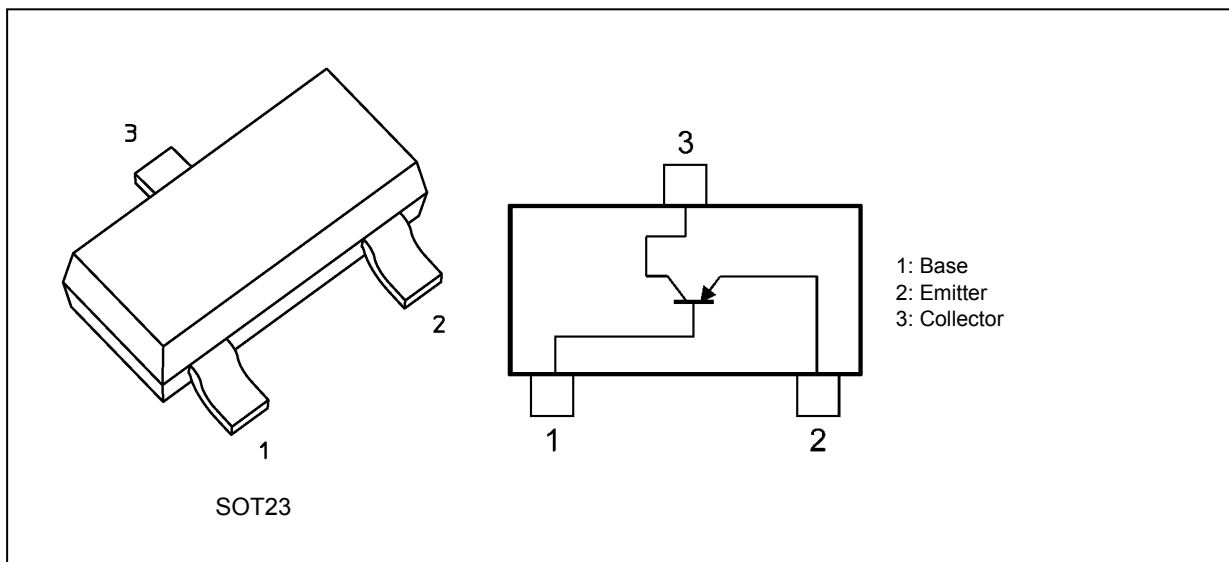


# TBC857

## 1. Applications

- Low-Frequency Amplifiers

## 2. Packaging and Internal Circuit



## 3. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CB0}$	-50	V
Collector-emitter voltage	$V_{CE0}$	-50	V
Emitter-base voltage	$V_{EB0}$	-5	V
Collector current (DC)	$I_C$	-150	mA
Collector current (pulsed)	$I_{CP}$	-200	
Base current	$I_B$	-30	mA
Collector power dissipation (Note 1)	$P_C$	320	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$

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).

Note 1: Device mounted on a 25.4 mm × 25.4 mm × 1.6 mm FR4 glass epoxy board (Cu pad: 0.42 mm<sup>2</sup> × 3)

