National Semiconductor

NB111,112,113(NPN) NB121,122,123(PNP) 100mA general purpose transistors

features

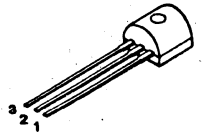
- 35 to 65 Volt at 100mA collector ratings
- 400mV guaranteed V_{CE} (sat) characteristics at I_C = 20mA and I_B = 0.4mA
- Matched HFE groupings for complementary applications
- "Epoxy B" packaging concept for excellent reliability

applications

- Small signal amplifier circuits
- Medium current level switching circuits
- LED drivers
- TV receivers

1 package and lead coding

TO-92

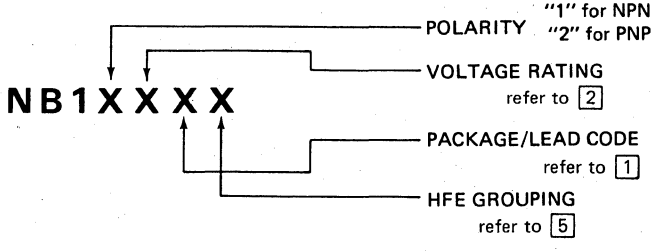


PACKAGE CODE TO-92	LEAD 1	2	3
E	E	B	C
F	E	C	B
H	C	B	E

2 maximum ratings

PARAMETER	SYMBOL	NB111 NB121	NB112 NB122	NB113 NB123	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 (max)	100	100	100	mA_{DC}
Power Dissipation (T_A = 25°C)	P_D	0.6	0.6	0.6	W
Power Dissipation (T_C = 25°C)	P_D	1.0	1.0	1.0	W
Thermal Resistance	θ_{JA}	208	208	208	°C/W
	θ_{JC}	125	125	125	°C/W
Temperature, Junction and Storage	T_j, T_{stg}	−55 to + 150	−55 to + 150	−55 to + 150	°C

3 ordering information



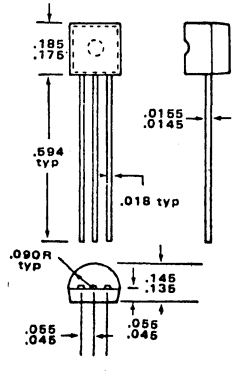
4 electrical characteristics $T_C = 25°C$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
BV_{CEO}	Collector-Emitter Sustaining Voltage	I_C = 1 mA				
	NB111/121		35			V
	NB112/122		50			V
	NB113/123		65			V
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 100μA				
	NB111/121		40			V
	NB112/122		55			V
	NB113/123		70			V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 10μA	6			V
I_{CEO}	Collector-Emitter Leakage Current	V_{CE} = 30V NB111/121			2	μA
		45V NB112/122			2	μA
		60V NB113/123			2	μA
I_{CBO}	Collector-Base Leakage Current	V_{CB} = 35V NB111/121			0.1	μA
		50V NB112/122			0.1	μA
		65V NB113/123			0.1	μA
I_{EBO}	Emitter-Base Leakage Current	V_{EB} = 5V			0.1	μA
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 20 mA, I_B = 0.4 mA		0.8	0.95	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 20 mA, I_B = 0.4 mA		0.15	0.4	V
H_{FE1}	DC Current Gain	I_C = 100μA, V_{CE} = 5V	50			ratio
Cob	Collector Ouput Capacitance	V_{CB} = 10V, f = 1MHz				
	NPN types			2		pF
	PNP types			3		pF
ft	Current Gain Bandwidth Product	I_C = 15 mA, V_{CE} = 5V	100			MHz

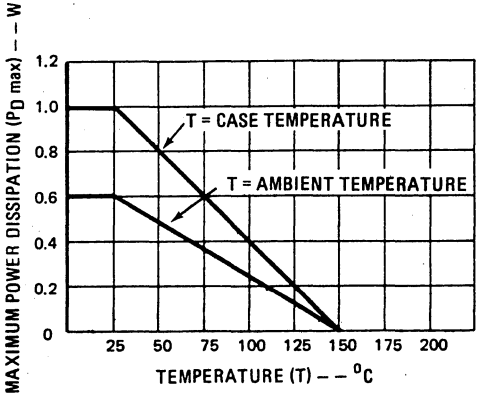
5 HFE groupings

GROUPING	PARAMETER	CONDITIONS	MIN	TYP	MAX	RATIO
H	DC Current Gain	I_C = 15 mA, V_{CE} = 5V	100	127	160	1:1.6
I	DC Current Gain	I_C = 15 mA, V_{CE} = 5V	140	180	240	1:1.6
J	DC Current Gain	I_C = 15 mA, V_{CE} = 5V	200	260	350	1:1.6
Y	DC Current Gain	I_C = 15 mA, V_{CE} = 5V	100	190	350	1:3.5

