

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC4116

## Audio Frequency General Purpose Amplifier Applications

- AEC-Q101 Qualified (Note1)
- High voltage and high current:  $V_{CEO} = 50\text{ V}$ ,  $I_C = 150\text{ mA}$  (max)
- Excellent  $h_{FE}$  linearity:  $h_{FE}(I_C = 0.1\text{ mA})/h_{FE}(I_C = 2\text{ mA}) = 0.95$  (typ.)
- High  $h_{FE}$ :  $h_{FE} = 70$  to  $700$
- Low noise:  $NF = 1\text{ dB}$  (typ.),  $10\text{ dB}$  (max)
- Complementary to 2SA1586
- Small package

Note1: For detail information, please contact to our sales.

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

Characteristics	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
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 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.

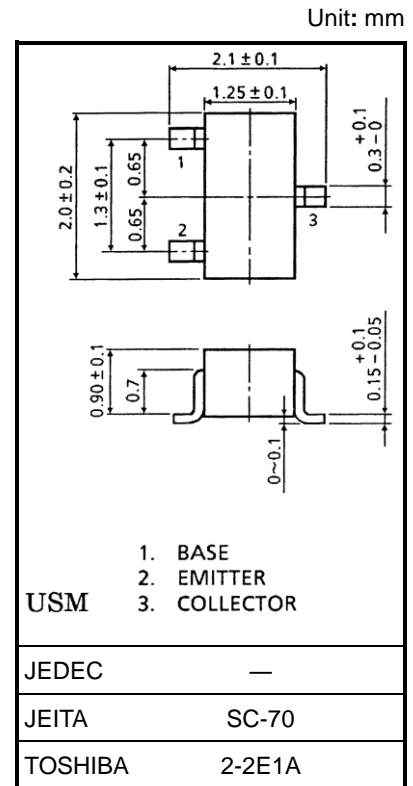
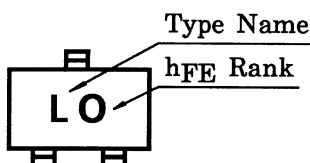
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 60\text{ V}$ , $I_E = 0$	—	—	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 (Note)	$h_{FE}$	$V_{CE} = 6\text{ V}$ , $I_C = 2\text{ mA}$	70	—	700	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$	—	0.1	0.25	V
Transition frequency	$f_T$	$V_{CE} = 10\text{ V}$ , $I_C = 1\text{ mA}$	80	—	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$	—	2.0	3.5	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

