

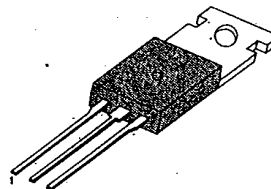
**TIP42 SERIES****(TIP42/42A/42B/42C) PNP EXITAXIAL SILICON TRANSISTOR****MEDIUM POWER LINEAR  
SWITCHING APPLICATIONS**

- Complement to TIP41/41A/41B/41C

**ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ )**

| Characteristic                                   | Symbol    | Rating  | Unit             |
|--------------------------------------------------|-----------|---------|------------------|
| Collector-Base Voltage : TIP42                   | $V_{CB0}$ | -40     | V                |
| : TIP42A                                         |           | -60     | V                |
| : TIP42B                                         |           | -80     | V                |
| : TIP42C                                         |           | -100    | V                |
| Collector-Emitter Voltage : TIP42                | $V_{CE0}$ | -40     | V                |
| : TIP42A                                         |           | -60     | V                |
| : TIP42B                                         |           | -80     | V                |
| : TIP42C                                         |           | -100    | V                |
| Emitter-Base Voltage                             | $V_{EB0}$ | -5      | V                |
| Collector Current (DC)                           | $I_C$     | -6      | A                |
| Collector Current (Pulse)                        | $I_C$     | -10     | A                |
| Base Current                                     | $I_B$     | -2      | A                |
| Collector Dissipation ( $T_c=25^\circ\text{C}$ ) | $P_C$     | 65      | W                |
| Collector Dissipation ( $T_a=25^\circ\text{C}$ ) | $P_C$     | 2       | W                |
| Junction Temperature                             | $T_j$     | 150     | $^\circ\text{C}$ |
| Storage Temperature                              | $T_{stg}$ | -65~150 | $^\circ\text{C}$ |

TO-220



1. Base 2. Collector 3. Emitter

3

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

| Characteristic                                 | Symbol                 | Test Condition                              | Min  | Max  | Unit          |
|------------------------------------------------|------------------------|---------------------------------------------|------|------|---------------|
| * Collector Emitter Sustaining Voltage : TIP42 | $BV_{CE0}(\text{sus})$ | $I_C = -30\text{mA}, I_B = 0$               | -40  |      | V             |
| : TIP42A                                       |                        |                                             | -60  |      | V             |
| : TIP42B                                       |                        |                                             | -80  |      | V             |
| : TIP42C                                       |                        |                                             | -100 |      | V             |
| Collector Cutoff Current : TIP42/42A           | $I_{CE0}$              | $V_{CE} = -30\text{V}, I_B = 0$             |      | -0.7 | mA            |
| : TIP42B/42C                                   |                        | $V_{CE} = -60\text{V}, I_B = 0$             |      | -0.7 | mA            |
| Collector Cutoff Current : TIP42               | $I_{CES}$              | $V_{CE} = -40\text{V}, V_{EB} = 0$          |      | -400 | $\mu\text{A}$ |
| : TIP42A                                       |                        | $V_{CE} = -60\text{V}, V_{EB} = 0$          |      | -400 | $\mu\text{A}$ |
| : TIP42B                                       |                        | $V_{CE} = -80\text{V}, V_{EB} = 0$          |      | -400 | $\mu\text{A}$ |
| : TIP42C                                       |                        | $V_{CE} = -100\text{V}, V_{EB} = 0$         |      | -400 | $\mu\text{A}$ |
| Emitter Cutoff Current                         | $I_{EBO}$              | $V_{BE} = -5\text{V}, I_C = 0$              |      | -1   | mA            |
| * DC Current Gain                              | $h_{FE}$               | $V_{CE} = -4\text{V}, I_C = -0.3\text{A}$   | 30   |      |               |
|                                                |                        | $V_{CE} = -4\text{V}, I_C = -3\text{A}$     | 15   | 75   |               |
| * Collector-Emitter Saturation Voltage         | $V_{CE}(\text{sat})$   | $I_C = -6\text{A}, I_B = -600\text{mA}$     |      | -1.5 | V             |
| * Base-Emitter On Voltage                      | $V_{BE}(\text{on})$    | $V_{CE} = -4\text{V}, I_C = -6\text{A}$     |      | -2.0 | V             |
| Current Gain Bandwidth Product                 | $f_T$                  | $V_{CE} = -10\text{V}, I_C = -500\text{mA}$ | 3.0  |      | MHz           |