6 physical dimensions



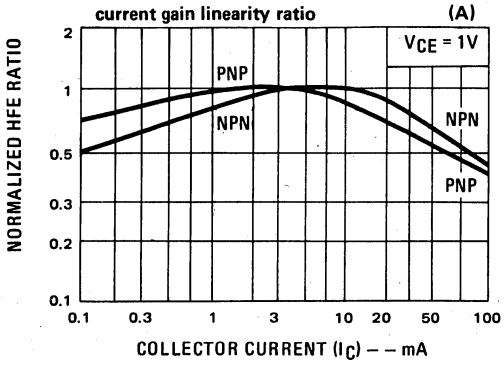
7 max power dissipation



8 typical performance characteristics

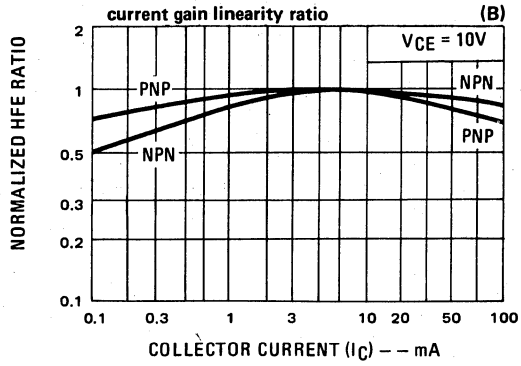
HFE1/HFE2

current gain linearity ratio (A)



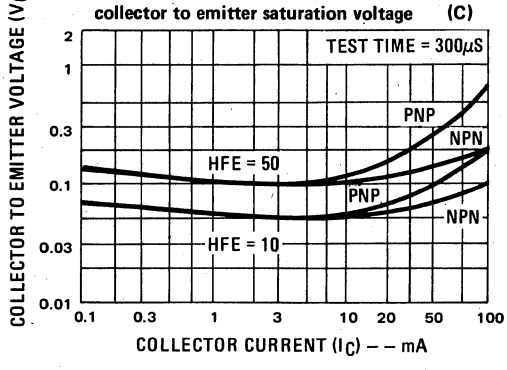
HFE1/HFE2

current gain linearity ratio (B)



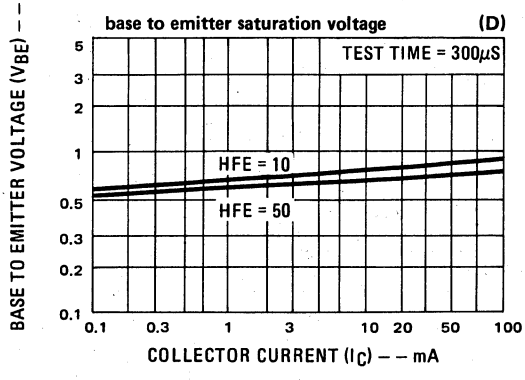
VCE(sat)

collector to emitter saturation voltage (C)



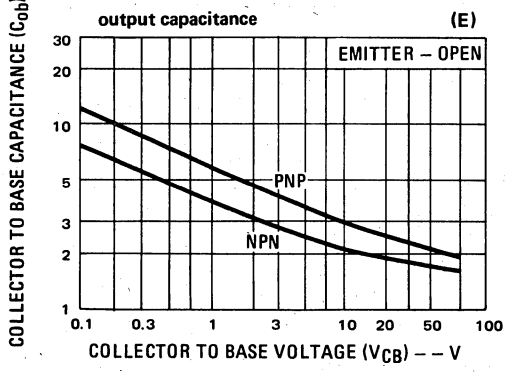
VBE(sat)

base to emitter saturation voltage (D)



