

2SC5170

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

DESCRIPTION

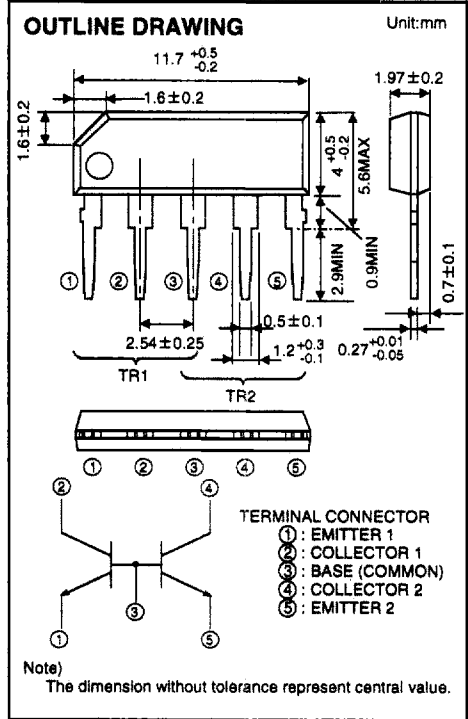
Mitsubishi 2SC5170 is a silicon NPN epitaxial type transistor. It is designed for constant-current circuit, active load application.

FEATURE

- High V_{CE0} $V_{CE0}=100V$
- Low noise $NF=0.6dB$ typ (@ $R_G=1k\Omega, I_E=-300\mu A, f=100Hz$) $NV=110mV$ 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.



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	100	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	$V_{CB}=100V, I_E=0$			0.1	μA
I_{EBO}	Emitter cut off current	$V_{EB}=5V, I_C=0$			0.1	μA
I_{CEO}	Collector cut off current	$V_{CE}=100V, R_{BE}=\infty$			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	$V_{CE}=6V, I_E=-0.3mA, f=100Hz, R_G=1k\Omega$		0.6		dB
NV	Low frequency broadband noise voltage	$V_{CE}=10V, I_E=-1mA, R_G=100k\Omega, G_v=80dB$, (Refer to test circuit)		110		mV
NVM				0.6		V

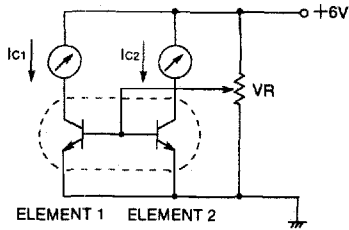
* : It shows h_{FE} classification in right table.

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

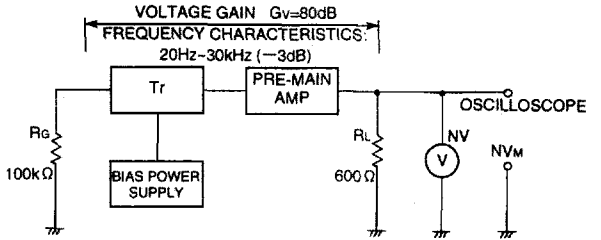
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COLLECTOR CURRENT RATIO TEST CIRCUIT

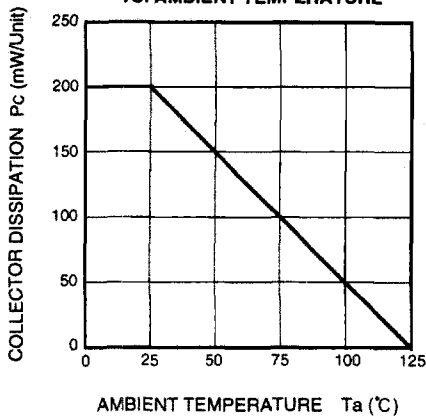


LOW FREQUENCY WIDE BAND NOISE VOLTAGE TEST CIRCUIT

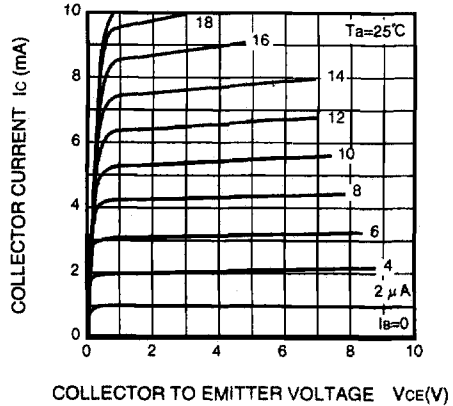


TYPICAL CHARACTERISTICS

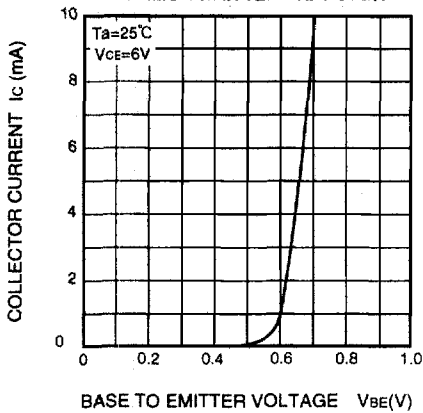
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



