

## NPN MEDIUM POWER TRANSISTORS

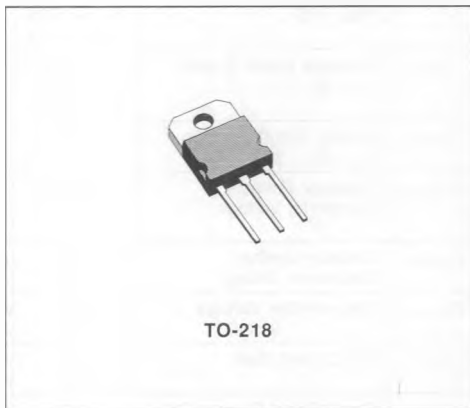
ADVANCE DATA

- 10A RATED COLLECTOR CURRENT
- HIGH SPEED SWITCHING

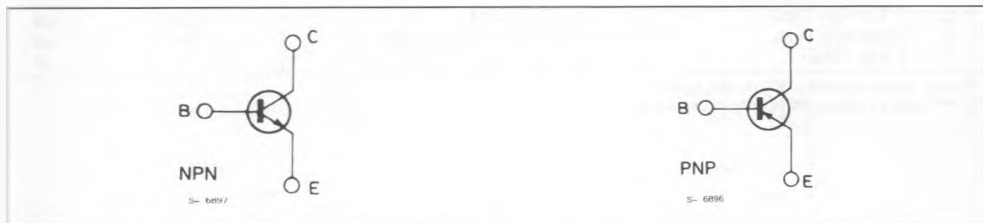
### DESCRIPTION

The TIP33A, TIP33B and TIP33C are silicon epitaxial base NPN power transistors in TO-218 plastic package intended for use in linear and switching applications.

The complementary PNP types are TIP34A, TIP34B and TIP34C respectively.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                               | NPN<br>PNP   | Value            |                  |                  | Unit       |
|-----------|---|--------------|------------------|------------------|------------------|------------|
|           |   |              | TIP33A<br>TIP34A | TIP33B<br>TIP34B | TIP33C<br>TIP34C |            |
| $V_{CBO}$ | Collector-base Voltage                  | $I_E = 0$    | 100              | 120              | 140              | V          |
| $V_{CES}$ | Collector-emitter Voltage               | $V_{BE} = 0$ | 100              | 120              | 140              | V          |
| $V_{CEO}$ | Collector-emitter Voltage               | $I_B = 0$    | 60               | 80               | 100              | V          |
| $V_{EBO}$ | Emitter-base Voltage                    | $I_C = 0$    | 7                |                  |                  | V          |
| $I_C$     | Collector Current                       |              | 10               |                  |                  | A          |
| $I_{CM}$  | Collector Peak Current $t_p < ?ms$      |              | 12               |                  |                  | A          |
| $I_B$     | Base Current                            |              | 3                |                  |                  | A          |
| $P_{tot}$ | Total Dissipation at $T_c < 25^\circ C$ |              | 80               |                  |                  | W          |
| $T_{stg}$ | Storage Temperature                     |              | - 65 to 150      |                  |                  | $^\circ C$ |
| $T_j$     | Max. Operating Junction Temperature     |              | 150              |                  |                  | $^\circ C$ |

For PNP types voltage and current values are negative.

## THERMAL DATA

|                |                                  |     |      |     |
|----------------|----------------------------------|-----|------|-----|
| $R_{thj-case}$ | Thermal Resistance Junction-case | max | 1.56 | C/W |
|----------------|----------------------------------|-----|------|-----|

ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$  unless otherwise specified)

| Symbol                     | Parameter   | Test Conditions                                       |  | Min.            | Typ.            | Max.              | Unit                          |
|----------------------------|---|---|--|-----------------|-----------------|-------------------|-------------------------------|
| $I_{CES}$                  | Collector Cutoff Current<br>( $V_{BE} = 0$ )                | $V_{CE} = 100V$<br>$V_{CE} = 120V$<br>$V_{CE} = 140V$ | for TIP33A/34A<br>for TIP33B/34B<br>for TIP33C/34C |                 |                 | 400<br>400<br>400 | $\mu A$<br>$\mu A$<br>$\mu A$ |
| $I_{CEO}$                  | Collector Cutoff Current<br>( $I_B = 0$ )                   | $V_{CE} = 30V$<br>$V_{CE} = 60V$<br>$V_{CE} = 60V$    | for TIP33A/34A<br>for TIP33B/34B<br>for TIP33C/34C |                 |                 | 0.7<br>0.7<br>0.7 | mA<br>mA<br>mA                |
| $I_{EBO}$                  | Emitter Cutoff Current<br>( $I_C = 0$ )                     | $V_{EB} = 5V$   |  |                 |                 | 1                 | mA                            |
| $V_{CE0(sus)}$             | Collector Emitter<br>Sustaining Voltage                     | $I_C = 30mA$  | for TIP33A/34A<br>for TIP33B/34B<br>for TIP33C/34C | 60<br>80<br>100 |                 |                   | V<br>V<br>V                   |
| $V_{CE(sat)}$              | Collector-emitter<br>Saturation Voltage                     | $I_C = 3A$<br>$I_C = 10A$                             | $I_B = 0.3A$<br>$I_B = 2.5A$                       |                 |                 | 1<br>4            | V<br>V                        |
| $V_{BE(on)}$               | Base-emitter Voltage  | $I_C = 3A$<br>$I_C = 10A$                             | $V_{CE} = 4V$<br>$V_{CE} = 4V$                     |                 |                 | 1.6<br>3          | V<br>V                        |
| $h_{FE}^*$                 | DC Current Gain   | $I_C = 1A$<br>$I_C = 3A$                              | $V_{CE} = 4V$<br>$V_{CE} = 4V$                     | 40<br>20        |                 | 100               |                               |
| $h_{fe}$                   | Small Signal Current Gain                                   | $I_C = 0.5A$  | $V_{CE} = 10V$ $f = 1KHz$                          | 20              |                 |                   |                               |
| $f_T$                      | Transition Frequency  | $I_C = 0.5A$  | $V_{CE} = 10V$ $f = 1MHz$                          | 3               |                 |                   | MHz                           |
| $t_{on}$<br>$t_s$<br>$t_f$ | RESISTIVE LOAD<br>Turn-on Time<br>Storage Time<br>Fall Time | $V_{CC} = 30V$<br>$V_{BB} = -6V$<br>$t_p = 20\mu s$   | $I_C = 6A$<br>$I_{B1} = -$ $I_{B2} = 0.6A$         |                 | 0.6<br>0.4<br>1 |                   | $\mu s$<br>$\mu s$<br>$\mu s$ |

\* Pulsed : pulse duration = 300 $\mu s$ , duty cycle = 1.5%.

For PNP types voltage and current values are negative.