〈Transistor〉

2SA1993

For Low Frequency Amplify Application
Silicon PNP Epitaxial Type Micro(Frame type)

DESCRIPTION

2SA1993 is a silicon PNP epitaxial type transistor. It is designed for low frequency voltage amplify application.

FEATURE

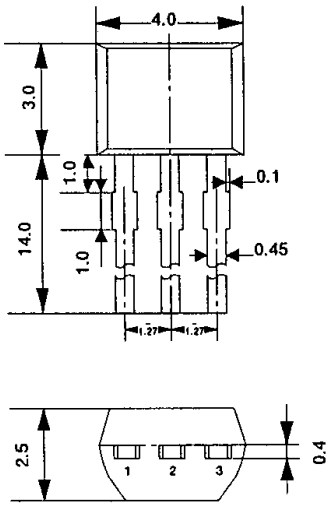
- Small collector to emitter saturation voltage.
  $V_{CE(sat)}$=-0.3V max (@ I_C=-100mA, I_B=-10mA)
- Excellent linearity of DC forward current gain
- Small package for easy mounting

APPLICATION

For small machine low frequency voltage amplify application.

OUTLINE DRAWING

UNIT:mm



TERMINAL CONNECTOR

① : EMITTER
② : COLLECTOR
③ : BASE

EIAJ : —
JEDEC :—

MAXIMUM RATINGS (Ta=25℃)

SYMBOL	PARAMETER	RATINGS	UNIT
V_{CBO}	Collector to Base voltage	-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 (Ta=25℃)	450	mW
T_j	Junction temperature	+125	℃
T_{stg}	Storage temperature	-55 to +125	℃

ELECTRICAL CHARACTERISTICS (Ta=25℃)

SYMBOL	PARAMETER	TESTCONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
$V_{(BR)CEO}$	C to E break down voltage	I_C=-100 μA, R_{BE}=∞	-50			V
I_{CBO}	Collector cut off current	V_{CB}=-50V, I_E=0			-0.1	μA
I_{EBO}	Emitter cut off current	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}	DC forward current gain	V_{CE}=-6V, I_C=-0.1mA	50			—
$V_{CE(sat)}$	C to E saturation voltage	I_C=-100mA, I_B=-10mA			-0.3	V
f_T	Gain band width product	V_{CE}=-6V, I_E=10mA		200		MHz
C_{ob}	Collector output capacitance	V_{CB}=-6V, I_E=0, f=1MHz		4.0		pF
NF	Noise figure	V_{CE}=-6V, I_E=0.3mA, f=100Hz, R_G=10kΩ			20	dB

ITEM	E	F
h_{FE}	150～300	250～500

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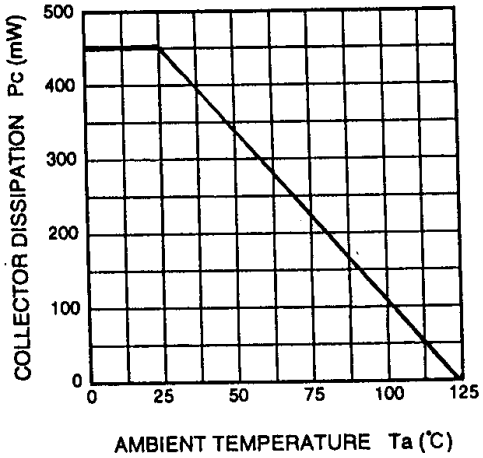
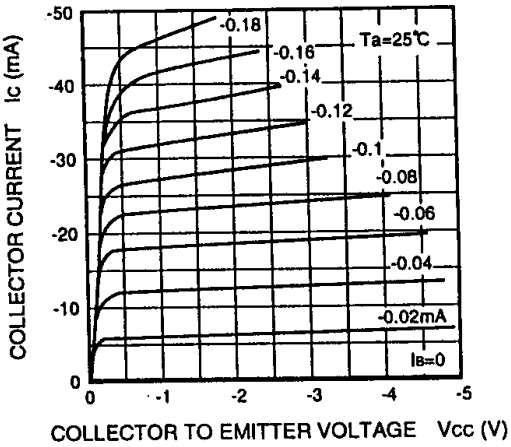
TYPICAL CHARACTERISTICS

