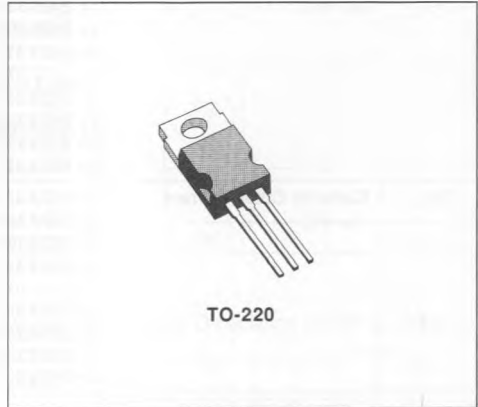




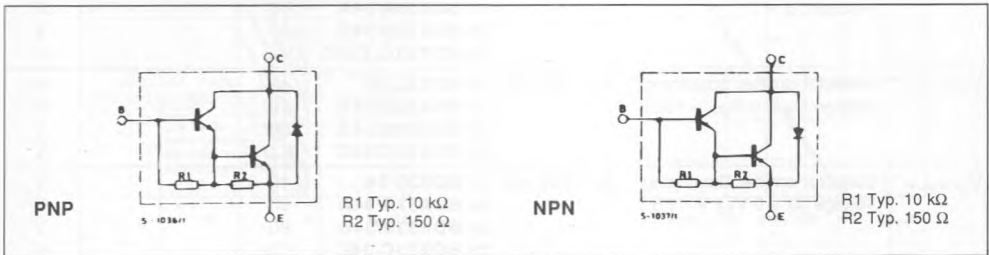
HIGH GAIN GENERAL PURPOSE

DESCRIPTION

The BDX33, BDX33A, BDX33B and BDX33C are silicon epitaxial-base NPN transistors in monolithic Darlingtion configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. This complementary PNP types are the BDX34, BDX34A, BDX34B and BDX34C respectively.



INTERNAL SCHEMATIC DIAGRAMS



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | NPN *PNP | Value | | | | Unit |
|-----------|--|-------------|----------------|------------------|------------------|------------------|------|
| | | | BDX33 BDX34 | BDX33A BDX34A | BDX33B BDX34B | BDX33C BDX34C | |
| V_{CBO} | Collector-base Voltage ($I_E = 0$) | | 45 | 60 | 80 | 100 | V |
| V_{CEO} | Collector-emitter Voltage ($I_B = 0$) | | 45 | 60 | 80 | 100 | V |
| I_C | Collector Current | | 10 | | | | A |
| I_{CM} | Collector Peak Current | | 15 | | | | A |
| I_B | Base Current | | 0.25 | | | | A |
| P_{tot} | Total Power Dissipation at $T_{case} \leq 25$ °C | | 70 | | | | W |
| T_{stg} | Storage Temperature | | - 65 to 150 | | | | °C |
| T_j | Junction Temperature | | 150 | | | | °C |

* For PNP types voltage and current values are negative.

THERMAL DATA

| | | | | |
|------------------|----------------------------------|-----|------|------|
| $R_{th(j-case)}$ | Thermal Resistance Junction-case | Max | 1.78 | °C/W |
|------------------|----------------------------------|-----|------|------|

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

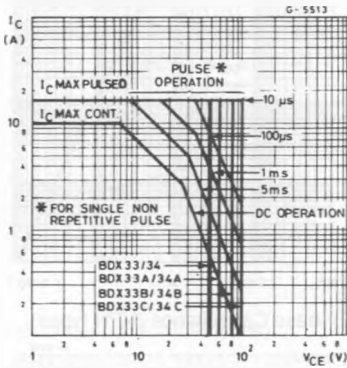
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------|---|--|-----------------------|------|--|--|
| I_{CBO} | Collector Cutoff Current ($I_E = 0$) | for BDX33/34 $V_{CB} = 45\text{ V}$ for BDX33A/34A $V_{CB} = 60\text{ V}$ for BDX33B/34B $V_{CB} = 80\text{ V}$ for BDX33C/X34C $V_{CB} = 100\text{ V}$ $T_{case} = 100\text{ °C}$ for BDX33/34 $V_{CB} = 45\text{ V}$ for BDX33A/34A $V_{CB} = 60\text{ V}$ for BDX33B/34B $V_{CB} = 80\text{ V}$ for BDX33C/X34C $V_{CB} = 100\text{ V}$ | | | 0.2 0.2 0.2 0.2 5 5 5 5 | mA mA mA mA mA mA mA mA |
| I_{CEO} | Collector Cutoff Current ($I_B = 0$) | for BDX33/34 $V_{CB} = 22\text{ V}$ for BDX33A/34A $V_{CB} = 30\text{ V}$ for BDX33B/34B $V_{CB} = 40\text{ V}$ for BDX33C/X34C $V_{CB} = 50\text{ V}$ $T_{case} = 100\text{ °C}$ for BDX33/34 $V_{CB} = 22\text{ V}$ for BDX33A/34A $V_{CB} = 30\text{ V}$ for BDX33B/34B $V_{CB} = 40\text{ V}$ for BDX33C/X34C $V_{CB} = 50\text{ V}$ | | | 0.5 0.5 0.5 0.5 10 10 10 10 | mA mA mA mA mA mA mA mA |
| I_{EBO} | Emitter Cutoff Current ($I_C = 0$) | $V_{EB} = 5\text{ V}$ | | | 5 | mA |
| $V_{CEO(sus)}^*$ | Collector-emitter Sustaining Voltage ($I_B = 0$) | $I_C = 100\text{ mA}$ for BDX33/34 for BDX33A/34A for BDX33B/34B for BDX33C/X34C | 45 60 80 100 | | | V V V V |
| $V_{CER(sus)}^*$ | Collector-emitter Sustaining Voltage ($I_B = 0$ $R_{BE} = 100\ \Omega$) | $I_C = 100\text{ mA}$ for BDX33/34 for BDX33A/34A for BDX33B/34B for BDX33C/34C | 45 60 80 100 | | | V V V V |
| $V_{CEV(sus)}^*$ | Collector-emitter Sustaining Voltage ($I_B = 0$ $V_{BE} = -1.5\text{ V}$) | $I_C = 100\text{ mA}$ for BDX33/34 for BDX33A/34A for BDX33B/34B for BDX33C/34C | 45 60 80 100 | | | V V V V |

