

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC1815(L)

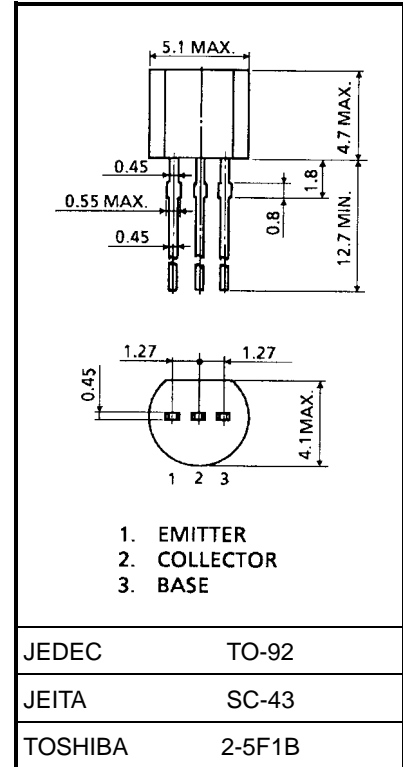
Audio Frequency Voltage Amplifier Applications  
 Low Noise Amplifier Applications

Unit: mm

- High breakdown voltage, high current capability  
 :  $V_{CEO} = 50\text{ V (min)}$ ,  $I_C = 150\text{ mA (max)}$
- Excellent linearity of  $h_{FE}$   
 :  $h_{FE(2)} = 100\text{ (typ.)}$  at  $V_{CE} = 6\text{ V}$ ,  $I_C = 150\text{ mA}$   
 :  $h_{FE(I_C = 0.1\text{ mA})}/h_{FE(I_C = 2\text{ mA})} = 0.95\text{ (typ.)}$
- Low noise:  $NF = 0.2\text{ dB (typ.)}$  ( $f = 1\text{ kHz}$ ).
- Complementary to 2SA1015 (L). (O, Y, GR class).

