

Bipolar Transistors Silicon NPN Epitaxial Type

HN1C01FU

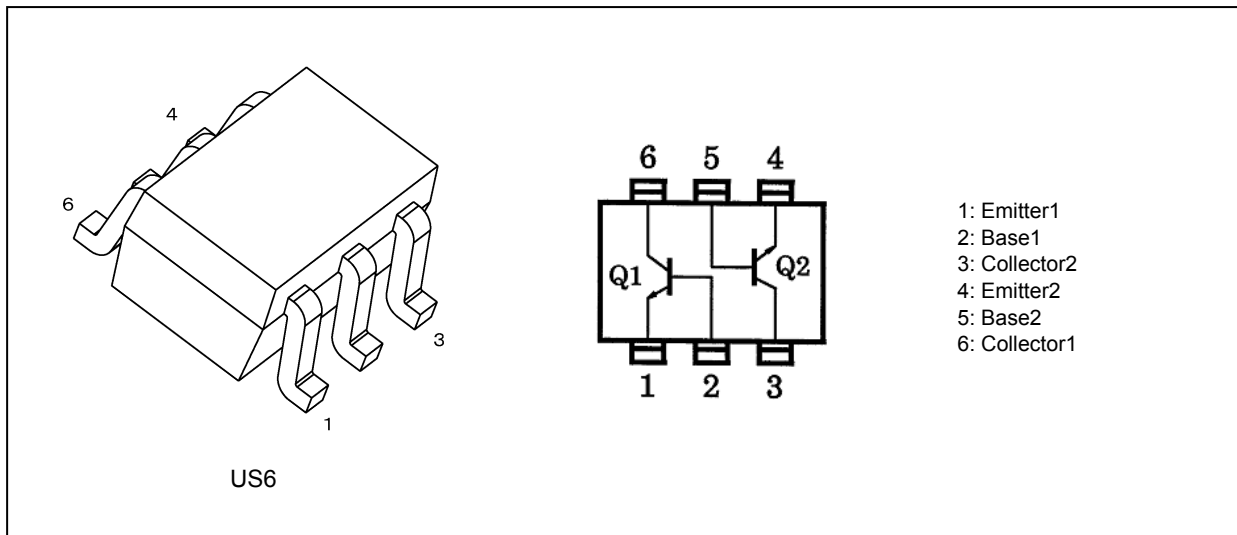
1. Applications

- Low-Frequency Amplifiers

2. Features

- (1) AEC-Q101 qualified (Please see the orderable part number list)
- (2) Small package (Dual type)
- (3) High voltage: $V_{CE0} = 50\text{ V}$
- (4) High collector current: $I_C = 150\text{ mA (max)}$
- (5) High h_{FE} : $h_{FE} = 120\text{ to }400$
- (6) Excellent h_{FE} linearity: $h_{FE}(I_C = 0.1\text{ mA})/h_{FE}(I_C = 2\text{ mA}) = 0.95\text{ (typ.)}$

3. Packaging and Internal Circuit



Start of commercial production

1990-10

4. Orderable part number

Orderable part number		AEC-Q101	Note
HN1C01FU-Y	HN1C01FU-Y,LF	—	General Use
	HN1C01FU-Y,LXGF	YES (Note 1)	Unintended Use (Note 1)
	HN1C01FU-Y,LXHF	YES	Automotive Use
HN1C01FU-GR	HN1C01FU-GR,LF	—	General Use
	HN1C01FU-GR,LXGF	YES (Note 1)	Unintended Use (Note 1)
	HN1C01FU-GR,LXHF	YES	Automotive Use

Note 1: For more information, please contact our sales or use the inquiry form on our website.

5. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25^\circ\text{C}$) (Q1, Q2 Common)

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	30	mA	
Collector power dissipation (Note 4)	P_C	200	mW	
Junction temperature	T_j	(Note 2)	150	°C
		(Note 3)	125	
Storage temperature	T_{stg}	(Note 2)	-55 to 150	°C
		(Note 3)	-55 to 125	

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).

Note 2: For devices with the ordering part number ending in LF(T).

Note 3: For devices with the ordering part number ending in XGF(T, XHF(T).

Note 4: Device mounted on an FR4 board.(total rating)(25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.32 mm² × 6)

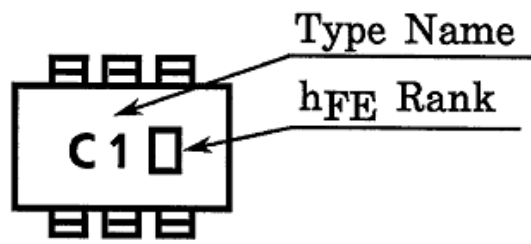
6. Electrical Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$) (Q1, Q2 Common)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 60\text{ V}, I_E = 0\text{ mA}$	—	—	0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5\text{ V}, I_C = 0\text{ mA}$	—	—	0.1	μA
DC current gain (Note 5)	h_{FE}	$V_{CE} = 6\text{ V}, I_C = 2\text{ mA}$	120	—	400	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 100\text{ mA}, I_B = 10\text{ mA}$	—	0.1	0.25	V
Transition frequency	f_T	$V_{CE} = 10\text{ V}, I_C = 1\text{ mA}$	80	—	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	—	2	3.5	pF

