

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

# 2SA1015(L)

## Audio Frequency Amplifier Applications

## Low Noise Amplifier Applications

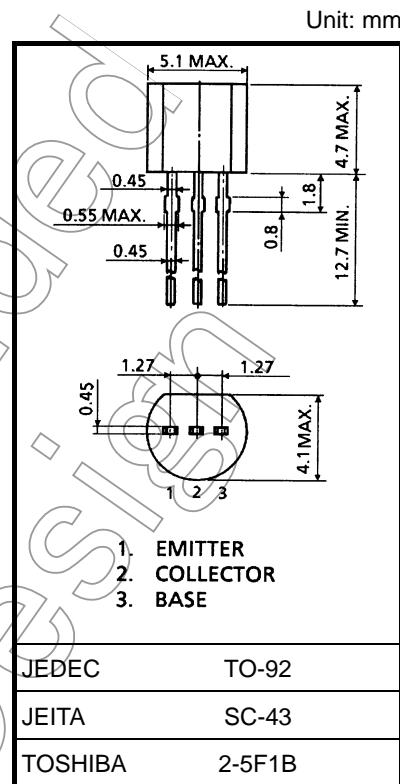
- High voltage and high current:  $V_{CEO} = -50$  V (min),  $I_C = -150$  mA (max)
- Excellent  $h_{FE}$  linearity:  $h_{FE}$  (2) = 80 (typ.) at  $V_{CE} = -6$  V,  $I_C = -150$  mA  
:  $h_{FE}$  ( $I_C = -0.1$  mA)/ $h_{FE}$  ( $I_C = -2$  mA) = 0.95 (typ)
- Low noise:  $NF = 0.2$  dB (typ.) ( $f = 1$  kHz)
- Complementary to 2SC1815 (L)

## 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	$P_C$	400	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.).

