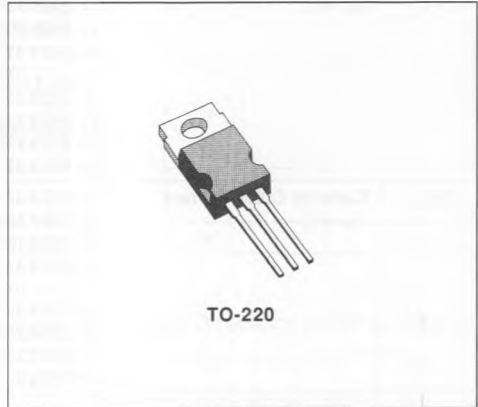




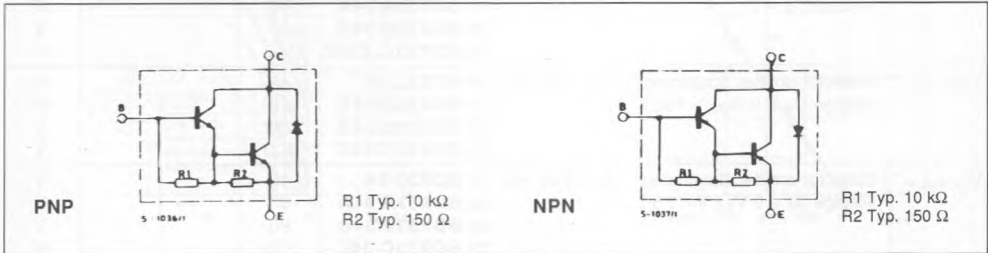
## HIGH GAIN GENERAL PURPOSE

### DESCRIPTION

The BDX33, BDX33A, BDX33B and BDX33C are silicon epitaxial-base NPN transistors in monolithic Darlington 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 $T_{case} \leq 25^\circ\text{C}$		70				W
$T_{stg}$	Storage Temperature		- 65 to 150				$^\circ\text{C}$
$T_j$	Junction Temperature		150				$^\circ\text{C}$

\* For PNP types voltage and current values are negative.

**THERMAL DATA**

$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	1.78	°C/W
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**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25\text{ °C}$  unless otherwise specified)

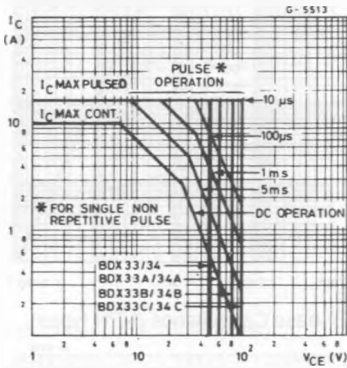
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BDX33/34</b> $V_{CB} = 45\text{ V}$ for <b>BDX33A/34A</b> $V_{CB} = 60\text{ V}$ for <b>BDX33B/34B</b> $V_{CB} = 80\text{ V}$ for <b>BDX33C/X34C</b> $V_{CB} = 100\text{ V}$ $T_{case} = 100\text{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

ELECTRICAL CHARACTERISTICS (continued)

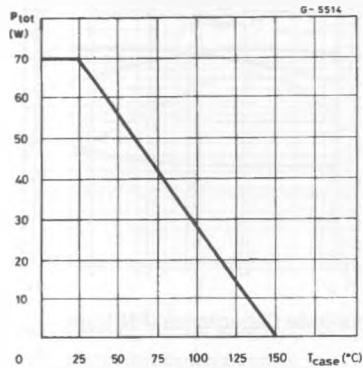
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$ *	Collector-emitter Saturation Voltage	for <b>BDX33/33A/34/34A</b> $I_C = 4\text{ A}$ $I_B = 8\text{ mA}$ for <b>BDX33B/33C/34B/34C</b> $I_C = 3\text{ A}$ $I_B = 6\text{ mA}$			2.5	V
$V_{BE}$ *	Base-emitter Voltage	for <b>BDX33/33A/34/34A</b> $I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$ for <b>BDX33B/33C/34B/34C</b> $I_C = 3\text{ A}$ $V_{CE} = 3\text{ V}$			2.5	V
$h_{FE}$ *	DC Current Gain	for <b>BDX33/33A/34/34A</b> $I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$ for <b>BDX33B/33C/34B/34C</b> $I_C = 3\text{ A}$ $V_{CE} = 3\text{ V}$	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.

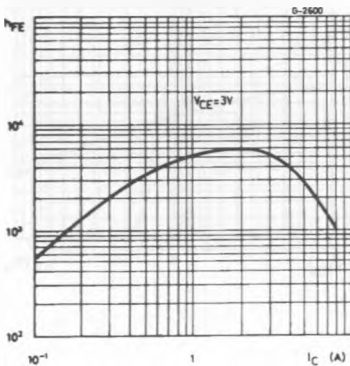
Safe Operating Areas.



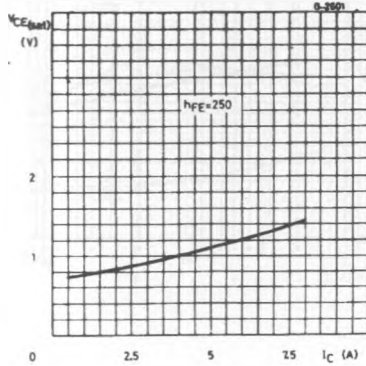
Case Temperature Dissipation Derating Curve.



