

## NTE65 Silicon NPN Transistor High Voltage, Low Noise for CATV, MATV

**Description:**

The NTE65 is silicon NPN transistor designed primarily for use in high-gain, low-noise, small-signal amplifier and also used in applications requiring fast switching times.

**Features:**

- High Current-Gain Bandwidth Product
- Low Noise Figure
- High Power Gain

**Absolute Maximum Ratings:**

|   |                                     |
|---|-------------------------------------|
| Collector-Emitter Voltage, $V_{CEO}$ .....                          | 15V                                 |
| Collector-Base Voltage, $V_{CBO}$ .....                             | 20V                                 |
| Emitter-Base Voltage, $V_{EBO}$ .....                               | 3V                                  |
| Continuous Collector Current, $I_C$ .....                           | 30mA                                |
| Total Device Dissipation ( $T_A = +60^\circ\text{C}$ ), $P_D$ ..... | 180mW                               |
| Derate Above $60^\circ\text{C}$ .....                               | 2.0mW/ $^\circ\text{C}$             |
| Storage Temperature Range, $T_{stg}$ .....                          | $-65^\circ$ to $+150^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....           | 500 $^\circ\text{C}/\text{W}$       |

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

| Parameter                           | Symbol        | Test Conditions                          | Min | Typ | Max | Unit |
|-------------------------------------|---------------|--|-----|-----|-----|------|
| <b>OFF Characteristics</b>          |               |  |     |     |     |      |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 1\text{mA}, I_B = 0$              | 15  | –   | –   | V    |
| Collector-Base Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C = 0.1\text{mA}, I_E = 0$            | 20  | –   | –   | V    |
| Emitter-Base Breakdown Voltage      | $V_{(BR)EBO}$ | $I_E = 0.1\text{mA}, I_C = 0$            | 3   | –   | –   | V    |
| Collector Cutoff Current            | $I_{CBO}$     | $V_{CB} = 10\text{V}, I_E = 0$           | –   | –   | 50  | nA   |
| <b>ON Characteristics</b>           |               |  |     |     |     |      |
| DC Current Gain                     | $h_{FE}$      | $V_{CE} = 10\text{V}, I_C = 14\text{mA}$ | 25  | –   | 250 |      |

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

| Parameter                                | Symbol    | Test Conditions   | Min | Typ | Max | Unit |
|--|-----------|---|-----|-----|-----|------|
| <b>Dynamic Characteristics</b>           |           |   |     |     |     |      |
| Current-Gain Bandwidth Product           | $f_T$     | $V_{CE} = 10\text{V}, I_C = 14\text{mA}, f = 0.5\text{GHz}$ | -   | 5.0 | -   | GHz  |
| Collector-Base Capacitance               | $C_{cb}$  | $V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$             | -   | 0.5 | 1.0 | pF   |
| <b>Functional Tests</b>                  |           |   |     |     |     |      |
| Noise Figure                             | NF        | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 0.5\text{GHz}$  | -   | 2.4 | -   | dB   |
|  |           | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 1.0\text{GHz}$  | -   | 3.0 | -   | dB   |
| Power Gain at Optimum Noise Figure       | $G_{NF}$  | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 0.5\text{GHz}$  | -   | 15  | -   | dB   |
|  |           | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 1.0\text{GHz}$  | -   | 10  | -   | dB   |
| Maximum Available Power Gain<br>(Note 1) | $G_{max}$ | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 0.5\text{GHz}$  | -   | 18  | -   | dB   |
|  |           | $V_{CE} = 10\text{V}, I_C = 2\text{mA}, f = 1.0\text{GHz}$  | -   | 12  | -   | dB   |

Note 1.  $G_{max} = \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)}$

