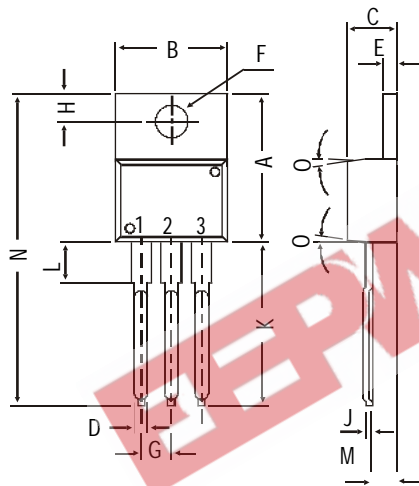
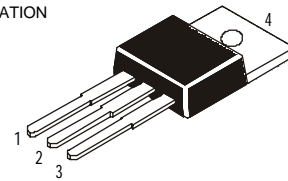


TO-220 Plastic Package

**TIP31, TIP31A, TIP31B, TIP31C
TIP32, TIP32A, TIP32B, TIP32C**

*TIP31, 31A, 31B, 31C NPN PLASTIC POWER TRANSISTORS
TIP32, 32A, 32B, 32C PNP PLASTIC POWER TRANSISTORS
General Purpose Amplifier and Switching Applications*

PIN CONFIGURATION
1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR



| DIM | MIN. | MAX. |
|-----|-------|-------|
| A | 14.42 | 16.51 |
| B | 9.63 | 10.67 |
| C | 3.56 | 4.83 |
| D | | 0.90 |
| E | 1.15 | 1.40 |
| F | 3.75 | 3.88 |
| G | 2.29 | 2.79 |
| H | 2.54 | 3.43 |
| J | | 0.56 |
| K | 12.70 | 14.73 |
| L | 2.80 | 4.07 |
| M | 2.03 | 2.92 |
| N | | 31.24 |
| O | | DEG 7 |

All dimensions in mm.

ABSOLUTE MAXIMUM RATINGS

| | | 31 | 31A | 31B | 31C | |
|--|-------------|-----------|------------|------------|------------|------------------|
| | | 32 | 32A | 32B | 32C | |
| Collector-base voltage (open emitter) | V_{CBO} | max. 40 | 60 | 80 | 100 | V |
| Collector-emitter voltage (open base) | V_{CEO} | max. 40 | 60 | 80 | 100 | V |
| Collector current | I_C | max. | 3.0 | | | A |
| Total power dissipation up to $T_C = 25^\circ\text{C}$ | P_{tot} | max. | 40 | | | W |
| Junction temperature | T_j | max. | 150 | | | $^\circ\text{C}$ |
| Collector-emitter saturation voltage | | | | | | |
| $I_C = 3\text{ A}; I_B = 375\text{ mA}$ | V_{CEsat} | max. | 1.2 | | | V |
| D.C. current gain | | | | | | |
| $I_C = 3\text{ A}; V_{CE} = 4\text{ V}$ | h_{FE} | min. | 10 | | | |
| | | max. | 50 | | | |

RATINGS (at $T_A=25^\circ\text{C}$ unless otherwise specified)

| Limiting values | | 31 | 31A | 31B | 31C | |
|---------------------------------------|-----------|-----------|------------|------------|------------|---|
| | | 32 | 32A | 32B | 32C | |
| Collector-base voltage (open emitter) | V_{CBO} | max. 40 | 60 | 80 | 100 | V |
| Collector-emitter voltage (open base) | V_{CEO} | max. 40 | 60 | 80 | 100 | V |
| Emitter-base voltage (open collector) | V_{EBO} | max. | 5.0 | | | V |

**TIP31, TIP31A, TIP31B, TIP31C
TIP32, TIP32A, TIP32B, TIP32C**

| | | | | |
|---|-----------|------|-------------|--------------|
| Collector current | I_C | max. | 3.0 | A |
| Collector current (Peak) | I_{CM} | max. | 5.0 | A |
| Base current | I_B | max. | 1.0 | A |
| Total power dissipation upto $T_C=25^\circ C$ | P_{tot} | max. | 40 | W |
| Derate above $25^\circ C$ | | max | 0.32 | W $^\circ C$ |
| Total power dissipation upto $T_A=25^\circ C$ | P_{tot} | max. | 2 | W |
| Derate above $25^\circ C$ | | max | 0.016 | W $^\circ C$ |
| Junction temperature | T_j | max. | 150 | $^\circ C$ |
| Storage temperature | T_{stg} | | -65 to +150 | $^\circ C$ |

THERMAL RESISTANCE

| | | | | |
|--------------------------|-------------|--|-------|--------------|
| From junction to case | R_{thj-c} | | 3.125 | $^\circ C/W$ |
| From junction to ambient | R_{thj-a} | | 62.5 | $^\circ C/W$ |

CHARACTERISTICS

$T_{amb} = 25^\circ C$ unless otherwise specified

| | | | 31 | 31A | 31B | 31C | |
|---------------------------------------|------------------|------|-----|-----|-----|-----|-----|
| | | | 32 | 32A | 32B | 32C | |
| Collector cutoff current | | | | | | | |
| $I_B = 0; V_{CE} = 30V$ | I_{CEO} | max. | 0.3 | 0.3 | - | - | mA |
| $I_B = 0; V_{CE} = 60V$ | I_{CEO} | max. | - | - | 0.3 | 0.3 | mA |
| $V_{BE} = 0; V_{CE} = V_{CEO(max)}$ | I_{CES} | max. | | | 0.2 | | mA |
| Emitter cut-off current | | | | | | | |
| $I_C = 0; V_{EB} = 5 V$ | I_{EBO} | max. | | | 1.0 | | mA |
| Breakdown voltages | | | | | | | |
| $I_C = 30 mA; I_B = 0$ | $V_{CEO(sus)}^*$ | min. | 40 | 60 | 80 | 100 | V |
| $I_C = 1 mA; I_E = 0$ | V_{CBO} | min. | 40 | 60 | 80 | 100 | V |
| $I_E = 1 mA; I_C = 0$ | V_{EBO} | min. | | | 5.0 | | V |
| Saturation voltage | | | | | | | |
| $I_C = 3 A; I_B = 375 mA$ | V_{CEsat}^* | max. | | | 1.2 | | V |
| Base emitter on voltage | | | | | | | |
| $I_C = 3 A; V_{CE} = 4 V$ | $V_{BE(on)}^*$ | max. | | | 1.8 | | V |
| D.C. current gain | | | | | | | |
| $I_C = 1 A; V_{CE} = 4 V$ | h_{FE}^* | min. | | | 25 | | |
| $I_C = 3 A; V_{CE} = 4 V$ | h_{FE}^* | min. | | | 10 | | |
| | | max. | | | 50 | | |
| Small-signal current gain | | | | | | | |
| $I_C = 0.5A; V_{CE} = 10V; f = 1 KHz$ | $ h_{fe} $ | min. | | | 20 | | |
| Transition frequency | | | | | | | |
| $I_C = 0.5A; V_{CE} = 10V; f = 1 MHz$ | $f_T (1)$ | min. | | | 3 | | MHz |

* Pulse test: pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.
(1) $f_T = |h_{fe}| \cdot f_{test}$