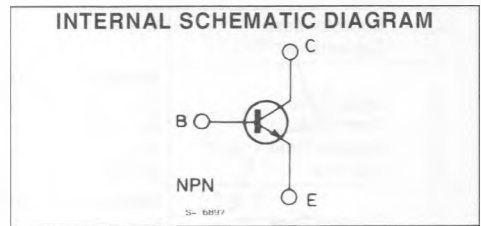
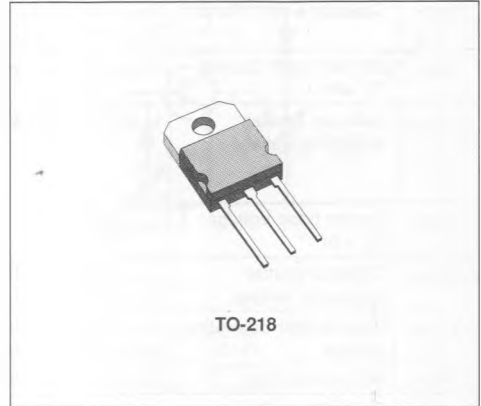


NPN HIGH VOLTAGE POWER TRANSISTORS

- OFF-LINE POWER SUPPLIES
- HIGH VOLTAGE INVERTERS
- SWITCHING REGULATORS



DESCRIPTION

High voltage, high speed, switching power transistors suited for use on medium voltage supply.

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | 2N6933 | 2N6934 | 2N6935 | Unit |
|-----------|--|-------------|--------|--------|------------------|
| V_{CEV} | Collector-emitter Voltage ($V_{BE} = -1.5\text{ V}$) | 450 | 550 | 650 | V |
| V_{CEX} | Collector-emitter Voltage | 350 | 400 | 450 | V |
| V_{CEO} | Collector-emitter Voltage ($I_B = 0$) | 300 | 350 | 400 | V |
| V_{EBO} | Emitter-base Voltage ($I_C = 0$) | 8 | | | V |
| I_C | Collector Current | 15 | | | A |
| I_{CM} | Collector Peak Current | 23 | | | A |
| I_B | Base Current | 5 | | | A |
| I_{BM} | Base Peak Current | 7 | | | A |
| I_E | Emitter Current | 20 | | | A |
| I_{EM} | Emitter Peak Current | 30 | | | A |
| P_{Tot} | Total Dissipation at $T_C < 25\text{ }^\circ\text{C}$ | 175 | | | W |
| T_{stg} | Storage Temperature | - 65 to 150 | | | $^\circ\text{C}$ |
| T_J | Max. Operating Junction Temperature | 150 | | | $^\circ\text{C}$ |

THERMAL DATA

| | | | | |
|------------------|--|------|------|-----------------------------|
| $R_{th(j-case)}$ | Thermal Resistance Junction-case | Max. | 0.71 | $^{\circ}\text{C}/\text{W}$ |
| T_L | Maximum Lead Temperature for Soldering Purpose | | 235 | $^{\circ}\text{C}$ |

