National Semiconductor

NA41 (NPN)
NA42 (PNP) 2.5 Amp complementary power transistors

features

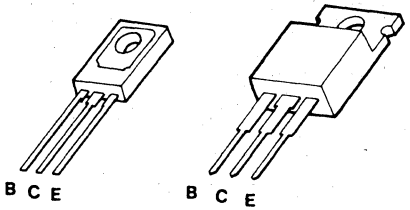
- 30 Volt/2.5 Amp rating
- Available in TO-126 and TO-220 packages
- Low V_{CE} (sat) and V_{BE} (sat) characteristics at I_C = 1.6 A, I_B = 40 mA
- Matched HFE groupings for complementary applications
- "Epoxy B" packaging concept for excellent reliability

applications

- 4 to 7 Watt, 4 or 8 Ohm audio power amplifiers
- High current switching circuits
- Converter/Inverter circuits
- TV receivers

1 packages and lead coding

TO-126 TO-220

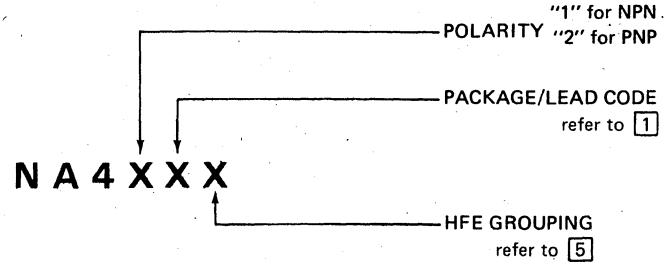


PACKAGE CODE	
TO 126	TO 220
U	W

2 maximum ratings

PARAMETER	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	V_{CE}	30	V_{DC}
Collector-Base Voltage	V_{CB}	35	V_{DC}
Emitter-Base Voltage	V_{EB}	4	V_{DC}
Collector Current (continuous)	I_C (max)	2.5	A
Power Dissipation (T_A = 25°C)	P_D		
TO-126		1.7	W
TO-220		1.8	W
Power Dissipation (T_C = 25°C)	P_D		
TO-126		25	W
TO-220		25	W
Thermal Resistance			
TO-126	θ_{JA}/θ_{JC}	73.5/5	°C/W
TO-220	θ_{JA}/θ_{JC}	69.4/5	°C/W
Temperature, Junction and Storage	Tj, Tstg	−55 to + 150	°C

3 ordering information



4 electrical characteristics $T_C = 25°C$

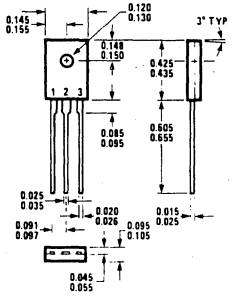
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
BV_{CER}	Collector-Emitter Sustaining Voltage	I_C = 10 mA, R = 1K	30			V
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 100μA	35			V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 100μA	4			V
I_{CER}	Collector-Emitter Leakage Current	V_{CE} = 20V, R = 1K			500	μA
I_{CBO}	Collector-Base Leakage Current	V_{CB} = 25V			200	μA
V_{BE} (on)	Base-Emitter Voltage	I_C = 10 mA, V_{CE} = 10V	510	590	670	mV
V_{BE} (sat)	Base-Emitter Saturation Voltage	I_C = 1.6A, I_B = 40 mA			1.2	V
V_{BE} (sat)	Base-Emitter Saturation Voltage	I_C = 1.6A, I_B = 160 mA			1.4	V
V_{CE} (sat)	Collector-Emitter Saturation Voltage	I_C = 1.6A, I_B = 40 mA			1.2	V
V_{CE} (sat)	Collector-Emitter Saturation Voltage	I_C = 1.6A, I_B = 160 mA			0.6	V
Cob	Collector Output Capacitance	V_{CB} = 10V, f = 1 MHz				
	NPN types			35		pF
	PNP types			65		pF

