

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

6501130 NATL SEMICONDUCTOR, (DISCRETE)



28C 35601 D

T-29-21

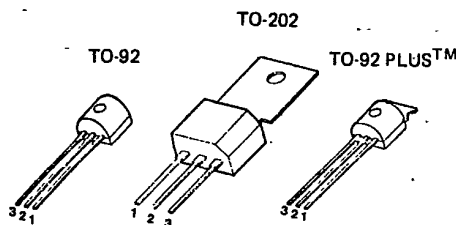
T-33-07

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



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
H	Z	M	B	C	E

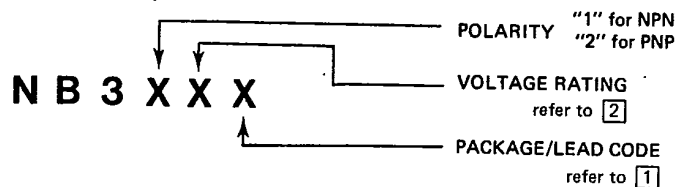
applications

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

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	0.6	W
TO-92 PLUS		0.75	0.75	0.75	W
TO-202		1.75	1.75	1.75	W
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D				
TO-92		1.0	1.0	1.0	W
TO-92 PLUS		2.5	2.5	2.5	W
TO-202		10	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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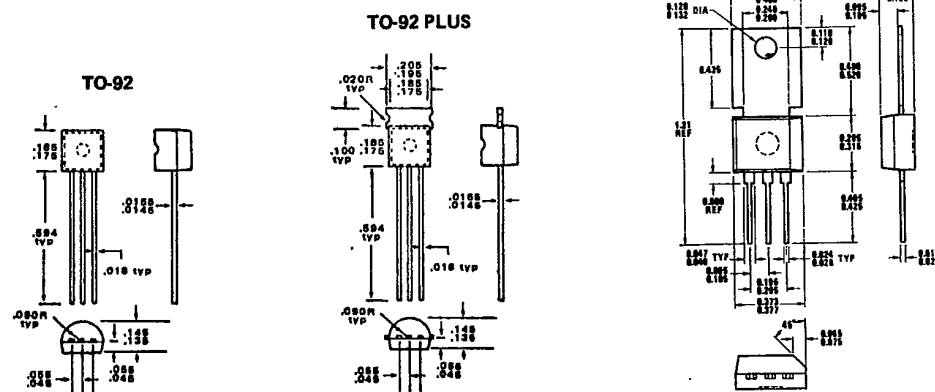
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
BV_{CEO}	Collector-Emitter Sustaining Voltage NB311/321 NB312/322 NB313/323	$I_C = 1\text{ mA}$	35 50 65			V V V
BV_{CBO}	Collector-Base Breakdown Voltage NB311/321 NB312/322 NB313/323	$I_C = 100\text{ }\mu\text{A}$	40 55 70			V V V
BV_{EBO}	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}$	6			V
I_{CEO}	Collector-Emitter Leakage Current	$V_{CE} = 30\text{ V NB311/321}$ 45 V NB312/322 60 V NB313/323			50 50 50	μA μA μA
I_{CBO}	Collector-Base Leakage Current	$V_{CB} = 35\text{ V NB311/321}$ 50 V NB312/322 65 V NB313/323			0.5 0.5 0.5	μA μA μA
I_{EBO}	Emitter-Base Leakage Current	$V_{EB} = 5\text{ V}$			0.5	μA
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 300\text{ mA}, I_B = 10\text{ mA}$		0.9	1	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 300\text{ mA}, I_B = 10\text{ mA}$		0.15	0.5	V
HFE_1	DC Current Gain	$I_C = 1\text{ mA}, V_{CE} = 10\text{ V}$	30			
HFE_2	DC Current Gain	$I_C = 100\text{ mA}, V_{CE} = 10\text{ V}$	50			
C_{ob}	Collector Output Capacitance NPN types PNP types	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$		10 17		pF pF
f_t	Current Gain Bandwidth Product	$I_C = 100\text{ mA}, V_{CE} = 10\text{ V}$	20			MHz

