

TOSHIBA**2SA1015(L)**

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

2SA1015(L)

Audio Frequency Amplifier Applications

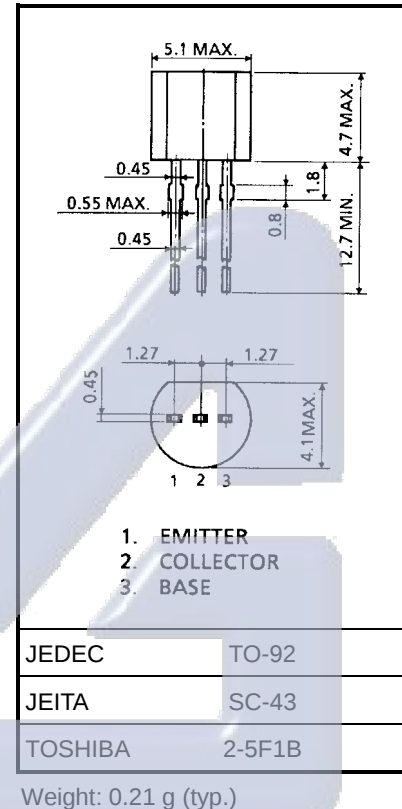
Low Noise Amplifier Applications

Unit: mm

- High voltage and high current: $V_{CEO} = -50\text{ V (min)}$,
 $I_C = -150\text{ mA (max)}$
- Excellent h_{FE} linearity: $h_{FE} (2) = 80\text{ (typ.)}$ 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 2SC1815 (L)

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	$^\circ\text{C}$

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = -50\text{ V}$, $I_E = 0$	—	—	-0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5\text{ V}$, $I_C = 0$	—	—	-0.1	μA
DC current gain	$h_{FE} (1)$ (Note)	$V_{CE} = -6\text{ V}$, $I_C = -2\text{ mA}$	70	—	400	
	$h_{FE} (2)$	$V_{CE} = -6\text{ V}$, $I_C = -150\text{ mA}$	25	80	—	
Collector-emitter saturation voltage	$V_{CE} (\text{sat})$	$I_C = -100\text{ mA}$, $I_B = -10\text{ mA}$	—	-0.1	-0.3	V
Base-emitter saturation voltage	$V_{BE} (\text{sat})$	$I_C = -100\text{ mA}$, $I_B = -10\text{ mA}$	—	—	-1.1	V
Transition frequency	f_T	$V_{CE} = -10\text{ V}$, $I_C = -1\text{ mA}$	80	—	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = -10\text{ V}$, $I_E = 0$ $f = 1\text{ MHz}$	—	4	7	pF
Base intrinsic resistance	$r_{bb'}$	$V_{CB} = -10\text{ V}$, $I_E = 1\text{ mA}$ $f = 30\text{ MHz}$	—	30	—	Ω
Noise figure	NF (1)	$V_{CE} = -6\text{ V}$, $I_C = -0.1\text{ mA}$ $f = 100\text{ Hz}$, $R_G = 10\text{ k}\Omega$	—	0.5	6	dB
	NF (2)	$V_{CE} = -6\text{ V}$, $I_C = -0.1\text{ mA}$ $f = 1\text{ kHz}$, $R_G = 10\text{ k}\Omega$	—	0.2	3	

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

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