

**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

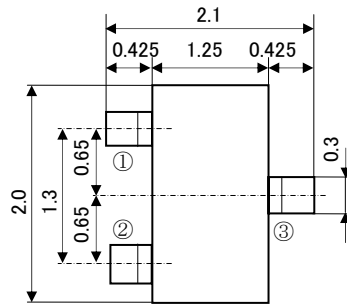
**APPLICATION**

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

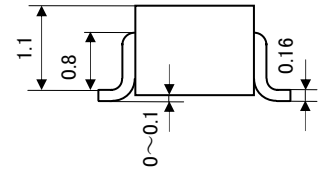
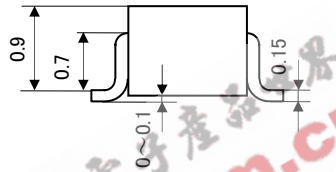
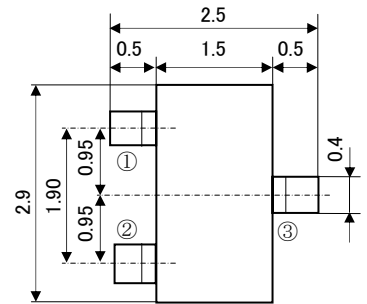
**OUTLINE DRAWING**

Unit: mm

2SA1602A



2SA1235A



JEITA: SC-70  
JEDEC: —

JEITA: SC-59  
JEDEC: TO-236 類似

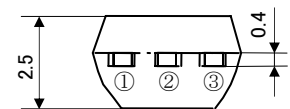
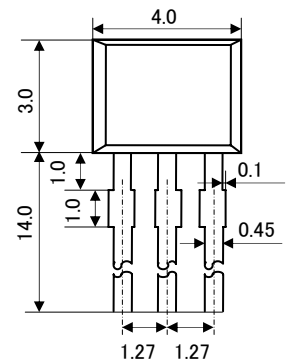
**TERMINAL CONNECTER**

