

## COMPLEMENTARY SILICON POWER TRANSISTORS

...designed for use in general-purpose amplifier and switching applications

### FEATURES:

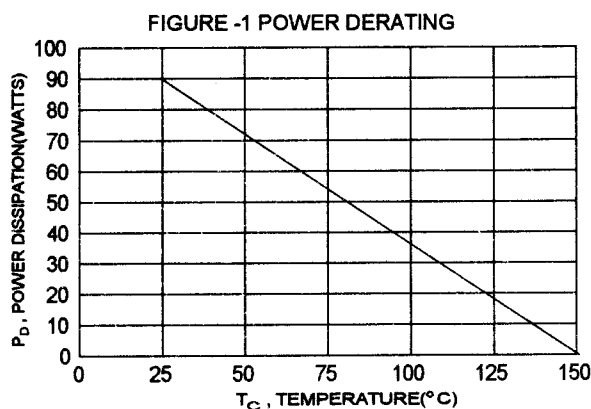
- \* Power Dissipation -  $P_D = 90W$  @  $T_C = 25^\circ C$
- \* DC Current Gain  $hFE = 20 \sim 100$  @  $I_C = 4.0 A$
- \*  $V_{CE(sat)} = 1.1 V$  (Max.) @  $I_C = 4.0 A$ ,  $I_B = 400 mA$

### MAXIMUM RATINGS

| Characteristic                                                            | Symbol         | Rating       | Unit               |
|---------------------------------------------------------------------------|----------------|--------------|--------------------|
| Collector-Emitter Voltage                                                 | $V_{CEO}$      | 60           | V                  |
| Collector-Emitter Voltage                                                 | $V_{CER}$      | 70           | V                  |
| Collector-Base Voltage                                                    | $V_{CBO}$      | 100          | V                  |
| Emitter-Base Voltage                                                      | $V_{EBO}$      | 7.0          | V                  |
| Collector Current-Continuous                                              | $I_C$          | 15           | A                  |
| Base Current                                                              | $I_B$          | 7.0          | A                  |
| Total Power Dissipation @ $T_C = 25^\circ C$<br>Derate above $25^\circ C$ | $P_D$          | 90<br>0.72   | W<br>W/ $^\circ C$ |
| Operating and Storage Junction<br>Temperature Range                       | $T_J, T_{STG}$ | - 65 to +150 | $^\circ C$         |

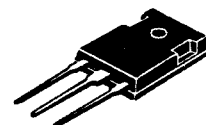
### THERMAL CHARACTERISTICS

| Characteristic                      | Symbol          | Max  | Unit         |
|-------------------------------------|-----------------|------|--------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 1.39 | $^\circ C/W$ |

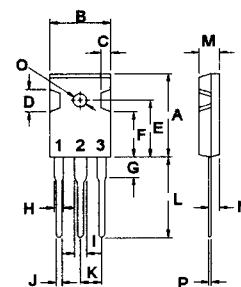


**NPN**      **PNP**  
**TIP3055**   **TIP2955**

**15 AMPERE**  
**COMPLEMENTARY SILICON**  
**POWER TRANSISTORS**  
**60 VOLTS**  
**90 WATTS**



**TO-247(3P)**



PIN 1.BASE  
2.COLLECTOR  
3.EMITTER

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 20.63       | 22.38 |
| B   | 15.38       | 16.20 |
| C   | 1.90        | 2.70  |
| D   | 5.10        | 6.10  |
| E   | 14.81       | 15.22 |
| F   | 11.72       | 12.84 |
| G   | 4.20        | 4.50  |
| H   | 1.82        | 2.46  |
| I   | 2.92        | 3.23  |
| J   | 0.89        | 1.53  |
| K   | 5.26        | 5.66  |
| L   | 18.50       | 21.50 |
| M   | 4.68        | 5.36  |
| N   | 2.40        | 2.80  |
| O   | 3.25        | 3.65  |
| P   | 0.55        | 0.70  |

**ELECTRICAL CHARACTERISTICS** (  $T_c = 25^\circ\text{C}$  unless otherwise noted )

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

**OFF CHARACTERISTICS**

|                                                                                        |                |    |     |    |
|----------------------------------------------------------------------------------------|----------------|----|-----|----|
| Collector - Emitter Sustaining Voltage (1)<br>( $I_C = 30\text{ mA}$ , $I_B = 0$ )     | $V_{CEO(sus)}$ | 60 |     | V  |
| Collector Cutoff Current<br>( $V_{CE} = 70\text{ V}$ , $R_{BE} = 100\text{ ohm}$ )     | $I_{CER}$      |    | 1.0 | mA |
| Collector Cutoff Current<br>( $V_{CE} = 30\text{ V}$ , $I_B = 0$ )                     | $I_{CEO}$      |    | 0.7 | mA |
| Collector Cutoff Current<br>( $V_{CE} = 100\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ ) | $I_{CEV}$      |    | 5.0 | mA |
| Emitter Cutoff Current<br>( $V_{EB} = 7.0\text{ V}$ , $I_C = 0$ )                      | $I_{EBO}$      |    | 5.0 | mA |

