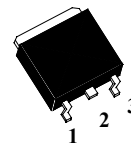


**NPN PLASTIC ENCAPSULATE TRANSISTORS**

 **Lead(Pb)-Free**

1.BASE  
2.COLLECTOR  
3.EMITTER



**D-PAK(TO-252)**

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)**

| Rating                      | Symbol           | Limits      | Unit |
|-----------------------------|------------------|-------------|------|
| Collector-Base Voltage      | V <sub>CBO</sub> | 60          | V    |
| Collector-Emitter Voltage   | V <sub>CEO</sub> | 50          | V    |
| Emitter-Base Voltage        | V <sub>EBO</sub> | 6.0         | V    |
| Collector Current           | I <sub>C</sub>   | 3.0         | μA   |
| Collector Power Dissipation | P <sub>D</sub>   | 1.0         | W    |
| Junction Temperature        | T <sub>j</sub>   | -55 to +150 | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -55 to +150 | °C   |

**ELECTRICAL CHARACTERISTICS(T<sub>A</sub>=25°C unless otherwise noted)**

| Parameter                                                    | Symbol            | Min | Typ | Max | Unit |
|--------------------------------------------------------------|-------------------|-----|-----|-----|------|
| Collector-Base Breakdown Voltage<br>I <sub>C</sub> =10μA     | BV <sub>CBO</sub> | 60  | -   | -   | V    |
| Collector-Emitter Breakdown Voltage<br>I <sub>C</sub> =1.0mA | BV <sub>CEO</sub> | 50  | -   | -   | V    |
| Emitter-Base Breakdown Voltage<br>I <sub>E</sub> =10μA       | BV <sub>EBO</sub> | 6.0 | -   | -   | V    |
| Collector Cutoff Current<br>V <sub>CB</sub> =40V             | I <sub>CBO</sub>  | -   | -   | 1.0 | μA   |
| Collector Cutoff Current<br>V <sub>EB</sub> =4.0V            | I <sub>EBO</sub>  | -   | -   | 1.0 | μA   |

## ON CHARACTERISTICS

|                                                                   |                            |           |        |          |   |
|-------------------------------------------------------------------|----------------------------|-----------|--------|----------|---|
| DC Current Gain<br>$V_{CE}=2V, I_C=0.1A$<br>$V_{CE}=2V, I_C=3.0A$ | $h_{FE(1)}$<br>$h_{FE(2)}$ | 100<br>35 | -<br>- | 560<br>- | - |
| Collector-Emitter Saturation Voltage<br>$I_C=2A, I_B=0.1A$        | $V_{CE(sat)}$              | -         | -      | 0.5      | V |
| Base-Emitter Saturation Voltage<br>$I_C=2A, I_B=0.1A$             | $V_{BE(sat)}$              | -         | -      | 1.2      | V |