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

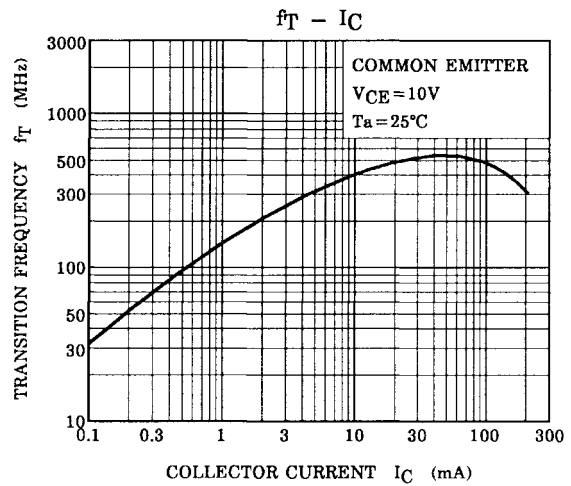
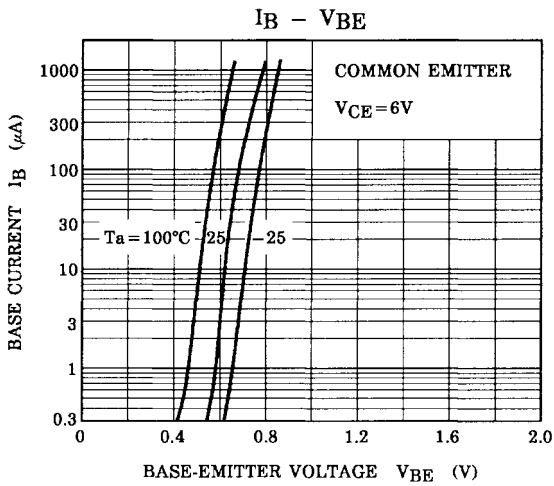
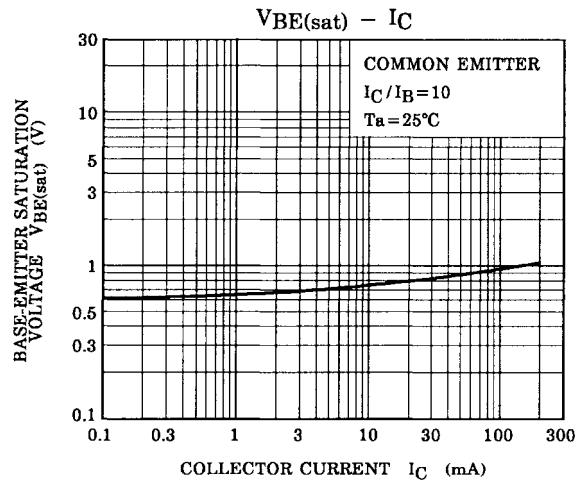
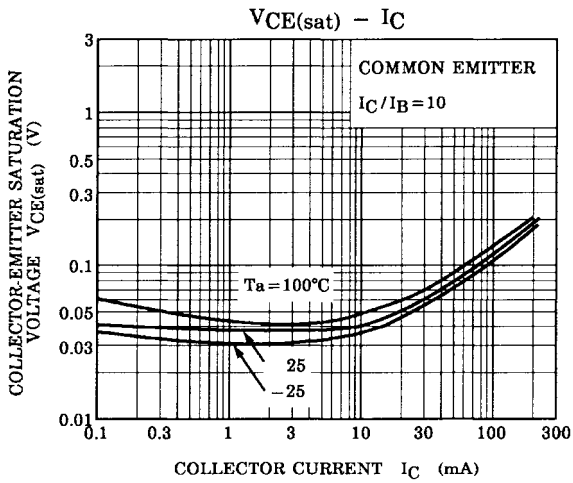
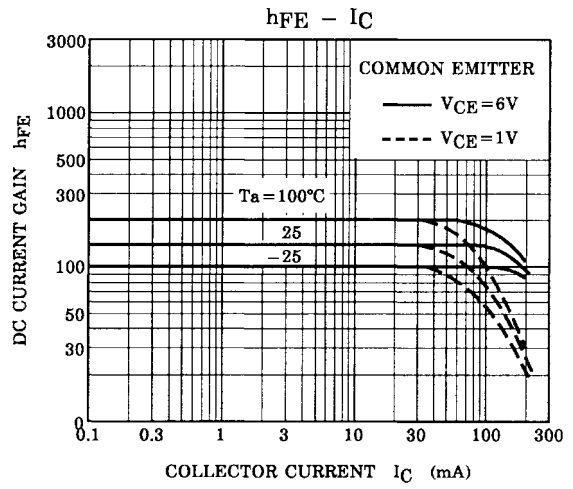
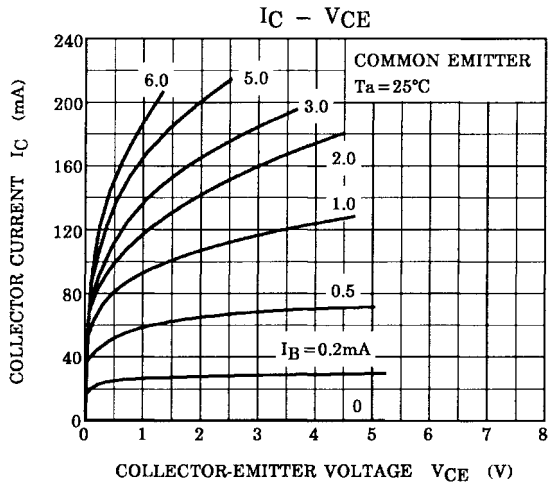


