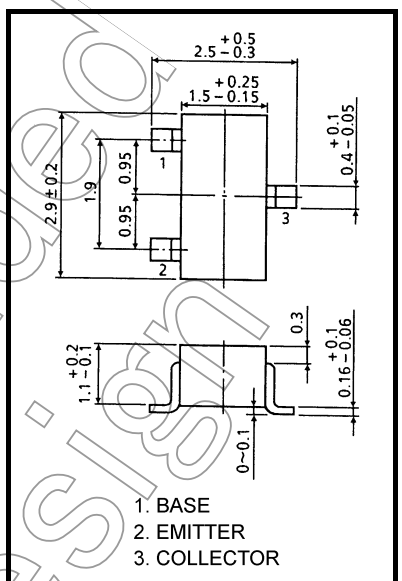
TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

2SC3123

TV VHF Mixer Applications

- High conversion gain: G_{ce} = 23dB (typ.)
- Low reverse transfer capacitance: C_{re} = 0.4 pF (typ.)

Unit: mm



JEDEC	—
JEITA	SC-59
TOSHIBA	2-3F1A

Weight: 0.012 g (typ.)

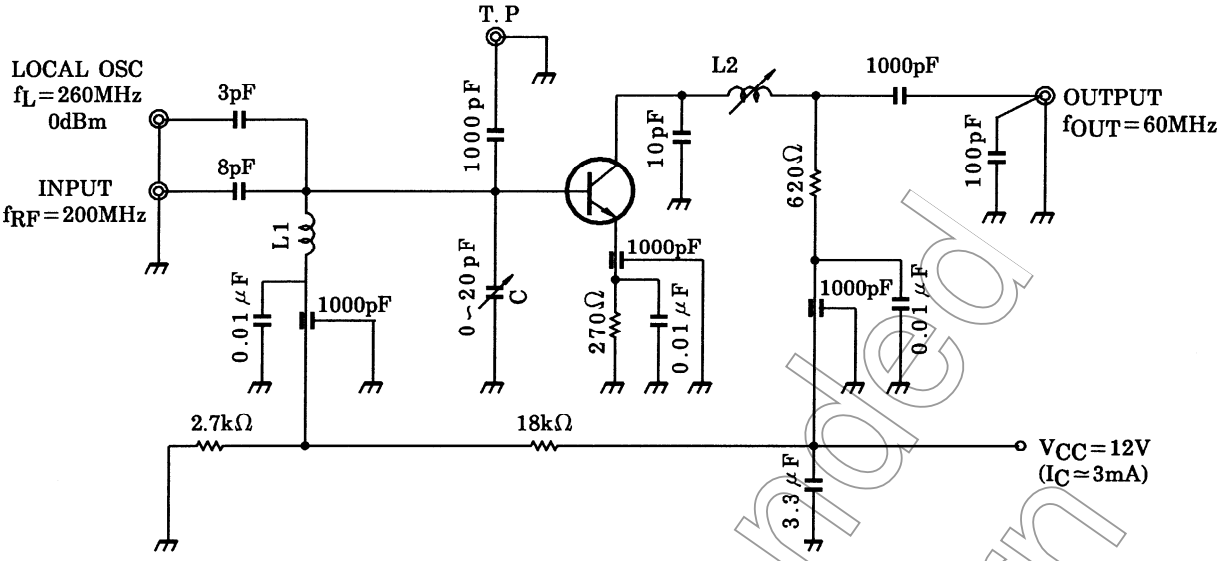
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	30	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	50	mA
Base current	I_B	25	mA
Collector power dissipation	P_C	150	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).

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 25 V, I_E = 0	—	—	100	nA
Emitter cut-off current	I_{EBO}	V_{EB} = 3 V, I_C = 0	—	—	1000	nA
Collector-emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = 1 mA, I_B = 0	20	—	—	V
DC current gain	h_{FE}	V_{CE} = 10 V, I_C = 5 mA	40	150	300	
Reverse transfer capacitance	C_{re}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	0.4	0.5	pF
Transition frequency	f_T	V_{CE} = 10 V, I_C = 5 mA	900	1400	—	MHz
Conversion gain	G_{ce}	V_{CC} = 12 V, f = 200 MHz	20	23	—	dB
Noise figure	NF	f_L = 260 MHz	—	3.8	5.5	dB



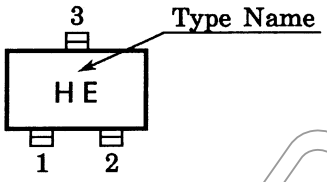
L1: 0.8 mmϕ silver plated copper wire, 1.5 T 5 mm ID

