

NB311, 312, 313(NPN), NB321, 322, 323(PNP)

6501130 NATL SEMICOND, (DISCRETE)



28C 35601 D

T-29-21

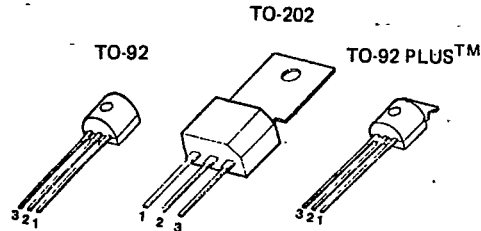
T-33-07

**NB311, 312, 313 (NPN)
NB321, 322, 323 (PNP) 1.5Amp complementary power drivers**

features

- 35 to 65 Volt at 1.5 Amp collector ratings
- Low $V_{CE(sat)}$ and $V_{BE(sat)}$ characteristics with $I_C = 300\text{ mA}$ and $I_B = 10\text{ mA}$ drive
- Available in TO-92, TO-92 PLUSTM and TO-202 packages
- "Epoxy B" packaging concept for excellent reliability

1 packages and lead coding



applications

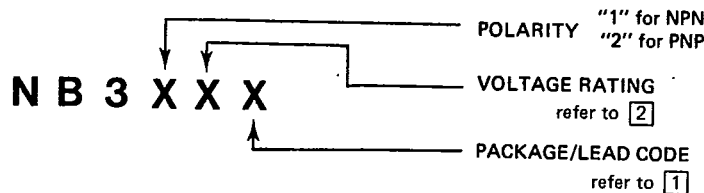
- Driver stages in high-power audio amplifiers
- Medium-power switching circuits
- Converter/inverter circuits
- TV receivers

PACKAGE CODE			LEAD		
TO-92	TO-92 PLUS	TO-202	1	2	3
E	X	K	E	B	C
F	Y	L	E	C	B
	Z	M	B	C	E
H			C	B	E

2 maximum ratings

PARAMETER	SYMBOL	NB311 NB321	NB312 NB322	NB313 NB323	UNIT
Collector-Emitter Voltage	V_{CEO}	35	50	65	V_{DC}
Collector-Base Voltage	V_{CB}	40	55	70	V_{DC}
Emitter-Base Voltage	V_{EB}	6	6	6	V_{DC}
Collector Current (continuous)	I_C	1.5	1.5	1.5	A_{DC}
Power Dissipation ($T_A = 25^\circ\text{C}$)	P_D	TO-92	0.6	0.6	W
		TO-92 PLUS	0.75	0.75	W
		TO-202	1.75	1.75	W
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	TO-92	1.0	1.0	W
		TO-92 PLUS	2.5	2.5	W
		TO-202	10	10	W
Temperature, Junction and Storage	T_j, T_{stg}	-55 to +150	-55 to +150	-55 to +150	$^\circ\text{C}$

3 ordering information



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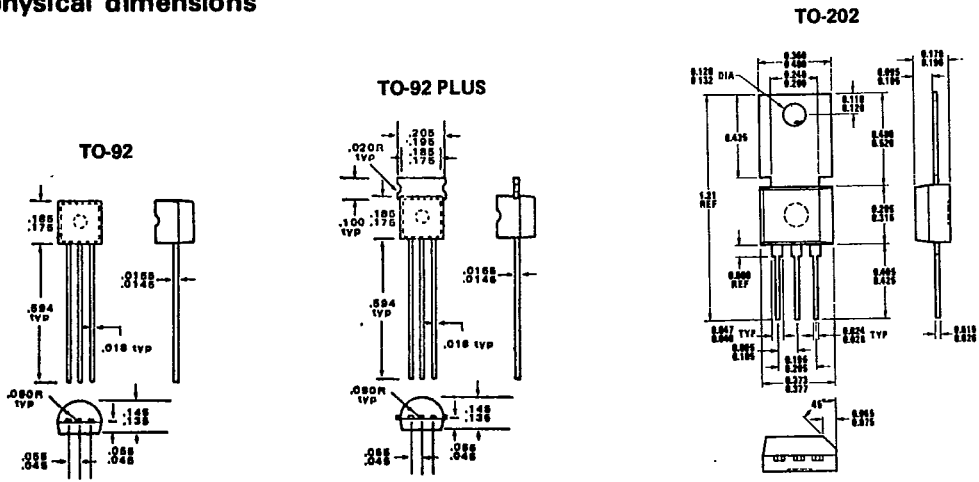
4 electrical characteristics $T_c = 25^\circ\text{C}$