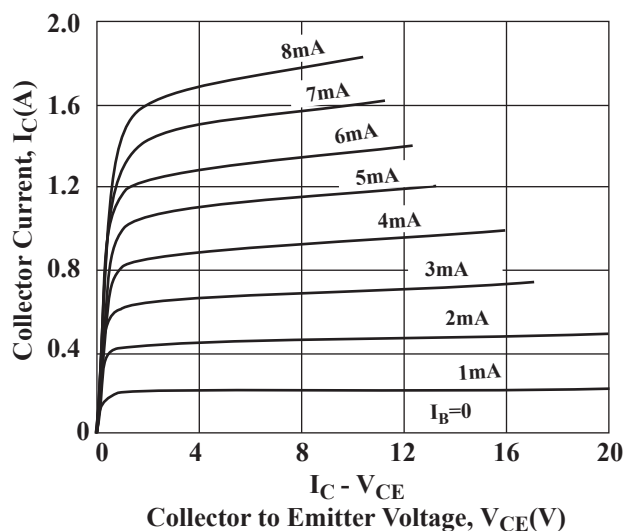
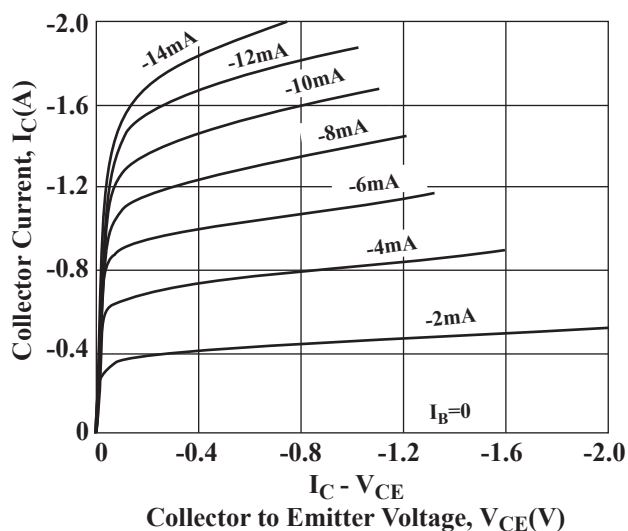
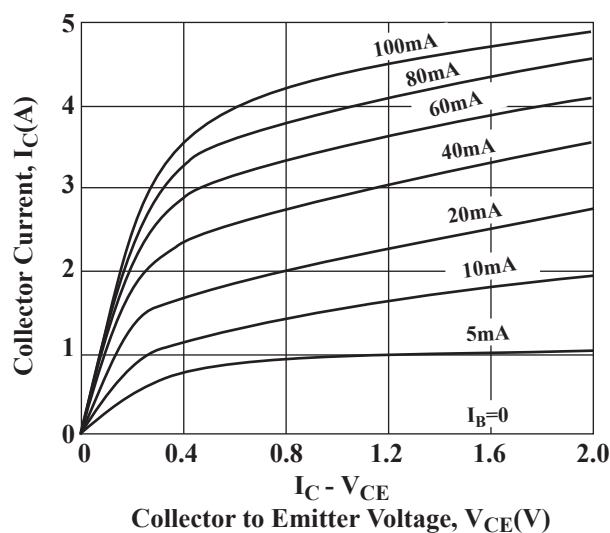
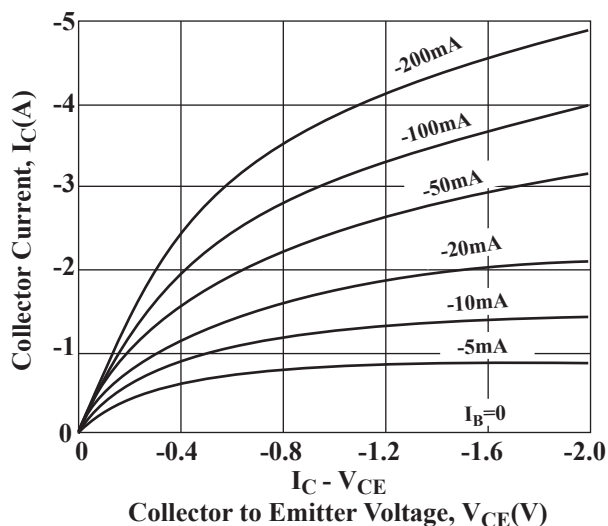
## DYNAMIC CHARACTERISTICS

|                                                            |          |   |     |   |     |
|------------------------------------------------------------|----------|---|-----|---|-----|
| Transition Frequency<br>$V_{CE}=10V, I_C=50mA$             | $f_T$    | - | 150 | - | MHz |
| Output Capacitance<br>$V_{CB}=10V, I_E=0, f=1.0MHz$        | $C_{ob}$ | - | 25  | - | pF  |
| Turn-off time<br>$V_{CC}=25V, I_C=1A, I_{B1}=-I_{B2}=0.1A$ | $t_{on}$ | - | 70  | - | nS  |
| Fall time<br>$V_{CC}=25V, I_C=1A, I_{B1}=-I_{B2}=0.1A$     | $t_f$    | - | 650 | - |     |
| Storage time<br>$V_{CC}=25V, I_C=1A, I_{B1}=-I_{B2}=0.1A$  | $t_s$    | - | 35  | - |     |

CLASSIFICATION OF  $h_{FE(1)}$ 

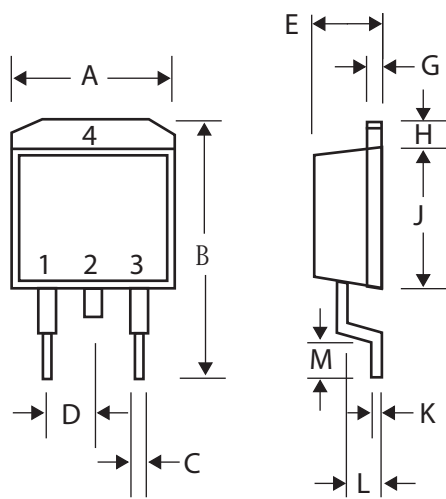
| Rank  | R         | S         | T         | U         |
|-------|-----------|-----------|-----------|-----------|
| Range | 100 - 200 | 140 - 280 | 200 - 400 | 280 - 560 |

## Typical Characteristics



TO-252 Outline Dimensions

unit:mm



| TO-252 |      |       |
|--------|------|-------|
| Dim    | Min  | Max   |
| A      | 6.40 | 6.80  |
| B      | 9.00 | 10.00 |
| C      | 0.50 | 0.80  |
| D      | -    | 2.30  |
| E      | 2.20 | 2.50  |
| G      | 0.45 | 0.55  |
| H      | 1.00 | 1.60  |
| J      | 5.40 | 5.80  |
| K      | 0.30 | 0.64  |
| L      | 0.70 | 1.70  |
| M      | 0.90 | 1.50  |