L2: Coil with core SCN-5962A (1)-(3) (TOKO INC.) or equivalent

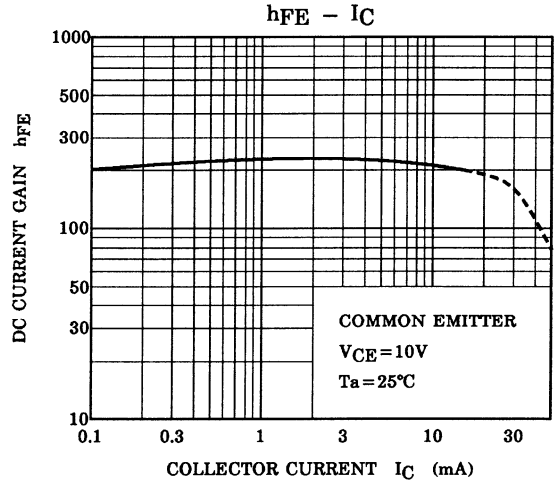
C: Air trimmer TTA25A200A (MURATA Manufacturing, Co., Ltd.) or equivalent

Figure 1 200 MHz G_{ce}, NF Test Circuit

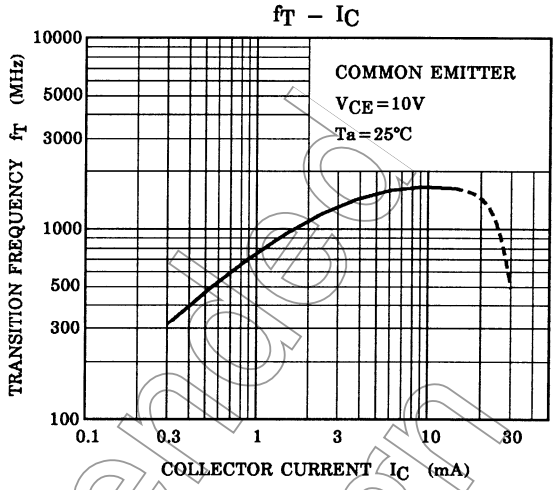
Marking



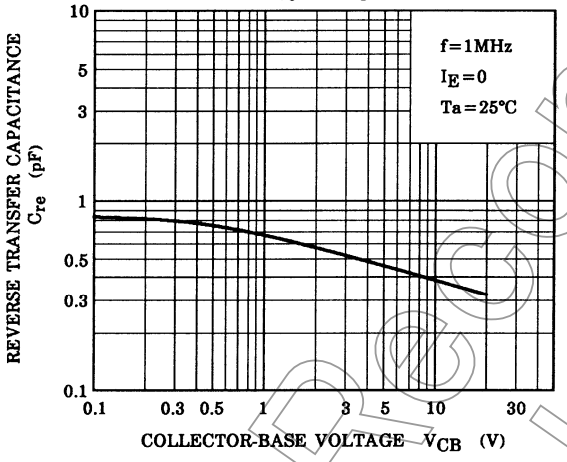
h_{FE} – I_C



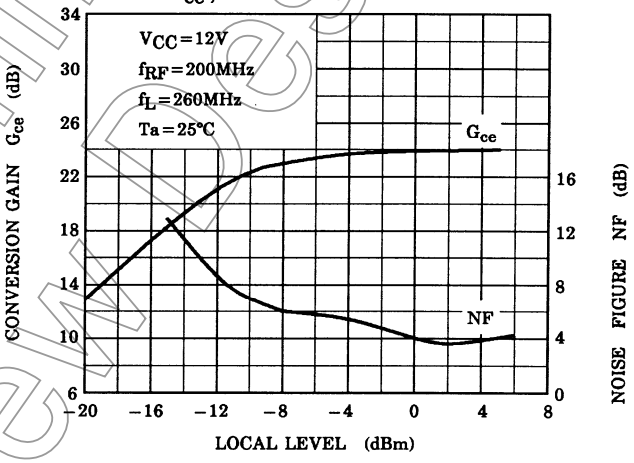
f_T – I_C



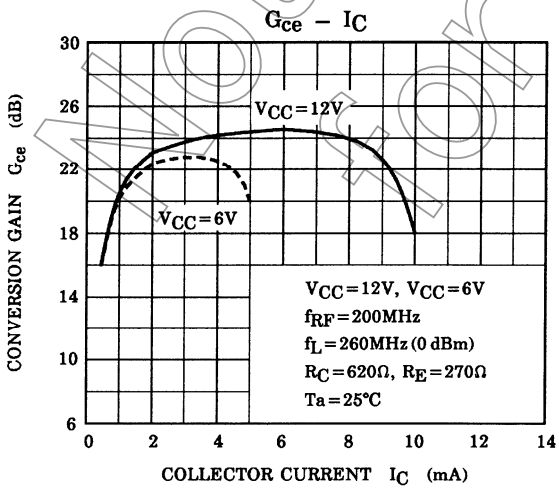