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SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
BV _{CEO}	Collector-Emitter Sustaining Voltage	I _C = 1 mA				
			NB311/321	35		V
			NB312/322 NB313/323	50 65		V V
BV _{CBO}	Collector-Base Breakdown Voltage	I _C = 100 μA				
			NB311/321	40		V
			NB312/322 NB313/323	55 70		V V
BV _{EBO}	Emitter-Base Breakdown Voltage	I _E = 10 μA	6			V
I _{CEO}	Collector-Emitter Leakage Current	V _{CE} = 30V NB311/321 45V NB312/322 60V NB313/323			50	μA
					50	μA
					50	μA
I _{CBO}	Collector-Base Leakage Current	V _{CB} = 35V NB311/321 50V NB312/322 65V NB313/323			0.5	μA
					0.5	μA
					0.5	μA
I _{EBO}	Emitter-Base Leakage Current	V _{EB} = 5V			0.5	μA
V _{BE(sat)}	Base-Emitter Saturation Voltage	I _C = 300 mA, I _B = 10 mA		0.9	1	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 300 mA, I _B = 10 mA		0.15	0.5	V
HFE ₁	DC Current Gain	I _C = 1 mA, V _{CE} = 10V	30			
HFE ₂	DC Current Gain	I _C = 100 mA, V _{CE} = 10V	50			
C _{ob}	Collector Output Capacitance	V _{CB} = 10V, f = 1 MHz				
			NPN types		10	pF
			PNP types		17	pF
f _t	Current Gain Bandwidth Product	I _C = 100 mA, V _{CE} = 10V	20			MHz

5 physical dimensions



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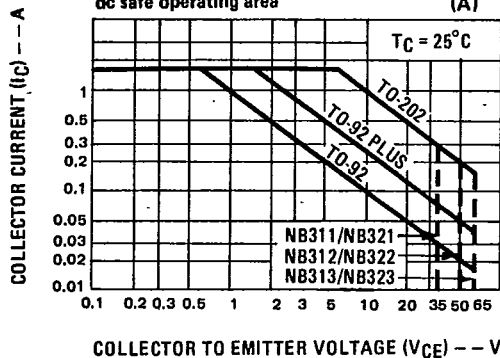
NB311, 312, 313(NPN), NB321, 322, 323(PNF)

⑥ typical performance characteristics

SOA

dc safe operating area

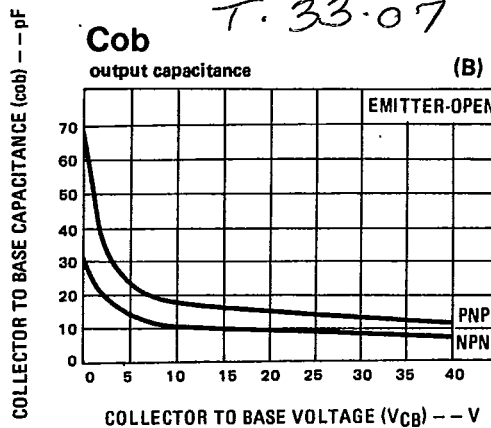
(A)



Cob

output capacitance

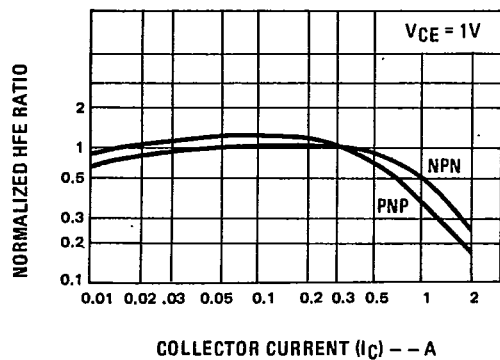
(B)



HFE1/HFE2

current gain linearity ratio

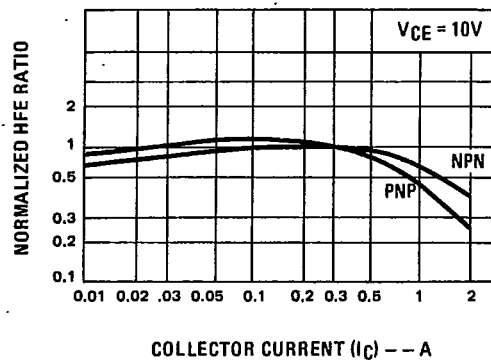
(C)



HFE1/HFE2

current gain linearity ratio

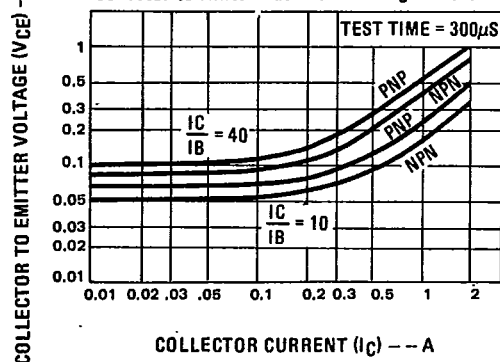
(D)



