2SC5170

DUAL TRANSISTOR (BASE COMMON) FOR CONSTANT-CURRENT CIRCUIT, ACTIVE LOAD APPLICATION SILICON NPN EPITAXIAL TYPE

DESCRIPTION

Mitsubishi 2SC5170 is a silicon NPN epitaxial type transistor. It is designed for constant-current circuit, active load application.

FEATURE

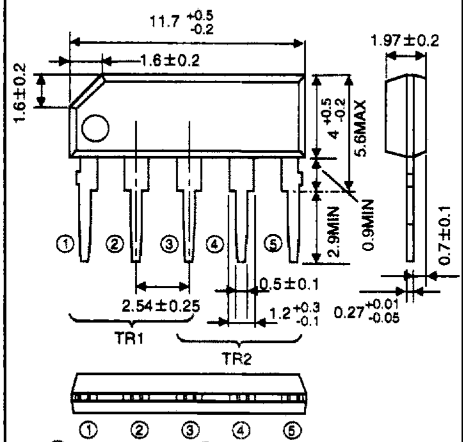
- ●High V_{CEO} V_{CEO}=100V
- ●Low noise NF=0.6dB typ (@R_G=1kΩ,I_E=-300μA,f=100Hz) NV=110mV typ
- ●High h_{FE} h_{FE}=250 to 800
- ●Good two elements characteristics
  - I_{C2}/I_{C1}=0.8 to 1.25
  - $|V_{BE1}-V_{BE2}|$=10mV max

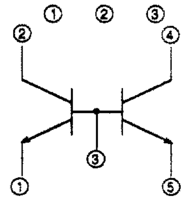
APPLICATION

For constant-current circuit, active load application.

OUTLINE DRAWING

Unit:mm





TERMINAL CONNECTOR
- ① : EMITTER 1
- ② : COLLECTOR 1
- ③ : BASE (COMMON)
- ④ : COLLECTOR 2
- ⑤ : EMITTER 2

Note)
The dimension without tolerance represent central value.

MAXIMUM RATINGS (Ta=25℃)

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	100	mA
P_C	Collector dissipation(Ta=25℃)	200	mW/unit
P_T	Total dissipation(Ta=25℃)	400	mW
T_j	Junction temperature	+125	℃
T_{stg}	Storage temperature	-55 to +125	℃

ELECTRICAL CHARACTERISTICS (Ta=25℃)

Symbol	Parameter		Test conditions	Limits			Unit
				Min	Typ	Max	
$V_{(BR)CEO}$	C to E break down voltage		I_C=100μA,R_{BE}=∞	100			V
I_{CBO}	Collector cut off current		V_{CB}=100V,I_E=0			0.1	μA
I_{EBO}	Emitter cut off current		V_{EB}=5V,I_C=0			0.1	μA
I_{CEO}	Collector cut off current		V_{CE}=100V,R_{BE}=∞			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			0.3	V
$\|V_{BE1}-V_{BE2}\|$	B-E voltage differential		V_{CE}=6V,I_C=1mA		1	10	mV
I_{C2}/I_{C1}	Collector current ratio		V_{CE}=6V,I_C=1mA (Refer to test circuit)	0.8		1.25	—
f_T	Gain band width product		V_{CE}=6V,I_E=1mA		100		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=-0.3mA,f=100Hz,R_G=1kΩ		0.6		dB
NV	Low frequency broadband noise voltage	effective value	V_{CE}=10V,I_E=-1mA,R_G=100kΩ,Gv=80dB,		110		mV
NV_M		peaked value	(Refer to test circuit)		0.6		V

* : It shows h_{FE} classification in right table.

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

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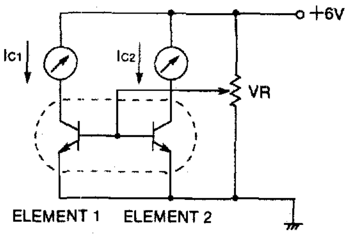
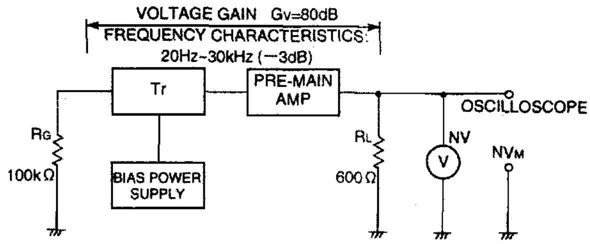
SILICON NPN EPITAXIAL TYPE

