National Semiconductor

NA71 (NPN)
NA72 (PNP) 3.5 Amp complementary power transistors

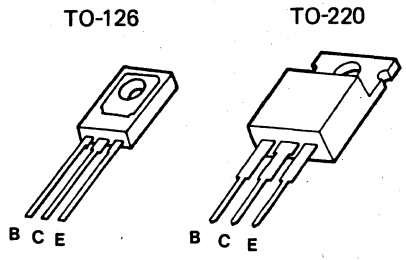
features

- 60 Volt/3.5 Amp rating
- Available in TO-126 and TO-220 packages
- Low V_{CE} (sat) and V_{BE} (sat) characteristics at I_C = 2 A, I_B = 100mA
- Guaranteed V_{CE} (sat) and V_{BE} (sat) at I_C = 3A, I_B = 200mA for improved short circuited protection design in audio amplifiers
- "Epoxy B" packaging concept for excellent reliability

applications

- 10–25 Watt 8 Ohm audio power amplifiers
- High current switching circuits
- Converter/Inverter circuits
- TV receivers

1 packages and lead coding

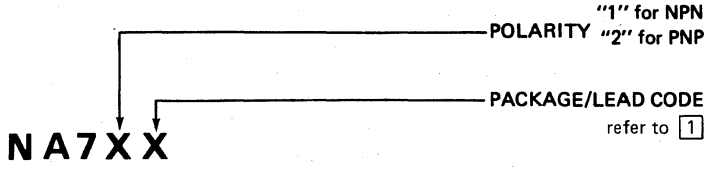


PACKAGE CODE	
TO 126	TO 220
U	W

2 maximum ratings

PARAMETER	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	V_{CE}	60	V_{DC}
Collector-Base Voltage	V_{CB}	65	V_{DC}
Emitter-Base Voltage	V_{EB}	4	V_{DC}
Collector Current (continuous)	I_C (max)	3.5	A
Power Dissipation (T_A = 25°C)	P_D		
TO-126		1.8	W
TO-220		2.0	W
Power Dissipation (T_C = 25°C)	P_D		
TO-126		40	W
TO-220		40	W
Thermal Resistance			
TO-126	θ_{JA}/θ_{JC}	69.4/3.125	°C/W
TO-220	θ_{JA}/θ_{JC}	62.5/3.125	°C/W
Temperature, Junction and Storage	Tj, Tstg	−55 to + 150	°C

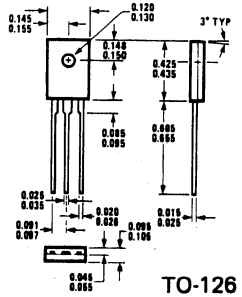
3 ordering information



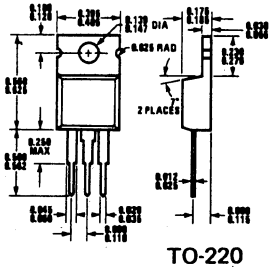
4 electrical characteristics $T_C = 25°C$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
BV_{CER}	Collector-Emitter Sustaining Voltage	I_C = 10 mA, R = 1K	60			V
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 100 μA	65			V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 100 μA	4			V
I_{CER}	Collector-Emitter Leakage Current	V_{CE} = 50V, R = 1K			2	mA
I_{CBO}	Collector-Base Leakage Current	V_{CB} = 55V			1	mA
V_{BE} (on)	Base-Emitter Voltage	I_C = 20 mA, V_{CE} = 10V	520	600	680	mV
V_{BE} (sat)	Base -Emitter Saturation Voltage	I_C = 2A, I_B = 100 mA			1.5	V
V_{BE} (sat)	Base-Emitter Saturation Voltage	I_C = 3A, I_B = 200 mA			2	V
V_{CE} (sat)	Collector-Emitter Saturation Voltage	I_C = 2A, I_B = 100 mA			2	V
V_{CE} (sat)	Collector-Emitter Saturation Voltage	I_C = 3A, I_B = 200 mA			5	V
HFE_1	DC Current Gain	I_C = 500 mA, V_{CE} = 10V	30	100		ratio
C_{ob}	Collector Ouput Capacitance NPN types PNP types	V_{CB} = 10V, f = 1 MHz		 40 70		 pF pF