VCE(sat)

collector to emitter saturation voltage

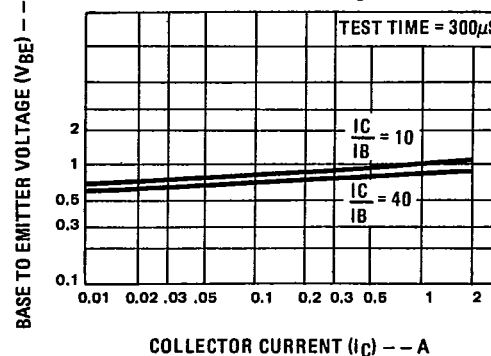
(E)



VBE(sat)

base to emitter saturation voltage

(F)



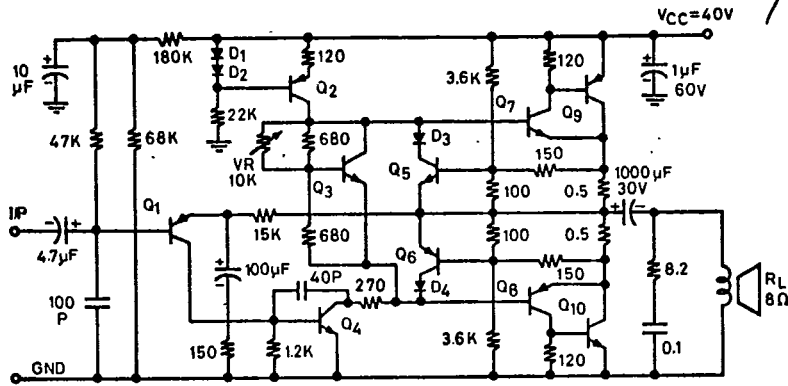
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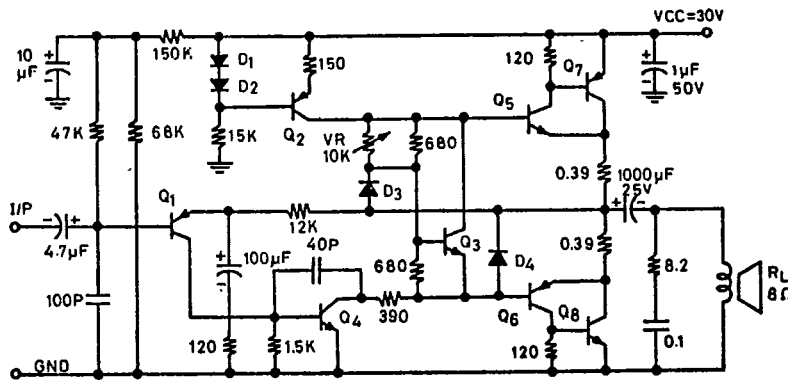
7 typical applications

T-29-21
T-33-07



- Q1 NB022EY
- Q2 NB123EY
- Q3 NR001E
- Q4 NB113EY
- Q5 NB111EY
- Q6 NB121EY
- Q7 NB313Y
- Q8 NB323Y
- Q9 NA72W
- Q10 NA71W

Figure A. 25 Watt OTL Amplifier



- Q1 NB021EY
- Q2 NB122EY
- Q3 NR001E
- Q4 NB112EY
- Q5 NB312E
- Q6 NB322E
- Q7 NA52W
- Q8 NA51W

Figure B. 12 Watt OTL Amplifier

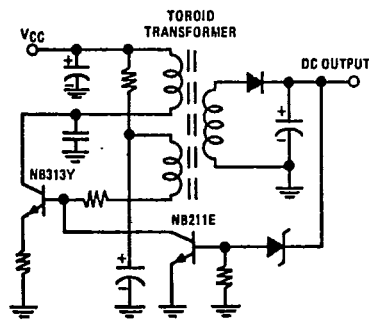


Figure C. Typical Converter Circuit

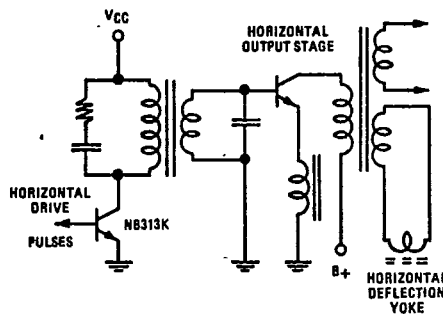


Figure D. Typical TV Horizontal Driver Application

NB311, 312, 313(NPN), NB321, 322, 323(PNP)

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