TOSHIBA Multi Chip Discrece Device

HN4G01J

Audio Frequency General Purpose Amplifier Applications

Q1

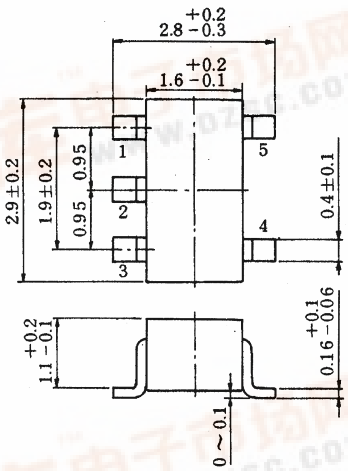
- Small package (Dual type)
- High voltage and high current
  : V_{CEO} = 50V, I_C = 150mA (max)
- High h_{FE} : h_{FE} = 120~400
- Excellent h_{FE} linearity
  : h_{FE} (I_C = 0.1mA) / h_{FE} (I_C = 2mA) = 0.95 (typ.)

Q2

- Incorporating a bias resistor into a transistor reduces parts count.
  Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.

Q1 : 2SC4837F
Q2 : RN1103F

Unit: mm



1.BASE1	(B1)
2.EMITTER	(E)
3.BASE2	(B2)
4.COLLECTOR2	(C2)
5.COLLECTOR1	(C1)

SMV

JEDEC	—
JEITA	—
TOSHIBA	2-3L1A

Weight: 0.014g(Typ.)

Q1 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	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	30	mA

Q2 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
Collector current	I_C	100	mA

Absolute Maximum Ratings (Ta = 25°C) (Q1,Q2Common)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P_C*	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°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).

*Total rating.

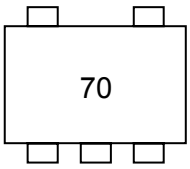
Electrical Characteristics (Ta = 25°C) (Q1)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 60 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}	V_{CE} = 6 V, I_C = 2 mA	120	—	400	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 100 mA, I_B = 10 mA	—	0.1	0.25	V
Transition frequency	f_T	V_{CE} = 10 V, I_C = 1 mA	60	—	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	2.0	—	pF

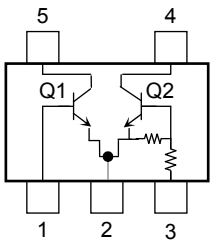
Electrical Characteristics (Ta = 25°C) (Q2)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
	I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cut-off current	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.17	—	0.33	mA
DC current gain	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	120	—	—	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.3	—	3.0	V
Input voltage (OFF)	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	1.0	—	1.5	V
Transition frequency	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	15.4	22	28.6	kΩ
Resistor ratio	R1/R2	—	0.9	1.0	1.1	

Marking

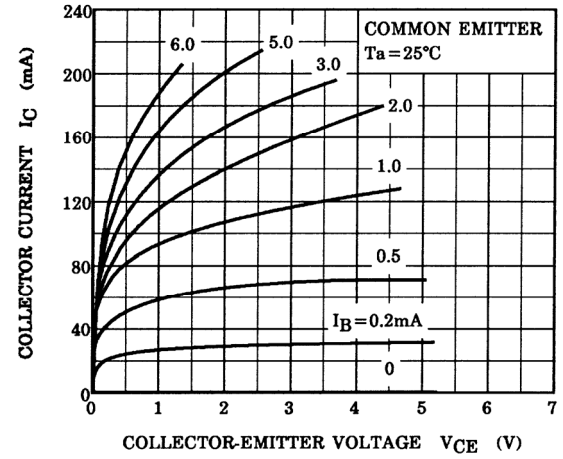


Equivalent Circuit (top view)