**ON CHARACTERISTICS (1)**

|                                                                                                                                             |               |           |            |   |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|------------|---|
| DC Current Gain<br>( $I_C = 4.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )<br>( $I_C = 10\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )                  | $h_{FE}$      | 20<br>5.0 | 100        |   |
| Collector - Emitter Saturation Voltage<br>( $I_C = 4.0\text{ A}$ , $I_B = 0.4\text{ A}$ )<br>( $I_C = 10\text{ A}$ , $I_B = 3.3\text{ A}$ ) | $V_{CE(sat)}$ |           | 1.1<br>3.0 | V |
| Base - Emitter On Voltage<br>( $I_C = 4.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )                                                             | $V_{BE(on)}$  |           | 1.8        | V |

**DYNAMIC CHARACTERISTICS**

|                                                                                                               |          |     |  |     |
|---------------------------------------------------------------------------------------------------------------|----------|-----|--|-----|
| Current Gain - Bandwidth Product<br>( $I_C = 500\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ ) | $f_T$    | 2.5 |  | MHz |
| Small-Signal Current Gain<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ , $f = 1\text{ KHz}$ )          | $h_{FE}$ | 15  |  |     |

(1) Pulse Test: Pulse width =  $300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ (2)  $f_T = |h_{fe}| \cdot f_{test}$

FIG-2 DC CURRENT GAIN

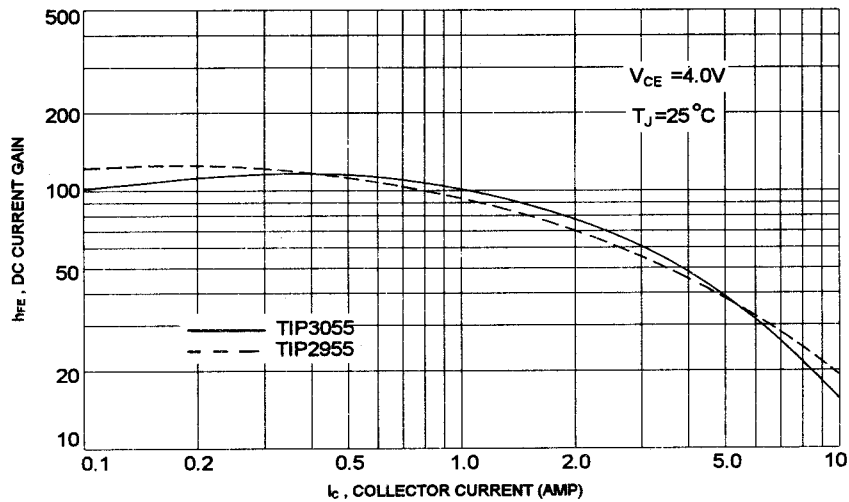
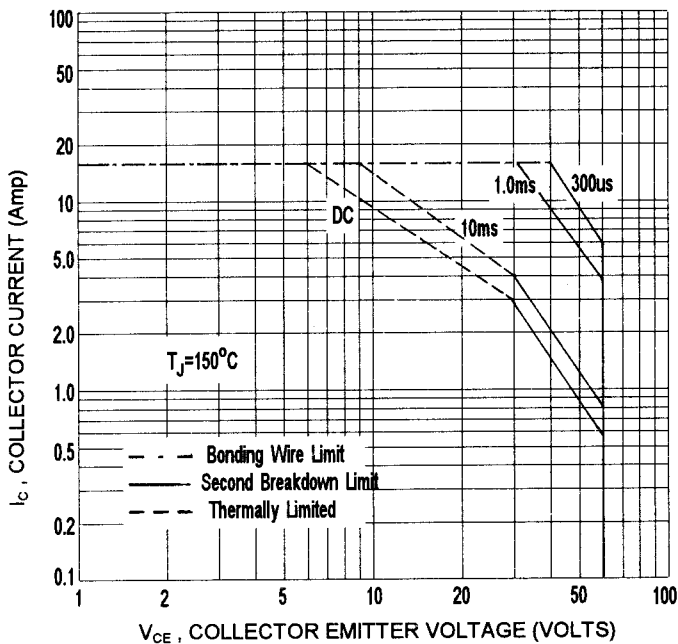


FIG-3 ACTIVE-REGION SAFE OPERATING AREA



There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of FIG-3 is base on  $T_C = 150^\circ C$ ;  $T_{J(PK)}$  is variable depending on power level. second breakdown pulse limits are valid for duty cycles to 10% but must be derated for temperature.