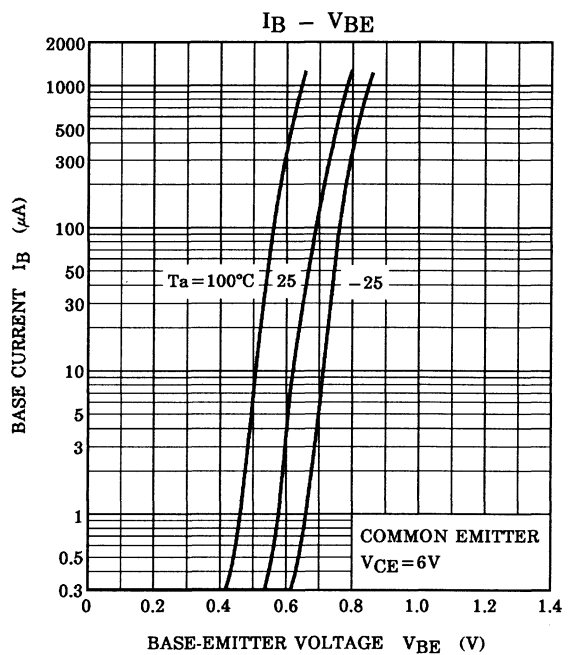
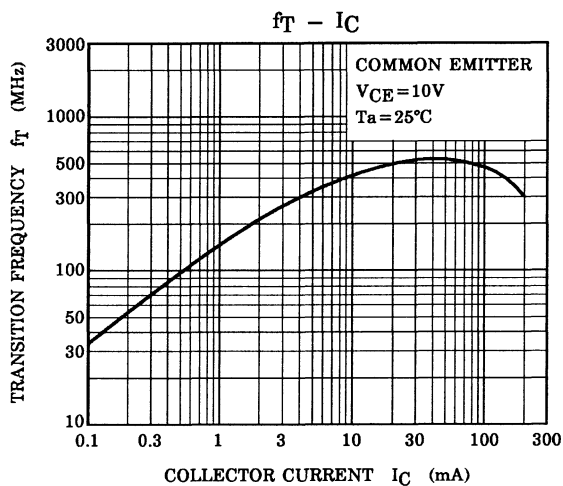
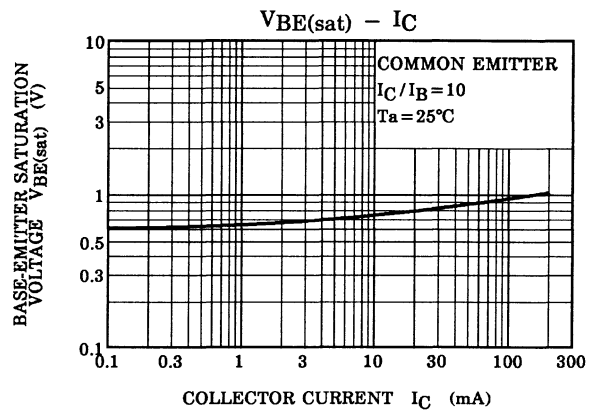
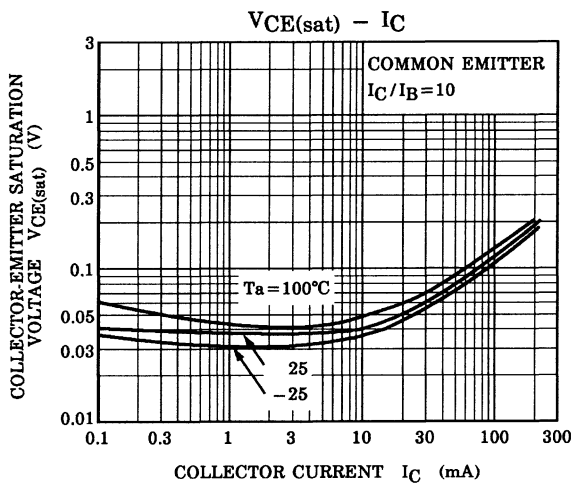
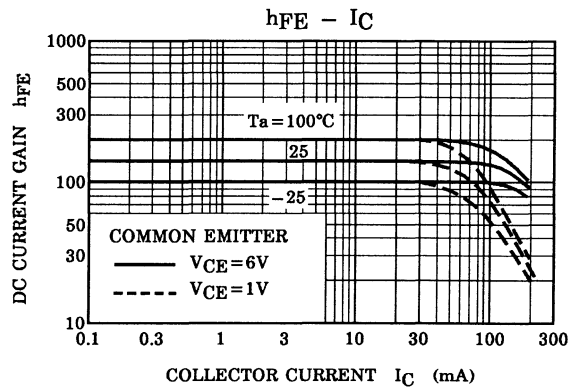
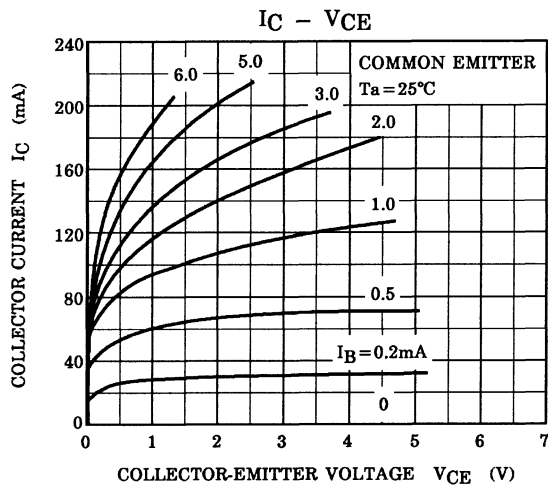
Note:  $h_{FE}$  classification O (O): 70 to 140, Y (Y): 120 to 240, GR (G): 200 to 400, BL (L): 350 to 700 ( ) marking symbol