5 physical dimensions



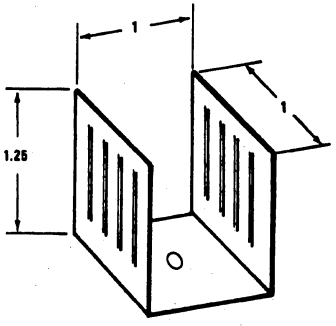
TO-126



TO-220

6 heatsink information

The TO-126 and TO-220 packages used with heatsink shown below permits about 10 Watts power dissipation and θ_{CA} = 9.4°C/W.



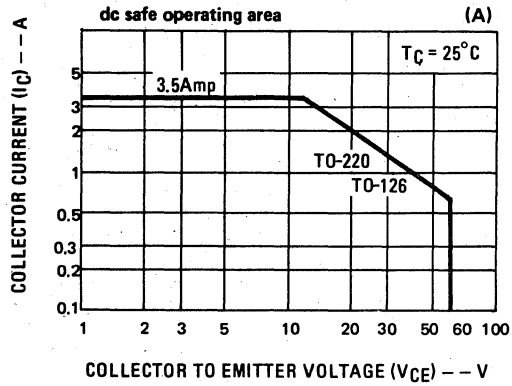
0.05 inch aluminium sheet

Mount transistor under heatsink and apply thermally conductive compound between contact surfaces.

7 typical performance characteristics

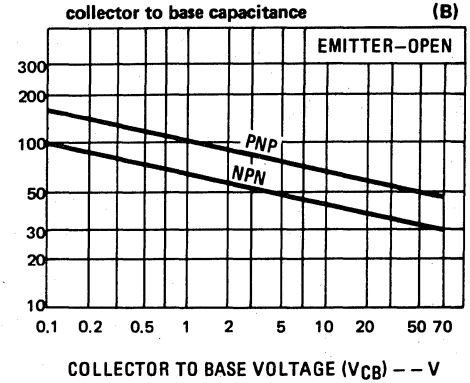
SOA

dc safe operating area (A)



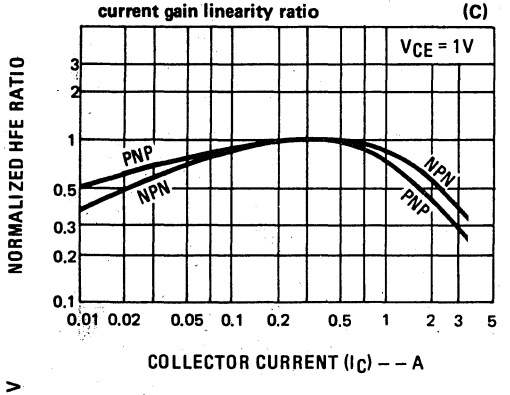
Cob

collector to base capacitance (B)



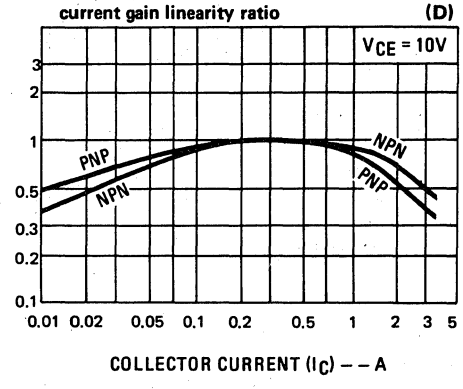
HFE_1/HFE_2

current gain linearity ratio (C)



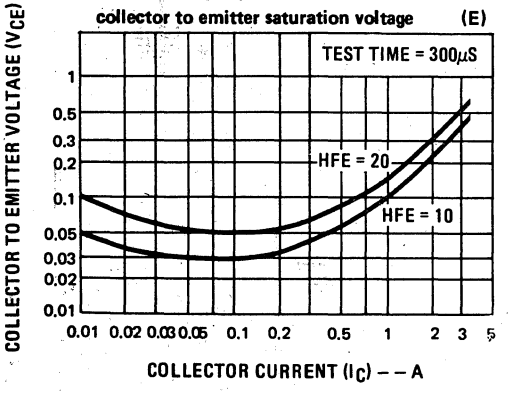
HFE_1/HFE_2

current gain linearity ratio (D)



