

## COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

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

### FEATURES:

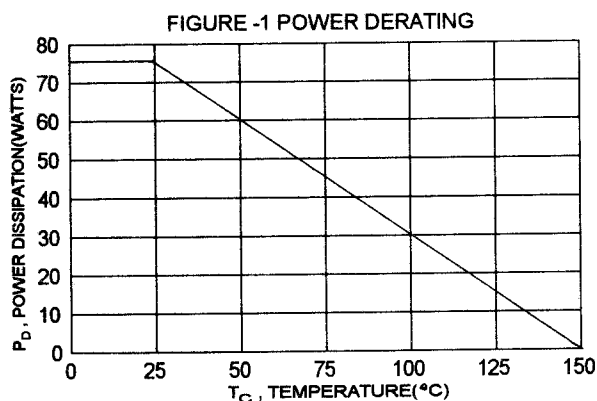
- \* Collector-Emitter Sustaining Voltage-  
 $V_{CE(SUS)} = 40\text{ V (Min)}$  -2N6486, 2N6489  
 $= 60\text{ V (Min)}$  -2N6487, 2N6490  
 $= 80\text{ V (Min)}$  -2N6488, 2N6491
- \* DC Current Gain Specified to 15 Amperes  
 $hFE = 20-150 @ I_C = 5.0\text{ A}$   
 $= 5.0(\text{Min}) @ I_C = 15\text{ A}$

### MAXIMUM RATINGS

| Characteristic                                                                        | Symbol         | 2N6486<br>2N6489 | 2N6487<br>2N6490 | 2N6488<br>2N6491 | Unit                     |
|---------------------------------------------------------------------------------------|----------------|------------------|------------------|------------------|--------------------------|
| Collector-Emitter Voltage                                                             | $V_{CEO}$      | 40               | 60               | 80               | V                        |
| Collector-Base Voltage                                                                | $V_{CBO}$      | 50               | 70               | 90               | V                        |
| Emitter-Base Voltage                                                                  | $V_{EBO}$      | 5.0              |                  |                  | V                        |
| Collector Current - Continuous                                                        | $I_C$          | 15               |                  |                  | A                        |
| Base Current                                                                          | $I_B$          | 5.0              |                  |                  | A                        |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 75<br>0.6        |                  |                  | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{STG}$ | -65 to +150      |                  |                  | $^\circ\text{C}$         |

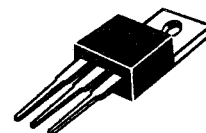
### THERMAL CHARACTERISTICS

| Characteristic                      | Symbol          | Max  | Unit               |
|-------------------------------------|-----------------|------|--------------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 1.67 | $^\circ\text{C/W}$ |

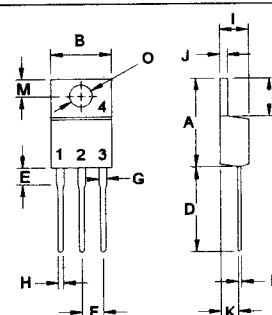


| NPN    | PNP    |
|--------|--------|
| 2N6486 | 2N6489 |
| 2N6487 | 2N6490 |
| 2N6488 | 2N6491 |

15 AMPERE  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
40-80 Volts  
75 Watts



TO-220



PIN 1.BASE  
2.COLLECTOR  
3.EMITTER  
4.COLLECTOR(CASE)

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 14.68       | 15.31 |
| B   | 9.78        | 10.42 |
| C   | 5.01        | 6.52  |
| D   | 13.06       | 14.62 |
| E   | 3.57        | 4.07  |
| F   | 2.42        | 3.66  |
| G   | 1.12        | 1.36  |
| H   | 0.72        | 0.96  |
| I   | 4.22        | 4.98  |
| J   | 1.14        | 1.38  |
| K   | 2.20        | 2.97  |
| L   | 0.33        | 0.55  |
| M   | 2.48        | 2.98  |
| O   | 3.70        | 3.90  |

