

(SMALL-SIGNAL TRANSISTOR)

2SA1928

**DUAL TRANSISTOR
FOR LOW NOISE DIFFERENTIAL AMPLIFY APPLICATION
SILICON PNP EPITAXIAL TYPE**

DESCRIPTION

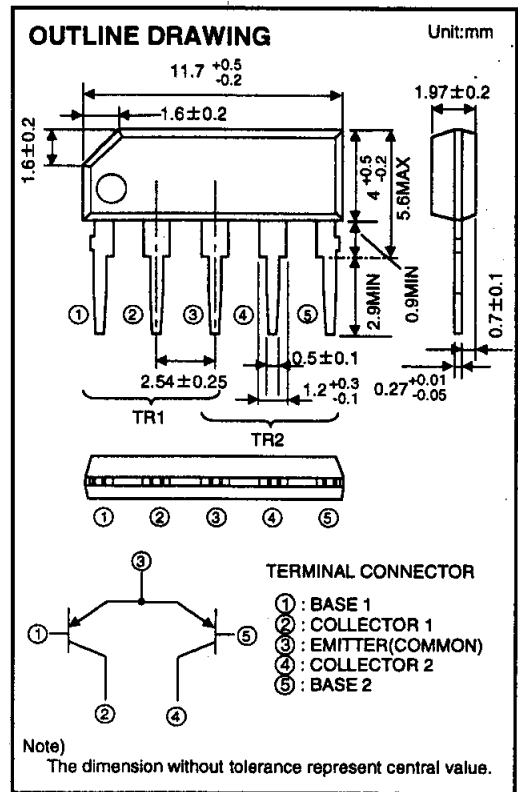
2SA1928 is a silicon PNP epitaxial type transistor. It is designed for low noise differential amplify application.

FEATURE

- High V_{CEO} $V_{CEO}=-100V$
- Low noise $NF=0.5dB$ typ $NV=100mV$ typ
- High h_{FE} $h_{FE}=250$ to 800
- Good two elements characteristics
 $h_{FE1}/h_{FE2}=0.98$ typ
 $|V_{BE1}-V_{BE2}|=1mV$ typ

APPLICATION

For Low noise differential amplify application.



MAXIMUM RATINGS ($T_a=25^{\circ}C$)

Symbol	Parameter	Ratings	Unit
V_{CBO}	Collector to Base voltage	-100	V
V_{EBO}	Emitter to Base voltage	-5	V
V_{CEO}	Collector to Emitter voltage	-100	V
I_C	Collector current	-50	mA
P_C	Collector dissipation ($T_a=25^{\circ}C$)	200	mW/unit
P_T	Total dissipation ($T_a=25^{\circ}C$)	400	mW
T_j	Junction temperature	+125	$^{\circ}C$
T_{stg}	Storage temperature	-55 to +125	$^{\circ}C$

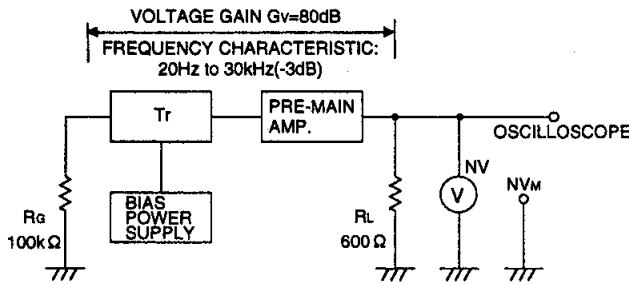
ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}C$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)CEO}$	C to E break down voltage	$I_C=-100\mu A, R_{BE}=\infty$	-100			V
I_{CBO}	Collector cut off current	$V_{CB}=-70V, I_E=0$			-0.1	μA
I_{EBO}	Emitter cut off current	$V_{EB}=-2V, I_C=0$			-0.1	μA
I_{CER}	Collector cut off current	$V_{CE}=-100V, R_{BE}=100k\Omega$			-10	μA
$h_{FE} *$	DC forward current gain	$V_{CE}=-6V, I_C=-1mA$	250		800	—
$V_{CE(sat)}$	C to E saturation voltage	$I_C=-10mA, I_B=-1mA$			-0.6	V
$ V_{BE1}-V_{BE2} $	B-E voltage differential	$V_{CE}=-6V, I_C=-1mA$		1	10	mV
h_{FE1}/h_{FE2}	DC forward current gain ratio	$V_{CE}=-6V, I_C=-1mA$	0.8	0.98	1.0	—
f_T	Gain band width product	$V_{CE}=-6V, I_E=1mA$		150		MHz
C_{ob}	Collector output capacitance	$V_{CB}=-6V, I_E=0, f=1MHz$		2.5		pF
NF	Noise figure	$V_{CE}=-6V, I_E=0.1mA, f=1kHz, R_G=10k\Omega$		0.5		dB
NV	Low frequency broadband noise voltage	effective value $V_{CE}=-10V, I_E=1mA, R_G=100k\Omega, G_v=80dB$ (Refer to test circuit)		100		mV
NVM			peaked value		0.5	