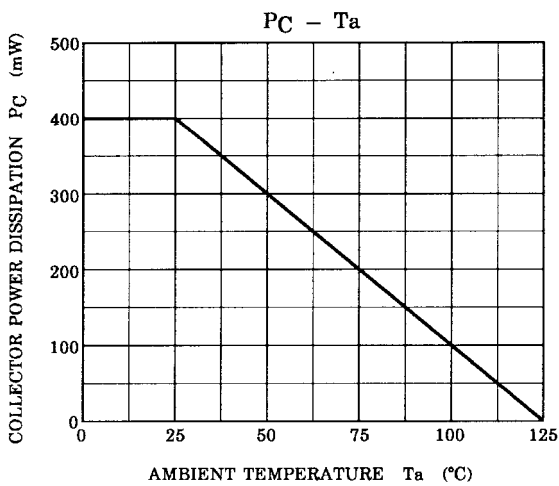
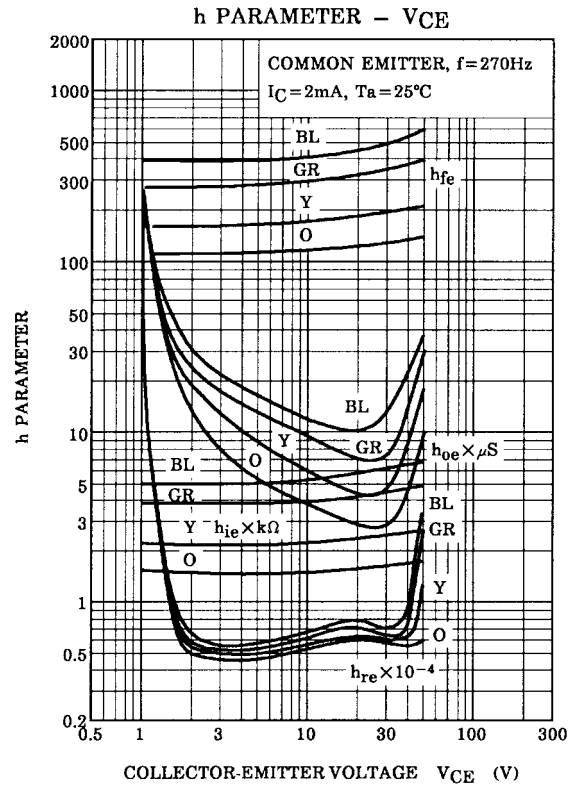
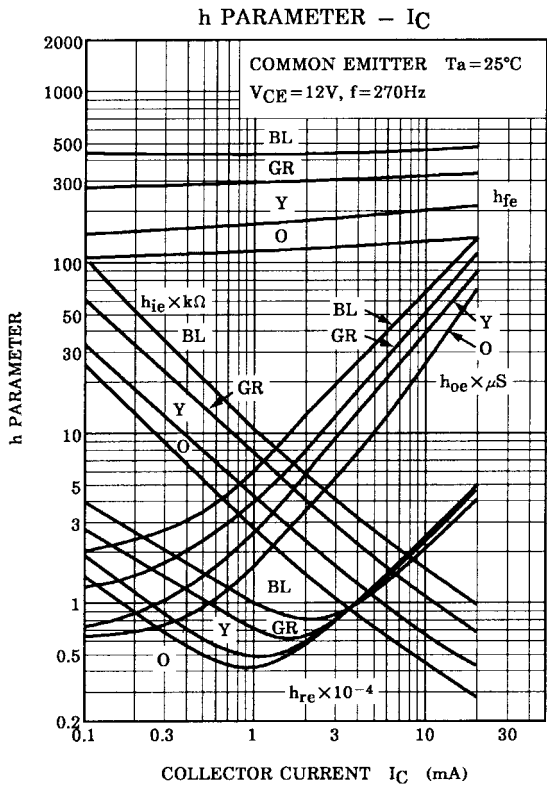
Weight: 0.21 g (typ.)

## 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	—		
Saturation voltage	Collector-emitter	$V_{CE(sat)}$	$I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$	—	0.1	0.25	V
	Base-emitter	$V_{BE(sat)}$	$I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$	—	—	1.0	
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 (1)	$V_{CE} = 6\text{ V}$ , $I_C = 0.1\text{ mA}$ $R_G = 10\text{ k}\Omega$ , $f = 100\text{ Hz}$	—	0.5	6	dB	
	NF (2)	$V_{CE} = 6\text{ V}$ , $I_C = 0.1\text{ mA}$ $R_G = 10\text{ k}\Omega$ , $f = 1\text{ kHz}$	—	0.2	3		

Note:  $h_{FE(1)}$  classification O: 70~140, Y: 120~240, GR: 200~400, BL: 350~700





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