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

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

**OFF CHARACTERISTICS**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                                        |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|----------------------------------------|----|
| Collector - Emitter Sustaining Voltage (1)<br>( $I_c = 100\text{ mA}$ , $I_B = 0$ )<br>2N6486, 2N6489<br>2N6487, 2N6490<br>2N6488, 2N6491                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $V_{CE(sus)}$ | 40<br>60<br>80 |                                        | V  |
| Collector Cutoff Current<br>( $V_{CE} = 20\text{ V}$ , $I_B = 0$ )<br>( $V_{CE} = 30\text{ V}$ , $I_B = 0$ )<br>( $V_{CE} = 40\text{ V}$ , $I_B = 0$ )<br>2N6486, 2N6489<br>2N6487, 2N6490<br>2N6488, 2N6491                                                                                                                                                                                                                                                                                                                                                                                           | $I_{CEO}$     |                | 1.0<br>1.0<br>1.0                      | mA |
| Collector Cutoff Current<br>( $V_{CE} = 45\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ )<br>( $V_{CE} = 65\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ )<br>( $V_{CE} = 85\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ )<br>( $V_{CE} = 40\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 125^\circ\text{C}$ )<br>( $V_{CE} = 60\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 125^\circ\text{C}$ )<br>( $V_{CE} = 80\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ , $T_c = 125^\circ\text{C}$ )<br>2N6486, 2N6489<br>2N6487, 2N6490<br>2N6488, 2N6491<br>2N6486, 2N6489<br>2N6487, 2N6490<br>2N6488, 2N6491 | $I_{CEX}$     |                | 0.5<br>0.5<br>0.5<br>5.0<br>5.0<br>5.0 | mA |
| Emitter Cutoff Current<br>( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $I_{EBO}$     |                | 1.0                                    | mA |

**ON CHARACTERISTICS (1)**

|                                                                                                                                           |               |           |            |   |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|------------|---|
| DC Current Gain<br>( $I_c = 5.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )<br>( $I_c = 15\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )                | $h_{FE}$      | 20<br>5.0 | 150        |   |
| Collector-Emitter Saturation Voltage<br>( $I_c = 5.0\text{ A}$ , $I_B = 0.5\text{ A}$ )<br>( $I_c = 15\text{ A}$ , $I_B = 5.0\text{ A}$ ) | $V_{CE(sat)}$ |           | 1.3<br>3.5 | V |
| Base-Emitter On Voltage<br>( $I_c = 5.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )<br>( $I_c = 15\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )        | $V_{BE(on)}$  |           | 1.3<br>3.5 | V |

**DYNAMIC CHARACTERISTICS**

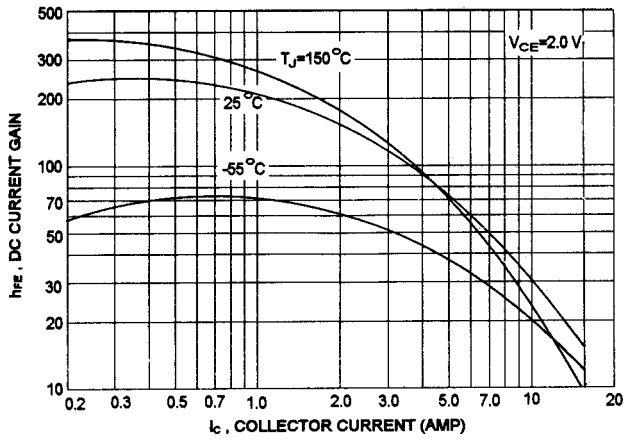
|                                                                                                                 |          |     |  |     |
|-----------------------------------------------------------------------------------------------------------------|----------|-----|--|-----|
| Current-Gain-Bandwidth Product (2)<br>( $I_c = 1.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ , $f = 1.0\text{ MHz}$ ) | $f_T$    | 5.0 |  | MHz |
| Small-Signal Current Gain<br>( $I_c = 1.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ , $f = 1.0\text{ KHz}$ )          | $h_{fe}$ | 15  |  |     |

