< SMALL-SIGNAL TRANSISTOR >

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

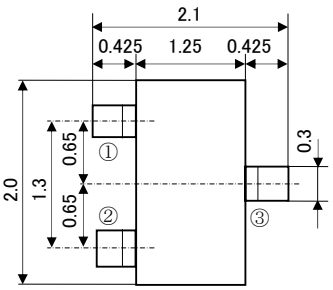
APPLICATION

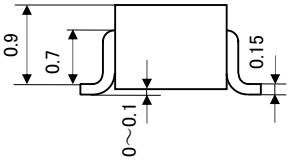
For Hybrid IC,small type machine low frequency voltageAmplify application

OUTLINE DRAWING

Unit:mm

2SA1602A

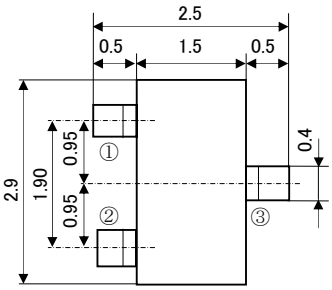


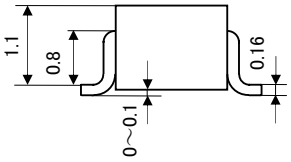


JEITA:SC-70
JEDEC:—

TERMINAL CONNECTER
①:BASE
②:EMITTER
③:COLLECTOR

2SA1235A

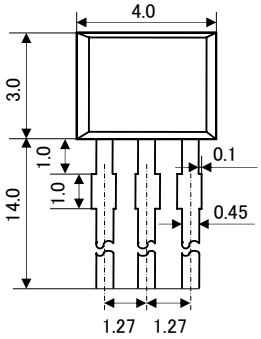


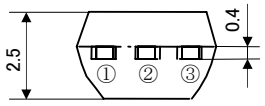


JEITA:SC-59
JEDEC:TO-236 類似

TERMINAL CONNECTER
①:BASE
②:EMITTER
③:COLLECTOR

2SA1993





JEITA:—
JEDEC:—

TERMINAL CONNECTER
①:EMITTER
②:COLLECTOR
③:BASE

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FOR LOW FREQUENCY AMPLIFY APPLICATION

SILICON PNP EPITAXIAL TYPE(Super mini type)

MAXIMUM RATINGS(Ta=25℃)

Symbol	Parameter	Ratings			Unit
		2SA1235A	2SA1602A	2SA1993	
V_{CBO}	Collector to Base voltage	−60	−60	−50	V
V_{EBO}	Emitter to Base voltage	−6			V
V_{CEO}	Collector to Emitter voltage	−50			V
I_C	Collector current	200			mA
P_C	Collector dissipation	200	200	450	mW
Tj	Junction temperature	+150			℃
Tstg	Storage temperature	−55～+150			℃

ELECTRICAL CHARACTERISTICS(Ta=25℃)

Parameter	Symbol	Test conditions		Limits			Unit
				Min	Typ	Max	
$V_{(BR)CEO}$	C to E break down voltage	I_C=−100μA, R_{BE}=∞		−50			V
I_{CBO}	Collector cut off current	2SA1993	V_{CB}=−50V, I_E=0			−0.1	μA
	Emitter cut off current	2SA1235A,2SA1602A	V_{CB}=−60V, I_E=0			−0.1	
I_{EBO}	DC forward current gain	V_{EB}=−6V, I_C=0				−0.1	μA
h_{FE}*	DC forward current gain	V_{CE}=−6V, I_C=−1mA		150		500	—
h_{FE}	C to E Saturation Vlotage	2SA1993	V_{CE}=−6V, I_C=−0.1mA	50			—
		2SA1235A,2SA1602A		90			—
$V_{CE(sat)}$	Gain bandwidth product	I_C=−100mA, I_B=−10mA				−0.3	V
f_T	Collector output capacitance	V_{CE}=−6V, I_E=10mA			200		MHz
Cob	C to E break down voltage	V_{CB}=−6V, I_E=0,f=1MHz			4.0		pF
NF	Noise figure	V_{CE}=−6V, I_E=0.3mA,f=100Hz,RG=10kΩ				20	dB

*: It shows hFE classification in below table.

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

< SMALL-SIGNAL TRANSISTOR >

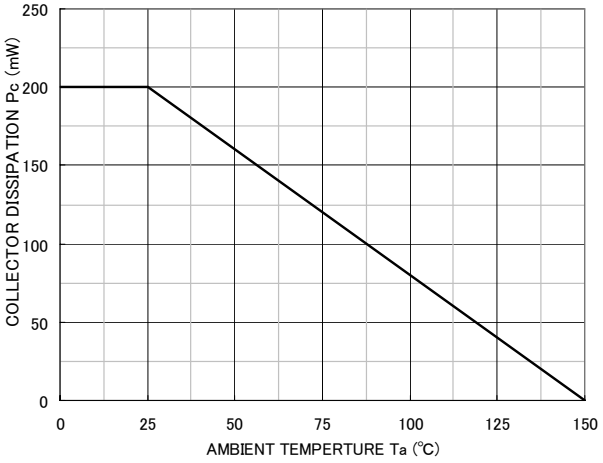
2SA1235A 2SA1602A
2SA1993

FOR LOW FREQUENCY AMPLIFY APPLICATION

SILICON PNP EPITAXIAL TYPE(Super mini type)

