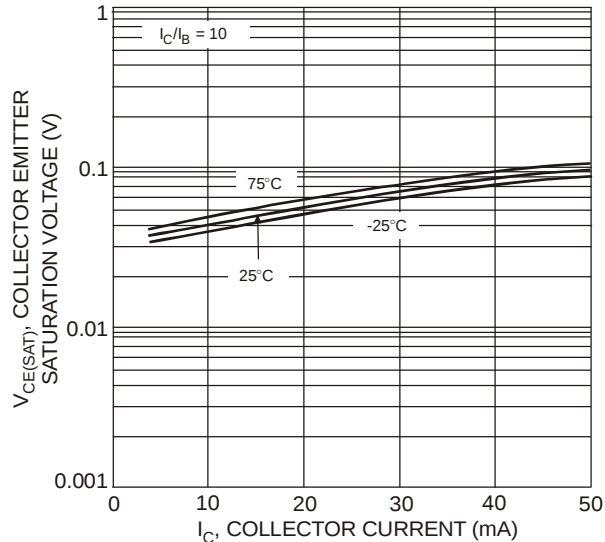


Fig. 3 Collector Emitter Saturation Voltage vs. Collector Current

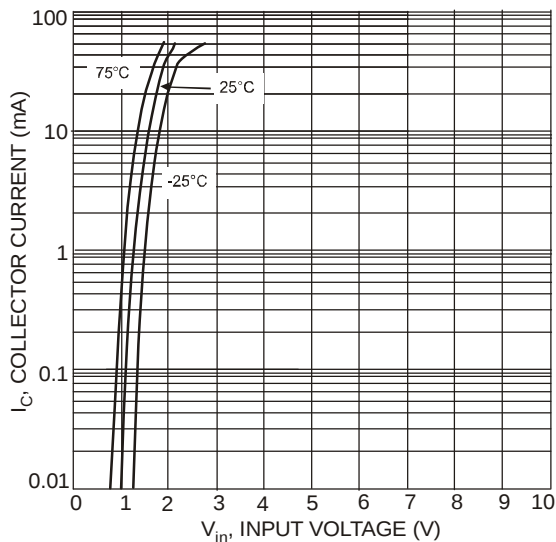


Fig. 5 Collector Current vs. Input Voltage

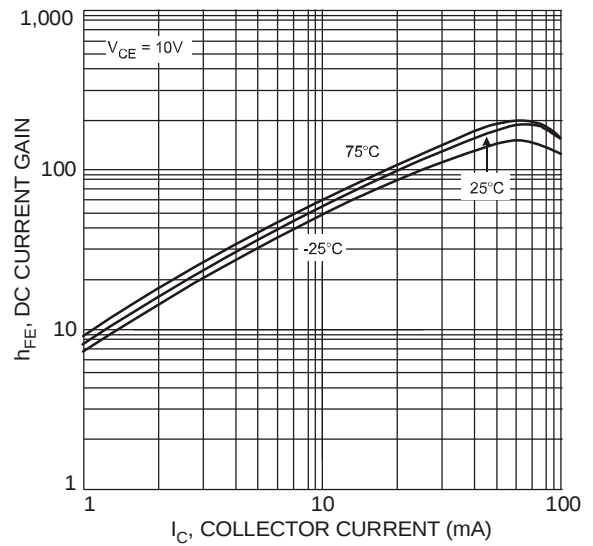


Fig. 2 Typical DC Current Gain vs. Collector Current

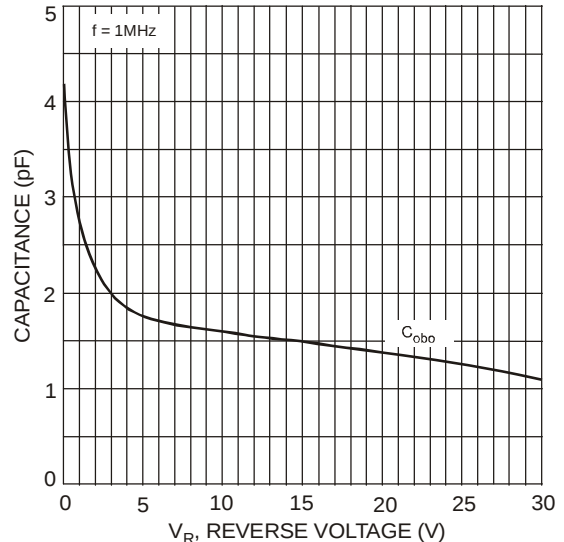


Fig. 4 Typical Capacitance Characteristics

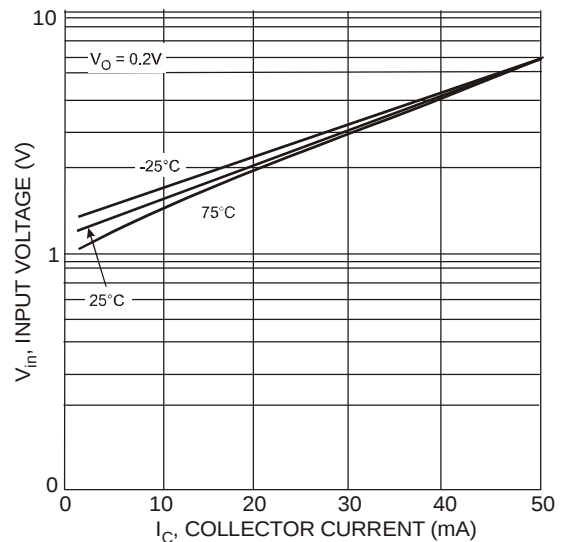
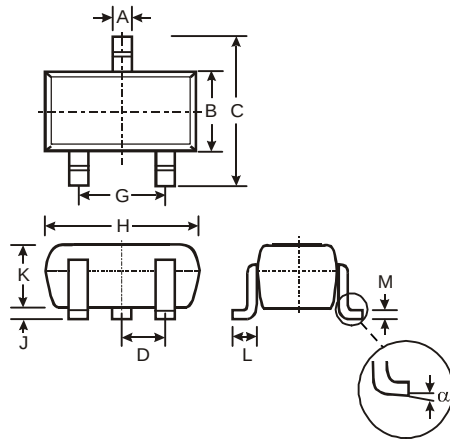


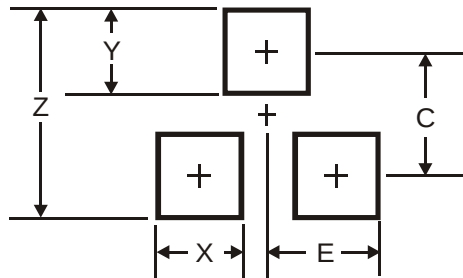
Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions



| SOT323               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.25 | 0.40 | 0.30 |
| B                    | 1.15 | 1.35 | 1.30 |
| C                    | 2.00 | 2.20 | 2.10 |
| D                    | -    | -    | 0.65 |
| G                    | 1.20 | 1.40 | 1.30 |
| H                    | 1.80 | 2.20 | 2.15 |
| J                    | 0.0  | 0.10 | 0.05 |
| K                    | 0.90 | 1.00 | 1.00 |
| L                    | 0.25 | 0.40 | 0.30 |
| M                    | 0.10 | 0.18 | 0.11 |
| $\alpha$             | 0°   | 8°   | -    |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.8           |
| X          | 0.7           |
| Y          | 0.9           |
| C          | 1.9           |
| E          | 1.0           |

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