5 HFE groupings

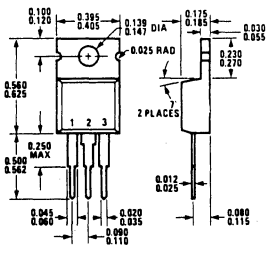
GROUPING	PARAMETER	CONDITIONS	MIN	TYP	MAX	RATIO
G	DC Current Gain	I_C = 300 mA, V_{CE} = 10V	68	85	110	1:1.6
H	DC Current Gain	I_C = 300 mA, V_{CE} = 10V	100	127	160	1:1.6
I	DC Current Gain	I_C = 300 mA, V_{CE} = 10V	140	180	240	1:1.6
X	DC Current Gain	I_C = 300 mA, V_{CE} = 10V	30	58	110	1:3.5
Y	DC Current Gain	I_C = 300 mA, V_{CE} = 10V	100	190	350	1:3.5

6 physical dimensions

TO-126

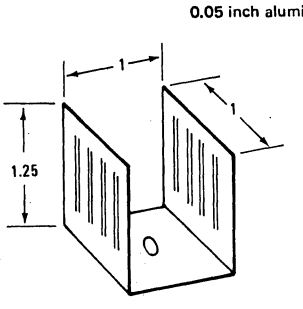


TO-220



7 heatsink information

The TO-126 and TO-220 packages used with heatsink shown below permits about 8.7 Watts Power Dissipation and θ_{CA} = 9.4°C/W.

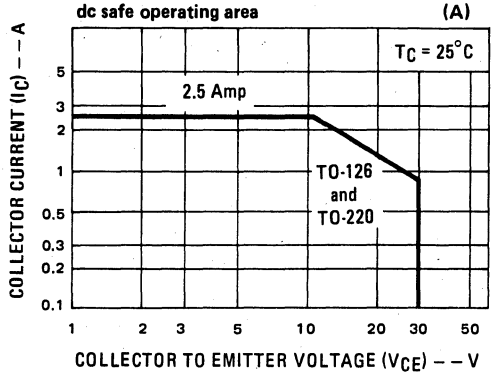


Mount transistor under heatsink and apply thermally conductive compound between contact surfaces.

8 typical performance characteristics

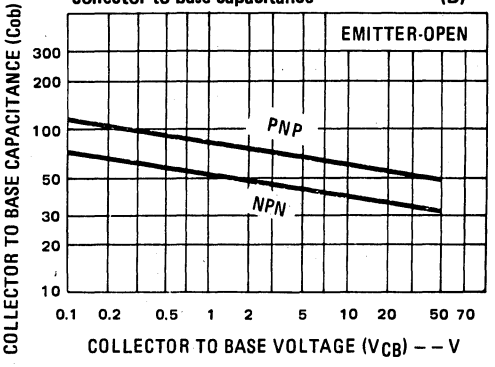
SOA

dc safe operating area (A)



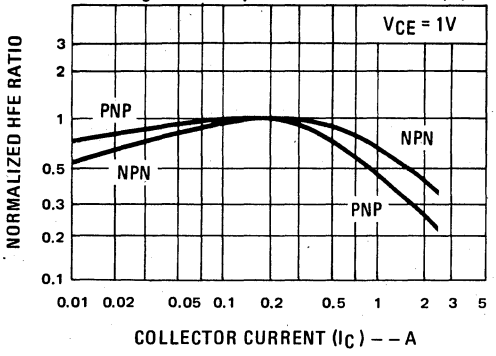
Cob

collector to base capacitance (B)



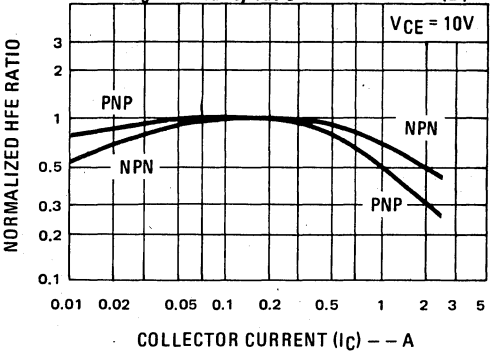
HFE1/HFE2

current gain linearity ratio (C)



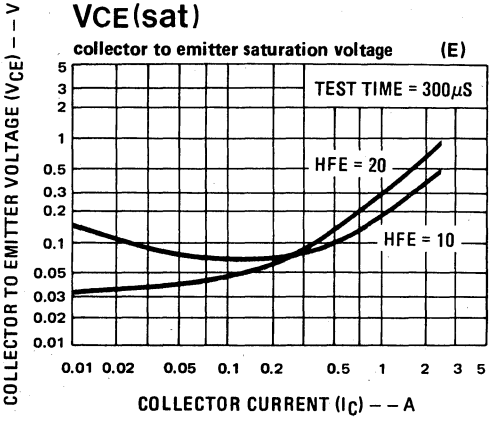
HFE1/HFE2

current gain linearity ratio (D)



