

# 2SC2240

## Low Noise Audio Amplifier Applications

The 2SC2240 is a transistor for low frequency and low noise applications. This device is designed to lower noise figure in the region of low signal source impedance, and to lower the pulse noise. This is recommended for the first stages of Equalizer amplifiers.

- Low noise: NF = 4dB (typ.)  $R_G = 100 \Omega$ ,  $V_{CE} = 6 V$ ,  $I_C = 100 \mu A$ ,  
 $f = 1 \text{ kHz}$   
 : NF = 0.5dB (typ.)  $R_G = 1 \text{ k}\Omega$ ,  $V_{CE} = 6 V$ ,  $I_C = 100 \mu A$ ,  
 $f = 1 \text{ kHz}$
- Low pulse noise: Low 1/f noise
- High DC current gain:  $h_{FE} = 200\sim 700$
- High breakdown voltage:  $V_{CEO} = 120 V$

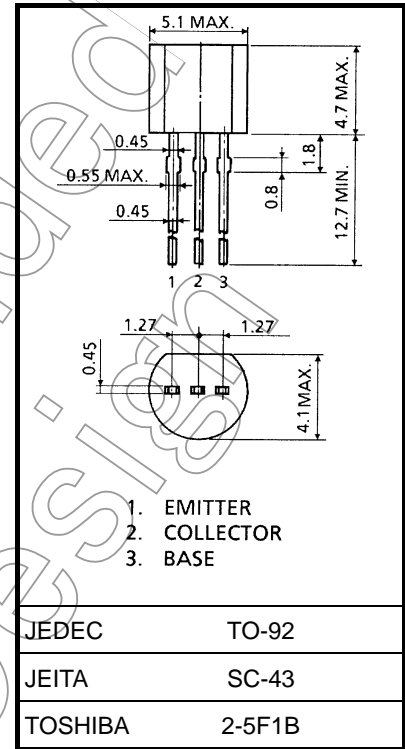
## Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	120	V
Collector-emitter voltage	$V_{CEO}$	120	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	100	mA
Base current	$I_B$	20	mA
Collector power dissipation	$P_C$	300	mW
Junction temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55~125	°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