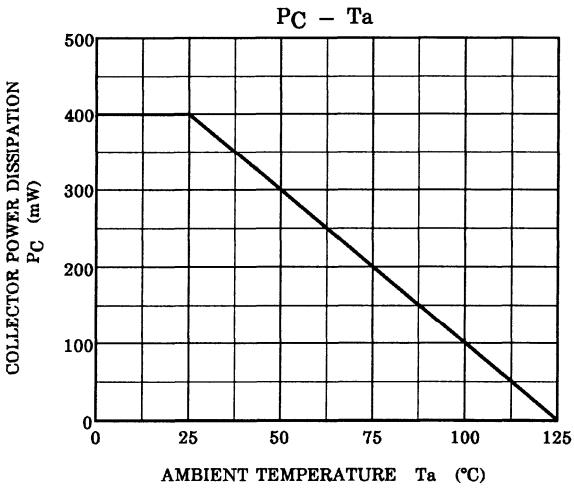
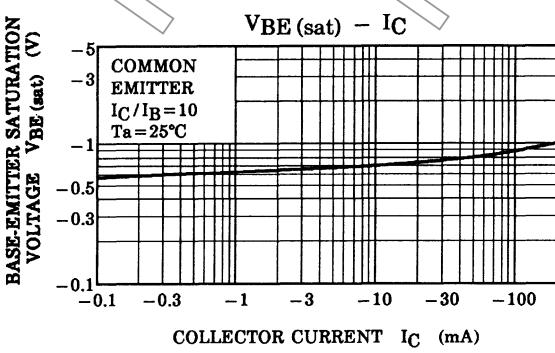
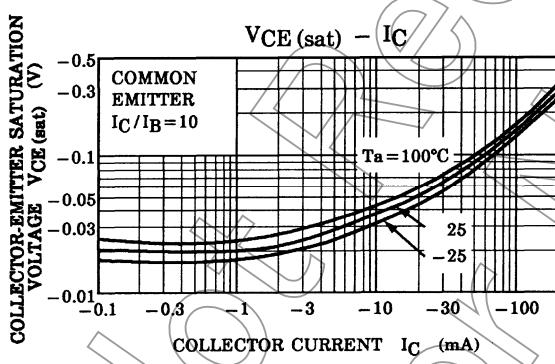
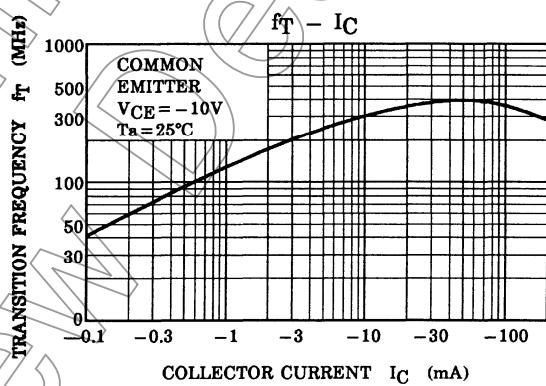
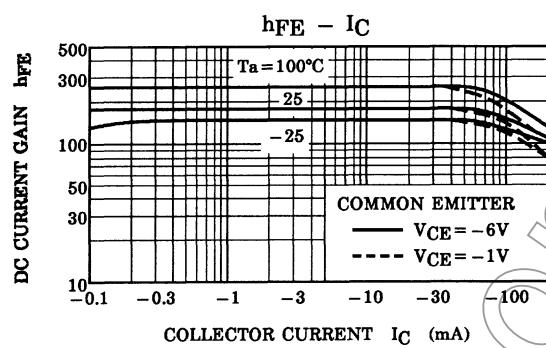
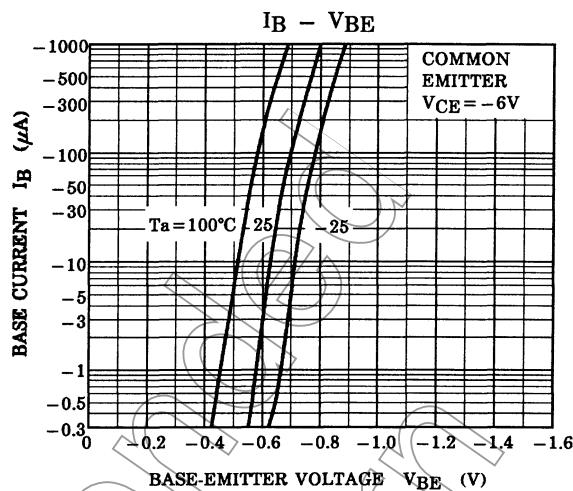
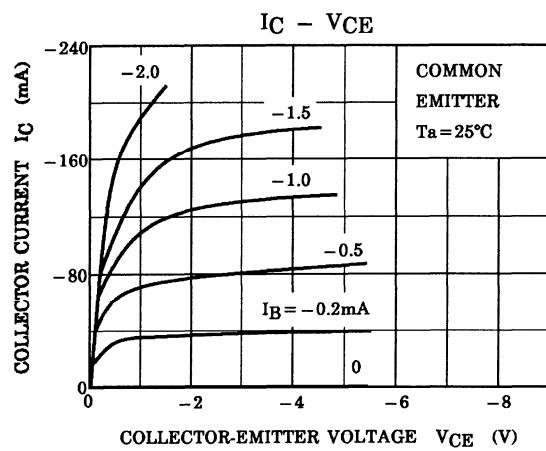


Weight: 0.21 g (typ.)

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = -50$ V, $I_E = 0$	—	—	-0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -5$ V, $I_C = 0$	—	—	-0.1	$\mu\text{A}$
DC current gain	$h_{FE}$ (1) (Note)	$V_{CE} = -6$ V, $I_C = -2$ mA	70	—	400	
	$h_{FE}$ (2)	$V_{CE} = -6$ V, $I_C = -150$ mA	25	80	—	
Collector-emitter saturation voltage	$V_{CE}$ (sat)	$I_C = -100$ mA, $I_B = -10$ mA	—	-0.1	-0.3	V
Base-emitter saturation voltage	$V_{BE}$ (sat)	$I_C = -100$ mA, $I_B = -10$ mA	—	—	-1.1	V
Transition frequency	$f_T$	$V_{CE} = -10$ V, $I_C = -1$ mA	80	—	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10$ V, $I_E = 0$ $f = 1$ MHz	—	4	7	pF
Base intrinsic resistance	$r_{bb'}$	$V_{CB} = -10$ V, $I_E = 1$ mA $f = 30$ MHz	—	30	—	$\Omega$
Noise figure	NF (1)	$V_{CE} = -6$ V, $I_C = -0.1$ mA $f = 100$ Hz, $R_G = 10$ k $\Omega$	—	0.5	6	dB
	NF (2)	$V_{CE} = -6$ V, $I_C = -0.1$ mA $f = 1$ kHz, $R_G = 10$ k $\Omega$	—	0.2	3	

Note:  $h_{FE}$  (1) classification O: 70~140, Y: 120~240, GR: 200~400



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