Note 5: h_{FE} classification Y (Y): 120 to 240, GR (G): 200 to 400

() marking symbol

7. Marking



Marking

8. Characteristics Curves (Note) (Q1, Q2 Common)

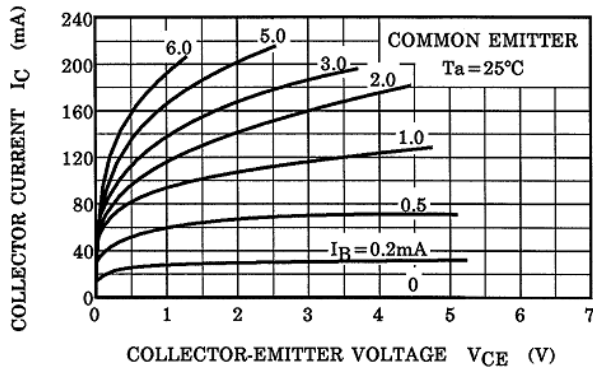


Fig. 8.1 $I_C - V_{CE}$

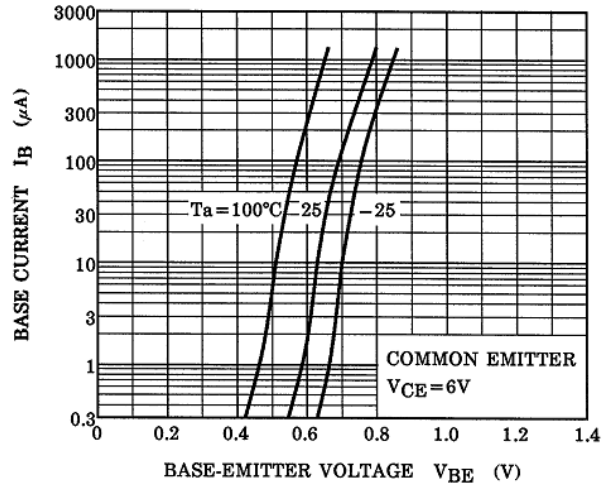


Fig. 8.2 $I_B - V_{BE}$

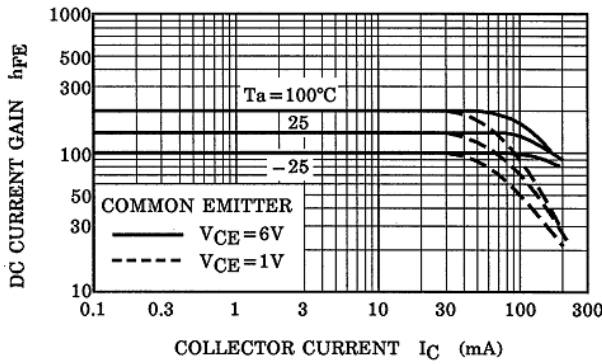


Fig. 8.3 $h_{FE} - I_C$

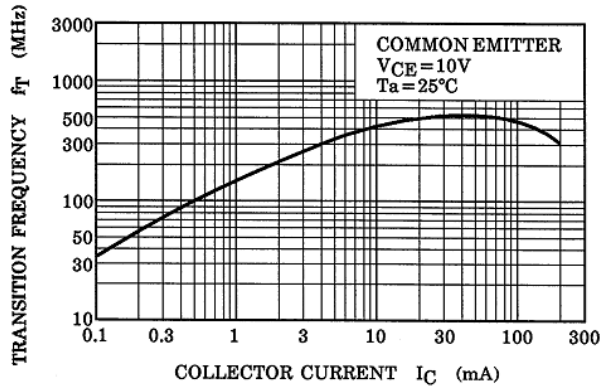


Fig. 8.4 $f_T - I_C$