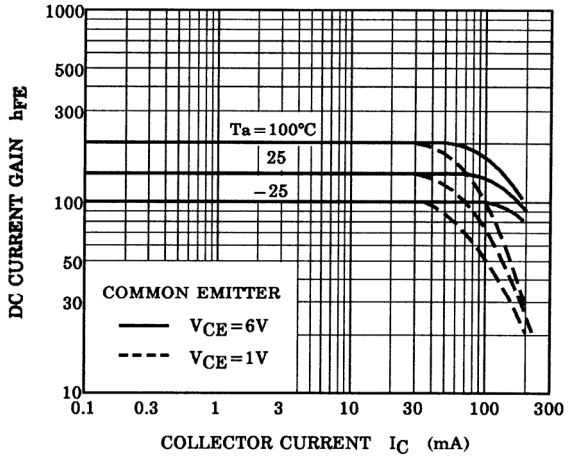


Q1

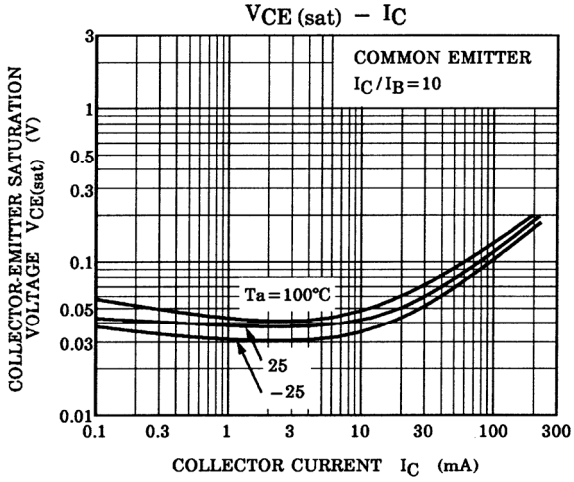
I_C – V_{CE}



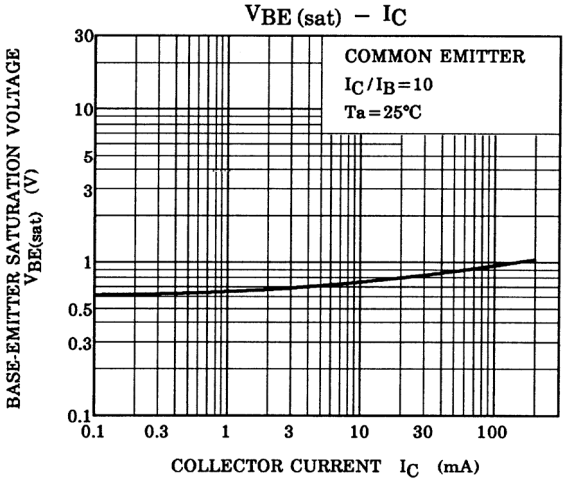
h_{FE} – I_C



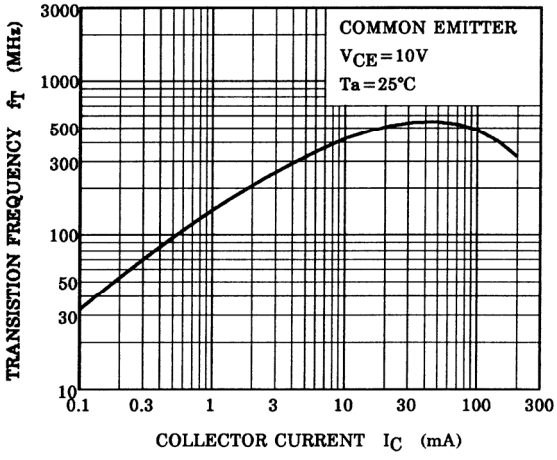
$V_{CE\,(sat)}$ – I_C



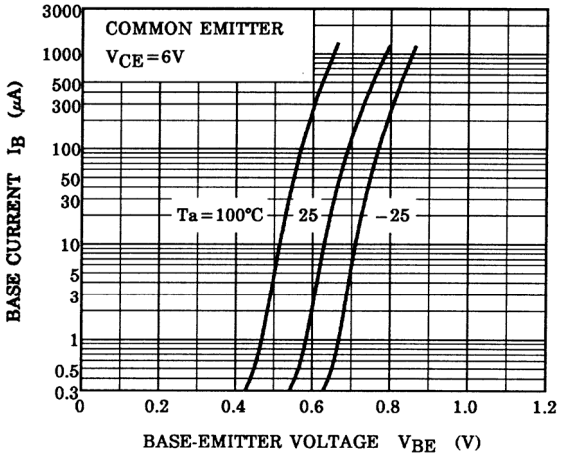
$V_{BE\,(sat)}$ – I_C



f_T – I_C

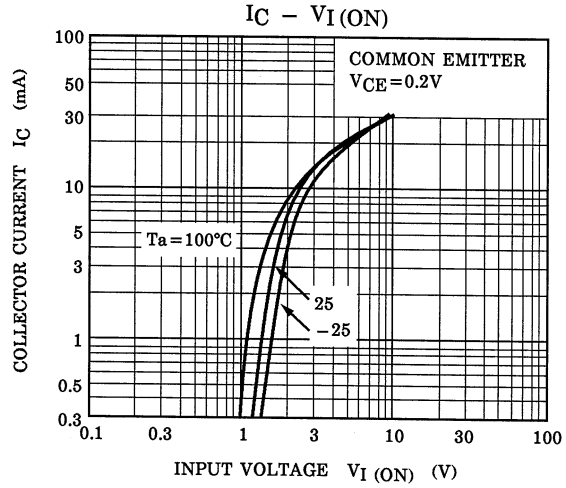


I_B – V_{BE}

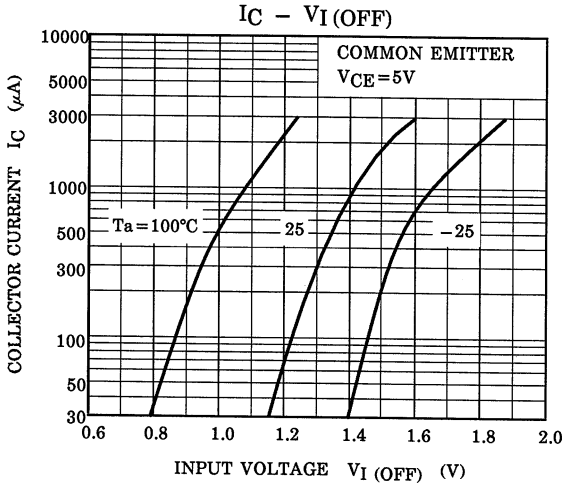


