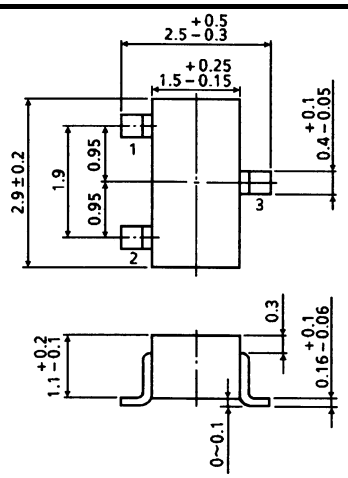
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

2SC2713

Audio Frequency General Purpose Amplifier Applications

- High voltage: V_{CEO} = 120 V
- Excellent h_{FE} linearity: h_{FE} (I_C = 0.1 mA)/h_{FE} (I_C = 2 mA) = 0.95 (typ.)
- High h_{FE}: h_{FE} = 200~700
- Low noise: NF = 1dB (typ.), 10dB (max)
- Complementary to 2SA1163
- Small package

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

S-MINI

JEDEC	TO-236MOD
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}	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	150	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

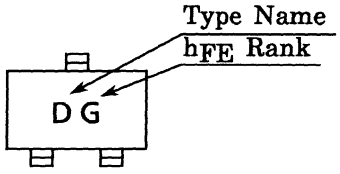
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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)

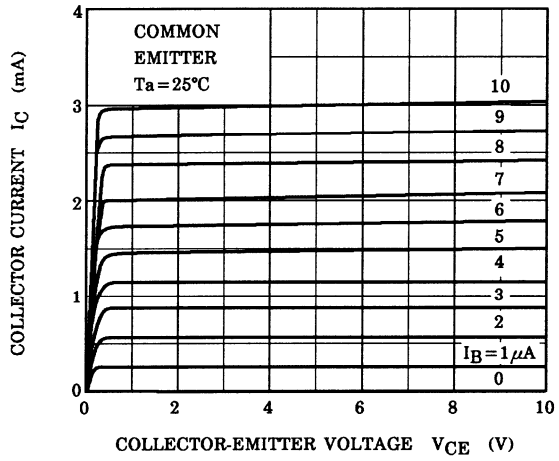
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 120 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	0.1	μA
DC current gain	h_{FE} (Note)	V_{CE} = 6 V, I_C = 2 mA	200	—	700	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 10 mA, I_B = 1 mA	—	—	0.3	V
Transition frequency	f_T	V_{CE} = 6 V, I_C = 1 mA	—	100	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3.0	—	pF
Noise figure	NF	V_{CE} = 6 V, I_C = 0.1 mA f = 1 kHz, R_G = 10 kΩ	—	1.0	10	dB