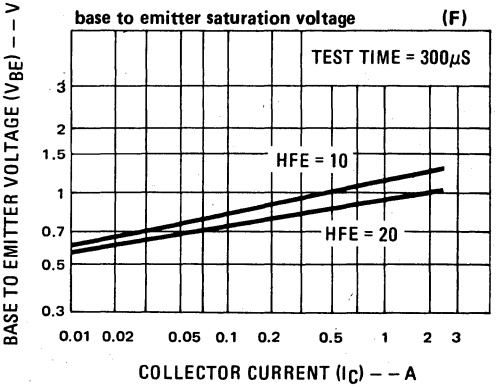
VCE(sat)

collector to emitter saturation voltage (E)

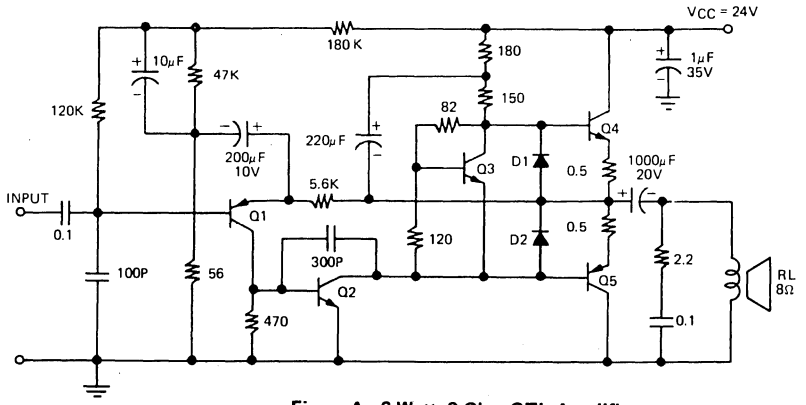


VBE(sat)

base to emitter saturation voltage (F)

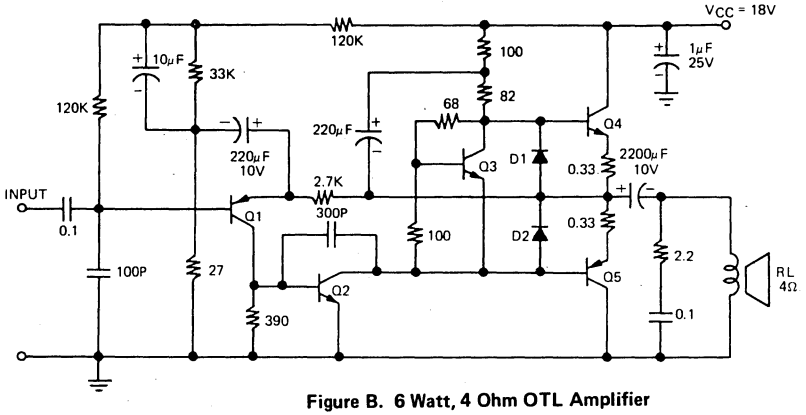


9 typical applications



Q1 NB021EY
Q2 NB211YY
Q3 NR001E
Q4 NA41U
Q5 NA42U

Figure A. 6 Watt, 8 Ohm OTL Amplifier



Q1 NB021EY
Q2 NB211YY
Q3 NR001E
Q4 NA41U
Q5 NA42U

Figure B. 6 Watt, 4 Ohm OTL Amplifier

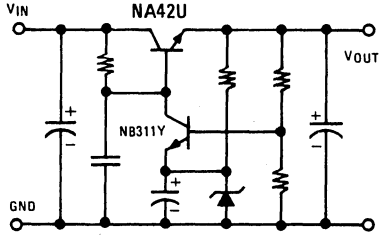


Figure C. Linear Regulator Circuit

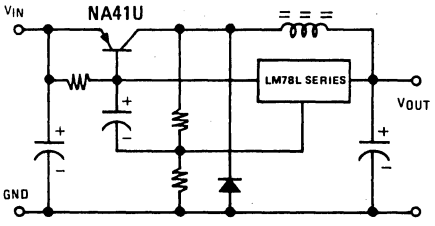


Figure D. Switching Regulator Circuit