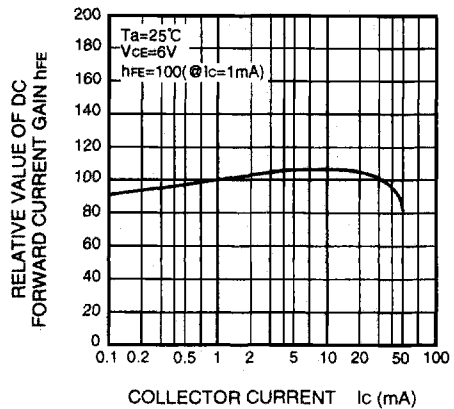
COMMON EMITTER OUTPUT



COMMON EMITTER TRANSFER

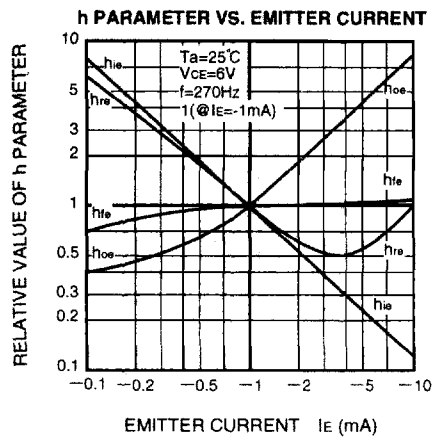
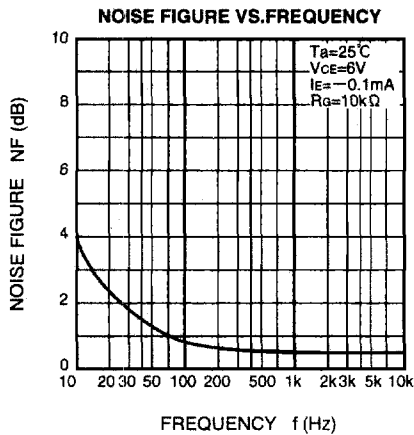
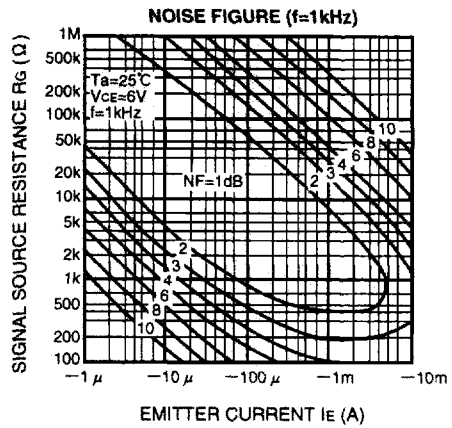
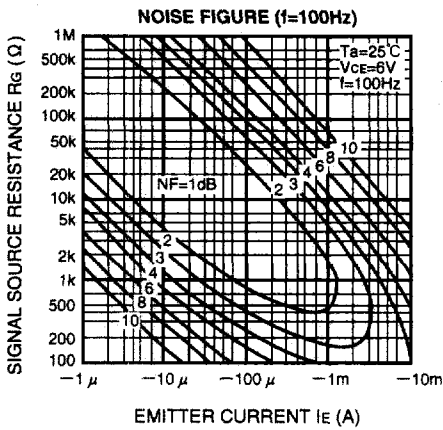
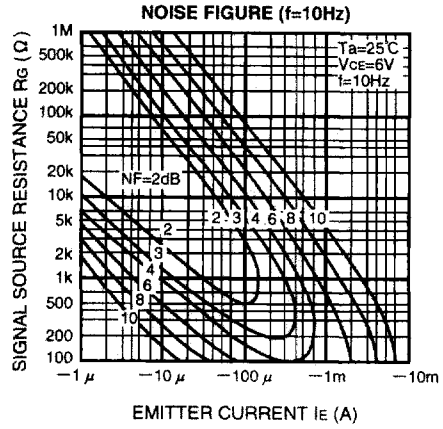
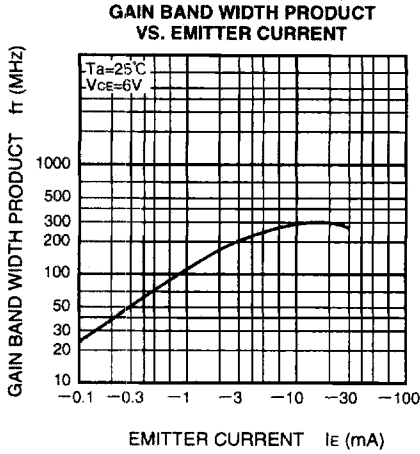


DC FORWARD CURRENT GAIN VS. COLLECTOR CURRENT



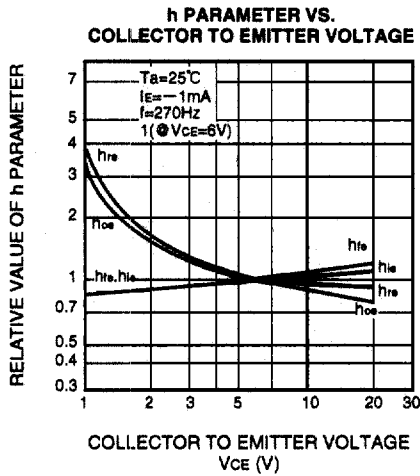
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COMMON EMITTER h PARAMETER (TYPICAL VALUE)

Symbol	Parameter	Test conditions	Limits	Unit
h_{ie}	Closed loop small signal input impedance	$T_a = 25^\circ\text{C}$	16	$\text{k}\Omega$
h_{re}	Open loop small signal reverse voltage amplification factor	$V_{ce} = 6\text{V}$	0.14	$\times 10^{-3}$
h_{fe}	Closed loop small signal forward current amplification factor	$I_e = -1\text{mA}$	600	—
h_{oe}	Open loop small signal output admittance	$f = 270\text{Hz}$	12	μS

APPLICATION EXAMPLE

HI-FI AMPLIFIER APPLICATION EXAMPLE