Note: h_{FE} classification GR (G): 200~400, BL (L): 350~700

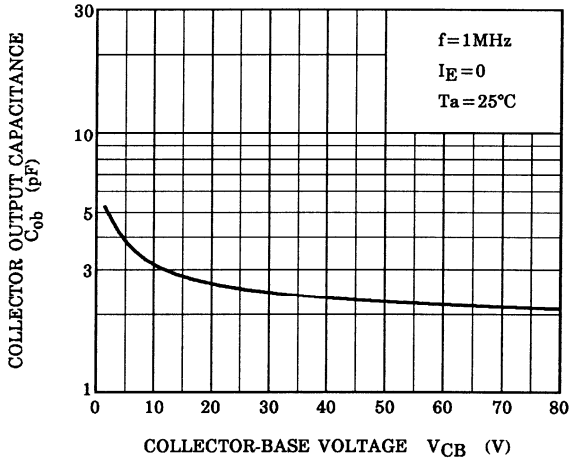
Marking



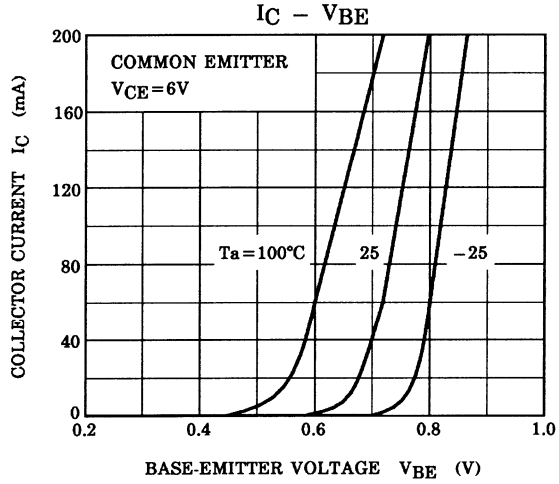
$I_C - V_{CE}$



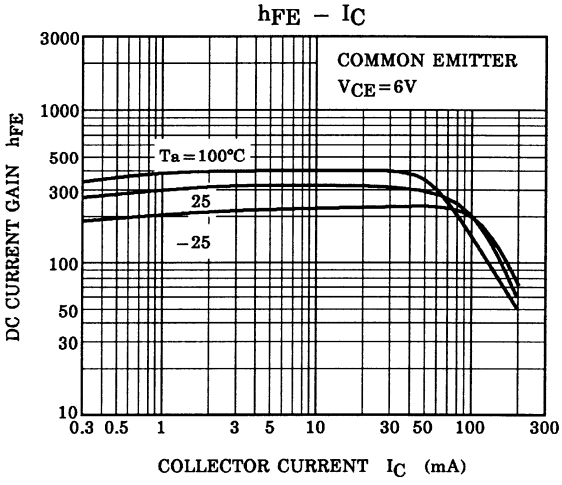
$C_{ob} - V_{CB}$



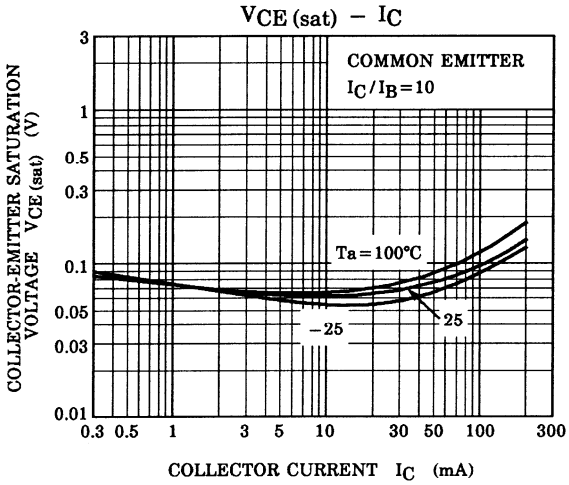
$I_C - V_{BE}$



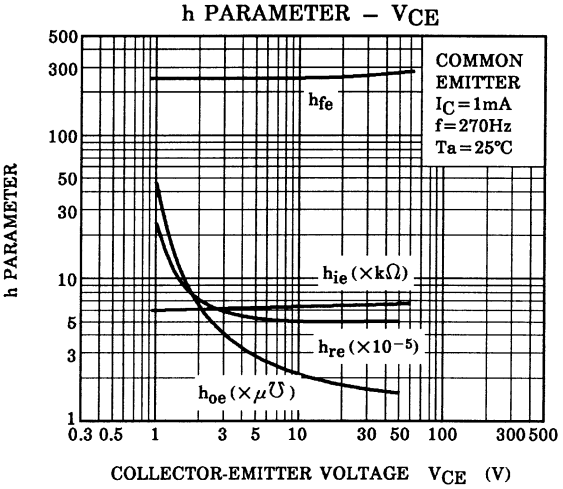
