

**TENTATIVE** TOSHIBA Transistor Silicon PNP-NPN Epitaxial Type (PCT Process)

# HN3B02FU

Audio Frequency General Purpose Amplifier Applications

Unit: mm

### Q1

- High voltage :  $V_{CEO} = -50V$
- High current :  $I_C = -150mA$  (max)
- High  $h_{FE}$  :  $h_{FE} = 120\sim 400$
- Excellent  $h_{FE}$  linearity :  $h_{FE}(I_C = -0.1mA) / (I_C = -2mA) = 0.95$  (typ.)

### Q2

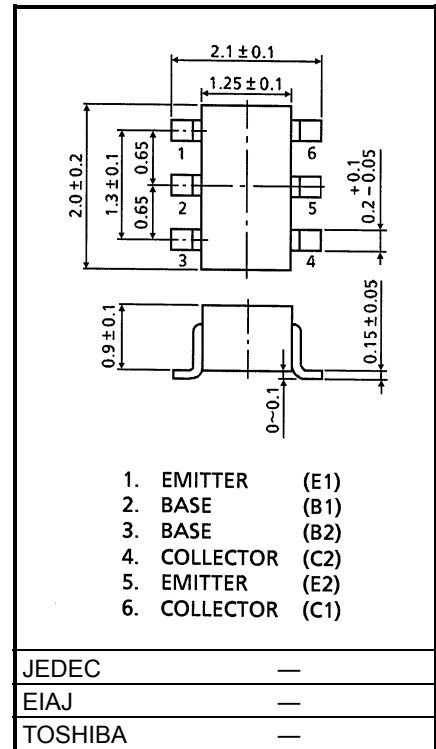
- High voltage :  $V_{CEO} = 60V$
- High current :  $I_C = 150mA$  (max)
- High  $h_{FE}$  :  $h_{FE} = 120\sim 400$
- Excellent  $h_{FE}$  linearity :  $h_{FE}(I_C = 0.1mA) / (I_C = 2mA) = 0.95$  (typ.)

### Q1 Maximum Ratings ( $T_a = 25^\circ C$ )

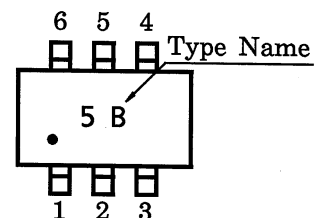
Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-50	V
Collector-emitter voltage	$V_{CEO}$	-50	V
Emitter-base voltage	$V_{EBO}$	-5	V
Collector current	$I_C$	-150	mA
Base current	$I_B$	-50	mA

### Q2 Maximum Ratings ( $T_a = 25^\circ C$ )

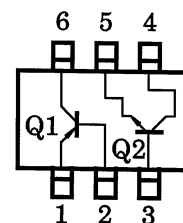
Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	60	V
Collector-emitter voltage	$V_{CEO}$	50	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	150	mA
Base current	$I_B$	30	mA



### Marking



### Equivalent Circuit (Top View)



## Q1 Q2 Common Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	$P_C$ (*)	200	mW
Junction temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55~125	°C

\*: Total rating

## Q1 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	—	$V_{CB} = -50V, I_E = 0$	—	—	-0.1	$\mu A$
Emitter cut-off current	$I_{EBO}$	—	$V_{EB} = -5V, I_C = 0$	—	—	-0.1	$\mu A$
DC current gain	$h_{FE}$	—	$V_{CE} = -6V, I_C = -2mA$	120	—	400	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	$I_C = -100mA, I_B = -10mA$	—	-0.1	-0.3	V
Transition frequency	$f_T$	—	$V_{CE} = -10V, I_C = -1mA$	—	120	—	MHz
Collector output capacitance	$C_{ob}$	—	$V_{CB} = -10V, I_E = 0, f = 1MHz$	—	4	—	pF

## Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	—	$V_{CB} = 60V, I_E = 0$	—	—	0.1	$\mu A$
Emitter cut-off current	$I_{EBO}$	—	$V_{EB} = 5V, I_C = 0$	—	—	0.1	$\mu A$
DC current gain	$h_{FE}$	—	$V_{CE} = 6V, I_C = 2mA$	120	—	400	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	$I_C = 100mA, I_B = 10mA$	—	0.1	0.25	V
Transition frequency	$f_T$	—	$V_{CE} = 10V, I_C = 1mA$	—	150	—	MHz
Collector output capacitance	$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	2	—	pF

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