

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

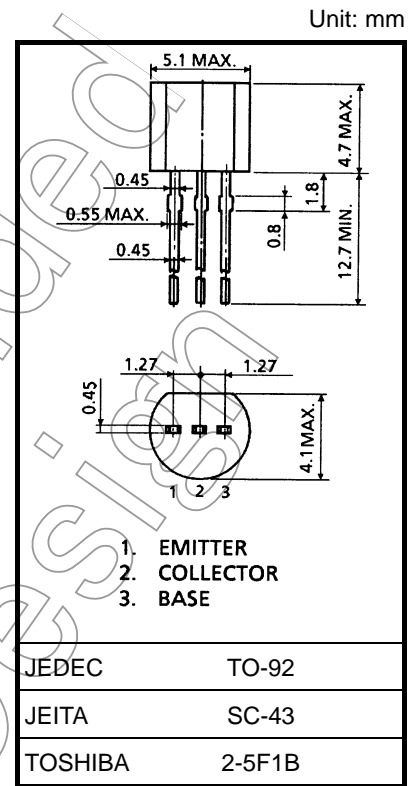
# 2SA1015

Audio Frequency General Purpose Amplifier Applications  
 Driver Stage 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 = 1dB (typ.) ( $f = 1$  kHz)
- Complementary to 2SC1815.

### 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	$^\circ\text{C}$



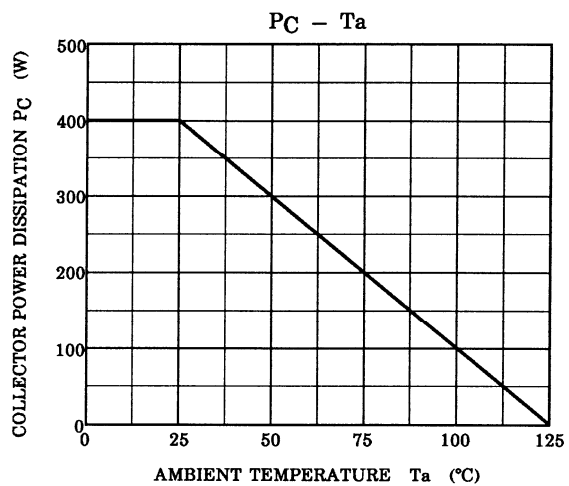
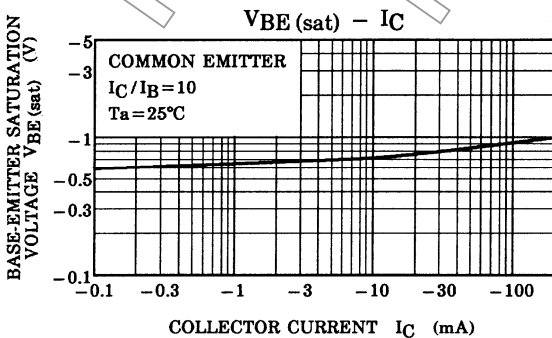
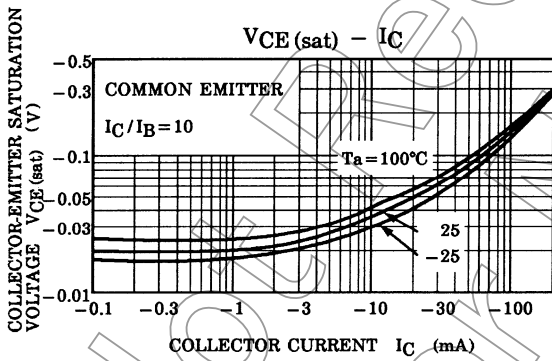
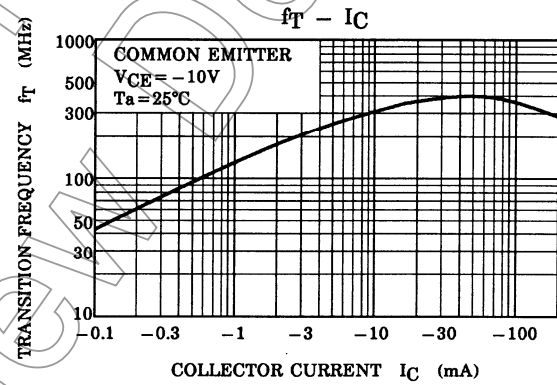
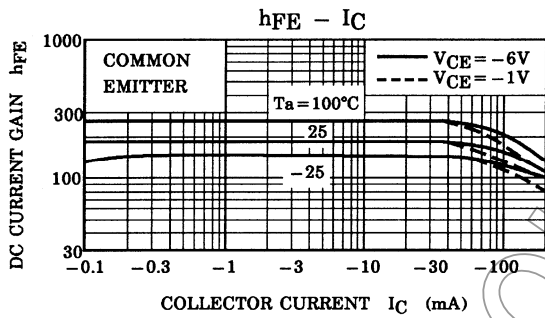
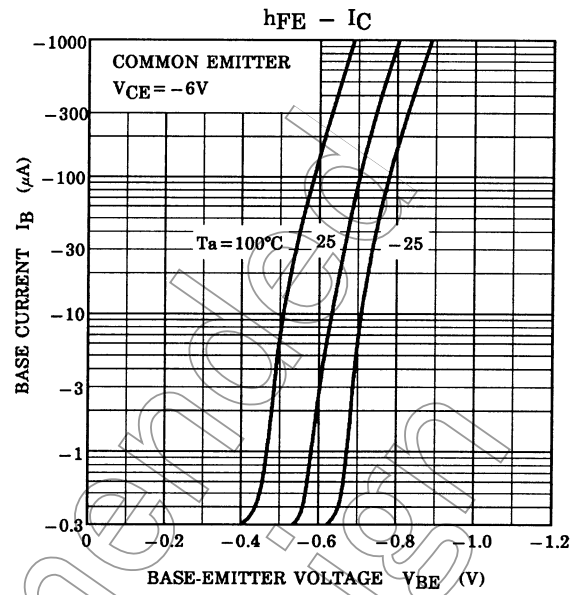
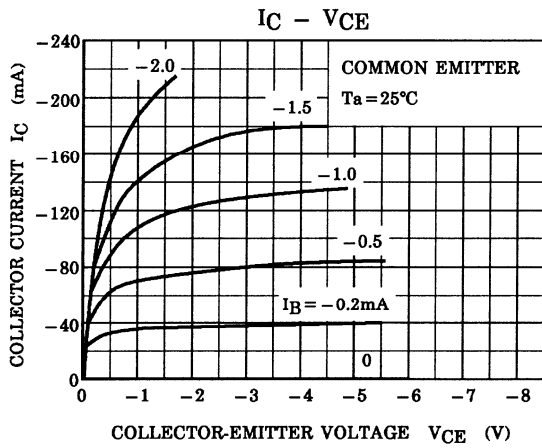
Weight: 0.21 g (typ.)

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).

### 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	$r_{bb'}$	$V_{CE} = -10$ V, $I_E = 1$ mA, $f = 30$ MHz	—	30	—	$\Omega$
Noise figure	NF	$V_{CE} = -6$ V, $I_C = -0.1$ mA, $R_G = 10$ k $\Omega$ , $f = 1$ kHz	—	1.0	10	dB

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



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