* : It shows h_{FE} (element 1) classification in right table.

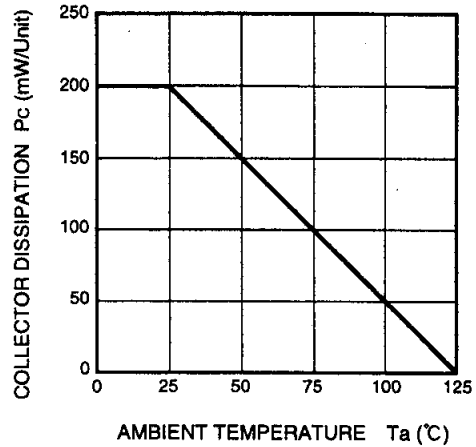
Item	F	G
h_{FE}	250 to 500	400 to 800

**LOW FREQUENCY WIDE BAND NOISE
VOLTAGE TEST CIRCUIT**

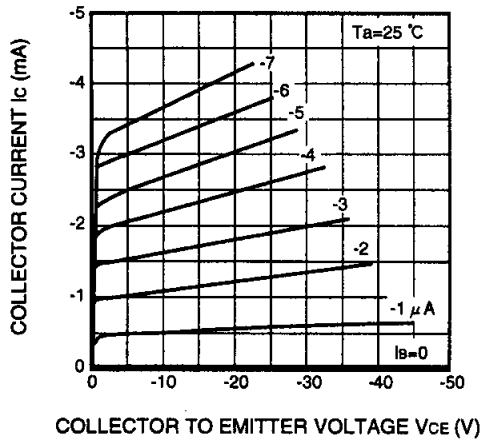


TYPICAL CHARACTERISTICS

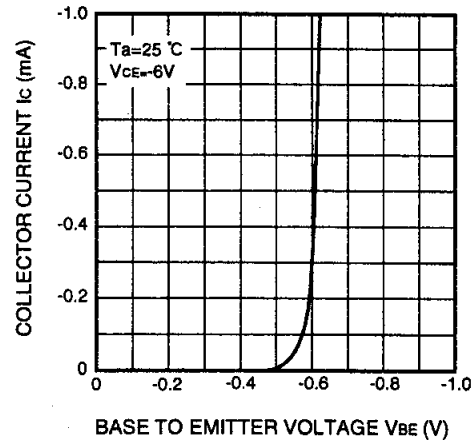
**COLLECTOR DISSIPATION
VS. AMBIENT TEMPERATURE**



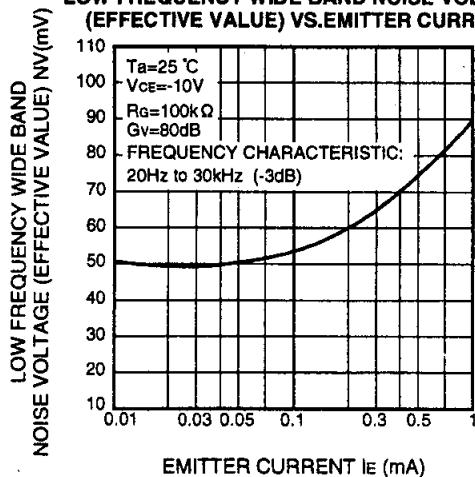