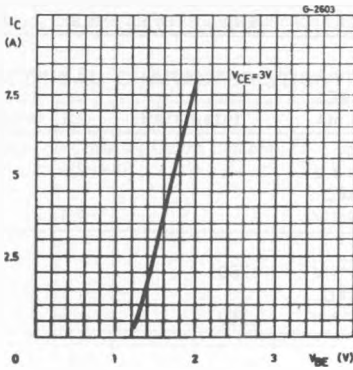
DC Current Gain (NPN types).



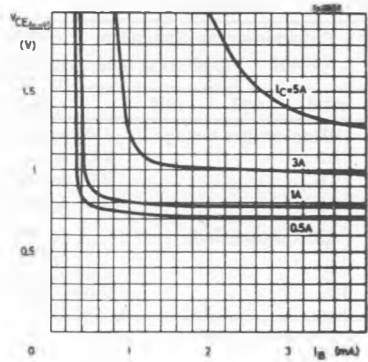
Collector-emitter Saturation Voltage (NPN types).



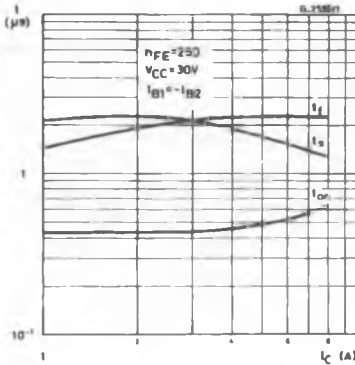
DC Transconductance (NPN types).



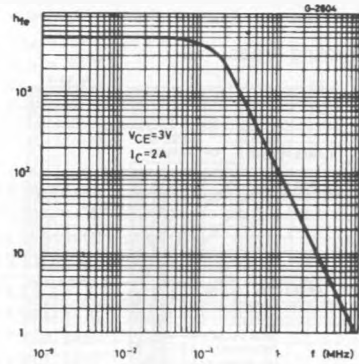
Collector-emitter Saturation Voltage (NPN types).



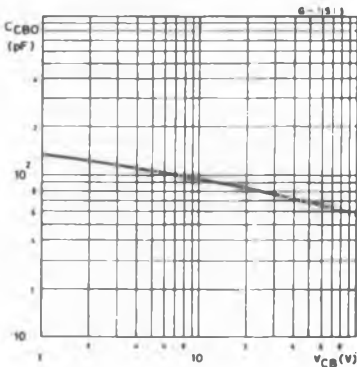
Saturated Switching Characteristics (NPN types).



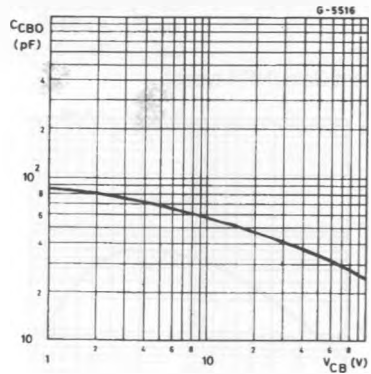
Small Signal Current Gain (NPN types).



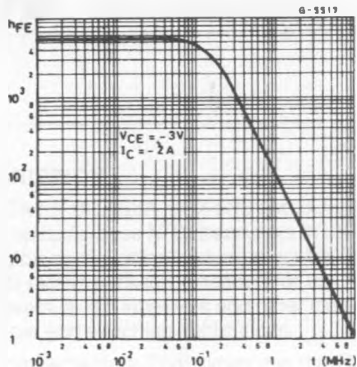
Collector-base Capacitance (PNP types).



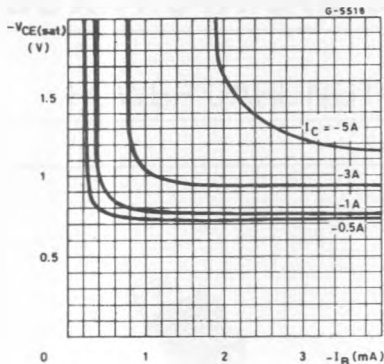
Collector-base Capacitance (NPN types).



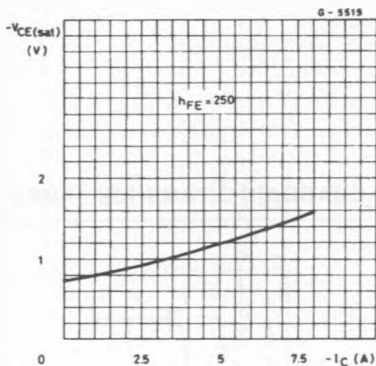
Small Signal Current Gain (PNP types).



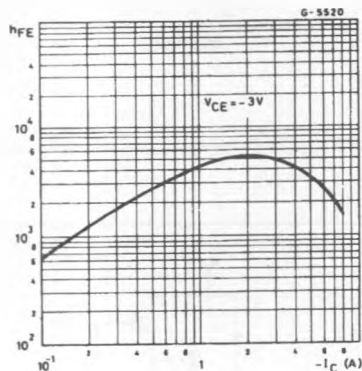
Collector-emitter Saturation Voltage (PNP types).



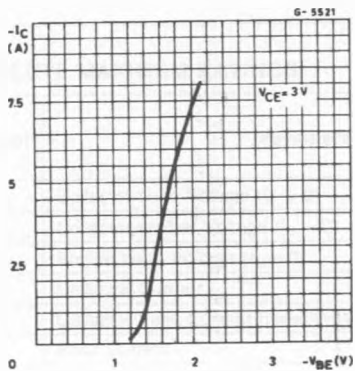
Collector-emitter Saturation Voltage (PNP types).



DC Current Gain (PNP types).



DC Transconductance (PNP types).



Saturated Switching Characteristics (PNP types).