Q2

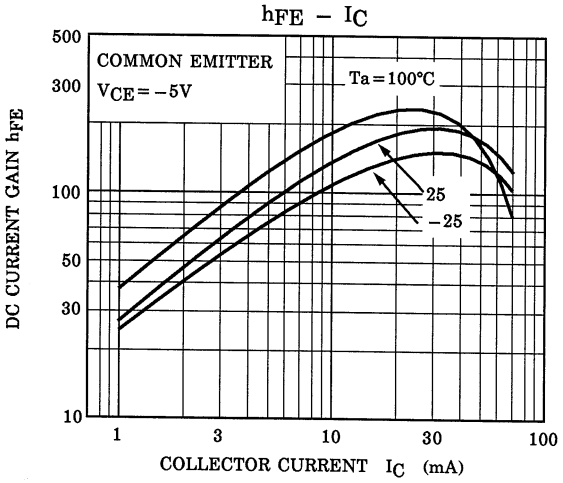
$I_C - V_{I\,(ON)}$



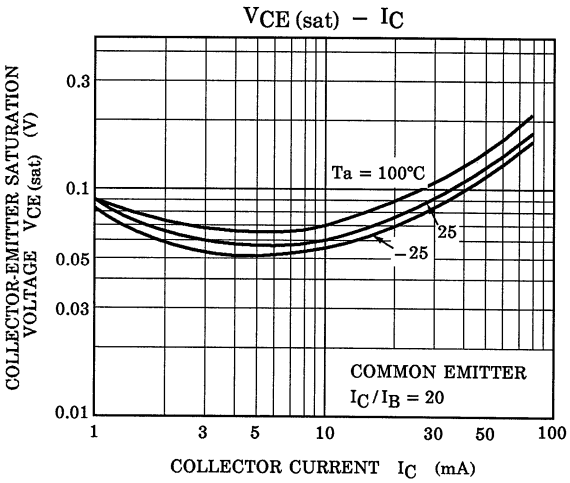
$I_C - V_{I\,(OFF)}$



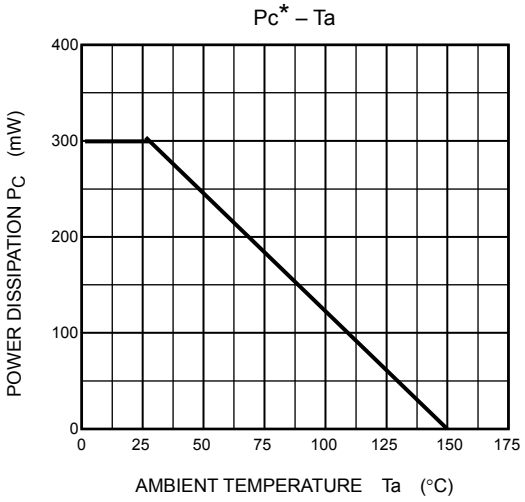
$h_{FE} - I_C$



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



Q1,Q2 Common



*:Total Rating

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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