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

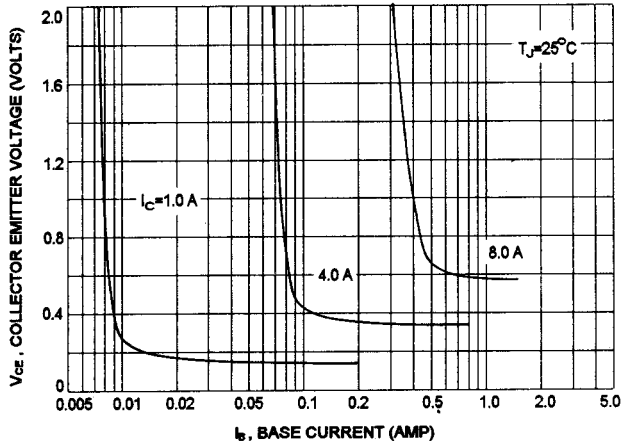
2N6486, 2N6487, 2N6488 NPN / 2N6489, 2N6490, 2N6491 PNP

NPN 2N6486, 2N6487, 2N6488

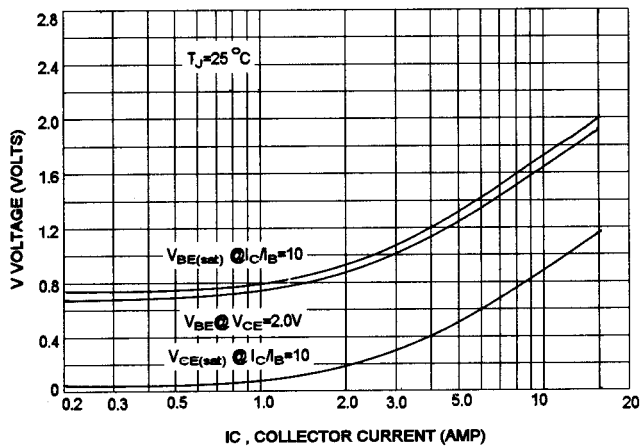
DC CURRENT GAIN



COLLECTOR SATURATION REGION

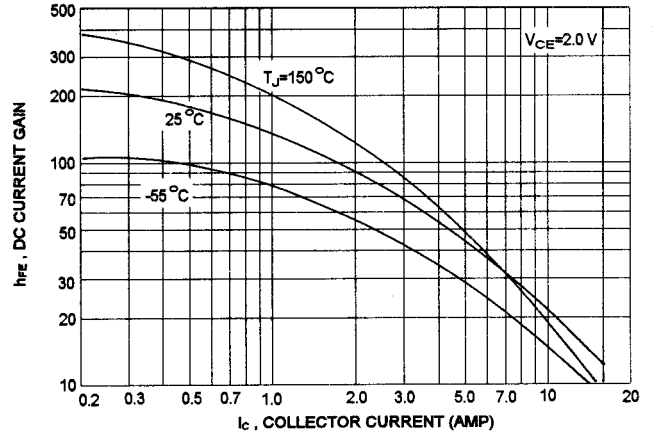


"ON" VOLTAGES

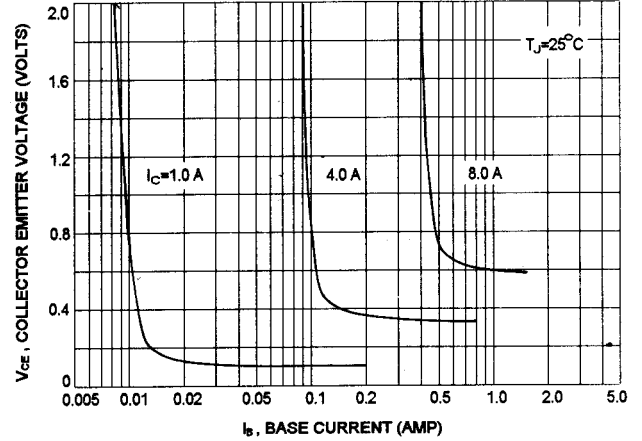


PNP 2N6489, 2N6490, 2N6491

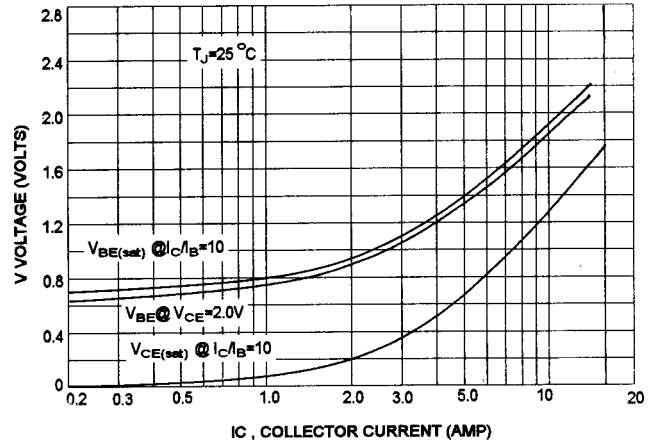
DC CURRENT GAIN



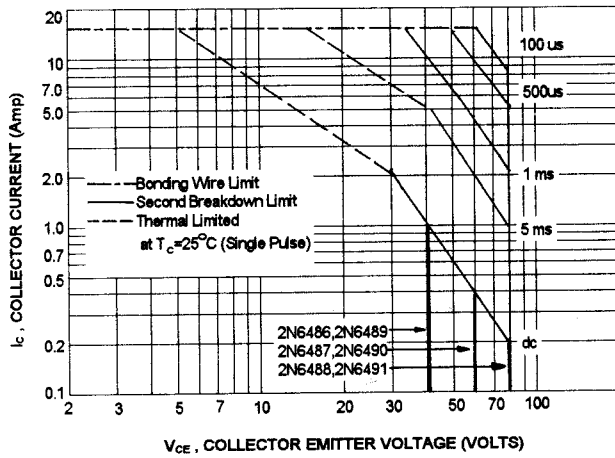