ELECTRICAL CHARACTERISTICS (continued)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--------------------------------------|--|------|------|------|------|
| $V_{CE(sat)}$ * | Collector-emitter Saturation Voltage | for BDX33/33A/34/34A $I_C = 4\text{ A}$ $I_B = 8\text{ mA}$ for BDX33B/33C/34B/34C $I_C = 3\text{ A}$ $I_B = 6\text{ mA}$ | | | 2.5 | V |
| V_{BE} * | Base-emitter Voltage | for BDX33/33A/34/34A $I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$ for BDX33B/33C/34B/34C $I_C = 3\text{ A}$ $V_{CE} = 3\text{ V}$ | | | 2.5 | V |
| h_{FE} * | DC Current Gain | for BDX33/33A/34/34A $I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$ for BDX33B/33C/34B/34C $I_C = 3\text{ A}$ $V_{CE} = 3\text{ V}$ | 750 | | | |
| V_F * | Parallel-diode Forward Voltage | $I_F = 8\text{ A}$ | | | 4 | V |
| h_{fe} | Small Signal Current Gain | $I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ KHz}$ | 100 | | | |

* Pulsed : pulse duration = 300 ms, duty cycle = 1.5 %.
For PNP types voltage and current values are negative.

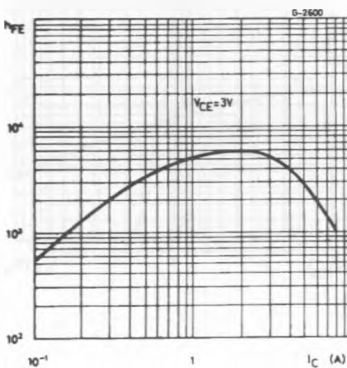
Safe Operating Areas.



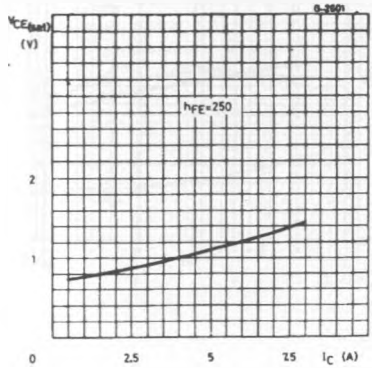
Case Temperature Dissipation Derating Curve.



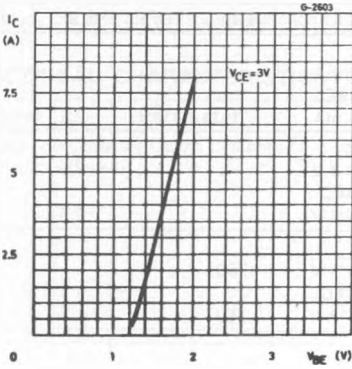
DC Current Gain (NPN types).



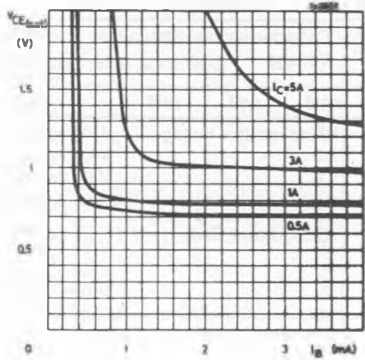
Collector-emitter Saturation Voltage (NPN types).



