

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

# 2SA1048

## Audio Frequency Amplifier Applications

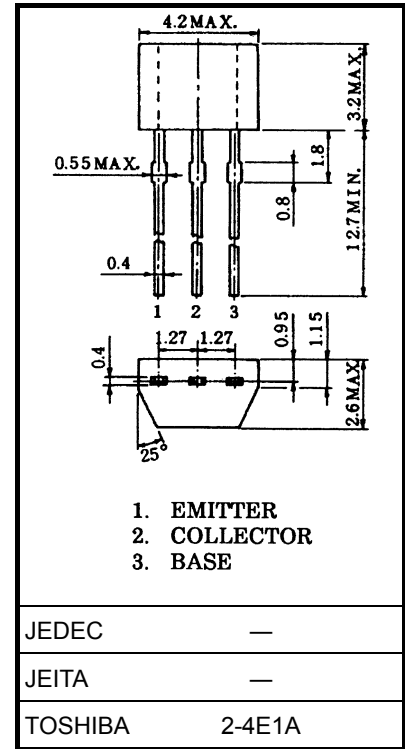
- Small package
- High voltage:  $V_{CEO} = -50$  V (min)
- High  $h_{FE}$ :  $h_{FE} = 70\sim 400$
- Excellent  $h_{FE}$  linearity:  $h_{FE}(I_C = -0.1 \text{ mA})/h_{FE}(I_C = -2 \text{ mA}) = 0.95$  (typ.)
- Low noise:  $NF = 1\text{dB}$  (typ.),  $10\text{dB}$  (max)
- Complementary to 2SC2458

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	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
Collector power dissipation	$P_C$	200	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~125	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm

