

# 2SA1235A 2SA1602A

# 2SA1993

FOR LOW FREQUENCY AMPLIFY APPLICATION  
SILICON PNP EPITAXIAL TYPE(Super mini type)

## FEATURE

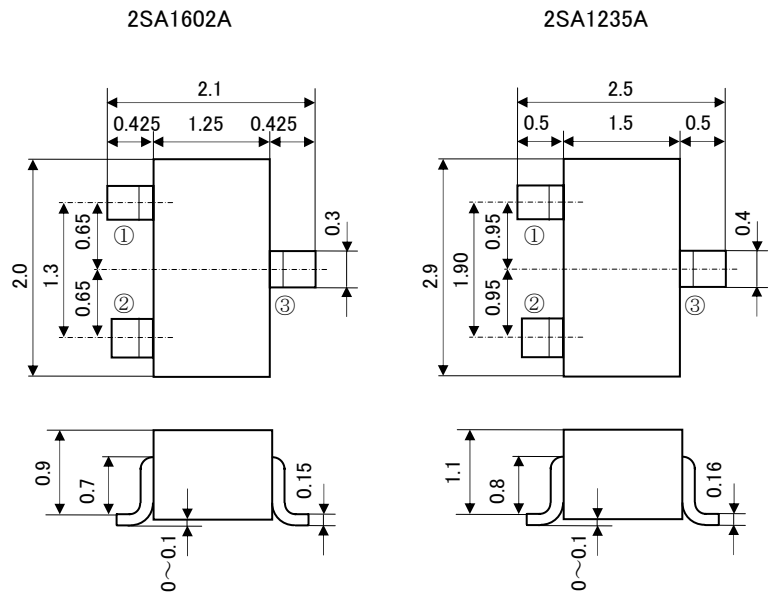
- Super mini package for easy mounting
- Excellent linearity of DC forward gain
- Small collector to emitter saturation voltage  
VCE(sat)=-0.3V max

## APPLICATION

For Hybrid IC, small type machine low frequency voltage Amplify application

## OUTLINE DRAWING

Unit: mm



JEITA: SC-70  
JEDEC: -

### TERMINAL CONNECTER

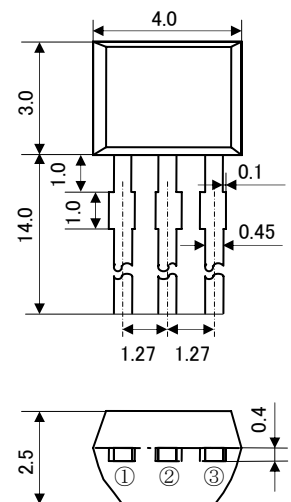
- ①: BASE
- ②: EMITTER
- ③: COLLECTOR

JEITA: SC-59  
JEDEC: TO-236 類似

### TERMINAL CONNECTER

- ①: BASE
- ②: EMITTER
- ③: COLLECTOR

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JEITA: -  
JEDEC: -

### TERMINAL CONNECTER

- ①: EMITTER
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**MAXIMUM RATINGS(Ta=25°C)**

Symbol	Parameter	Ratings			Unit
		2SA1235A	2SA1602A	2SA1993	
V <sub>CBO</sub>	Collector to Base voltage	-60	-60	-50	V
V <sub>EBO</sub>	Emitter to Base voltage	-6			V
V <sub>CEO</sub>	Collector to Emitter voltage	-50			V
I <sub>C</sub>	Collector current	200			mA
P <sub>C</sub>	Collector dissipation	200	200	450	mW
T <sub>J</sub>	Junction temperature	+150			°C
T <sub>stg</sub>	Storage temperature	-55~+150			°C