COLLECTOR SATURATION REGION



"ON" VOLTAGES



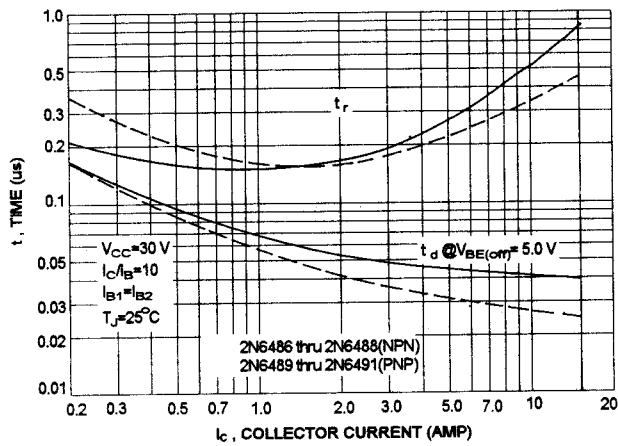
### ACTIVE-REGION SAFE OPERATING AREA (SOA)



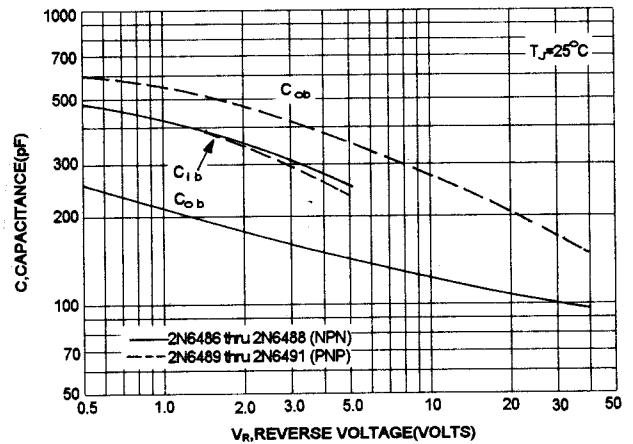
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater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

The data of SOA curve is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} < 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

### TURN-ON TIME



### CAPACITANCES



### TURN-OFF TIME