 $f = 1\text{MHz}$ 

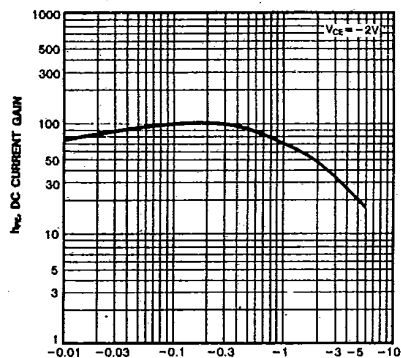
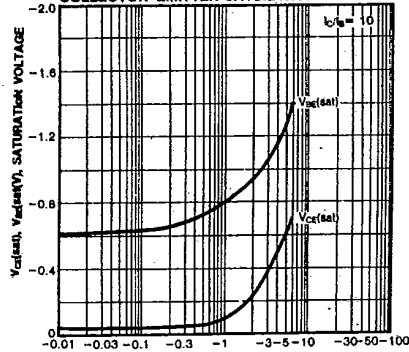
- \* Pulse Test:  $PW \leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$



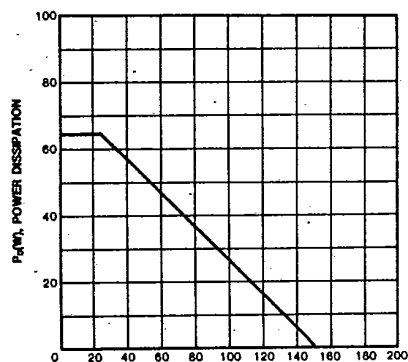
**TIP42 SERIES****(TIP42/42A/42B/42C) PNP EXITAXIAL SILICON TRANSISTOR**

T-33-21

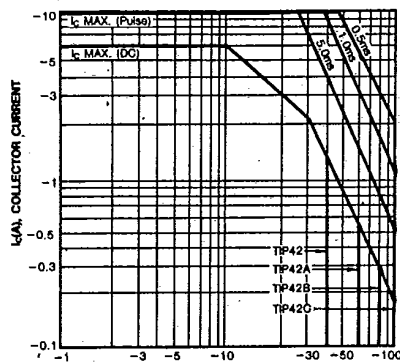
DC CURRENT GAIN

 $I_C$ (A), COLLECTOR CURRENTBASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE $I_C$ (A), COLLECTOR CURRENT

POWER DERATING

 $T_d$ (°C), CASE TEMPERATURE

SAFE OPERATING AREA

 $V_{CE}$ (V), COLLECTOR-EMITTER VOLTAGE

## TIP47/48/49/50

## NPN SILICON TRANSISTOR

T-33-11

HIGH VOLTAGE AND SWITCHING  
APPLICATIONS

## HIGH SUSTAINING VOLTAGE

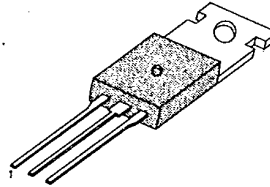
(V<sub>ceo(sus)</sub>: 250 to 400V)