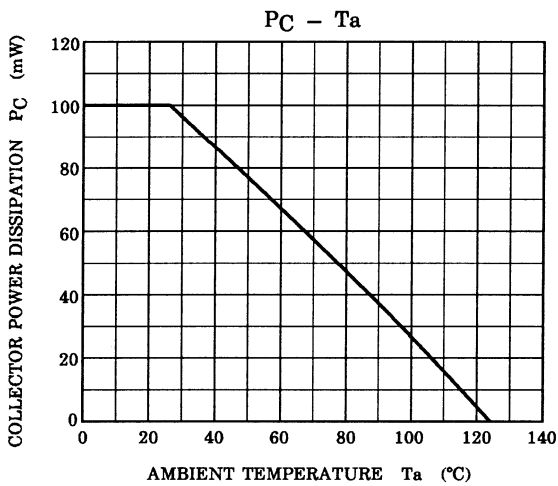
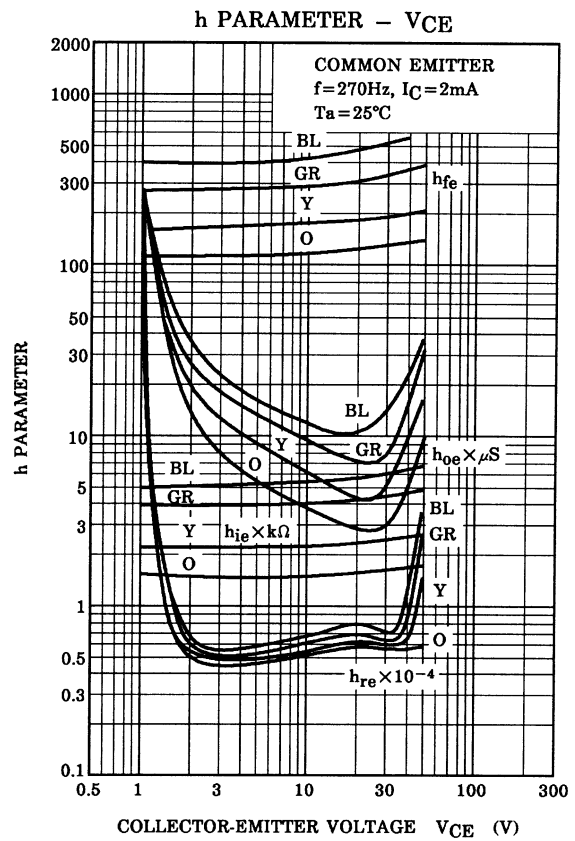
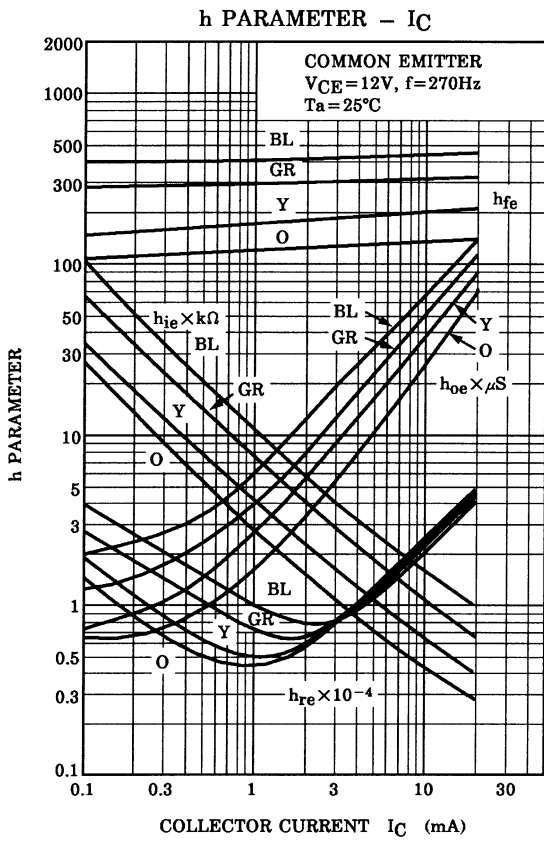
### Marking



Weight: 0.006 g (typ.)

Start of commercial production  
1987-01





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