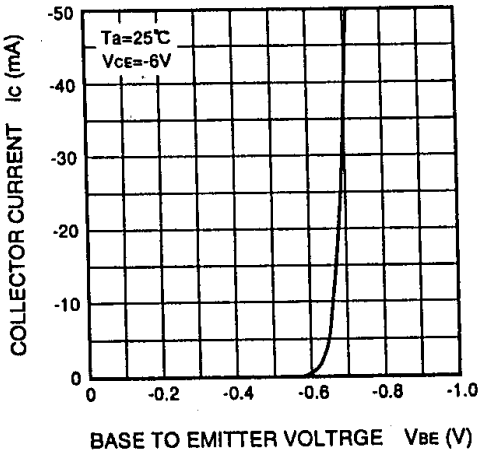
COLLECTOR DISSIPATION VS.AMBIENT TEMPERATURE



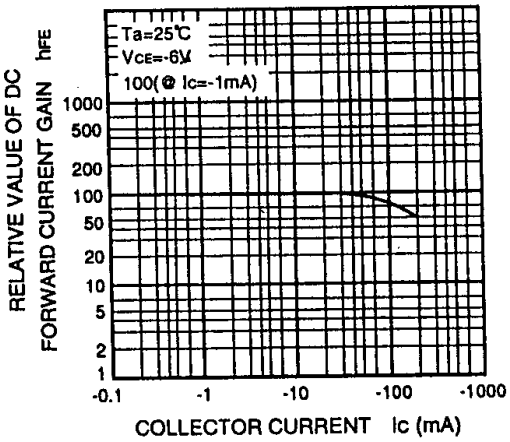
COMMON EMITTER OUTPUT



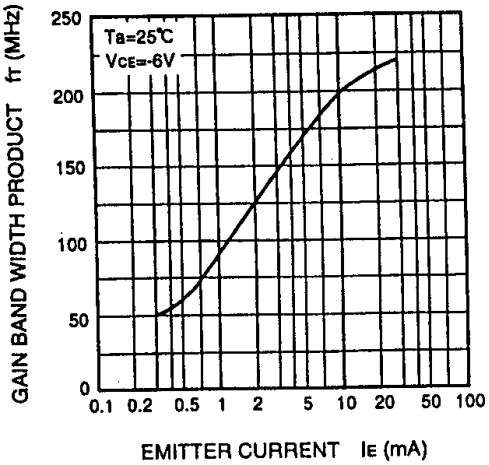
COMMON EMITTER TRANSFER



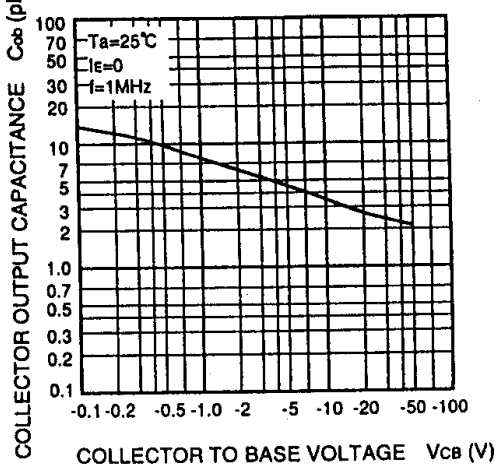
DC FORWORD CURRENT GAIN VS. COLLECTOR CURRENT



GAIN BAND WIDTH PRODUCT VS. EMITTER CURRENT



COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



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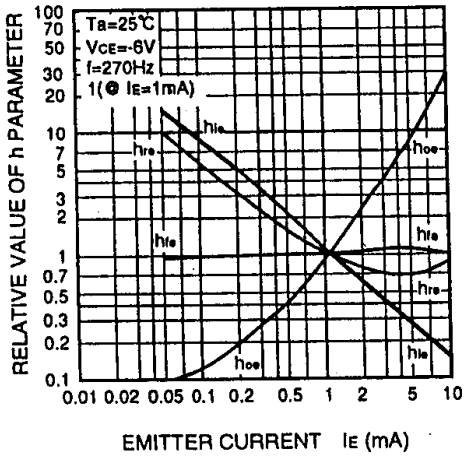
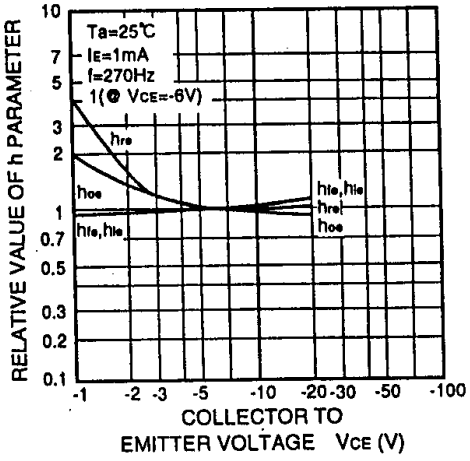
h PARAMETER VS. EMITTER CURRENT



h PARAMENTER VS. COLLECTOR TO EMITTER VOLTAGE



COMMON EMITTER h PARAMETER (TYPICAL VALUE)

Symbol	Parameter	Test conditions	Limits	Unit
hie	Closed loop small signal input impedance	Ta=25℃ VCE=-6V IE=1mA f=270Hz	7.0	kΩ
hre	Open loop small signal reverse voltage amplification factor		0.1	×10-3
hfe	Closed loop small signal forward current amplification factor		250	—
hoe	Open loop small signal output admittance		18	μS

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