COMMON EMITTER OUTPUT



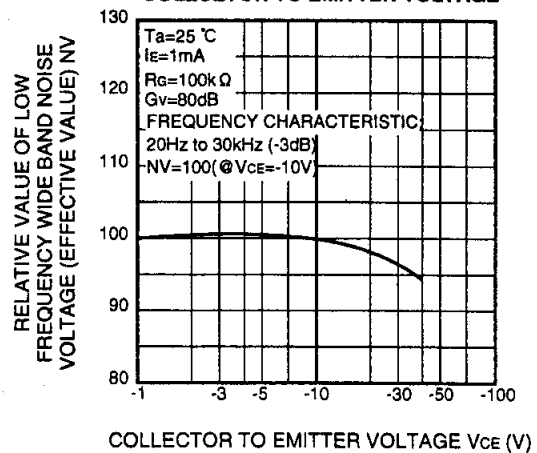
COMMON EMITTER TRANSFER



**LOW FREQUENCY WIDE BAND NOISE VOLTAGE
(EFFECTIVE VALUE) VS. EMITTER CURRENT**

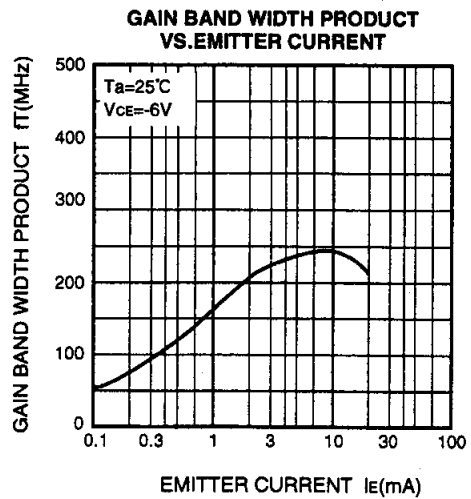
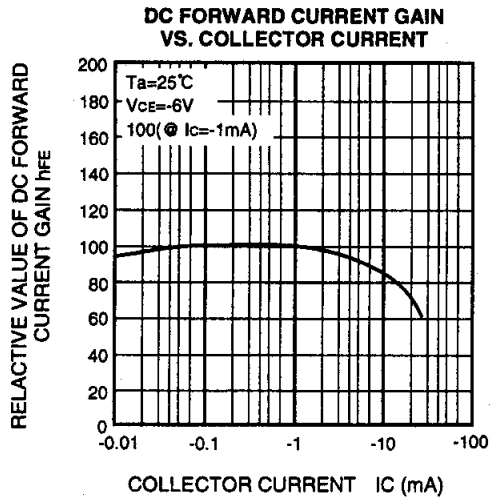
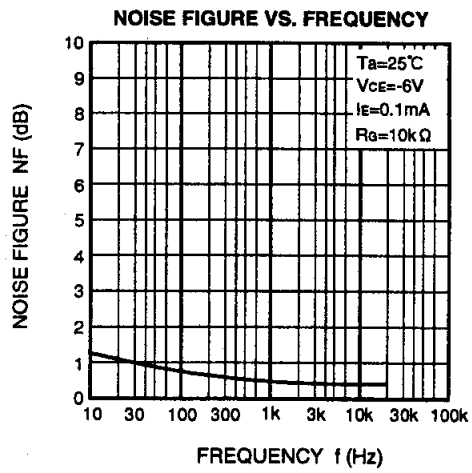
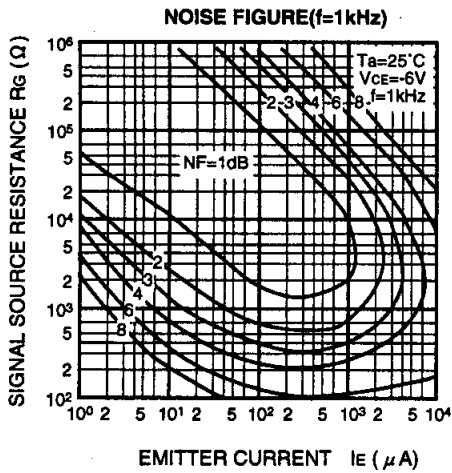
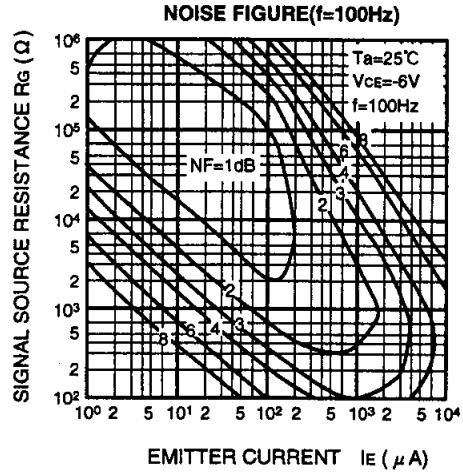
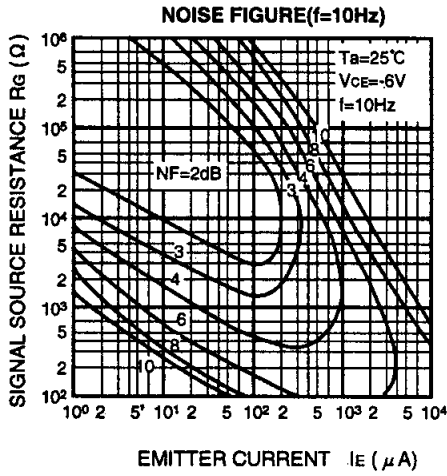