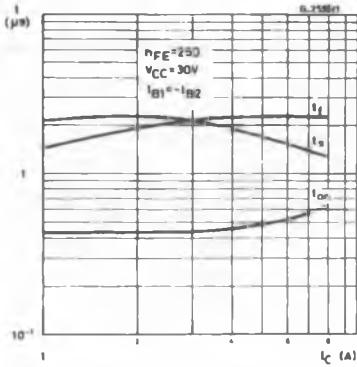
DC Transconductance (NPN types).



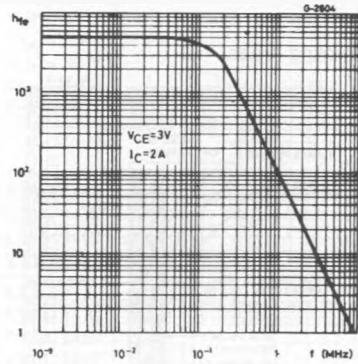
Collector-emitter Saturation Voltage (NPN types).



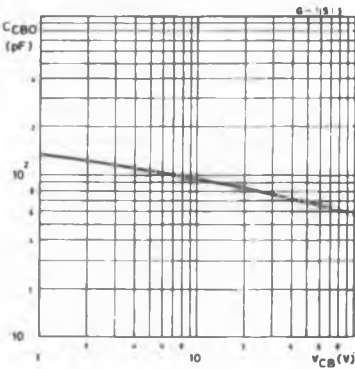
Saturated Switching Characteristics (NPN types).



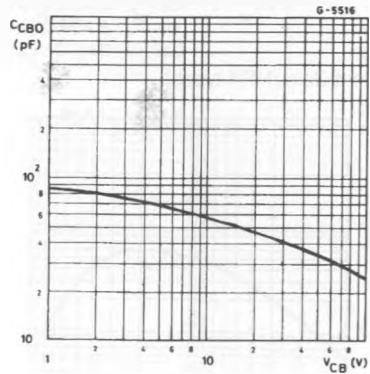
Small Signal Current Gain (NPN types).



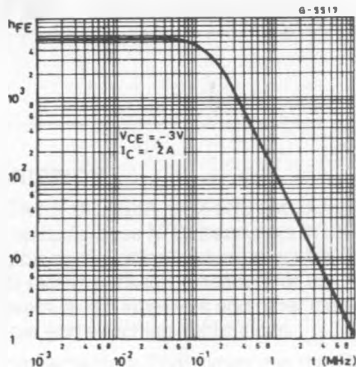
Collector-base Capacitance (PNP types).



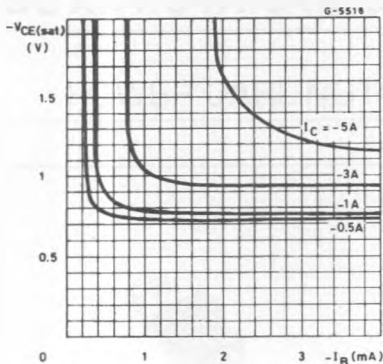
Collector-base Capacitance (NPN types).



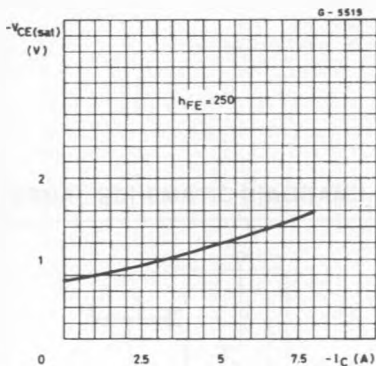
Small Signal Current Gain (PNP types).



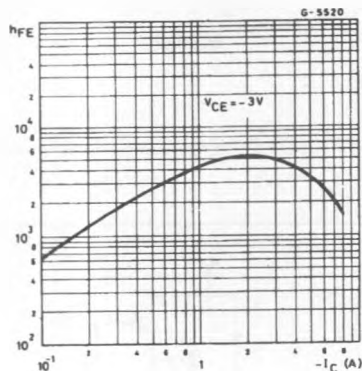
Collector-emitter Saturation Voltage (PNP types).



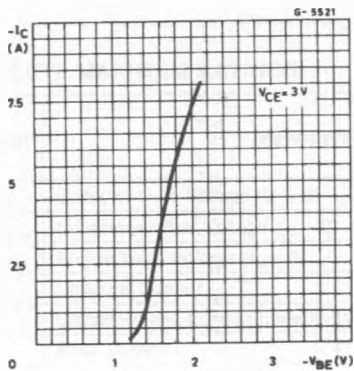
Collector-emitter Saturation Voltage (PNP types).



DC Current Gain (PNP types).



DC Transconductance (PNP types).



Saturated Switching Characteristics (PNP types).

