

Bipolar Transistors Silicon PNP Epitaxial Type

# 2SA1162

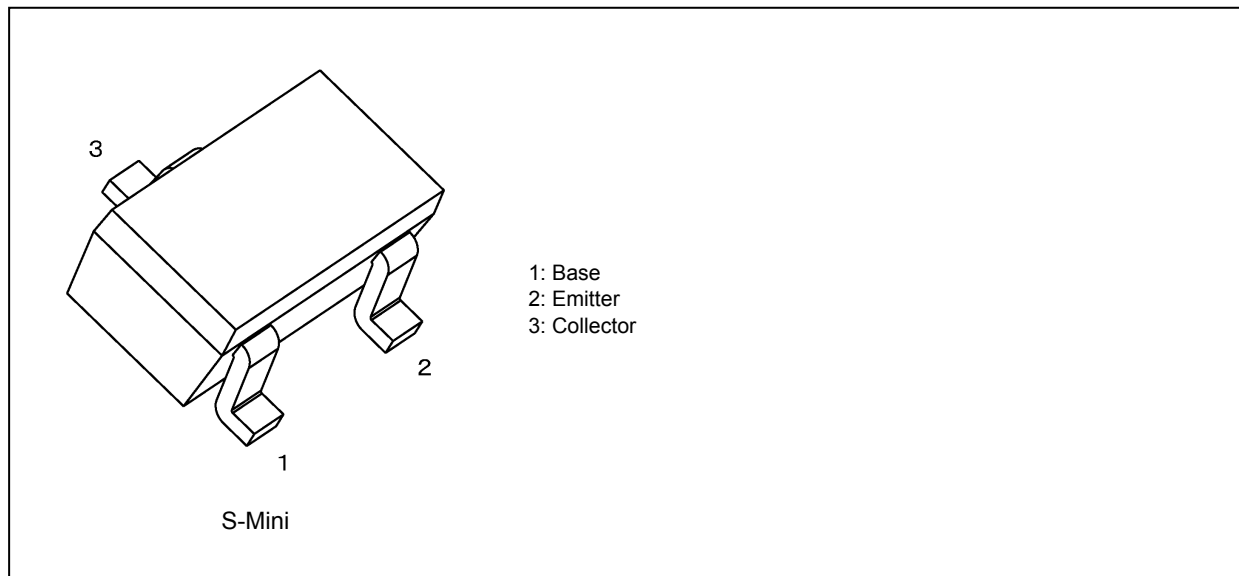
## 1. Applications

- Low-Frequency Amplifiers
- Audio Frequency General Purpose Amplifier Applications

## 2. Features

- (1) AEC-Q101 qualified (Please see the orderable part number list)
- (2) High voltage:  $V_{CEO} = -50\text{ V}$
- (3) High collector current:  $I_C = -150\text{ mA}$  (max)
- (4) High  $h_{FE}$ :  $h_{FE} = 70$  to  $400$
- (5) Excellent  $h_{FE}$  linearity:  $h_{FE}(I_C = -0.1\text{ mA})/h_{FE}(I_C = -2\text{ mA}) = 0.95$  (typ.)
- (6) Low noise:  $NF = 1\text{ dB}$  (typ.),  $10\text{ dB}$  (max)
- (7) Complementary to 2SC2712

## 3. Packaging



Start of commercial production

1982-12

## 4. Orderable part number

Orderable part number		AEC-Q101	Note
2SA1162-O	2SA1162-O,LF	—	General Use
	2SA1162-O,LXGF	YES (Note 1)	Unintended Use (Note 1)
	2SA1162-O,LXHF	YES	Automotive Use
2SA1162-Y	2SA1162-Y,LF	—	General Use
	2SA1162-Y,LXGF	YES (Note 1)	Unintended Use (Note 1)
	2SA1162-Y,LXHF	YES	Automotive Use
2SA1162-GR	2SA1162-GR,LF	—	General Use
	2SA1162-GR,LXGF	YES (Note 1)	Unintended Use (Note 1)
	2SA1162-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, $T_a = 25\text{ }^{\circ}\text{C}$ )

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 (DC)		$I_C$	-150	mA
Base current		$I_B$	-30	mA
Collector power dissipation	(Note 2), (Note 4)	$P_C$	200	mW
	(Note 3)		150	
Junction temperature	(Note 2)	$T_j$	150	$^{\circ}\text{C}$
	(Note 3)		125	
Storage temperature	(Note 2)	$T_{stg}$	-55 to 150	$^{\circ}\text{C}$
	(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).