Start of commercial production

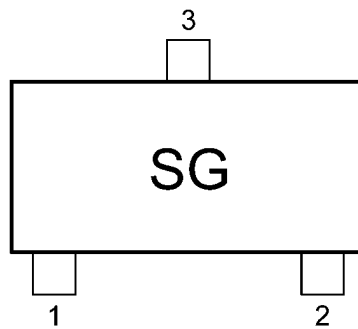
2016-05

**4. Electrical Characteristics (Unless otherwise specified,  $T_a = 25\text{ }^\circ\text{C}$ )**

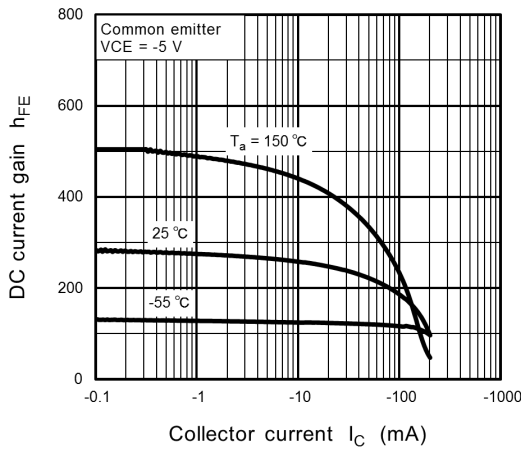
Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$		$V_{CB} = -30\text{ V}, I_E = 0\text{ mA}$	—	-1	-30	nA
Emitter cut-off current	$I_{EBO}$		$V_{EB} = -5\text{ V}, I_C = 0\text{ mA}$	—	—	-0.1	$\mu\text{A}$
DC current gain	$h_{FE}$	(Note 1)	$V_{CE} = -5\text{ V}, I_C = -2\text{ mA}$	210	—	475	—
Collector-emitter saturation voltage	$V_{CE(sat)}$		$I_C = -10\text{ mA}, I_B = -0.5\text{ mA}$	—	-0.06	-0.3	V
			$I_C = -100\text{ mA}, I_B = -5\text{ mA}$	—	-0.22	-0.65	
Base-emitter saturation voltage	$V_{BE(sat)}$		$I_C = -10\text{ mA}, I_B = -0.5\text{ mA}$	—	-0.7	—	V
			$I_C = -100\text{ mA}, I_B = -5\text{ mA}$	—	-0.85	—	
Base-emitter voltage	$V_{BE}$		$I_C = -2\text{ mA}, V_{CE} = -5\text{ V}$	-0.6	-0.65	-0.75	V
			$I_C = -10\text{ mA}, V_{CE} = -5\text{ V}$	—	—	-0.82	
Transition frequency	$f_T$		$V_{CE} = -10\text{ V}, I_C = -1\text{ mA}, f = 100\text{ MHz}$	80	—	—	MHz
Collector output capacitance	$C_{ob}$		$V_{CB} = -10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	—	4	—	pF
Noise figure	NF		$V_{CE} = -6\text{ V}, I_C = -100\text{ }\mu\text{A}, f = 1\text{ kHz}, R_G = 10\text{ k}\Omega$	—	1	10	dB