1A RETED COLLECTOR CURRENT

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

| Characteristic                               | Symbol           | Rating  | Unit |
|----------------------------------------------|------------------|---------|------|
| Collector-Base Voltage : TIP47               | V <sub>CB0</sub> | 350     | V    |
| : TIP48                                      |                  | 400     | V    |
| : TIP49                                      |                  | 450     | V    |
| : TIP50                                      |                  | 500     | V    |
| Collector-Emitter Voltage: TIP47             | V <sub>CEO</sub> | 250     | V    |
| : TIP48                                      |                  | 300     | V    |
| : TIP49                                      |                  | 350     | V    |
| : TIP50                                      |                  | 400     | V    |
| Emitter-Base Voltage                         | V <sub>EB0</sub> | 5       | V    |
| Collector Current (DC)                       | I <sub>C</sub>   | 1       | A    |
| Collector Current (Pulse)                    | I <sub>C</sub>   | 2       | A    |
| Base Current                                 | I <sub>B</sub>   | 0.6     | A    |
| Collector Dissipation (T <sub>C</sub> =25°C) | P <sub>C</sub>   | 40      | W    |
| Collector Dissipation (T <sub>a</sub> =25°C) | P <sub>C</sub>   | 2       | W    |
| Junction Temperature                         | T <sub>J</sub>   | 150     | °C   |
| Storage Temperature                          | T <sub>stg</sub> | -65~150 | °C   |

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1. Base 2. Collector 3. Emitter

3

ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C)

| Characteristic                        | Symbol                | Test Condition                                            | Min | Max | Unit |
|---------------------------------------|-----------------------|-----------------------------------------------------------|-----|-----|------|
| Collector Emitter Sustaining Voltage  | V <sub>CEX(SUS)</sub> |                                                           |     |     |      |
| : TIP47                               |                       | I <sub>C</sub> =30mA, I <sub>B</sub> =0                   | 250 |     | V    |
| : TIP48                               |                       |                                                           | 300 |     | V    |
| : TIP49                               |                       |                                                           | 350 |     | V    |
| : TIP50                               |                       |                                                           | 400 |     | V    |
| Collector Cutoff Current              | I <sub>CEO</sub>      | V <sub>CE</sub> =150V, I <sub>B</sub> =0                  |     | 1   | mA   |
| : TIP48                               |                       | V <sub>CE</sub> =200V, I <sub>B</sub> =0                  |     | 1   | mA   |
| : TIP49                               |                       | V <sub>CE</sub> =250V, I <sub>B</sub> =0                  |     | 1   | mA   |
| : TIP50                               |                       | V <sub>CE</sub> =300V, I <sub>B</sub> =0                  |     | 1   | mA   |
| Collector Cutoff Current              | I <sub>CX</sub>       | V <sub>CE</sub> =350V, V <sub>BE</sub> =0                 |     | 1   | mA   |
| : TIP47                               |                       | V <sub>CE</sub> =400V, V <sub>BE</sub> =0                 |     | 1   | mA   |
| : TIP48                               |                       | V <sub>CE</sub> =450V, V <sub>BE</sub> =0                 |     | 1   | mA   |
| : TIP49                               |                       | V <sub>CE</sub> =500V, V <sub>BE</sub> =0                 |     | 1   | mA   |
| : TIP50                               |                       | V <sub>CE</sub> =500V, V <sub>BE</sub> =0                 |     | 1   | mA   |
| Emitter Cutoff Current                | I <sub>EBO</sub>      | V <sub>EB</sub> =5V, I <sub>C</sub> =0                    |     | 1   | mA   |
| *DC Current Gain                      | h <sub>FE</sub>       | V <sub>CE</sub> =10V, I <sub>C</sub> =0.3A                | 30  | 150 |      |
|                                       |                       | V <sub>CE</sub> =10V, I <sub>C</sub> =1A                  | 10  |     |      |
| *Collector Emitter Saturation Voltage | V <sub>CE(sat)</sub>  | I <sub>C</sub> =1A, I <sub>B</sub> =0.2A                  |     | 1   | V    |
| *Base Emitter On Voltage              | V <sub>BE(on)</sub>   | V <sub>CE</sub> =10V, I <sub>C</sub> =1A                  |     | 1.5 | V    |
| Current Gain Bandwidth Product        | f <sub>T</sub>        | V <sub>CE</sub> =10V, I <sub>C</sub> =0.2A, f=1KHz        | 10  |     | MHz  |
| Turn On Time                          | t <sub>on</sub>       | V <sub>CC</sub> =400V                                     |     | 0.5 | μs   |
| Storage Time                          | t <sub>s</sub>        | 5I <sub>B1</sub> =-2.5I <sub>B2</sub> =I <sub>C</sub> =6A |     | 3   | μs   |
| Fall Time                             | t <sub>f</sub>        | RL=66.7Ω                                                  |     | 0.3 | μs   |