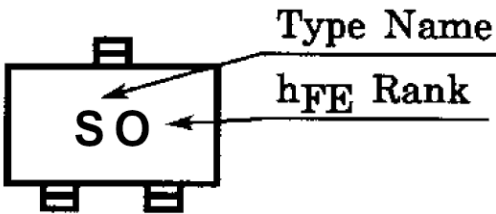
Note 4: Device mounted on an 25.4 mm × 25.4 mm × 1.6 mm FR4 glass epoxy board (Cu pad: 0.8 mm<sup>2</sup> × 3)

6. Electrical Characteristics (Unless otherwise specified, T<sub>a</sub> = 25 °C)

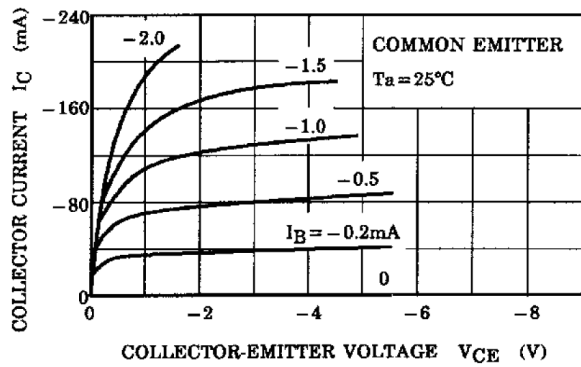
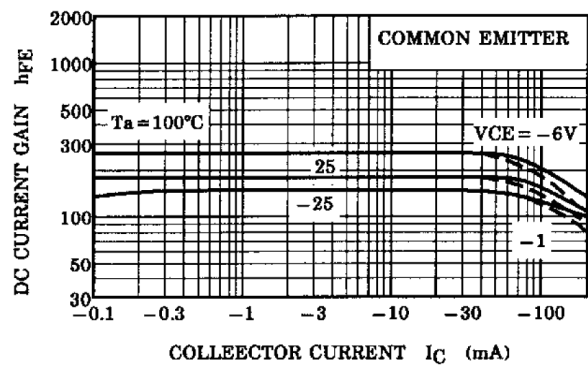
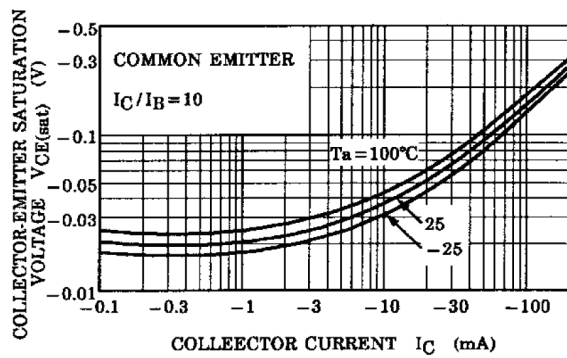
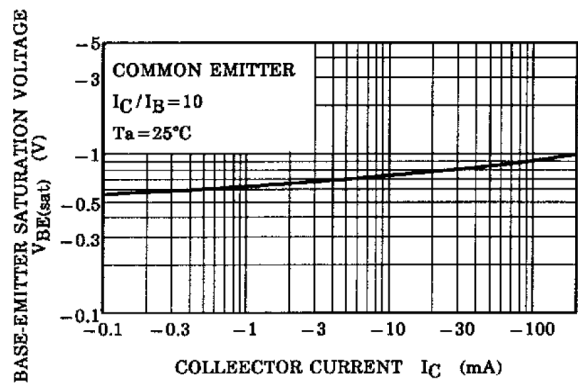
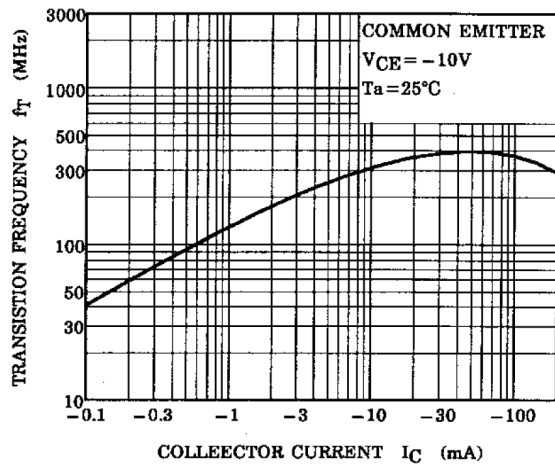
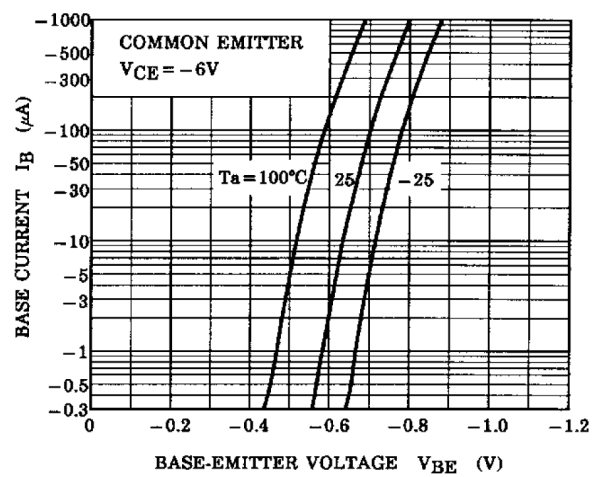
Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>		V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0 A	—	—	-0.1	μA
Emitter cut-off current	I <sub>EBO</sub>		V <sub>EB</sub> = -5 V, I <sub>C</sub> = 0 mA	—	—	-0.1	μA
DC current gain	h <sub>FE</sub>	(Note 5)	V <sub>CE</sub> = -6 V, I <sub>C</sub> = -2 mA	70	—	400	—
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>		I <sub>C</sub> = -100 mA, I <sub>B</sub> = -10 mA	—	-0.1	-0.3	V
Transition frequency	f <sub>T</sub>		V <sub>CE</sub> = -10 V, I <sub>C</sub> = -1 mA	80	—	—	MHz
Collector output capacitance	C <sub>ob</sub>		V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0 A, f = 1 MHz	—	4	7	pF
Noise figure	NF		V <sub>CE</sub> = -6 V, I <sub>C</sub> = -0.1 mA, f = 1 kHz, R <sub>G</sub> = 10 kΩ	—	1.0	10	dB