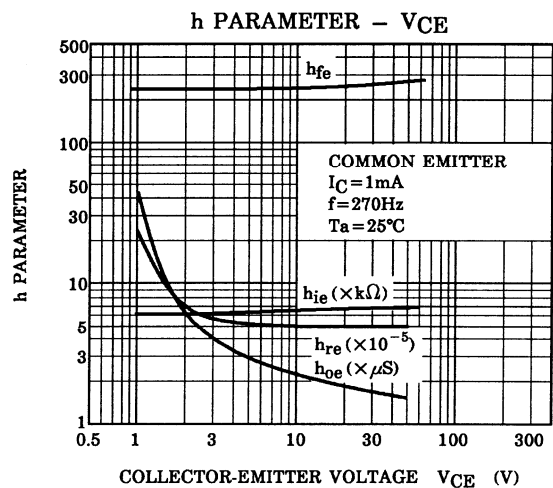
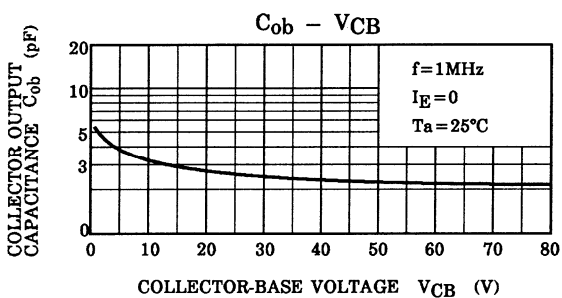
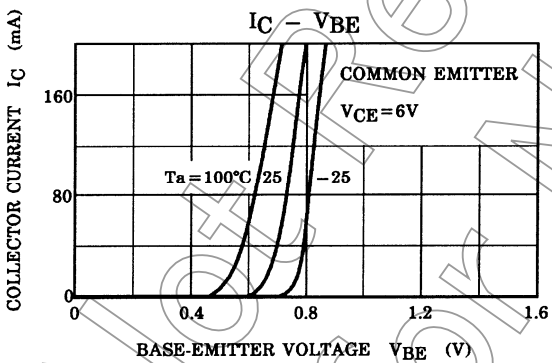
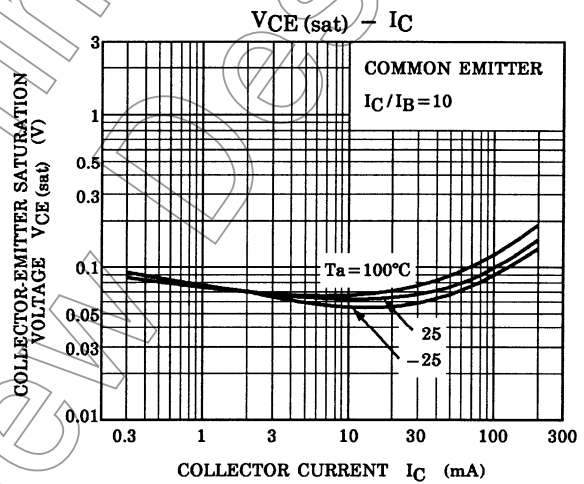
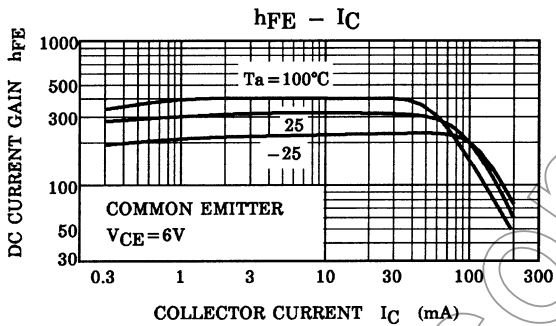
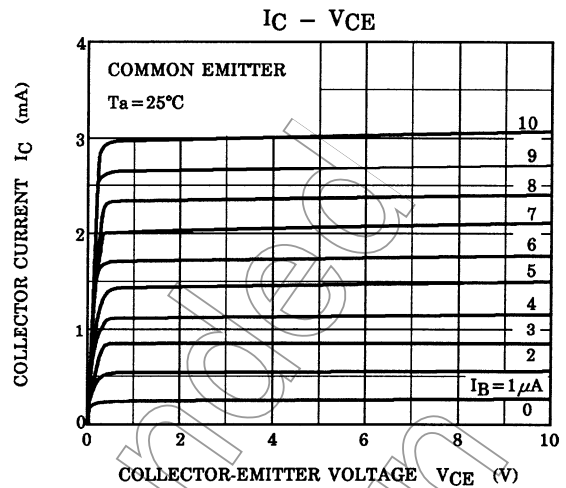
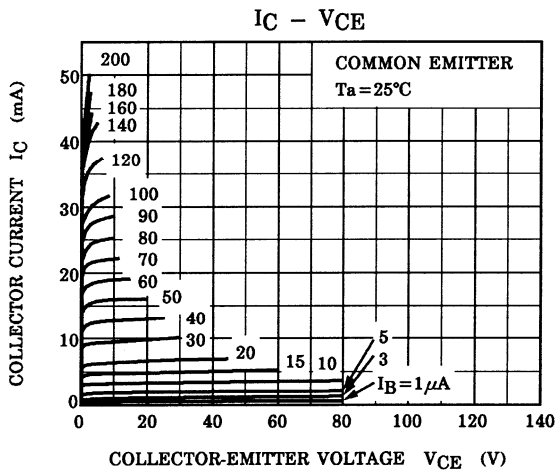
Weight: 0.21 g (typ.)

