

Bipolar Transistors Silicon NPN Epitaxial Type

# HN1C01FU

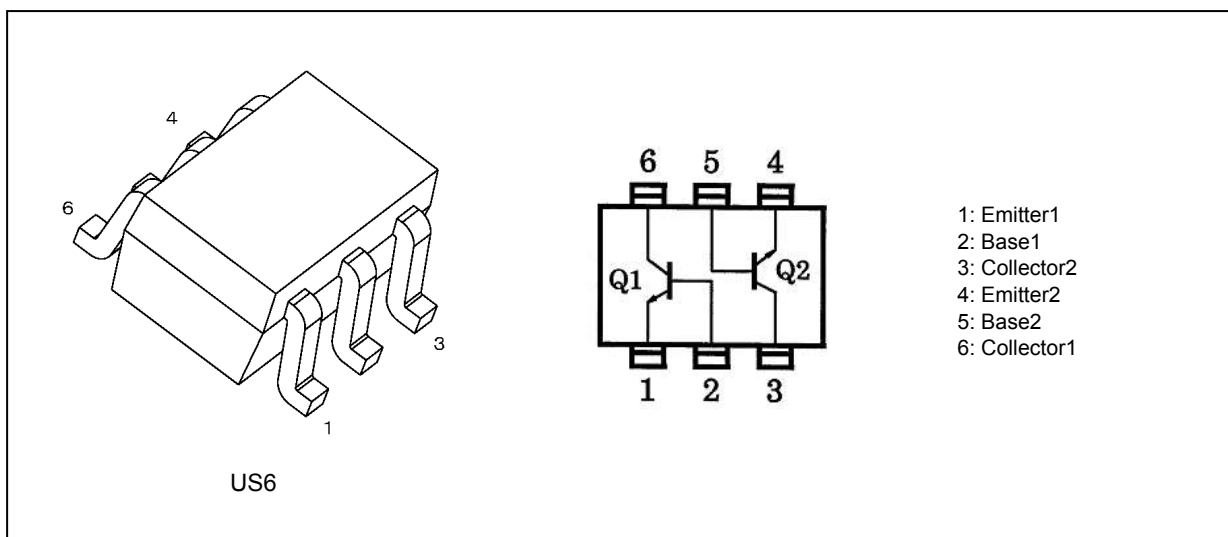
## 1. Applications

- 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 mm<sup>2</sup> × 6)

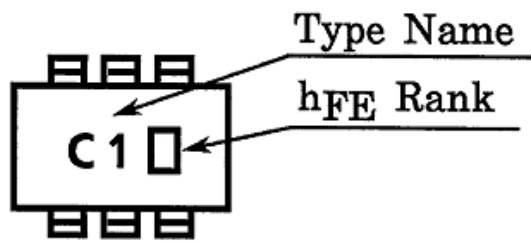
### 6. Electrical Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$ ) (Q1, Q2 Common)

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)