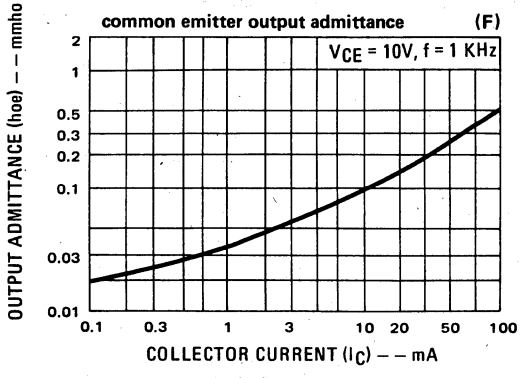
Cob

output capacitance (E)

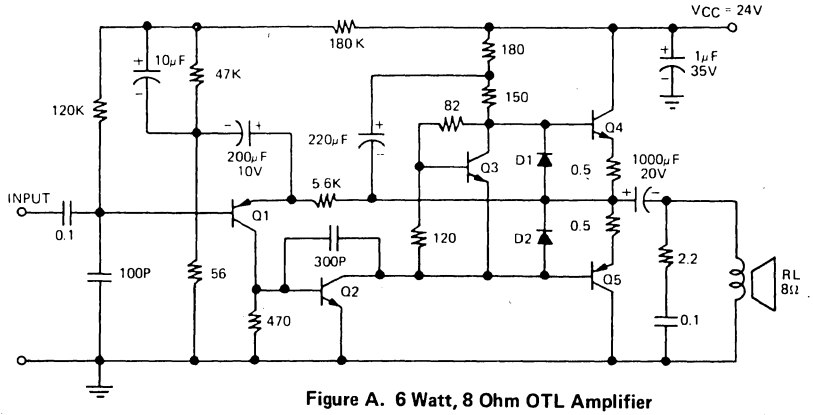


hoe

common emitter output admittance (F)

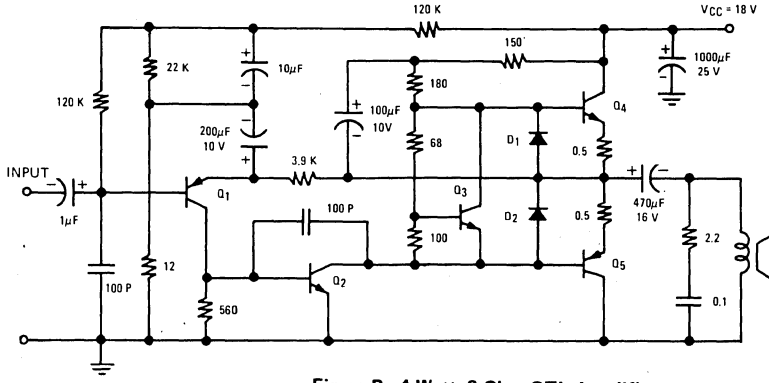


9 typical applications



Q1 NB021EY
Q2 NB211YY
Q3 NR001E
Q4 NA41U
Q5 NA42U

Figure A. 6 Watt, 8 Ohm OTL Amplifier



Q1 NB021EY
Q2 NB211EY
Q3 NR001E
Q4 NA31YG/I
Q5 NA32YG/I

Figure B. 4 Watt, 8 Ohm OTL Amplifier

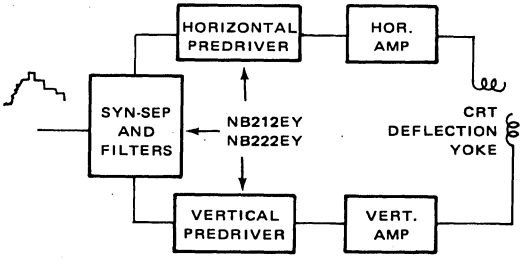


Figure C. TV processor/predriver applications

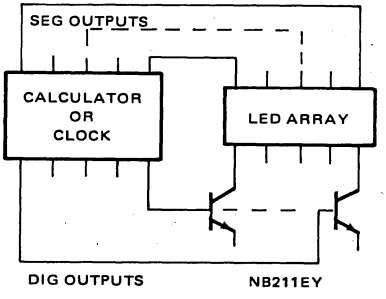


Figure D. Calculator/Clock driver application

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