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

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|--|---|-------------------|------|--------------------------|--|
| I_{CEV} | Collector Cutoff Current | $V_{CE} = V_{CEV}$ $V_{BE} = -1.5\text{ V}$ $V_{QE} = V_{CEV}$ $V_{BE} = -1.5\text{ V}$ $T_C = 100^{\circ}\text{C}$ | | | 0.1 1 | mA mA |
| I_{EBO} | Emitter Cutoff Current ($I_C = 0$) | $V_{EB} = 8\text{ V}$ | | | 2 | mA |
| $V_{CE0(sus)}$ * | Collector-emitter sustaining Voltage | $I_C = 0.2\text{ A}$ $L = 25\text{ mH}$ for 2N6933 for 2N6934 for 2N6935 | 300 350 400 | | | V V V |
| V_{EBO} | Emitter-base Voltage ($I_C = 0$) | $I_E = 50\text{ mA}$ | 8 | | | V |
| $V_{CE(sat)}$ * | Collector-emitter Saturation Voltage | $I_C = 15\text{ A}$ $I_B = 3\text{ A}$ $I_C = 15\text{ A}$ $I_B = 3\text{ A}$ $T_C = 100^{\circ}\text{C}$ | | | 1 2 | V V |
| $V_{BE(sat)}$ * | Base-emitter Saturation Voltage | $I_C = 15\text{ A}$ $I_B = 3\text{ A}$ $I_C = 15\text{ A}$ $I_B = 3\text{ A}$ $T_C = 100^{\circ}\text{C}$ | | | 1.5 1.5 | V V |
| h_{FE} * | DC Current Gain | $I_C = 15\text{ A}$ $V_{CE} = 3\text{ V}$ | 8 | | 35 | |
| h_{ie} | Small Signal Current Gain | $I_C = 1\text{ A}$ $V_{CE} = 10\text{ V}$ $f = 5\text{ MHz}$ | 2 | | 6 | |
| C_{cbo} | Collector-base Capacitance | $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$ | 150 | | 400 | pF |
| t_d t_r t_s t_f | Delay Time Rise Time Storage Time Fall time | RESISTIVE LOAD $V_{CC} = 300\text{ V}$ $I_C = 15\text{ A}$ $R_C = 20\ \Omega$ $I_{B1} = -I_{B2} = 3\text{ A}$ $V_{BB} = -5\text{ V}$ $t_p = 30\ \mu\text{s}$ see fig. 1 | | | 0.1 0.7 2.5 0.5 | μs μs μs μs |
| t_s t_f t_c | Storage Time Fall Time Crossover Time | INDUCTIVE LOAD $V_{CC} = 50\text{ V}$ $I_C = 15\text{ A}$ $L_C = 100\ \mu\text{H}$ $I_{B1} = -I_{B2} = 3\text{ A}$ $R_{BB} = 1.5\ \Omega$ $V_{clamp} = V_{CEX}$ $T_C = 100^{\circ}\text{C}$ see fig. 1 | | | 3.5 0.4 0.8 | μs μs μs |
| di_c/dt | Turn-on Current Slope | $V_{CC} = 300\text{ V}$ $I_B = 4.5\text{ A}$ $R_C = 0$ $t_p = 3\ \mu\text{s}$ see fig. 2 | 75 | | | A/ μs |
| V_{CEX} | Collector-emitter Sustaining Voltage | $V_{CC} = 50\text{ V}$ $I_C = 15\text{ A}$ $L_C = 100\ \mu\text{H}$ $I_{B1} = -I_{B2} = 3\text{ A}$ $R_{BB} = 1.5\ \Omega$ $V_{clamp} = V_{CEX}$ $T_C = 100^{\circ}\text{C}$ see fig. 3 for 2N6933 for 2N6934 for 2N6935 | 350 400 450 | | | V V V |

* Pulse duration = 300 μs , duty cycle 2 %.

Figure 2 : Turn-on Switching Waveforms.

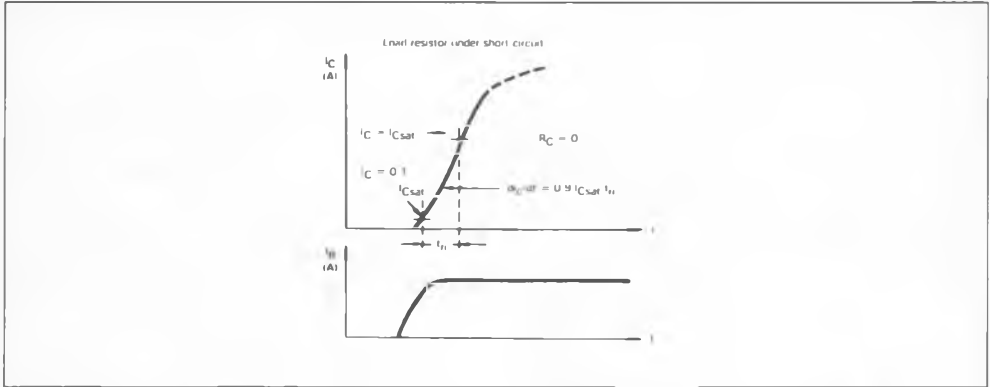


Figure 3 : Maximum Operating Conditions for Switching between Saturation and Cut off.