Note 1:  $h_{FE}$  classification: B rank

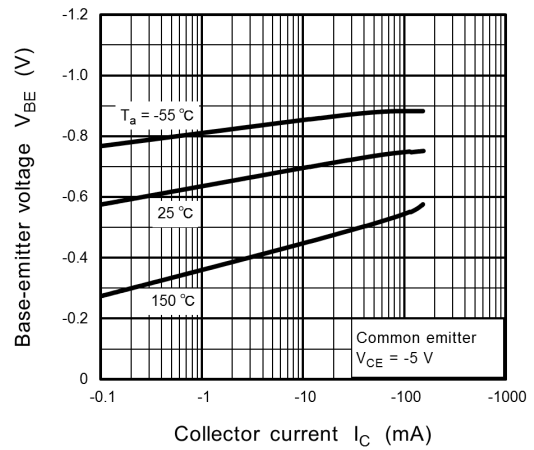
**5. Marking**



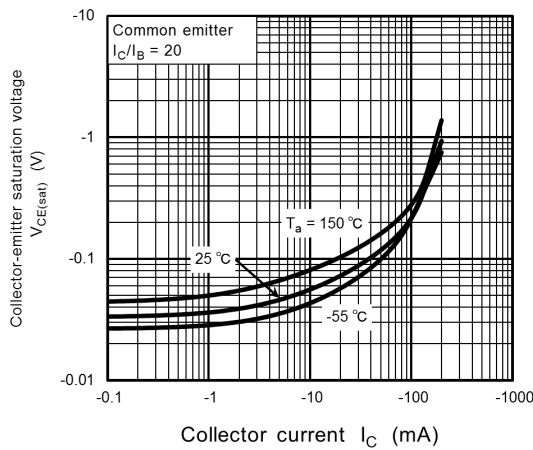
**6. Characteristics Curves (Note)**



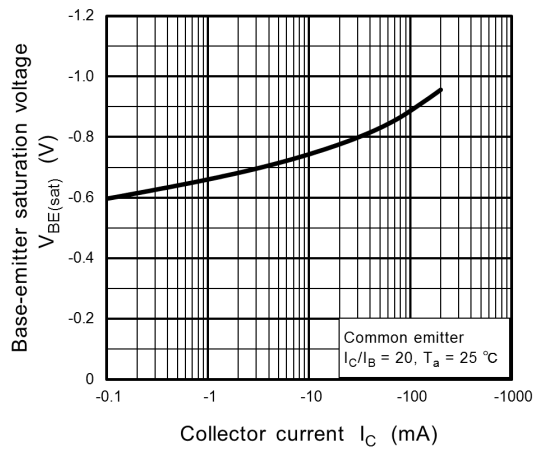
**Fig. 6.1  $h_{FE} - I_C$**



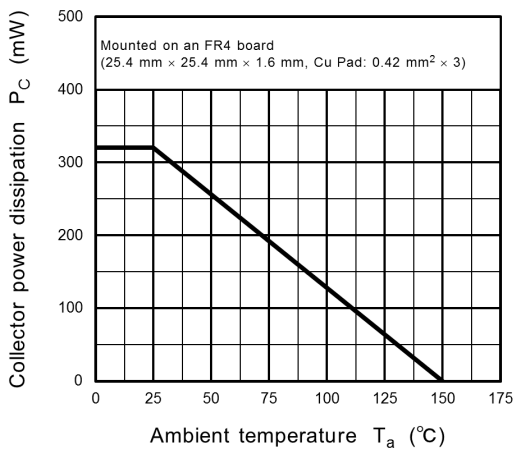
**Fig. 6.2  $V_{BE} - I_C$**



**Fig. 6.3  $V_{CE(sat)} - I_C$**



**Fig. 6.4  $V_{BE(sat)} - I_C$**

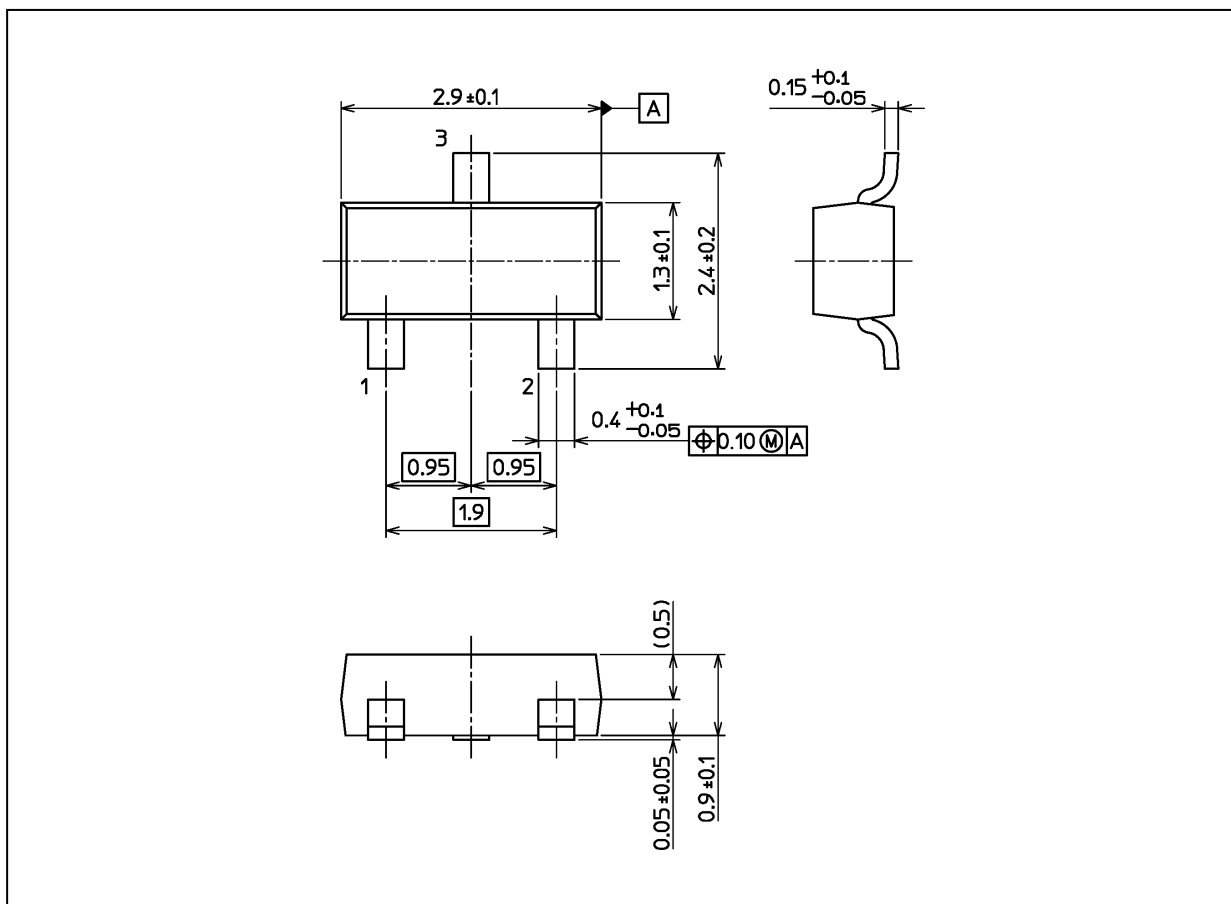


**Fig. 6.5  $P_C - T_a$**

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

**Package Dimensions**

Unit: mm



Weight: 0.009 g (typ.)

Package Name(s)
TOSHIBA: 2-3AB1A
Nickname: SOT23

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