C_{re} – V_{CB}



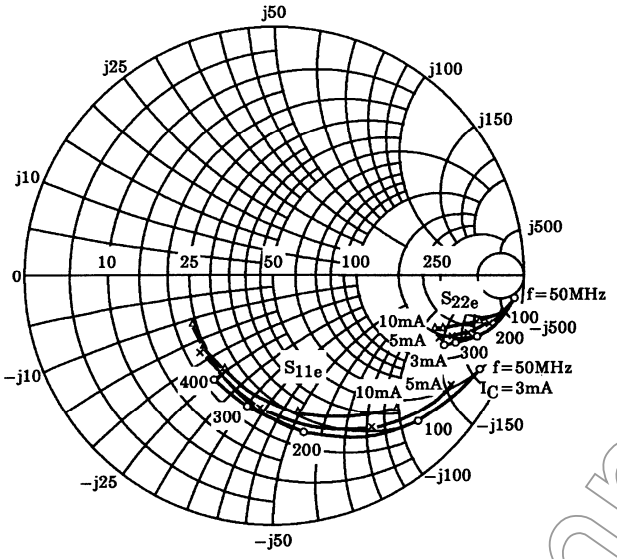
G_{ce}, NF – LOCAL LEVEL



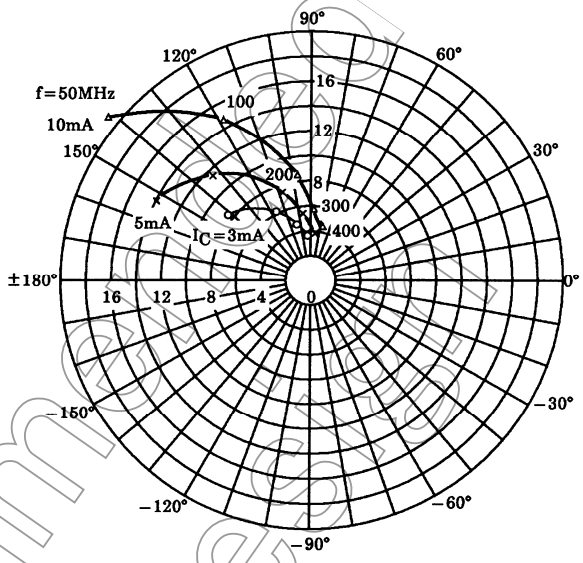
G_{ce} – I_C



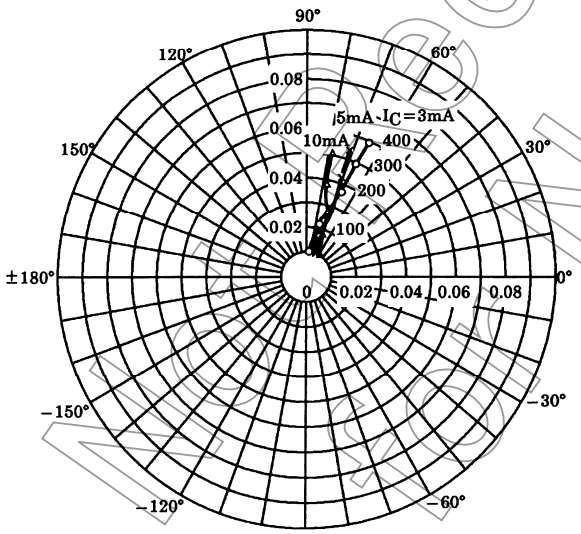
S_{11e}, S_{22e}
V_{CE} = 10V
Ta = 25°C
(UNIT : Ω)



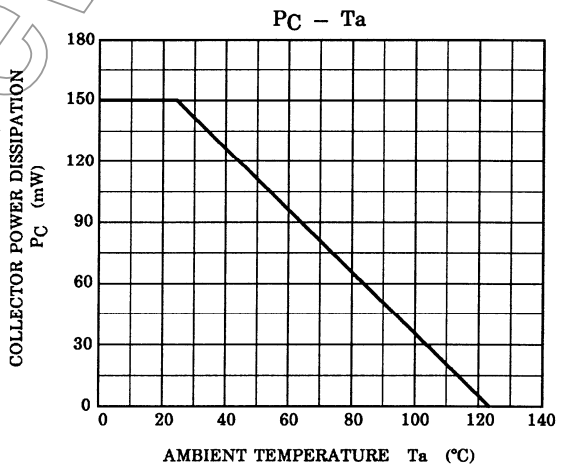
S_{21e}
V_{CE} = 10V
Ta = 25°C



S_{12e}
V_{CE} = 10V
Ta = 25°C



P_C – Ta



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