**ELECTRICAL CHARACTERISTICS(Ta=25°C)**

Parameter	Symbol	Test conditions	Limits			Unit
			Min	Typ	Max	
V <sub>(BR)CEO</sub>	C to E break down voltage	I <sub>C</sub> = -100 μA, R <sub>BE</sub> = ∞	-50			V
I <sub>CBO</sub>	Collector cut off current Emitter cut off current	2SA1993			-0.1	μA
		2SA1235A, 2SA1602A			-0.1	
I <sub>EBO</sub>	DC forward current gain	V <sub>EB</sub> = -6V, I <sub>C</sub> = 0			-0.1	μA
h <sub>FE</sub> *	DC forward current gain	V <sub>CE</sub> = -6V, I <sub>C</sub> = -1mA	150		500	—
h <sub>FE</sub>	C to E Saturation Voltage	2SA1993	50			—
		2SA1235A, 2SA1602A	90			—
V <sub>CE(sat)</sub>	Gain bandwidth product	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA			-0.3	V
f <sub>T</sub>	Collector output capacitance	V <sub>CE</sub> = -6V, I <sub>E</sub> = 10mA		200		MHz
Cob	C to E break down voltage	V <sub>CB</sub> = -6V, I <sub>E</sub> = 0, f = 1MHz		4.0		pF
NF	Noise figure	V <sub>CE</sub> = -6V, I <sub>E</sub> = 0.3mA, f = 100Hz, R <sub>G</sub> = 10kΩ			20	dB

\*: It shows hFE classification in below table.

		E	F
hFE	2SA1235A	150~300	250~500
	2SA1602A		
	2SA1993		

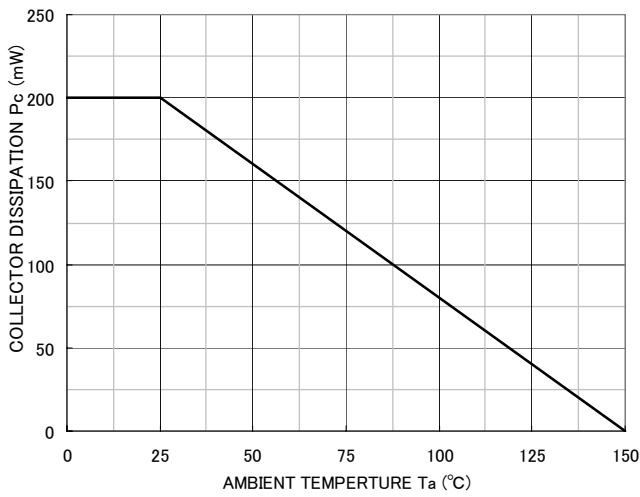
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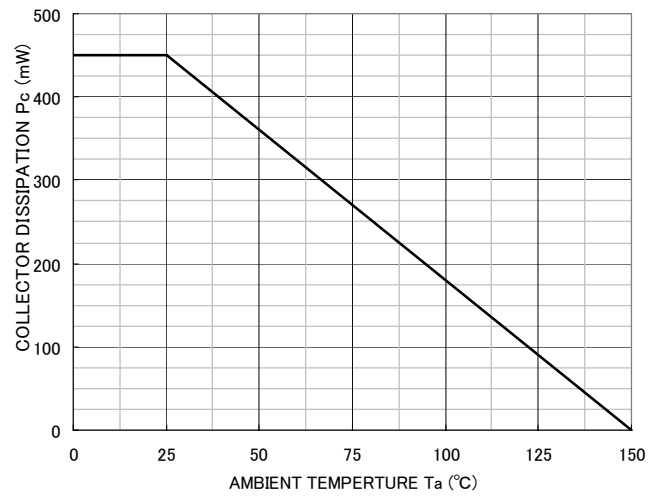
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COLLECTOR DISSIPATION VS.AMBIENT TEMPERATURE



