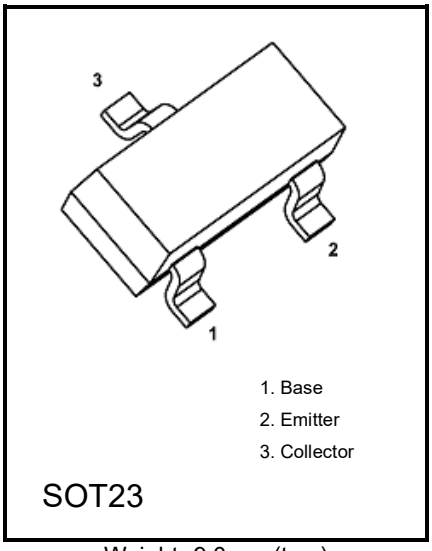
TOSHIBA Transistor Silicon PNP Epitaxial Type

TMBT3906

Audio Frequency General Purpose Amplifier Applications

1. Features

- High voltage and high current
  : V_{CEO} = −50 V, I_C = −200 mA (max)
- Complementary to TMBT3904



Weight: 9.0 mg (typ.)

2. Absolute Maximum Ratings (Note) (Ta = 25°C)

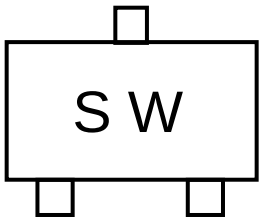
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−50	V
Collector-emitter voltage	V_{CEO}	−50	V
Emitter-base voltage	V_{EBO}	−5	V
Collector current	I_C	−200	mA
Base current	I_B	−30	mA
Collector power dissipation	P_C (Note 1)	320	mW
	P_C (Note 2)	1000	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 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).

Note 1: Mounted on an FR4 board.
(25.4mm x 25.4mm x 1.6mm, Cu Pad: 0.42mm^2 x 3)

Note 2: Mounted on an FR4 board.
(25.4mm x 25.4mm x 1.6mm, Cu Pad: 645mm^2)

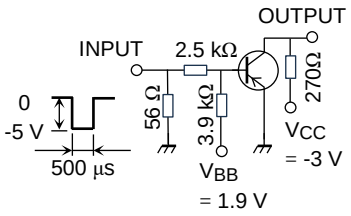
3. Marking



Start of commercial production
2015-01

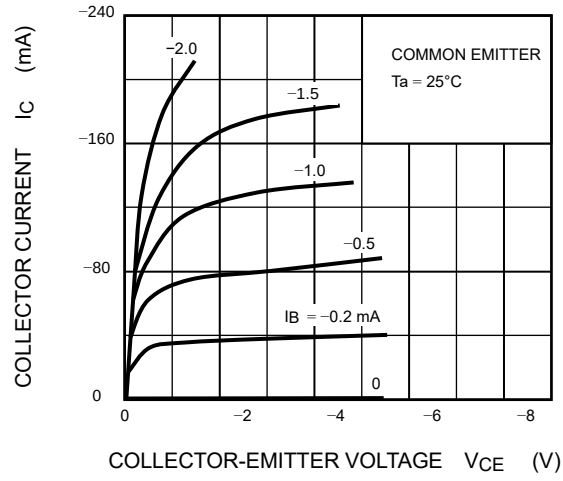
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4. Electrical Characteristics (Ta = 25°C)

