

## TIP29,A,B,C(NPN) TIP30,A,B,C(PNP)

### Features

- Halogen free available upon request by adding suffix "-HF"
- Mounting Torque: 5 in-lbs Maximum
- Lead Free Finish/RoHS Compliant(Note 1) ("P" Suffix designates RoHS Compliant. See ordering information)
- Marking: Type Number
- $R_{th(jc)}$  is  $4.167^{\circ}\text{C/W}$ ,  $R_{th(ja)}$  is  $62.5^{\circ}\text{C/W}$
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

### Maximum Ratings

| Symbol           | Rating                                                             |                | Rating      | Unit      |
|------------------|--------------------------------------------------------------------|----------------|-------------|-----------|
| V <sub>CEO</sub> | Collector-Emitter Voltage                                          | TIP29, TIP30   | 40          | V         |
| V <sub>CBO</sub> | Collector-Base Voltage                                             | TIP29A, TIP30A | 60          |           |
|                  |                                                                    | TIP29B, TIP30B | 80          |           |
|                  |                                                                    | TIP29C, TIP30C | 100         |           |
| V <sub>EB</sub>  | Emitter-Base Voltage                                               |                | 5.0         | V         |
| I <sub>C</sub>   | Collector Current- Continuous<br>Peak <sup>(1)</sup>               |                | 1.0<br>3.0  | A         |
| I <sub>B</sub>   | Base Current-Continuous                                            |                | 0.4         | A         |
| P <sub>D</sub>   | Total power dissipation @T <sub>C</sub> =25°C<br>Derate above 25°C |                | 30<br>0.24  | W<br>W/°C |
| T <sub>J</sub>   | Junction Temperature                                               |                | -55 to +150 | °C        |
| T <sub>STG</sub> | Storage Temperature                                                |                | -55 to +150 | °C        |

### Electrical Characteristics @ $25^{\circ}\text{C}$ Unless Otherwise Specified

| Symbol | Parameter | Min | Max | Units |
|--------|-----------|-----|-----|-------|
|--------|-----------|-----|-----|-------|

#### OFF CHARACTERISTICS

|                |                                                                                                                                                                                           |                                                                    |                       |                          |               |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------|--------------------------|---------------|
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage <sup>(note 2)</sup><br>( $I_C=30\text{mA}$ , $I_B=0$ )                                                                                               | TIP29, TIP30<br>TIP29A, TIP30A<br>TIP29B, TIP30B<br>TIP29C, TIP30C | 40<br>60<br>80<br>100 | ---                      | Vdc           |
| $I_{EBO}$      | Emitter-Base Cutoff Current<br>( $V_{EB}=5.0\text{Vdc}$ , $I_C=0$ )                                                                                                                       |                                                                    | ---                   | 1.0                      | mA            |
| $I_{CES}$      | Collector Cutoff Current<br>( $V_{CE}=40\text{V}$ , $V_{EB}=0$ )<br>( $V_{CE}=60\text{V}$ , $V_{EB}=0$ )<br>( $V_{CE}=80\text{V}$ , $V_{EB}=0$ )<br>( $V_{CE}=100\text{V}$ , $V_{EB}=0$ ) | TIP29, TIP30<br>TIP29A, TIP30A<br>TIP29B, TIP30B<br>TIP29C, TIP30C | ---                   | 200<br>200<br>200<br>200 | $\mu\text{A}$ |
| $I_{CEO}$      | Collector Cutoff Current<br>( $V_{CE}=30\text{Vdc}$ , $I_B=0$ )<br>TIP29, TIP29A, TIP30, TIP30A<br>( $V_{CE}=60\text{Vdc}$ , $I_B=0$ )<br>TIP29B, TIP29C, TIP30B, TIP30C                  |                                                                    | ---                   | 0.3<br>0.3               | mA            |

