

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC1815

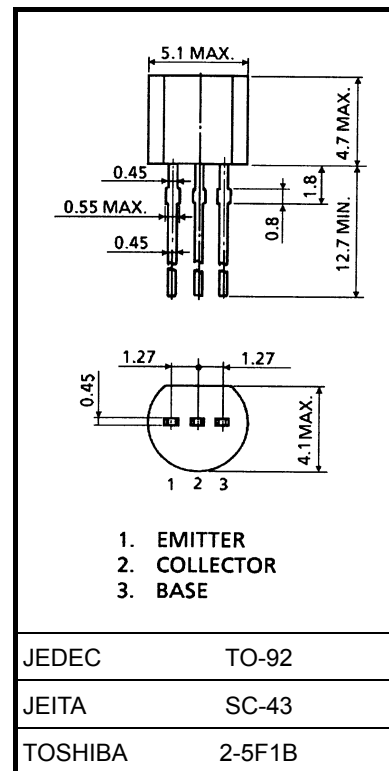
Audio Frequency General Purpose Amplifier Applications  
 Driver Stage Amplifier Applications

Unit: mm

- High voltage and high current:  $V_{CEO} = 50 \text{ V (min)}$ ,  
 $I_C = 150 \text{ mA (max)}$
- Excellent  $h_{FE}$  linearity:  $h_{FE} (2) = 100 \text{ (typ.)}$   
 at  $V_{CE} = 6 \text{ V}$ ,  $I_C = 150 \text{ mA}$   
 :  $h_{FE} (I_C = 0.1 \text{ mA})/h_{FE} (I_C = 2 \text{ mA})$   
 = 0.95 (typ.)
- Low noise:  $NF = 1 \text{ dB (typ.)}$  at  $f = 1 \text{ kHz}$
- Complementary to 2SA1015 (O, Y, GR class)

## 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	$I_B$	50	mA
Collector power dissipation	$P_C$	400	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~125	$^\circ\text{C}$