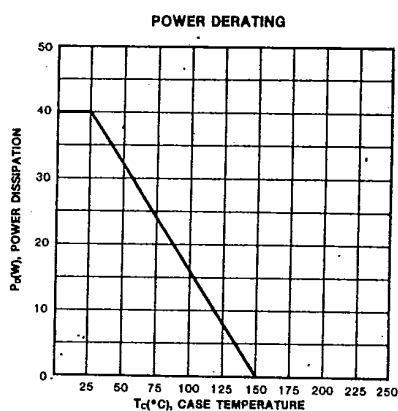
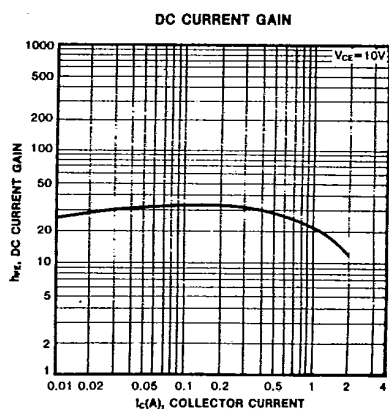
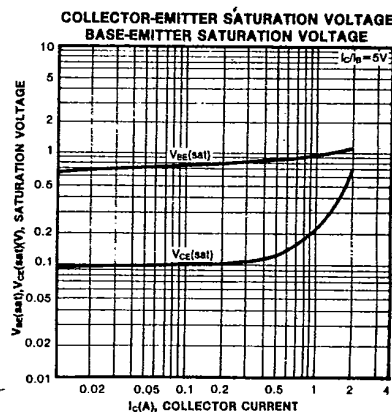
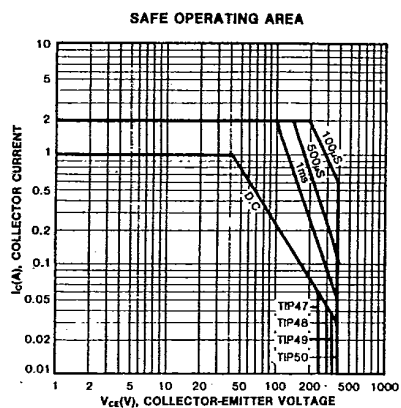
\* Pulse test: PW≤300μs, duty cycle ≤ 2% Pulse



## TIP47/48/49/50

## NPN SILICON TRANSISTOR

T-33-11



## TIP100/101/102

## SILICON DARLINGTON TRANSISTOR

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## HIGH DC CURRENT GAIN

MIN  $h_{FE}=1000$  @  $V_{CE}=4V$ ,  $I_C=3A$ 

## COLLECTOR-EMITTER SUSTAINING VOLTAGE

## LOW COLLECTOR-EMITTER

## SATURATION VOLTAGE

## MONOLITHIC CONSTRUCTION WITH BUILT

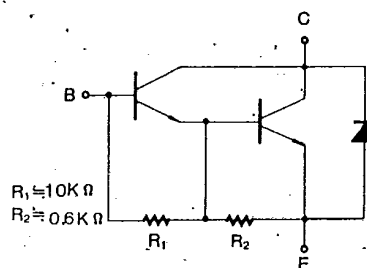
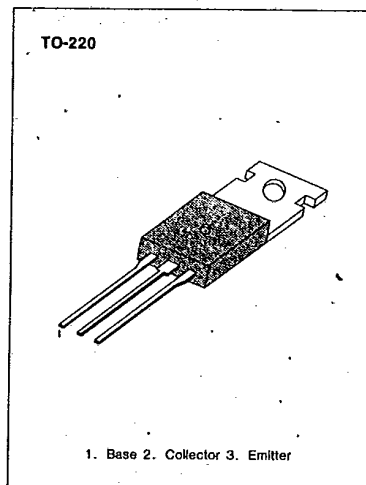
## IN BASE-EMITTER SHUNT RESISTORS