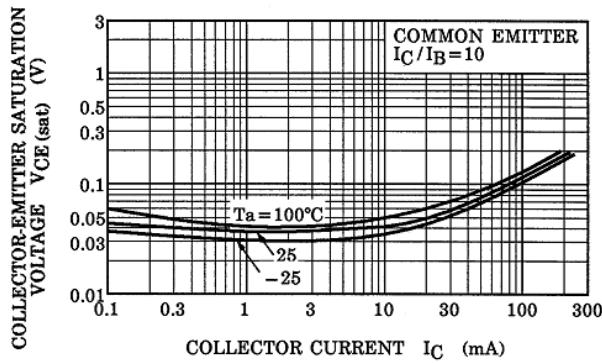


Fig. 8.5 $V_{CE(sat)} - I_C$

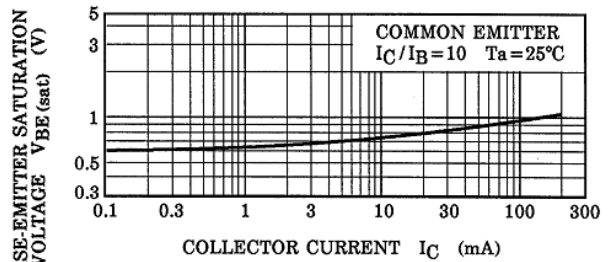


Fig. 8.6 $V_{BE(sat)} - I_C$

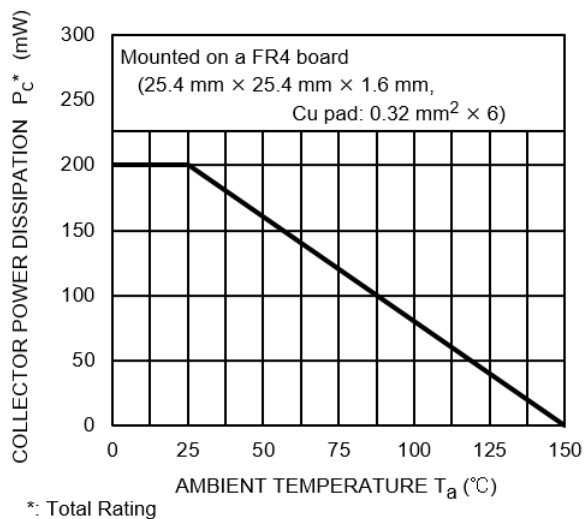
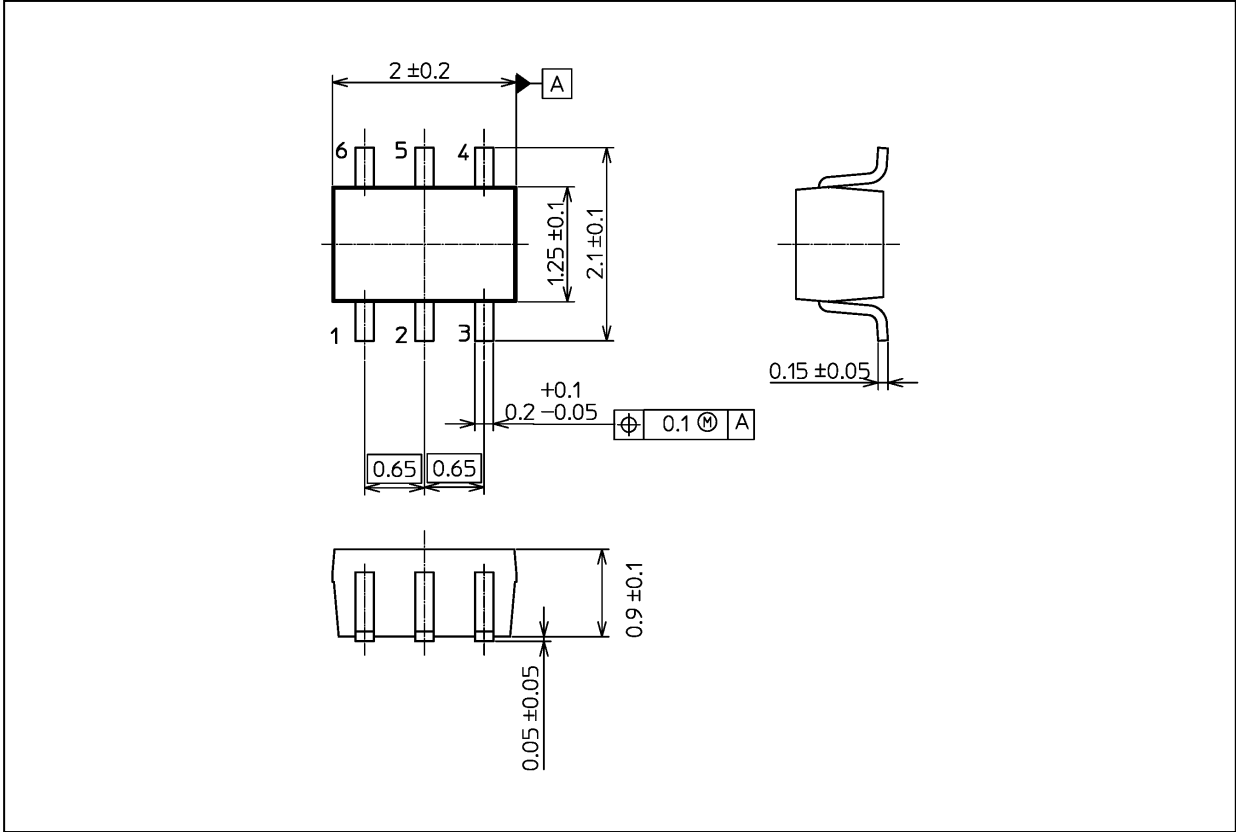


Fig. 8.7 P_C (Note1) - T_a
Reference only with T_j of 150 °C.

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 6.8 mg (typ.)

Package Name(s)
TOSHIBA: 1-2T1S
Nickname: US6

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