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5 physical dimensions

TO-202

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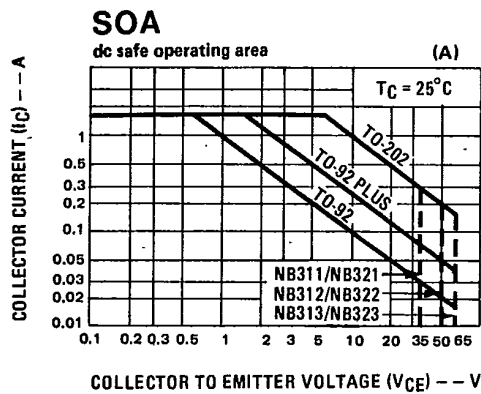
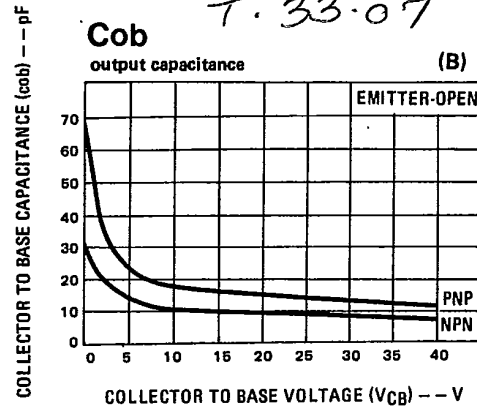
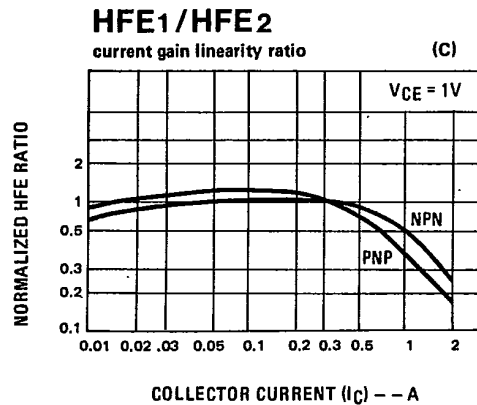
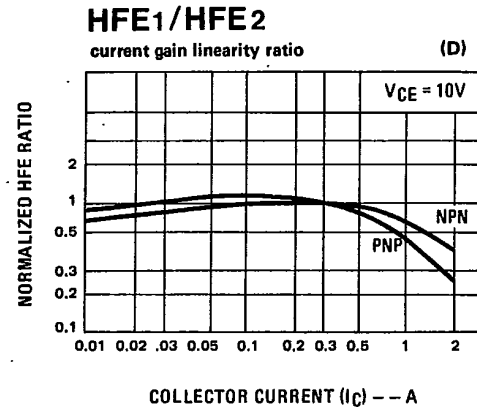
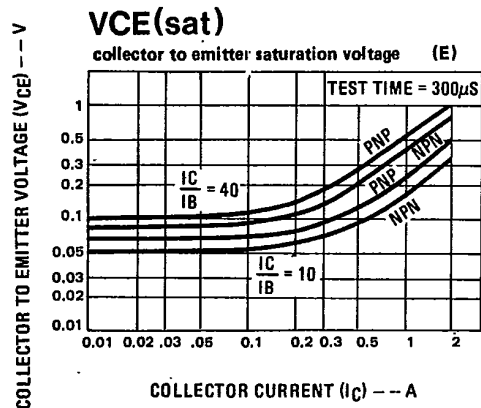
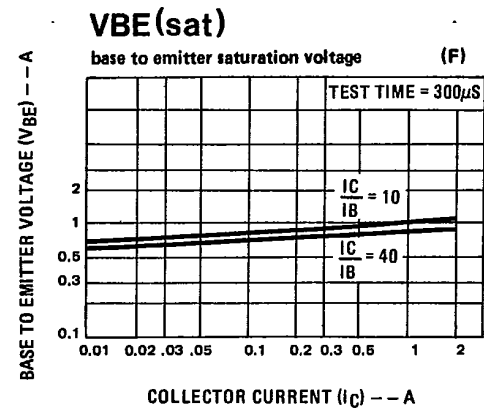


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NB311, 312, 313(NPN), NB321, 322, 323(PNP)

⑥ typical performance characteristics



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7 typical applications

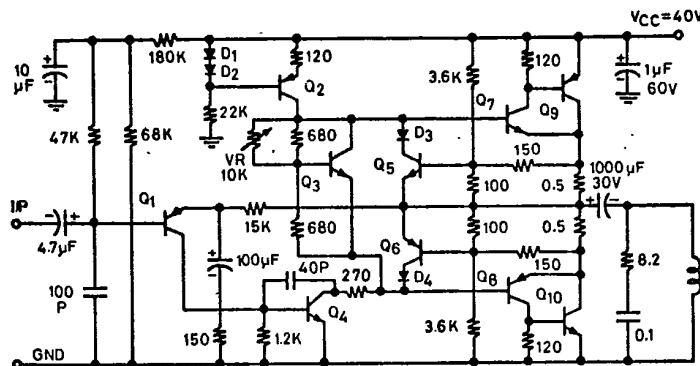
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Figure A. 25 Watt OTL Amplifier

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

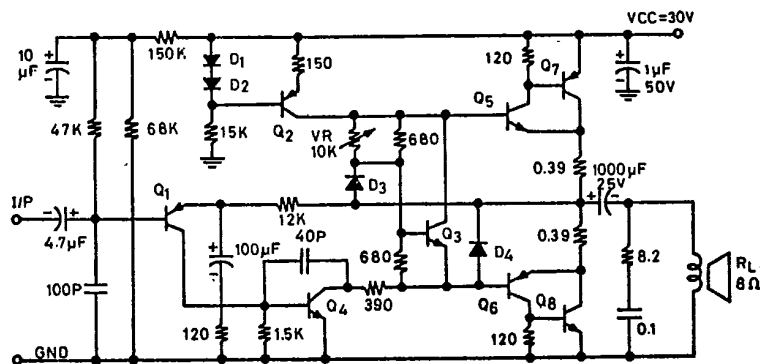


Figure B. 12 Watt OTL Amplifier

- Q1 NB021EY
- Q2 NB122EY
- Q3 NR001E
- Q4 NB112EY
- Q5 NB312E
- Q6 NB322E
- Q7 NA62W
- Q8 NA51W

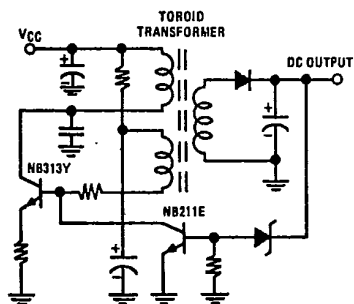


Figure C. Typical Converter Circuit

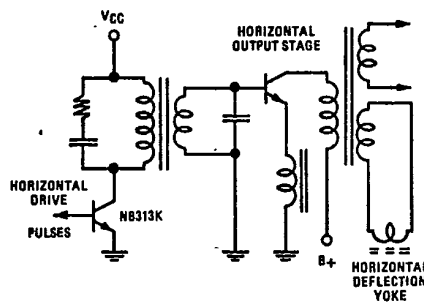


Figure D. Typical TV Horizontal Driver Application

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