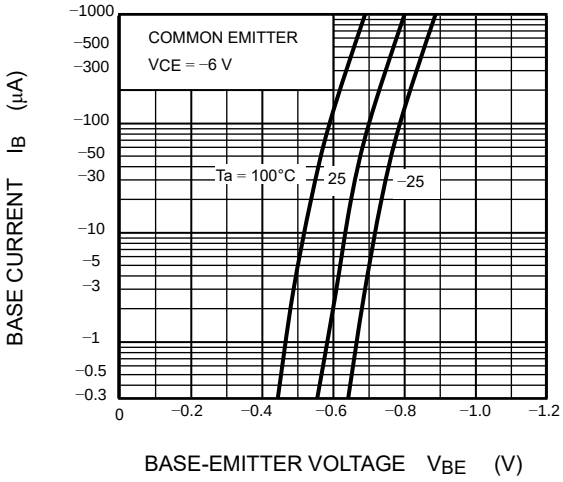
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −50 V, I_E = 0 mA	—	—	−0.1	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −5 V, I_C = 0 mA	—	—	−0.1	μA
DC current gain		h_{FE}	V_{CE} = −1 V, I_C = −0.1 mA	60	—	—	—
			V_{CE} = −1 V, I_C = −1 mA	80	—	—	
			V_{CE} = −1 V, I_C = −10 mA	100	—	300	
			V_{CE} = −1 V, I_C = −50 mA	60	—	—	
			V_{CE} = −1 V, I_C = −100 mA	30	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = −10 mA, I_B = −1 mA	—	—	−0.25	V
			I_C = −50 mA, I_B = −5 mA	—	—	−0.40	
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = −10 mA, I_B = −1 mA	—	—	−0.85	V
			I_C = −50 mA, I_B = −5 mA	—	—	−0.95	
Transition frequency		f_T	V_{CE} = −10 V, I_C = −1 mA	80	—	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = −10 V, I_E = 0 mA, f = 1 MHz	—	4	7	pF
Noise figure		NF	V_{CE} = −6 V, I_C = −0.1 mA, f = 1 kHz, R_G = 10 kΩ,	—	—	10	dB
Switching times	delay time	td	 I_C = -10mA, I_{B1} = -I_{B2} = -1mA	—	—	55	ns
	rise time	tr		—	—	55	
	storage time	ts		—	—	1000	
	fall time	tf		—	—	65	