#### ON CHARACTERISTICS<sup>(2)</sup>

|               |                                                                                                                             |          |     |    |     |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|----------|-----|----|-----|
| $h_{FE(1)}$   | DC Current Gain<br>( $I_C=0.2\text{A}$ , $V_{CE}=4.0\text{Vdc}$ )<br>( $I_C=1.0\text{A}$ , $V_{CE}=4.0\text{Vdc}$ )         | 40<br>15 | --- | 75 | --- |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage<br>( $I_C=1.0\text{A}$ , $I_B=125\text{mA}$ )                                          | ---      | 0.7 |    | Vdc |
| $V_{BE(ON)}$  | Base-Emitter On Voltage<br>( $I_C=1.0\text{A}$ , $V_{CE}=4.0\text{Vdc}$ )                                                   | ---      | 1.3 |    | Vdc |
| $f_T$         | Current-Gain-Bandwidth Product <sup>(note 3)</sup><br>( $I_C=200\text{mA}$ , $V_{CE}=10\text{Vdc}$ ,<br>$f=1.0\text{MHz}$ ) | 3.0      | --- |    | MHz |
| $h_{fe}$      | Small-Signal Current Gain<br>( $I_C=0.2\text{A}$ , $V_{CE}=10\text{Vdc}$ , $f=1.0\text{kHz}$ )                              | 20       | --- |    | --- |

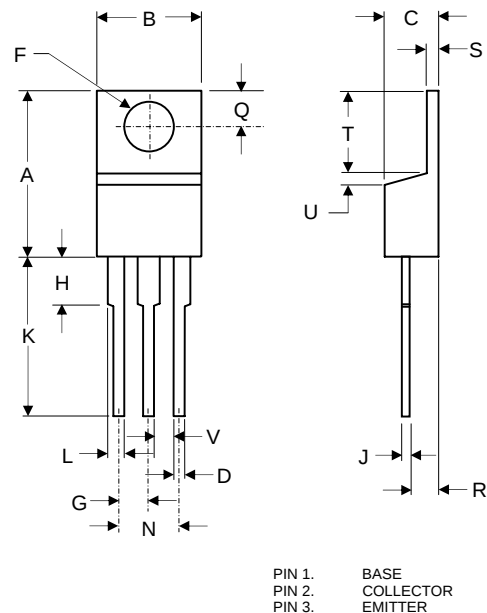
Notes:1.High Temperature Solder Exemption Applied, see EU Directive Annex 7.

2. Pulse Test: Pulse Width=300 $\mu\text{s}$ , Duty Cycle <2.0%

3.  $f_T = |h_{fe}| \times f_{test}$

## 1.0 Amp Complementary Silicon Power Transistors

### TO-220



| DIM | INCHES |      | MM    |       | NOTE |
|-----|--------|------|-------|-------|------|
|     | MIN    | MAX  | MIN   | MAX   |      |
| A   | .560   | .625 | 14.22 | 15.88 |      |
| B   | .380   | .420 | 9.65  | 10.67 |      |
| C   | .140   | .190 | 3.56  | 4.82  |      |
| D   | .020   | .045 | 0.51  | 1.14  |      |
| F   | .139   | .161 | 3.53  | 4.09  | Ø    |
| G   | .190   | .110 | 2.29  | 2.79  |      |
| H   | ---    | .250 | ---   | 6.35  |      |
| J   | .012   | .025 | 0.30  | 0.64  |      |
| K   | .500   | .580 | 12.70 | 14.73 |      |
| L   | .045   | .060 | 1.14  | 1.52  |      |
| N   | .190   | .210 | 4.83  | 5.33  |      |
| Q   | .100   | .135 | 2.54  | 3.43  |      |
| R   | .080   | .115 | 2.04  | 2.92  |      |
| S   | .045   | .055 | 1.14  | 1.39  |      |
| T   | .230   | .270 | 5.84  | 6.86  |      |
| U   | ---    | .050 | ---   | 1.27  |      |
| V   | .045   | ---  | 1.15  | ---   |      |