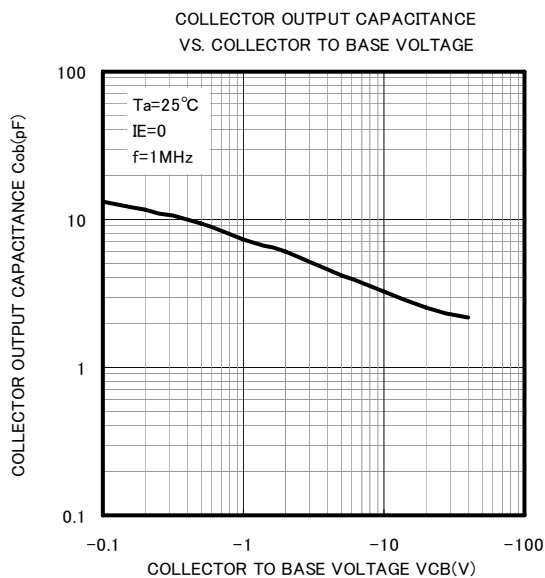
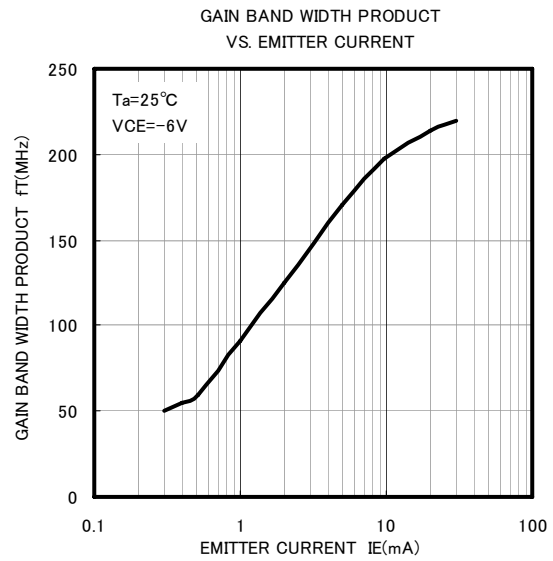
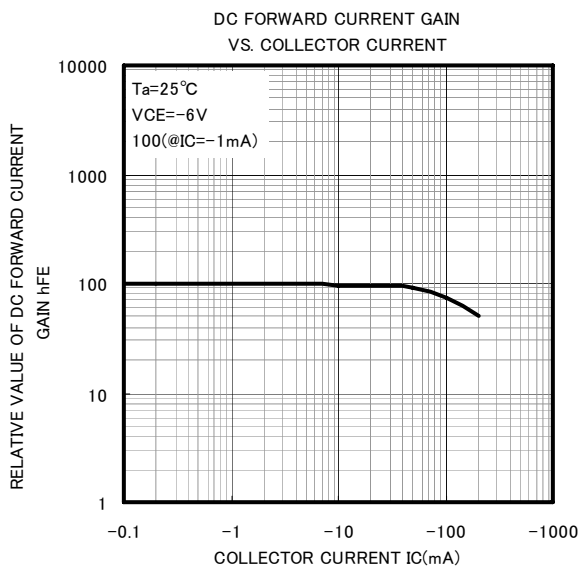
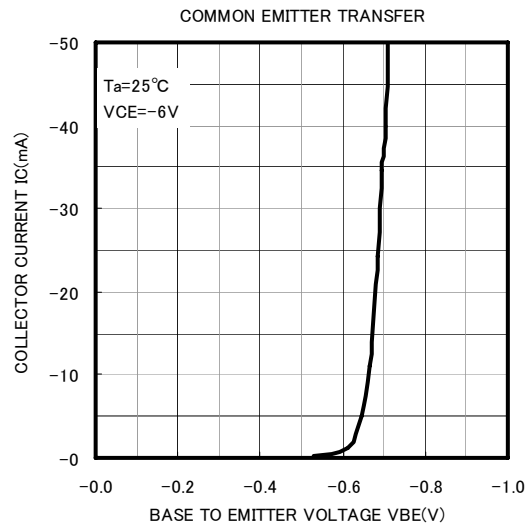
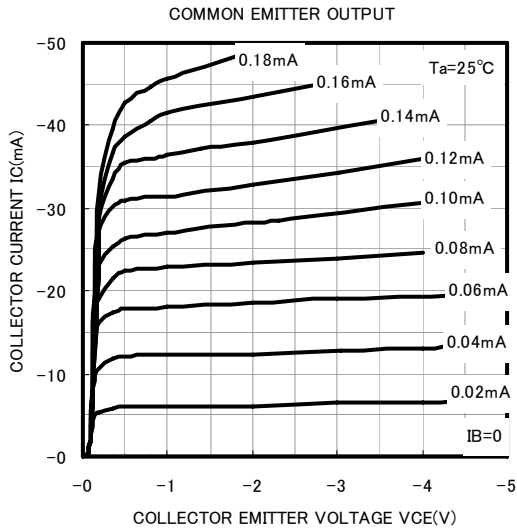
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COLLECTOR DISSIPATION VS.AMBIENT TEMPERATURE



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