5. Characteristics Curves (Note)

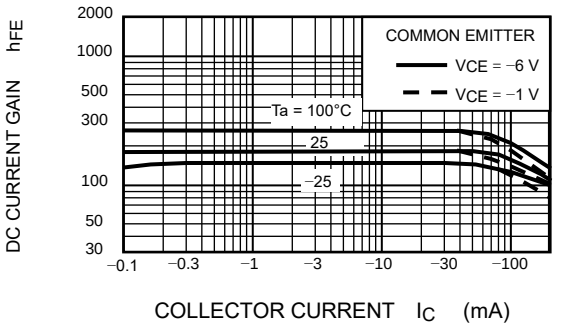
$I_C - V_{CE}$



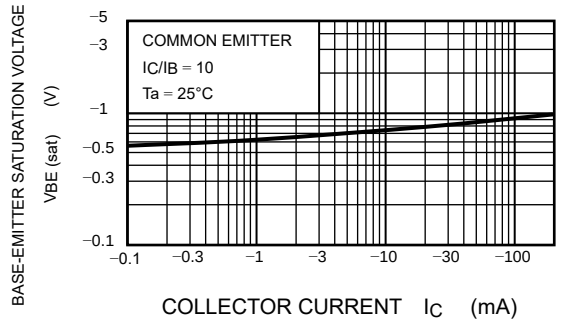
$I_B - V_{BE}$



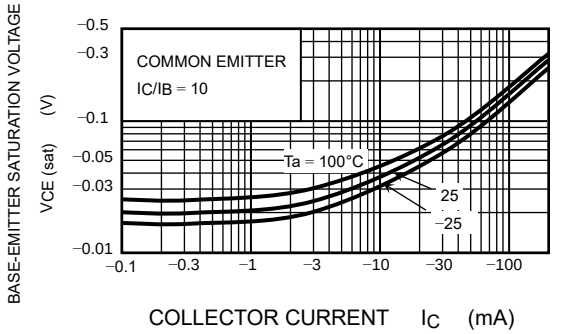
$h_{FE} - I_C$



$V_{BE\ (sat)} - I_C$



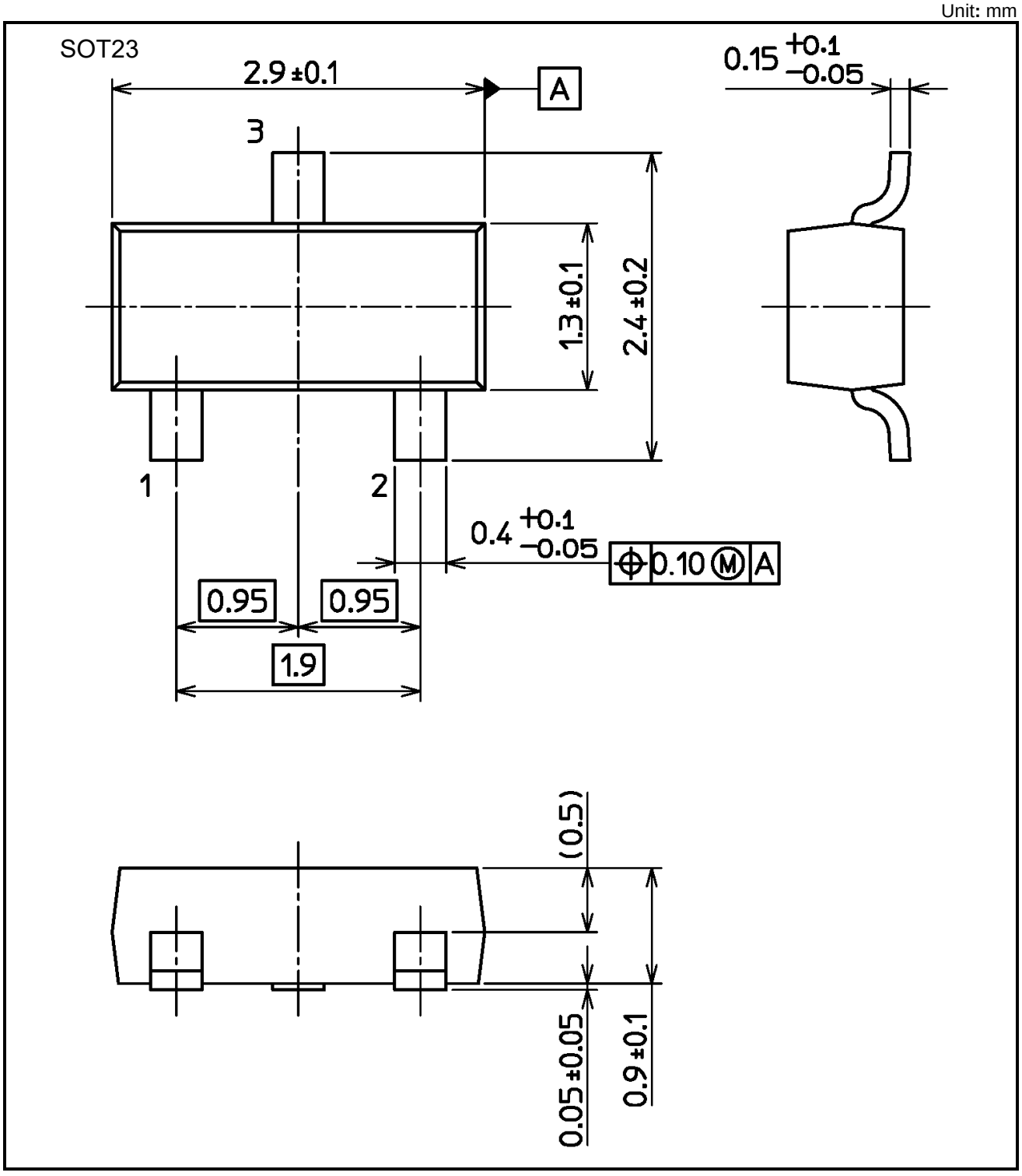
$V_{CE\ (sat)} - I_C$



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

6. Package Dimensions

Unit: mm



Weight: 9.0 mg (typ.)

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