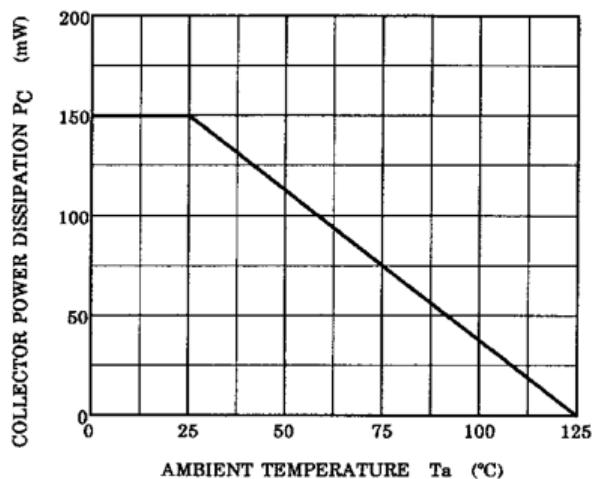
Note 5: h<sub>FE</sub> classification O (O): 70 to 140, Y (Y): 120 to 240, GR (G): 200 to 400  
( ) marking symbol

7. Marking

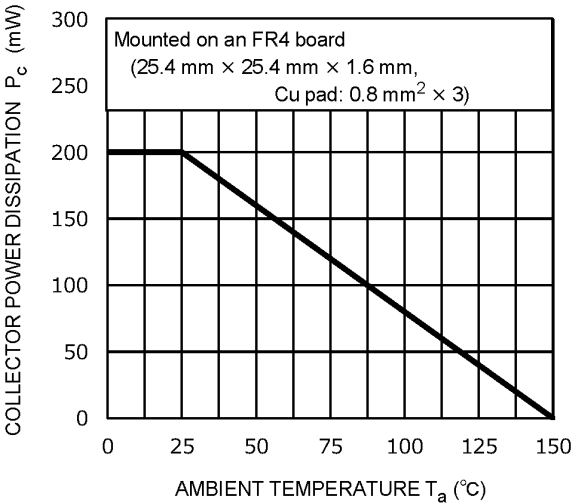


## 8. Characteristics Curves (Note)


Fig. 8.1 I<sub>C</sub> - V<sub>CE</sub>

Fig. 8.2 h<sub>FE</sub> - I<sub>C</sub>

Fig. 8.3 V<sub>CE(sat)</sub> - I<sub>C</sub>

Fig. 8.4 V<sub>BE(sat)</sub> - I<sub>C</sub>

Fig. 8.5 f<sub>T</sub> - I<sub>C</sub>