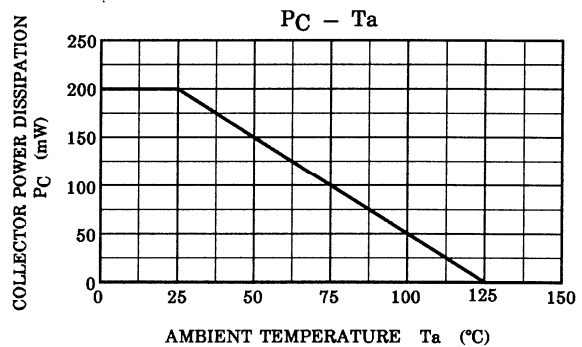
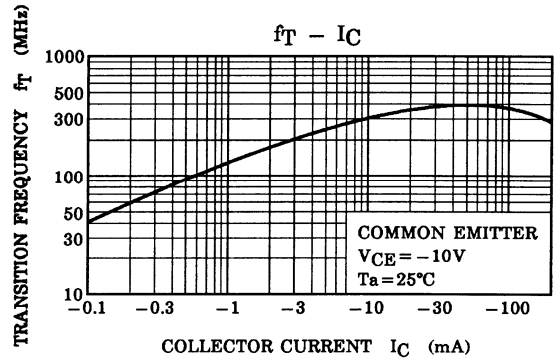
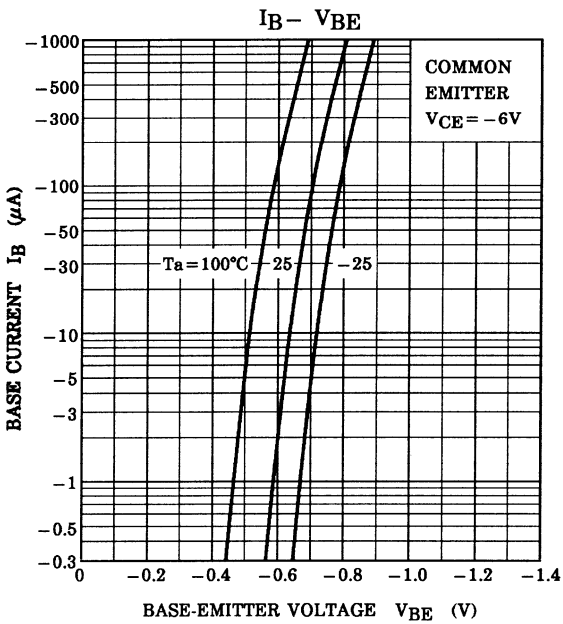
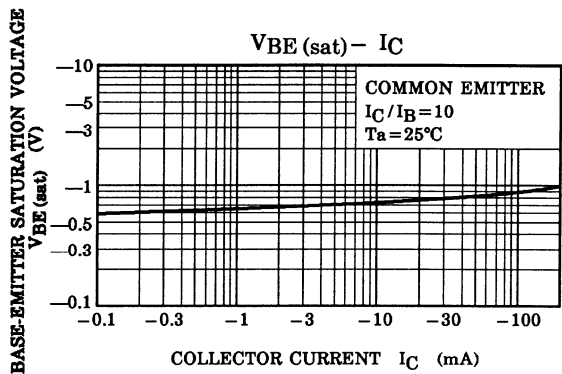
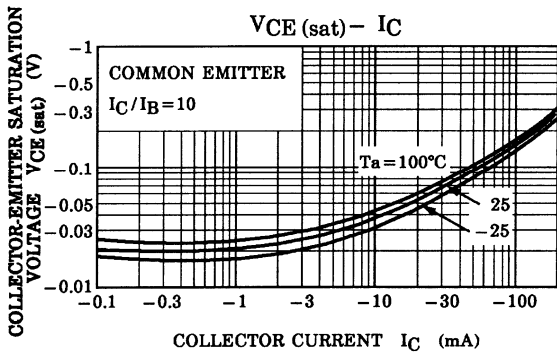
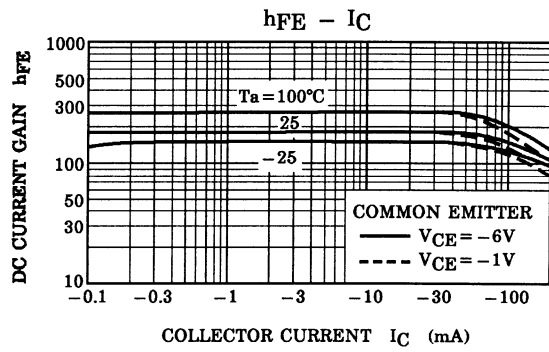
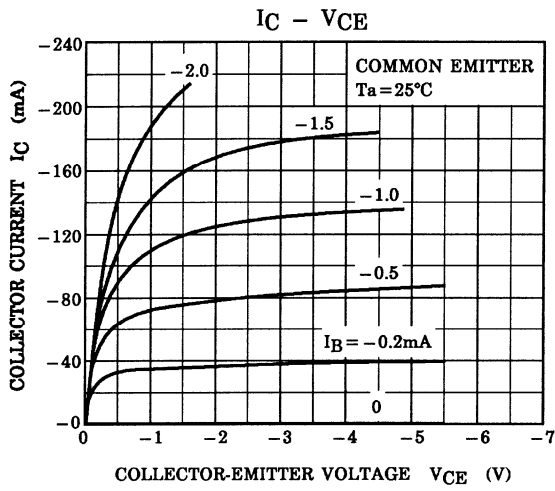


Weight: 0.13 g (typ.)

## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = -50 \text{ V}, I_E = 0$	—	—	-0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -5 \text{ V}, I_C = 0$	—	—	-0.1	$\mu\text{A}$
DC current gain	$h_{FE}$ (Note)	$V_{CE} = -6 \text{ V}, I_C = -2 \text{ mA}$	70	—	400	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -100 \text{ mA}, I_B = -10 \text{ mA}$	—	-0.1	-0.3	V
Transition frequency	$f_T$	$V_{CE} = -10 \text{ V}, I_C = -1 \text{ mA}$	80	—	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	4	7	pF
Noise figure	NF	$V_{CE} = -6 \text{ V}, I_C = -0.1 \text{ mA}, f = 1 \text{ kHz}, R_G = 10 \text{ k}\Omega$	—	1.0	10	dB

Note:  $h_{FE}$  classification O: 70~140, Y: 120~240, GR: 200~400



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