## INDUSTRIAL USE

Complementary to TIP105/106/107

ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ C$ )

| Characteristic                             | Symbol    | Rating  | Unit       |
|--------------------------------------------|-----------|---------|------------|
| Collector-Base Voltage : TIP100            | $V_{CBO}$ | 60      | V          |
| : TIP101                                   |           | 80      | V          |
| : TIP102                                   |           | 100     | V          |
| Collector-Emitter Voltage                  | $V_{CEO}$ | 60      | V          |
| : TIP100                                   |           | 80      | V          |
| : TIP101                                   |           | 100     | V          |
| Emitter-Base Voltage                       | $V_{EBO}$ | 5       | V          |
| Collector Current (DC)                     | $I_C$     | 8       | A          |
| Collector Current (Pulse)                  | $I_C$     | 15      | A          |
| Base Current (DC)                          | $I_B$     | 1       | A          |
| Collector Dissipation ( $T_a=25^\circ C$ ) | $P_C$     | 2       | W          |
| Collector Dissipation ( $T_c=25^\circ C$ ) | $P_C$     | 80      | W          |
| Junction Temperature                       | $T_J$     | 150     | $^\circ C$ |
| Storage Temperature                        | $T_{stg}$ | -65~150 | $^\circ C$ |

ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ C$ )

| Characteristic                       | Symbol        | Test Condition                      | Min             | Max   | Unit    |
|--------------------------------------|---------------|-------------------------------------|-----------------|-------|---------|
| Collector Emitter Sustaining Voltage | $V_{CE(sus)}$ | $I_C=30mA$ , $I_B=0$                | 60<br>80<br>100 |       | V       |
| : TIP100                             |               |                                     |                 |       |         |
| : TIP101                             |               |                                     |                 |       |         |
| Collector Cutoff Current : TIP100    | $I_{CEO}$     | $V_{CE}=30V$ , $I_B=0$              |                 | 50    | $\mu A$ |
| : TIP101                             |               | $V_{CE}=40V$ , $I_B=0$              |                 | 50    | $\mu A$ |
| : TIP102                             |               | $V_{CE}=50V$ , $I_B=0$              |                 | 50    | $\mu A$ |
| Collector Cutoff Current : TIP100    | $I_{CBO}$     | $V_{CB}=60V$ , $I_E=0$              |                 | 50    | $\mu A$ |
| : TIP101                             |               | $V_{CB}=80V$ , $I_E=0$              |                 | 50    | $\mu A$ |
| : TIP102                             |               | $V_{CB}=100V$ , $I_E=0$             |                 | 50    | $\mu A$ |
| Emitter Cutoff Current               | $I_{EBO}$     | $V_{BE}=5V$ , $I_C=0$               |                 | 2     | mA      |
| DC Current Gain                      | $h_{FE}$      | $V_{CE}=4V$ , $I_C=3A$              | 1000<br>200     | 20000 |         |
|                                      |               | $V_{CE}=4V$ , $I_C=8A$              |                 |       |         |
| Collector Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=3A$ , $I_B=6mA$                |                 | 2     | V       |
|                                      |               | $I_C=8A$ , $I_B=80mA$               |                 | 2.5   | V       |
| Base Emitter On Voltage              | $V_{BE(on)}$  | $V_{CE}=4V$ , $I_C=8A$              |                 | 2.8   | V       |
| Output Capacitance                   | $C_{ob}$      | $V_{CB}=10V$ , $I_E=0$ , $f=0.1MHz$ |                 | 200   | pF      |