Fig. 8.6 I<sub>B</sub> - V<sub>BE</sub>



**Fig. 8.7 P<sub>C</sub> - T<sub>a</sub>**  
Reference only with T<sub>j</sub> of 125 °C.

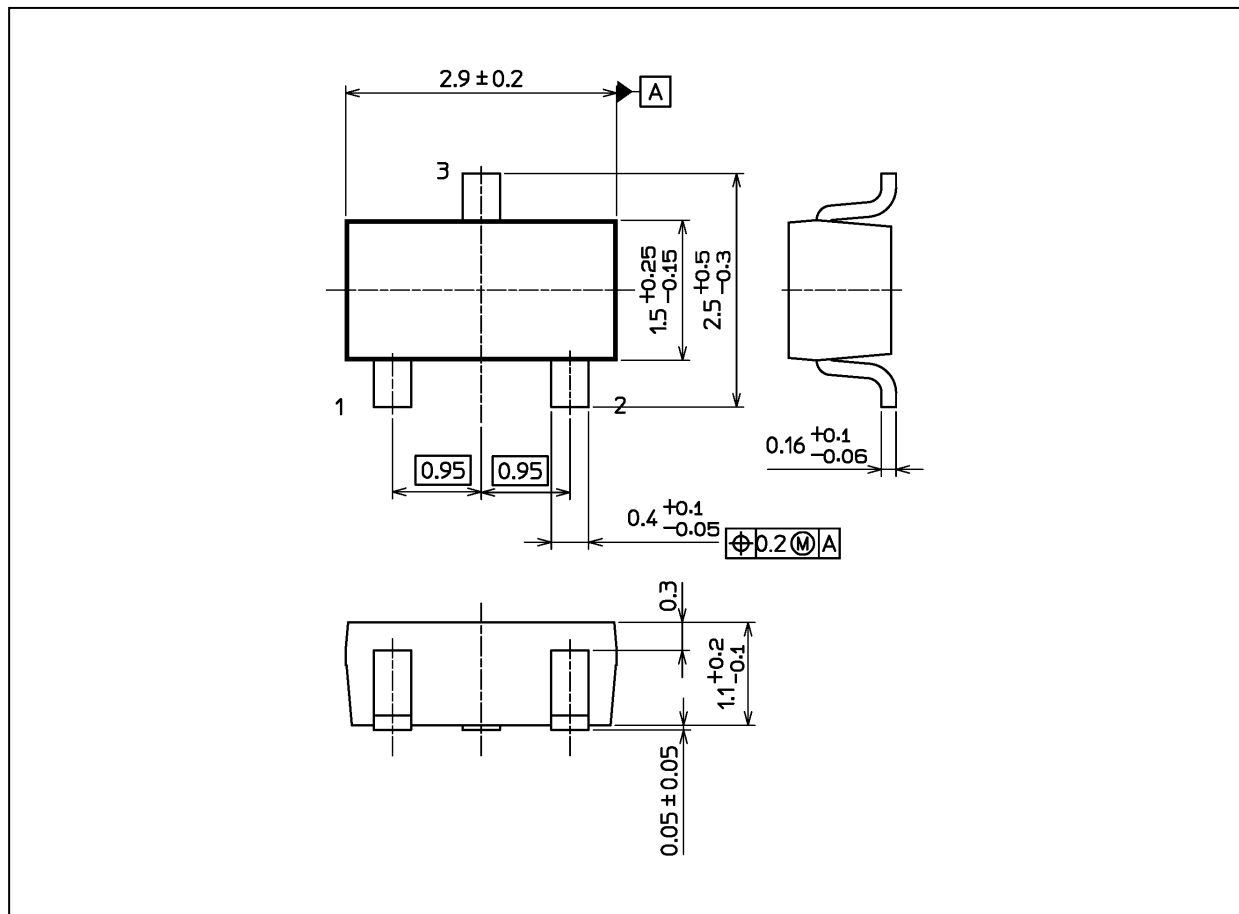


**Fig. 8.8 P<sub>C</sub> - T<sub>a</sub>**  
Reference only with T<sub>j</sub> of 150 °C.

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

## Package Dimensions

Unit: mm



Weight: 12 mg (typ.)

Package Name(s)
TOSHIBA: 2-3F1S
Nickname: S-Mini

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