**LOW FREQUENCY WIDE BAND NOISE VOLTAGE (EFFECTIVE VALUE) VS.
COLLECTOR TO EMITTER VOLTAGE**



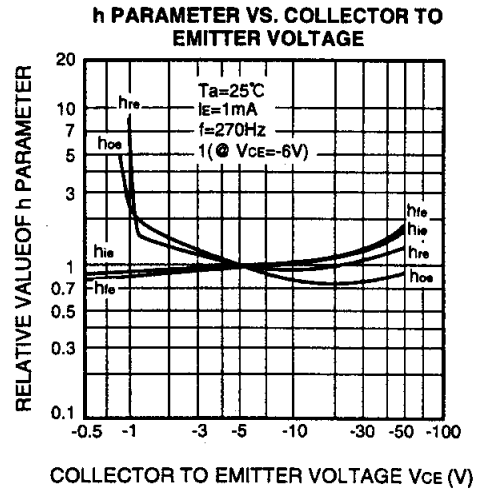
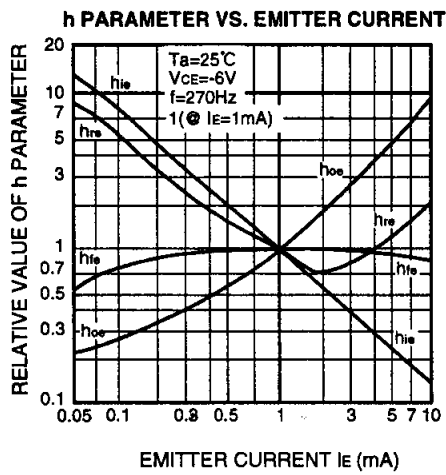
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COMMON EMITTER h PARAMETER (TYPICAL VALUE)

Symbol	Parameter	Test conditions	Limits	Unit
h_{ie}	Closed loop small signal input impedance	$T_a=25^\circ\text{C}$ $V_{CE}=-6\text{V}$ $I_E=1\text{mA}$ $f=270\text{Hz}$	14	$\text{k}\Omega$
h_{re}	Open loop small signal reverse voltage amplification factor		0.08	$\times 10^{-3}$
h_{fe}	Closed loop small signal forward current amplification factor		500	—
h_{oe}	Open loop small signal output admittance		19	μS

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