# TIP29,A,B,C(NPN) TIP30,A,B,C(PNP)

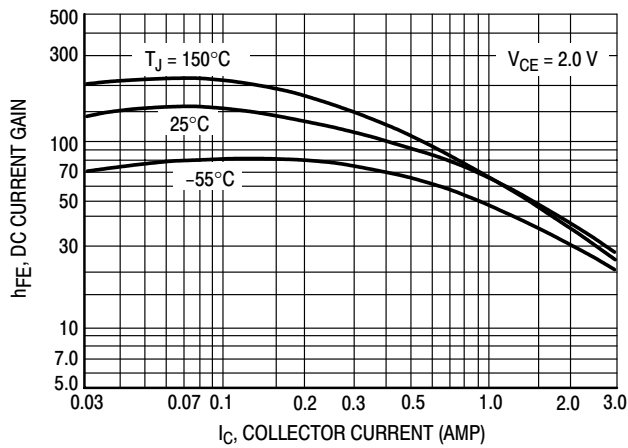


Figure 1. DC Current Gain

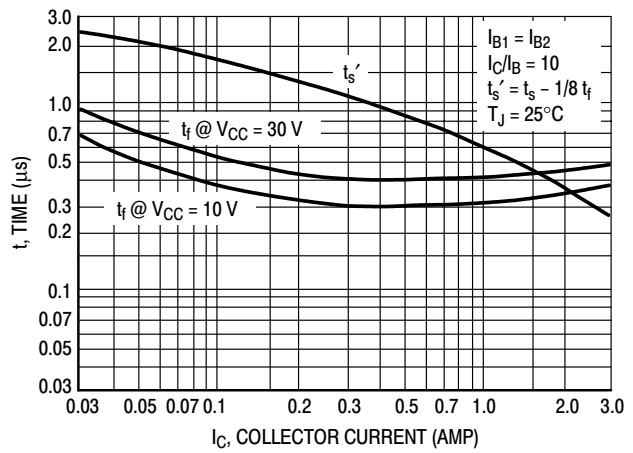


Figure 2. Turn-Off Time

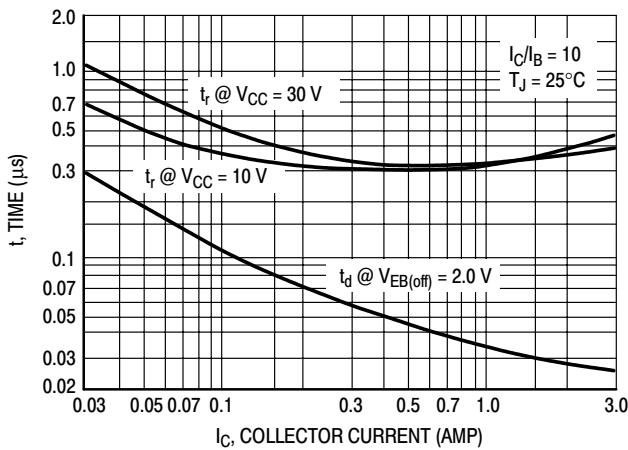


Figure 3. Turn-On Time

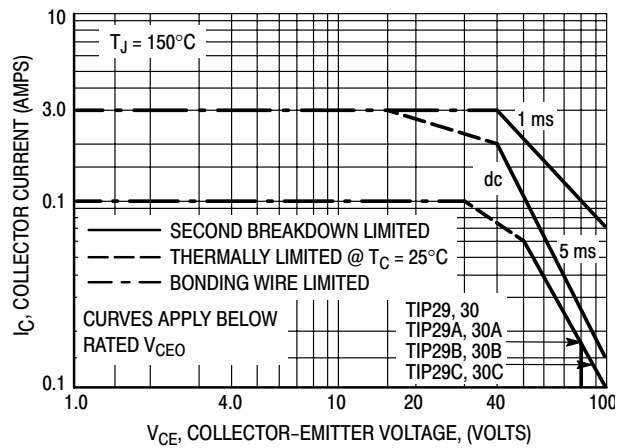


Figure 4. Active Region Safe Operating Area

## Ordering Information :

| Device         | Packing         |
|----------------|-----------------|
| Part Number-BP | Bulk; 1Kpcs/Box |

Note : Adding "-HF" suffix for halogen free, eg. Part Number-BP-HF

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