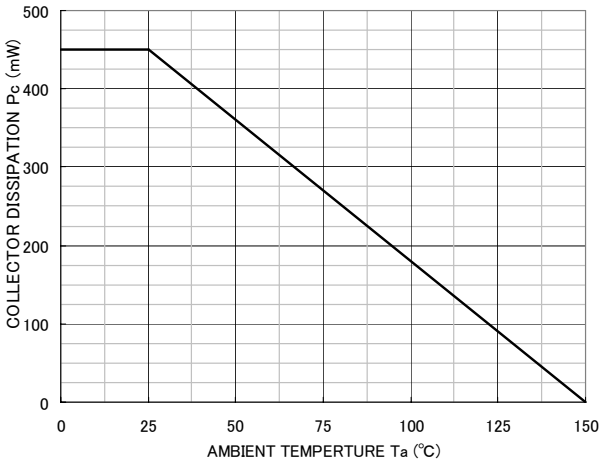
2SA1235A、2SA1602

COLLECTOR DISSIPATION VS.AMBIENT TEMPERTURE



2SA1993

COLLECTOR DISSIPATION VS.AMBIENT TEMPERTURE

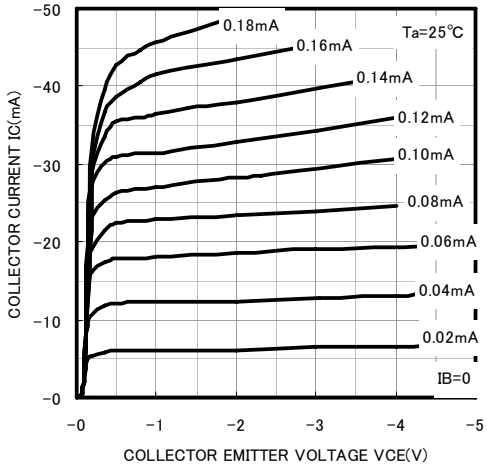


2SA1235A 2SA1602A 2SA1993

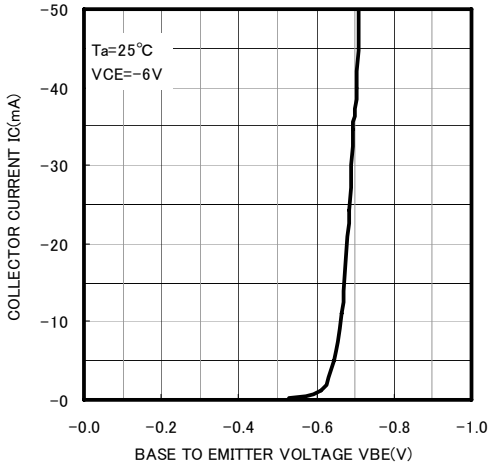
FOR LOW FREQUENCY AMPLIFY APPLICATION

SILICON PNP EPITAXIAL TYPE(Super mini type)

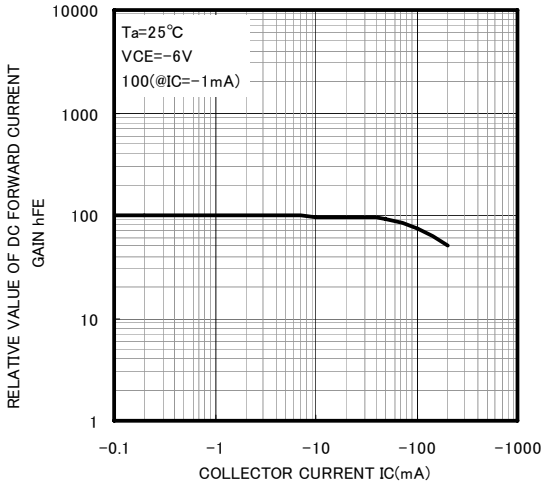
COMMON EMITTER OUTPUT



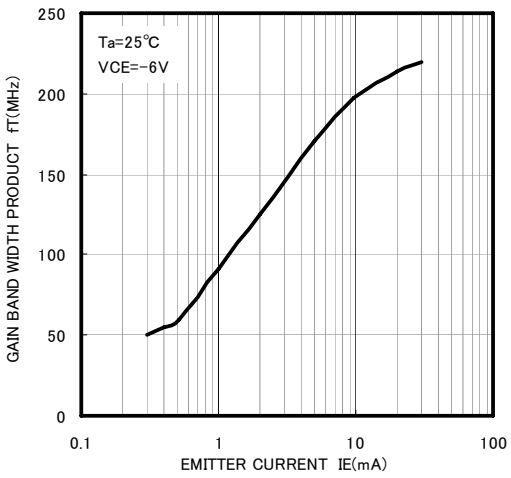
COMMON EMITTER TRANSFER



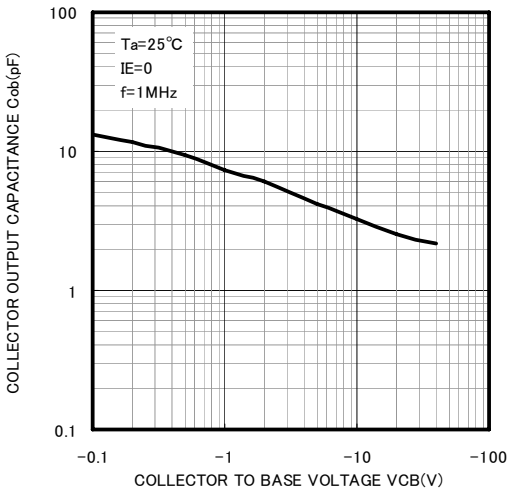
DC FORWARD CURRENT GAIN
VS. COLLECTOR CURRENT



GAIN BAND WIDTH PRODUCT
VS. EMITTER CURRENT



COLLECTOR OUTPUT CAPACITANCE
VS. COLLECTOR TO BASE VOLTAGE



ISAHAYA ELECTRONICS CORPORATION

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Jan.2007