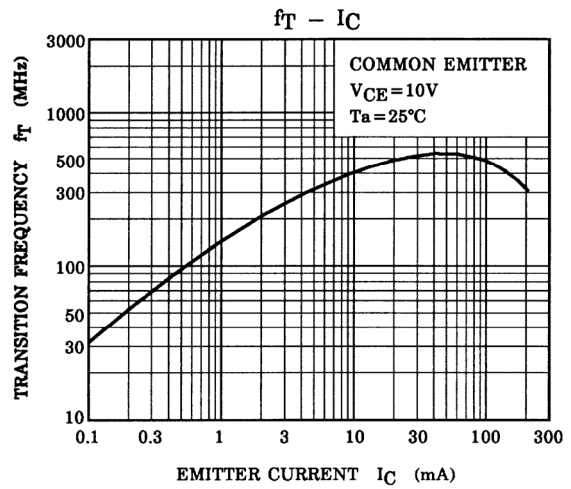
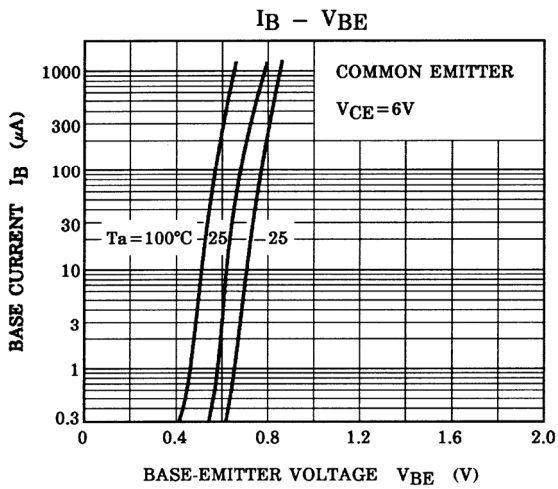
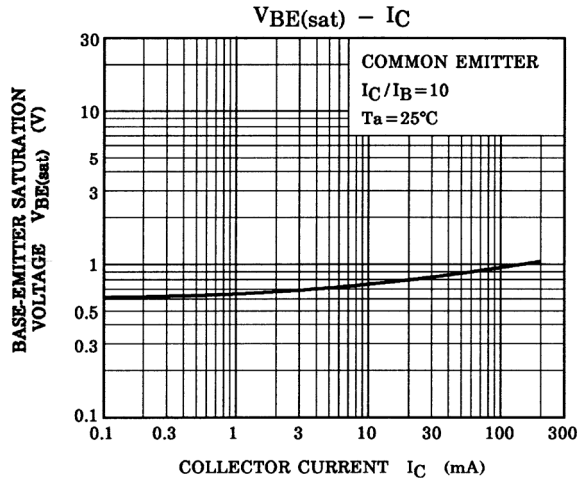
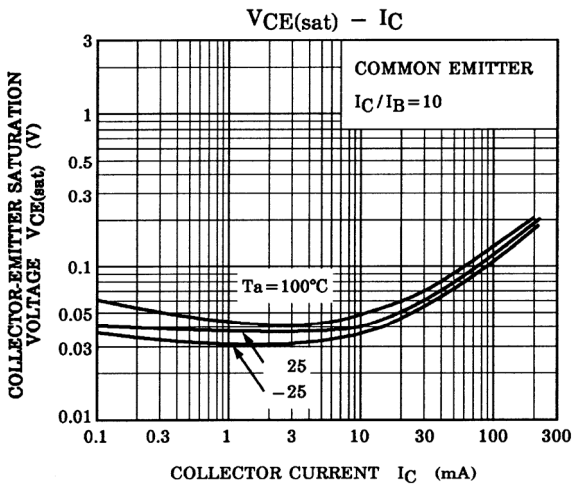
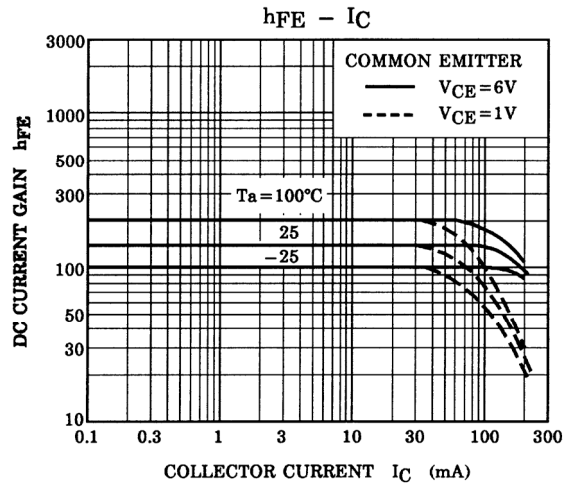
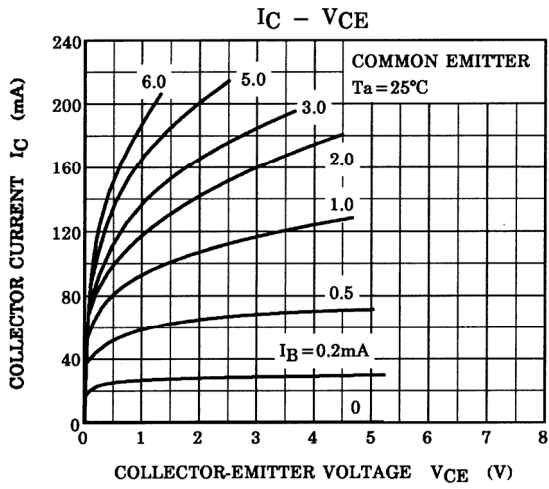
Weight: 0.21 g (typ.)