- ①: BASE
- ②: EMITTER
- ③: COLLECTOR

**TERMINAL CONNECTER**

- ①: BASE
- ②: EMITTER
- ③: COLLECTOR

2SA1993



JEITA: —  
JEDEC: —

**TERMINAL CONNECTER**

- ①: EMITTER
- ②: COLLECTOR
- ③: BASE

**2SA1235A 2SA1602A**

**2SA1993**

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

**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		

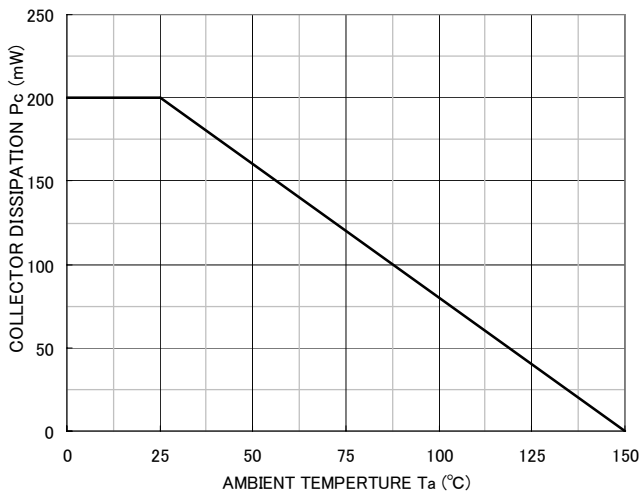
**2SA1235A 2SA1602A**

**2SA1993**

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

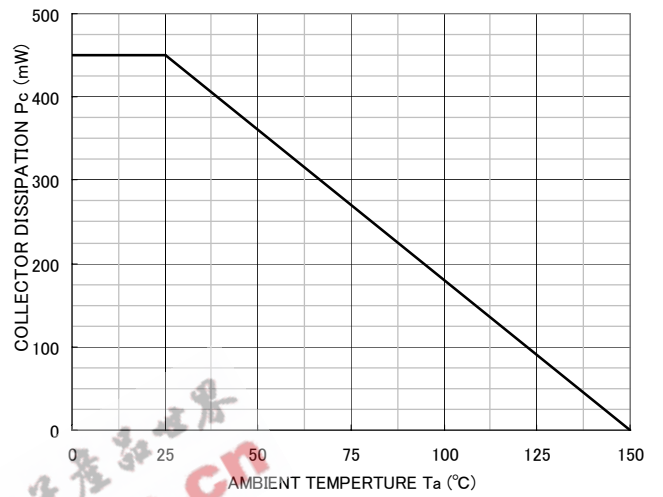
2SA1235A, 2SA1602

COLLECTOR DISSIPATION VS.AMBIENT TEMPERATURE



2SA1993

COLLECTOR DISSIPATION VS.AMBIENT TEMPERATURE

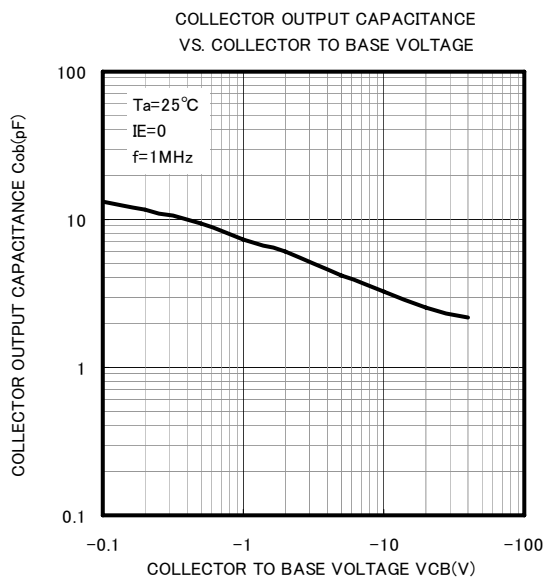
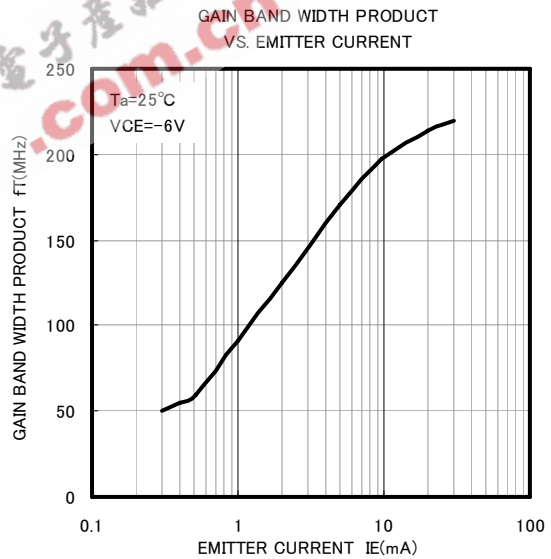
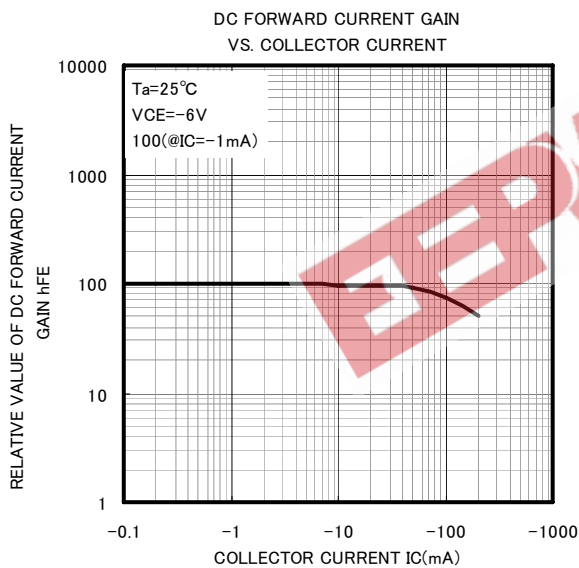
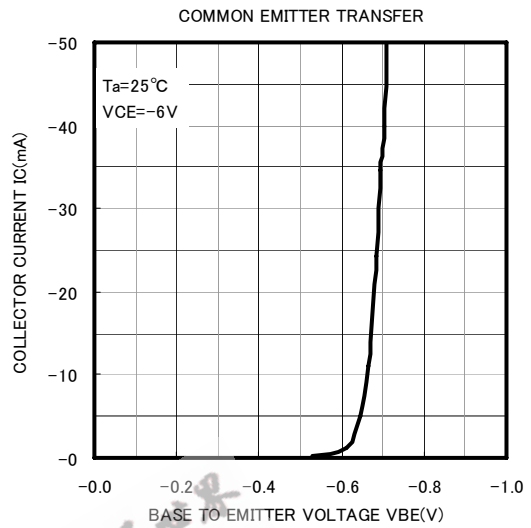
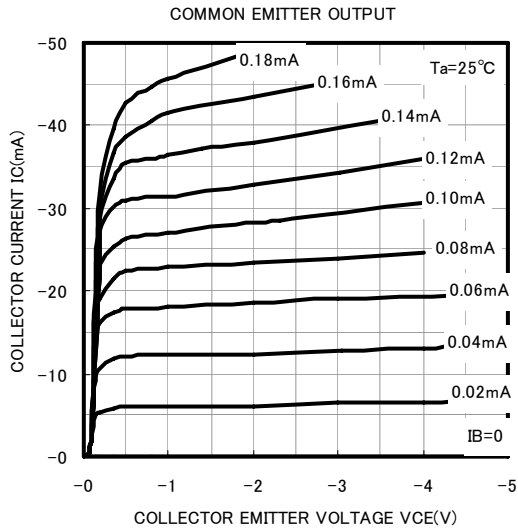


EEPW.com.cn 電子產品世界

# 2SA1235A 2SA1602A

# 2SA1993

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





*Marketing division, Marketing planning department*

6-41 Tsukuba, Isahaya, Nagasaki, 854-0065 Japan

**Keep safety first in your circuit designs!**

• ISAHAYA Electronics Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (1) placement of substitutive, auxiliary, (2) use of non-flammable material or (3) prevention against any malfunction or mishap.

**Notes regarding these materials**

- These materials are intended as a reference to our customers in the selection of the ISAHAYA products best suited to the customer's application; they don't convey any license under any intellectual property rights, or any other rights, belonging ISAHAYA or third party.
- ISAHAYA Electronics Corporation assumes no responsibility for any damage, or infringement of any third party's rights, originating in the use of any product data, diagrams, charts or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams and charts, represent information on products at the time of publication of these materials, and are subject to change by ISAHAYA Electronics Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact ISAHAYA Electronics Corporation or an authorized ISAHAYA products distributor for the latest product information before purchasing product listed herein.
- ISAHAYA Electronics Corporation products are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact ISAHAYA electronics corporation or an authorized ISAHAYA products distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of ISAHAYA Electronics Corporation is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination. Any diversion or re-export contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact ISAHAYA Electronics Corporation or authorized ISAHAYA products distributor for further details on these materials or the products contained therein.