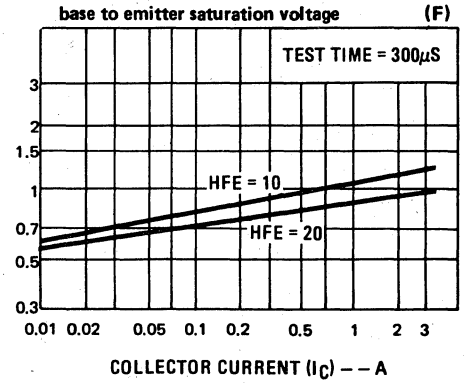
VCE (sat)

collector to emitter saturation voltage (E)

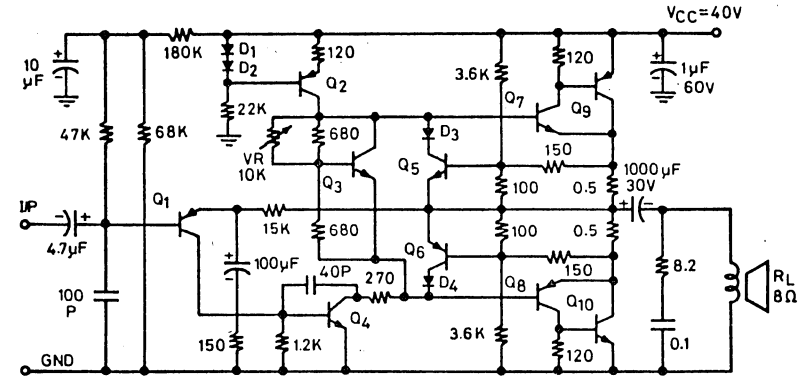


VBE (sat)

base to emitter saturation voltage (F)

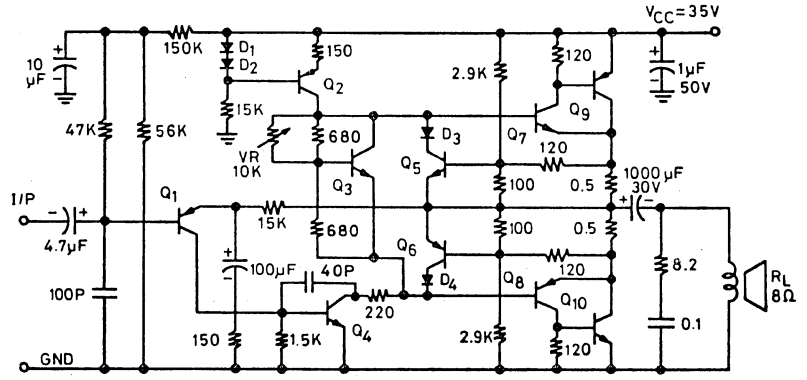


8 typical applications



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

Figure B. 18 Watt OTL Amplifier

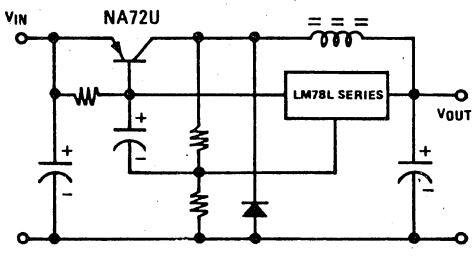


Figure C. Switching Regulator Circuit

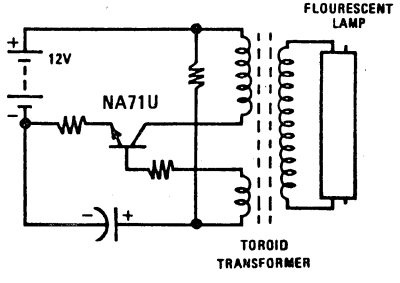


Figure D. Battery Lantern Circuit

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