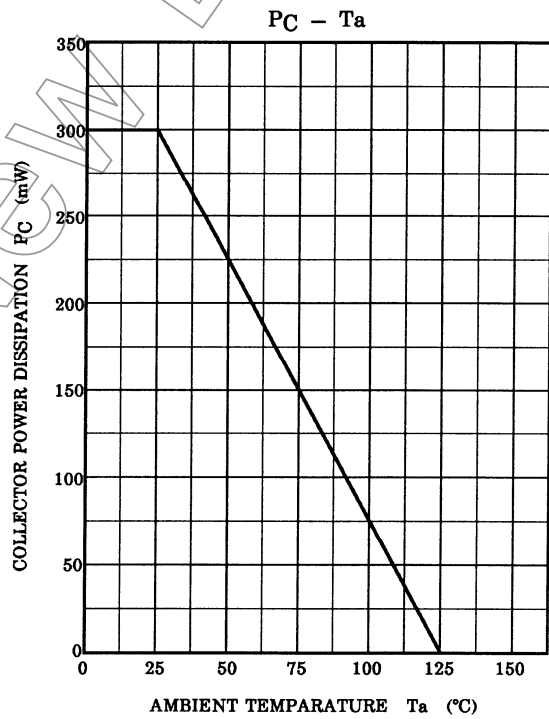
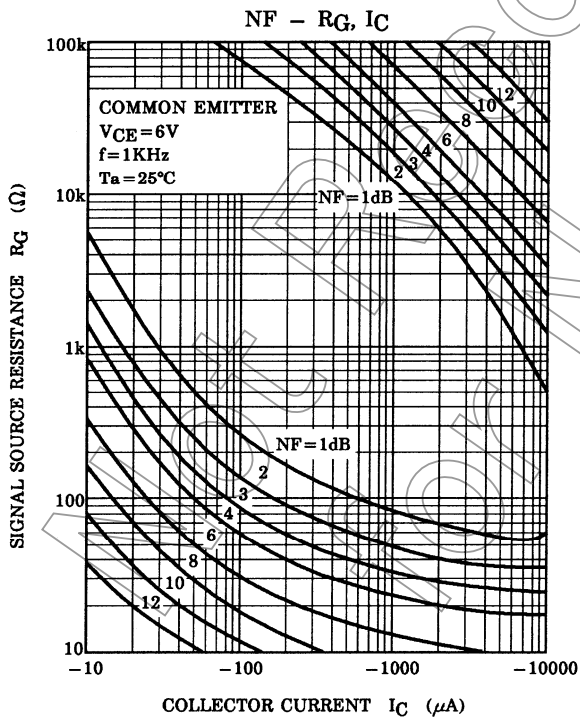
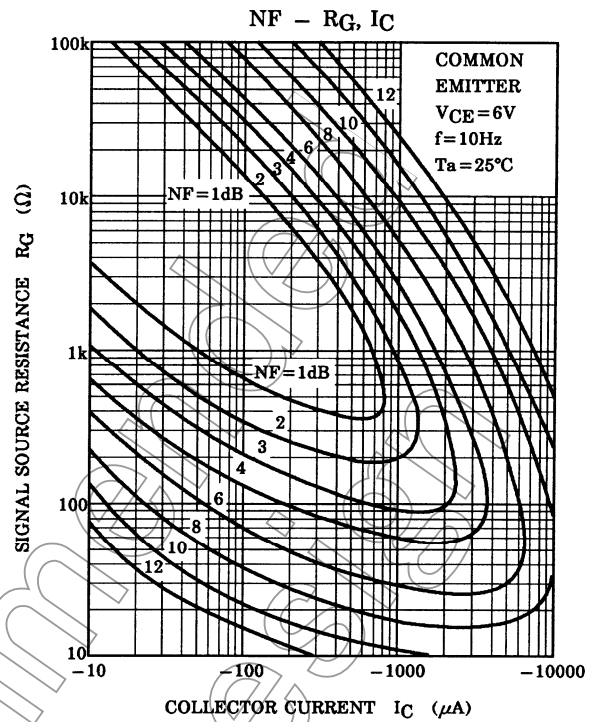
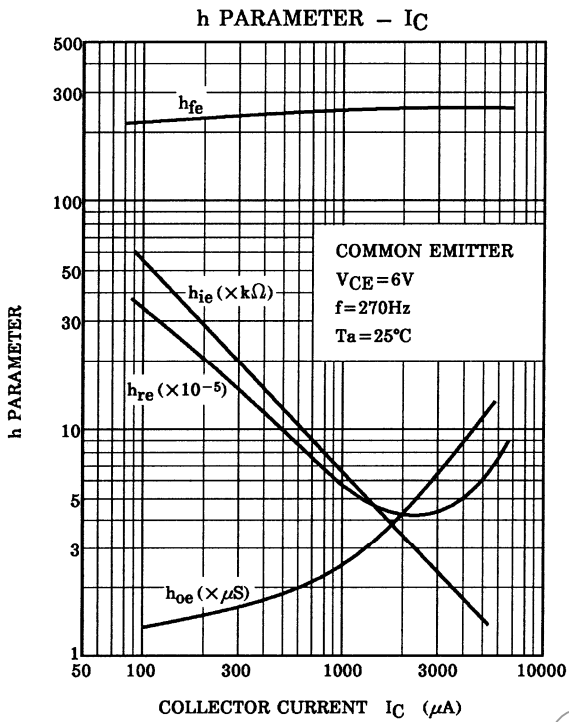
**Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 120\text{ V}, I_E = 0$	—	—	0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	0.1	$\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR) CEO}$	$I_C = 1\text{ mA}, I_B = 0$	120	—	—	V
DC current gain	$h_{FE}$ (Note)	$V_{CE} = 6\text{ V}, I_C = 2\text{ mA}$	200	—	700	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	—	0.3	V
Base-emitter voltage	$V_{BE}$	$V_{CE} = 6\text{ V}, I_C = 2\text{ mA}$	—	0.65	—	V
Transition frequency	$f_T$	$V_{CE} = 6\text{ V}, I_C = 1\text{ mA}$	—	100	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3.0	—	pF
Noise figure	NF	$V_{CE} = 6\text{ V}, I_C = 0.1\text{ mA}, f = 10\text{ Hz}, R_G = 10\text{ k}\Omega$	—	—	6	dB
		$V_{CE} = 6\text{ V}, I_C = 0.1\text{ mA}, f = 1\text{ kHz}, R_G = 10\text{ k}\Omega$	—	—	2	
		$V_{CE} = 6\text{ V}, I_C = 0.1\text{ mA}, f = 1\text{ kHz}, R_G = 100\ \Omega$	—	4	—	

Note:  $h_{FE}$  classification GR: 200~400, BL: 350~700

Not Recommended for New Design





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