COLLECTOR CURRENT RATIO TEST CIRCUIT

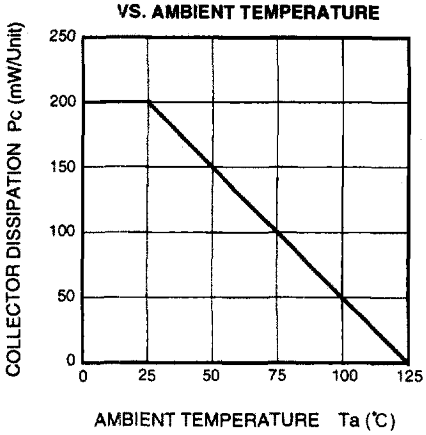


LOW FREQUENCY WIDE BAND NOISE VOLTAGE TEST CIRCUIT

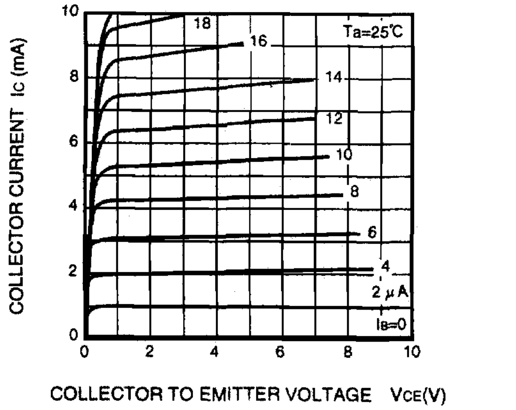


TYPICAL CHARACTERISTICS

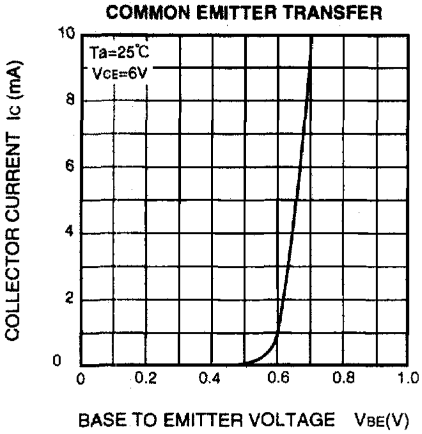
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



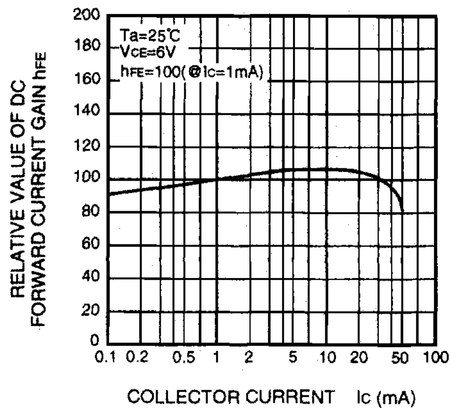
COMMON EMITTER OUTPUT



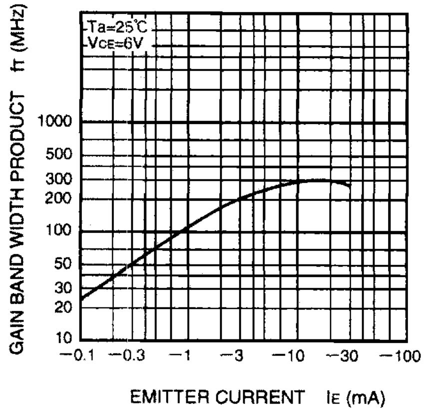
COMMON EMITTER TRANSFER



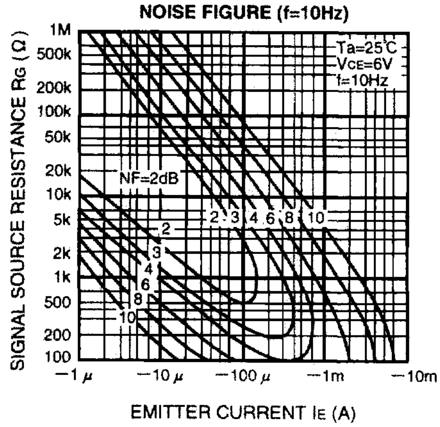
DC FORWARD CURRENT GAIN VS. COLLECTOR CURRENT