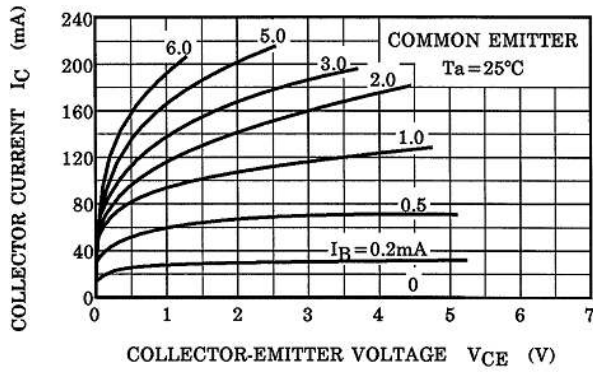


Fig. 8.1  $I_C - V_{CE}$

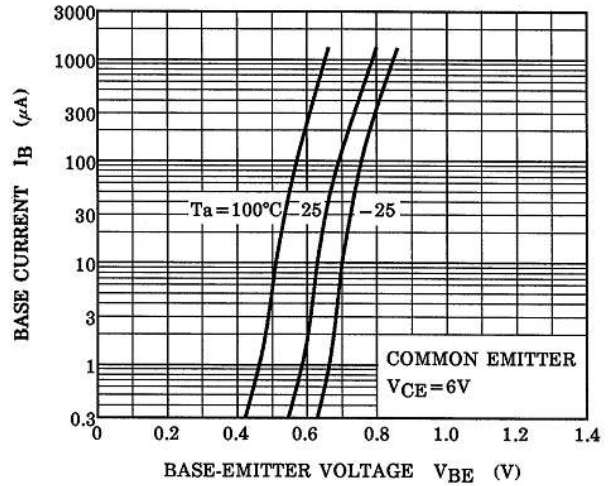


Fig. 8.2  $I_B - V_{BE}$

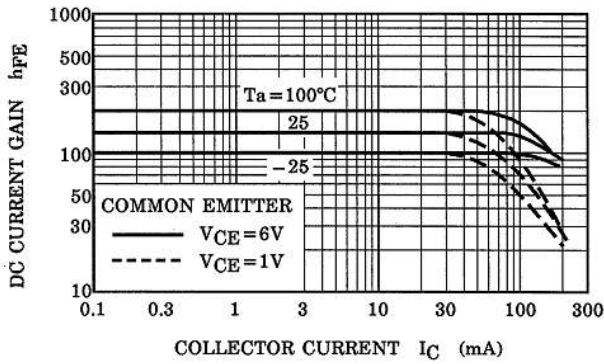


Fig. 8.3  $h_{FE} - I_C$

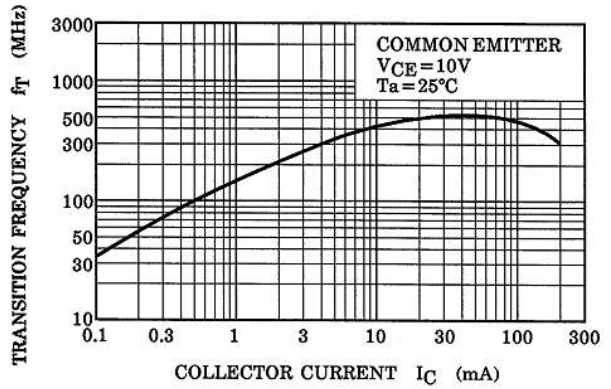


Fig. 8.4  $f_T - I_C$

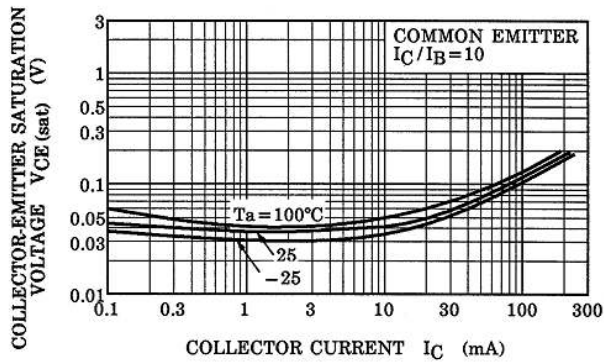


Fig. 8.5  $V_{CE(sat)} - I_C$

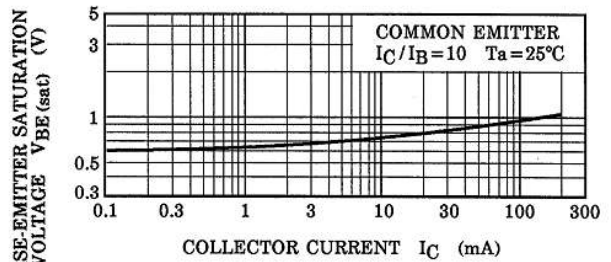
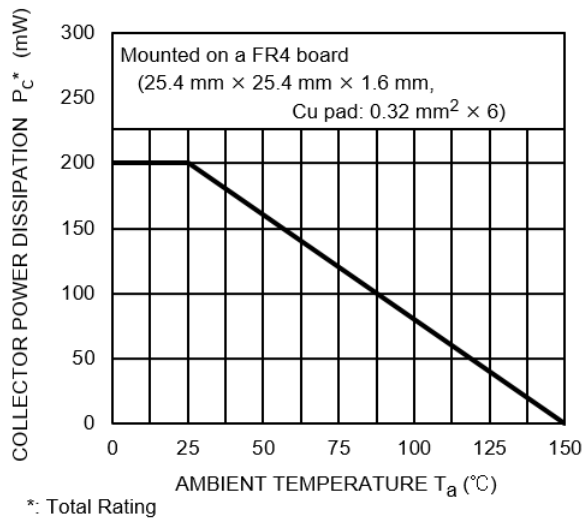