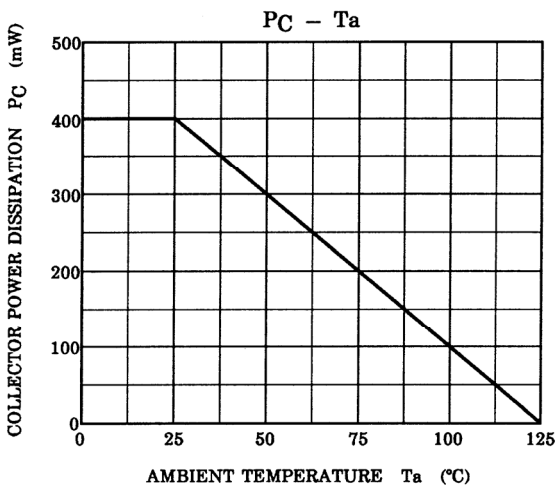
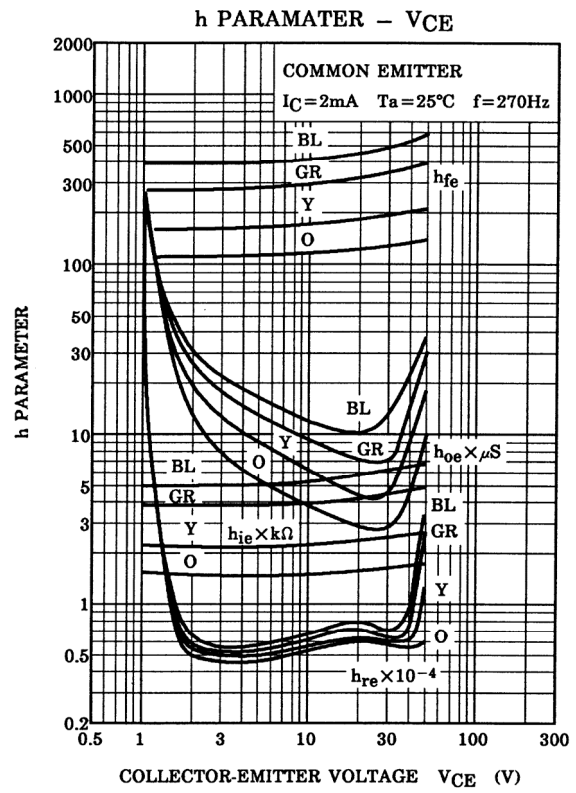
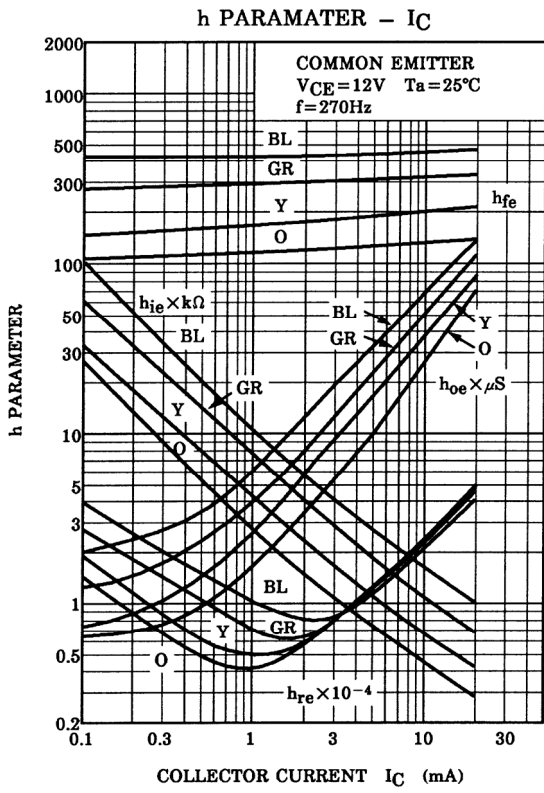
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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	$I_{CBO}$	$V_{CB} = 60 \text{ V}$ , $I_E = 0$	—	—	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	$h_{FE} (1)$ (Note)	$V_{CE} = 6 \text{ V}$ , $I_C = 2 \text{ mA}$	70	—	700	
	$h_{FE} (2)$	$V_{CE} = 6 \text{ V}$ , $I_C = 150 \text{ mA}$	25	100	—	
Collector-emitter saturation voltage	$V_{CE (sat)}$	$I_C = 100 \text{ mA}$ , $I_B = 10 \text{ mA}$	—	0.1	0.25	V
Base-emitter saturation voltage	$V_{BE (sat)}$	$I_C = 100 \text{ mA}$ , $I_B = 10 \text{ mA}$	—	—	1.0	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
Base intrinsic resistance	$r_{bb'}$	$V_{CE} = 10 \text{ V}$ , $I_E = -1 \text{ mA}$ $f = 30 \text{ MHz}$	—	50	—	$\Omega$
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, BL: 350~700





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20070701-EN GENERAL

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