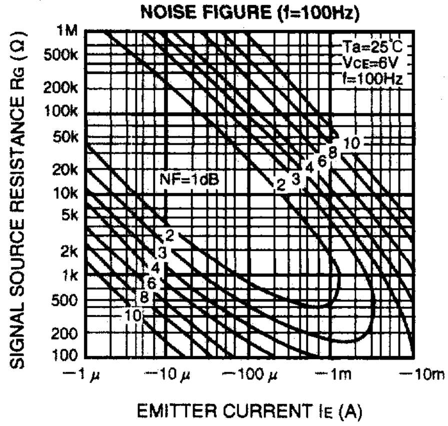
GAIN BAND WIDTH PRODUCT VS. EMITTER CURRENT



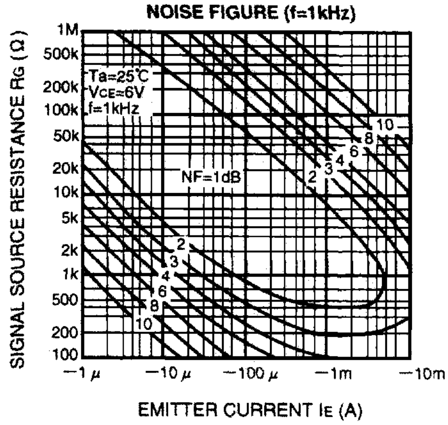
NOISE FIGURE (f=10Hz)



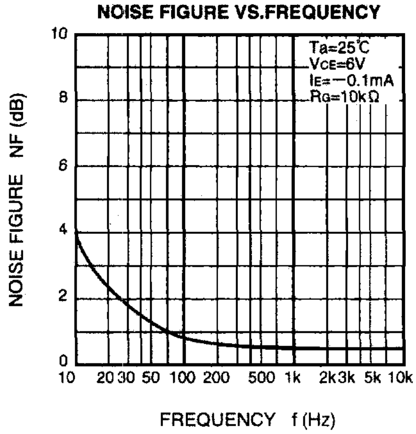
NOISE FIGURE (f=100Hz)



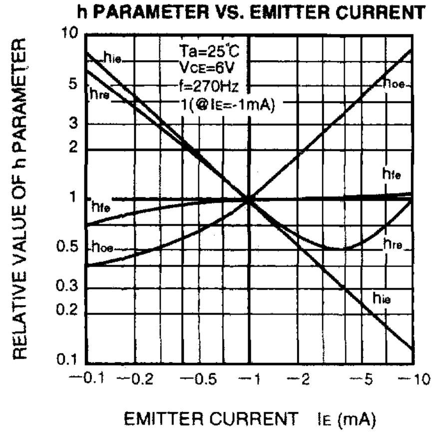
NOISE FIGURE (f=1kHz)



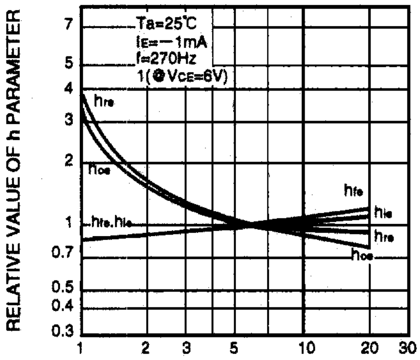
NOISE FIGURE VS.FREQUENCY



h PARAMETER VS. EMITTER CURRENT



h PARAMETER VS.
COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER VOLTAGE
VCE (V)

COMMON EMITTER h PARAMETER (TYPICAL VALUE)

Symbol	Parameter	Test conditions	Limits	Unit
hie	Closed loop small signal input impedance	Ta=25°C VCE=6V IE=-1mA f=270Hz	16	kΩ
hre	Open loop small signal reverse voltage amplification factor		0.14	×10⁻³
hfe	Closed loop small signal forward current amplification factor		600	—
hoe	Open loop small signal output admittance		12	μS

APPLICATION EXAMPLE

HI-FI AMPLIFIER APPLICATION EXAMPLE