Fig. 8.6  $V_{BE(sat)} - I_C$

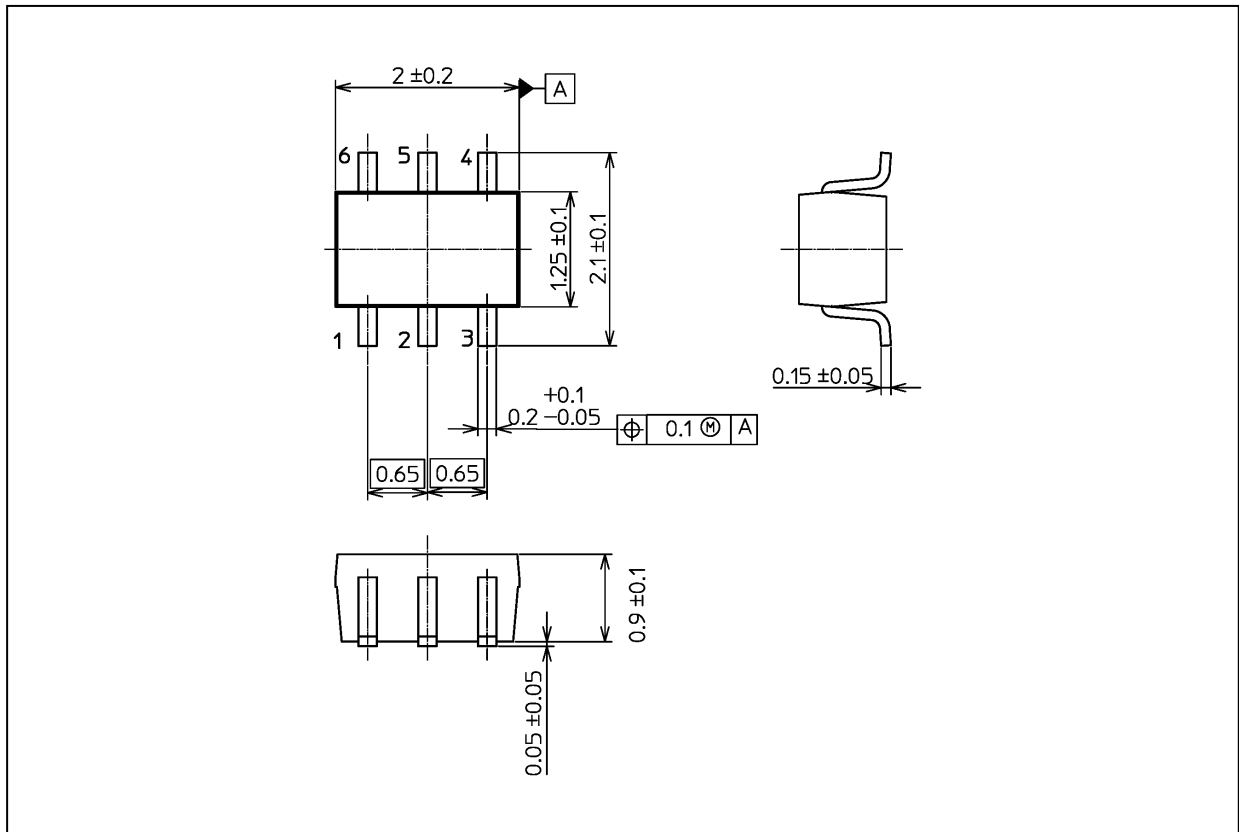


**Fig. 8.7  $P_C$  (Note1) -  $T_a$**   
**Reference only with  $T_j$  of 150 °C.**

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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