$h_{FE} - I_C$



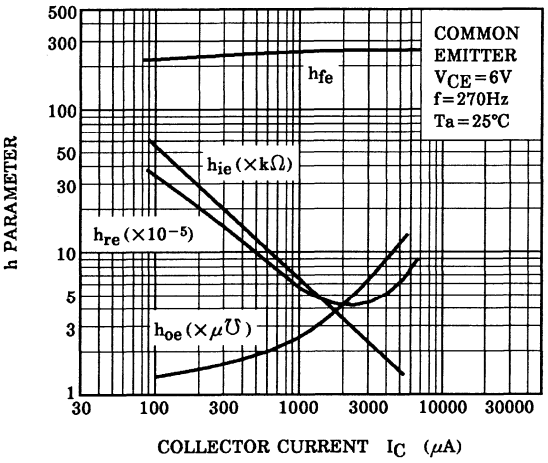
$V_{CE\,(sat)} - I_C$



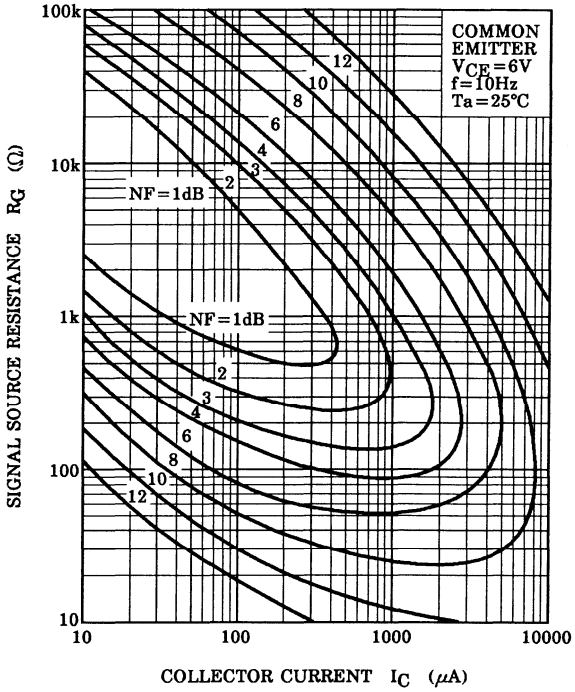
h PARAMETER − V_{CE}



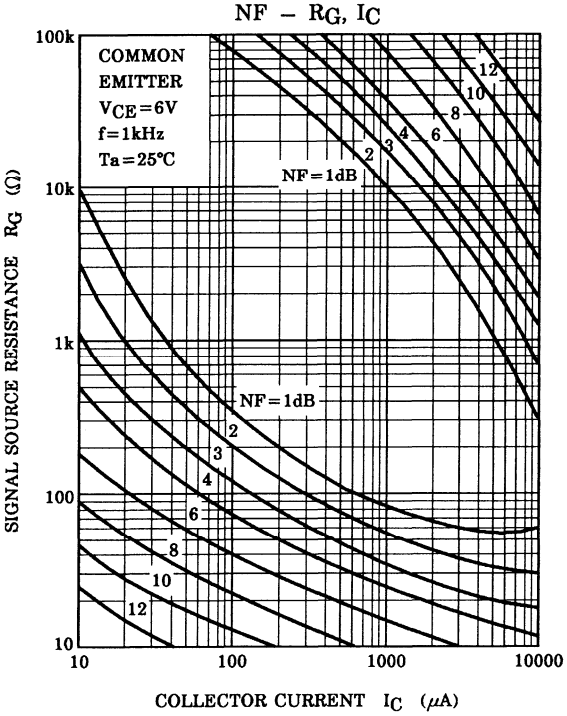
h PARAMETER – I_C



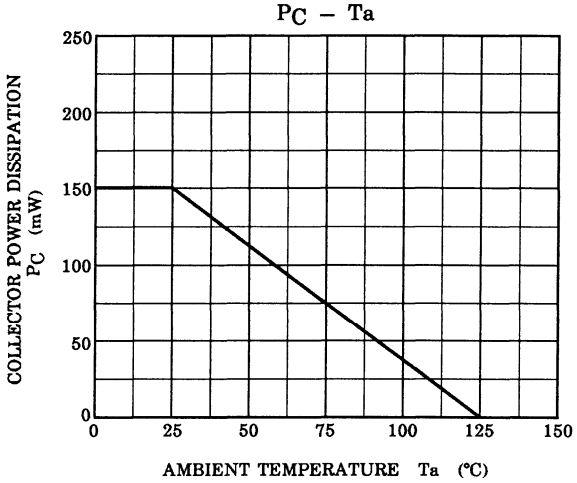
NF – R_G, I_C



NF – R_G, I_C



P_C – Ta



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