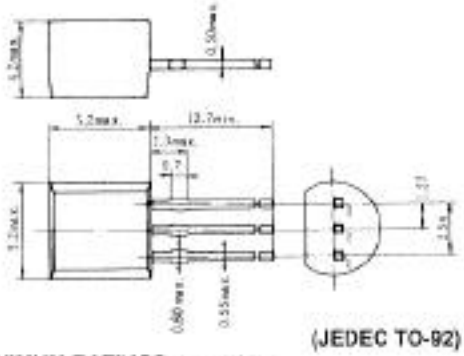
HITACHI

2SA1190, 2SA1191

SILICON PNP EPITAXIAL

LOW FREQUENCY LOW NOISE AMPLIFIER
Complementary pair with 2SC2855 and 2SC2656



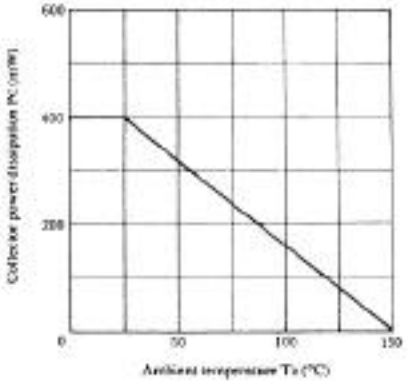
(JEDEC TO-92)

1. Emitter
2. Collector
3. Base
(Dimension in mm)

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Item	Symbol	2SA1190	2SA1191	Unit
Collector to base voltage	V_{CBO}	−90	−120	V
Collector to emitter voltage	V_{CEO}	−90	−120	V
Emitter to base voltage	V_{EBO}	−5	−5	V
Collector current	I_C	−100	−100	mA
Emitter current	I_E	100	100	mA
Collector power dissipation	P_C	400	400	mW
Junction temperature	T_j	150	150	°C
Storage temperature	T_{stg}	−55 to +150	−55 to +150	°C

MAXIMUM COLLECTOR DISSIPATION CURVE



■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

Item	Symbol	Test Condition	2SA1190			2SA1191			Unit
			min.	typ.	max.	min.	typ.	max.	
Collector to base breakdown voltage	$V_{(BR)CBO}$	I_C = −10μA, I_E = 0	−90	—	—	−120	—	—	V
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	I_C = −1mA, R_{BE} = ∞	−90	—	—	−120	—	—	V
Emitter to base breakdown voltage	$V_{(BR)EBO}$	I_E = −10μA, I_C = 0	−5	—	—	−5	—	—	V
Collector cutoff current	I_{CBO}	V_{CB} = −70V, I_E = 0	—	—	−0.1	—	—	−0.1	μA
Emitter cutoff current	I_{EBO}	V_{EB} = −2V, I_C = 0	—	—	−0.1	—	—	−0.1	μA
DC current transfer ratio	h_{FE}*	V_{CE} = −12V, I_C = −2mA**	250	—	800	250	—	800	
Collector to emitter saturation voltage	$V_{CE(sat)}$	I_C = −10mA, I_B = −1mA**	—	−0.05	−0.15	—	−0.05	−0.15	V
Base to emitter saturation voltage	$V_{BE(sat)}$		—	−0.7	−1.0	—	−0.7	−1.0	V
Gain bandwidth product	f_T	V_{CE} = −6V, I_C = −10mA	—	130	—	—	130	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = −10V, I_E = 0, f = 1MHz	—	3.2	—	—	3.2	—	pF
Noise figure	NF	V_{CE} = −6V, I_C = −0.1mA, Rg=10kΩ, f=1kHz	—	0.15	1.5	—	0.15	1.5	dB
		V_{CE} = −6V, I_C = −0.1mA, Rg=10kΩ, f=10Hz	—	0.2	2.0	—	0.2	2.0	dB
Noise voltage reffered to input	e_n	V_{CE} = −6V, I_C = −10mA, Rg=0, f=1kHz	—	0.7	—	—	0.7	—	$nV/\sqrt{Hz}$

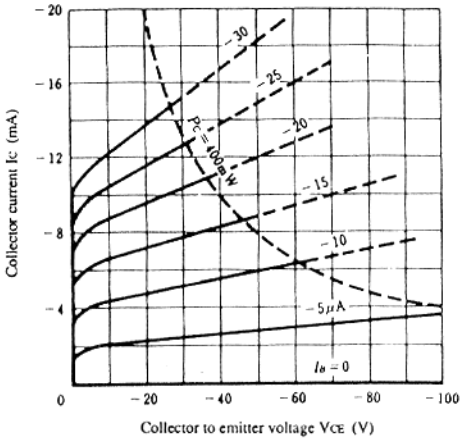
* The 2SA1190 and 2SA1191 are grouped by hFE as follows.

D	E
250 to 500	400 to 800

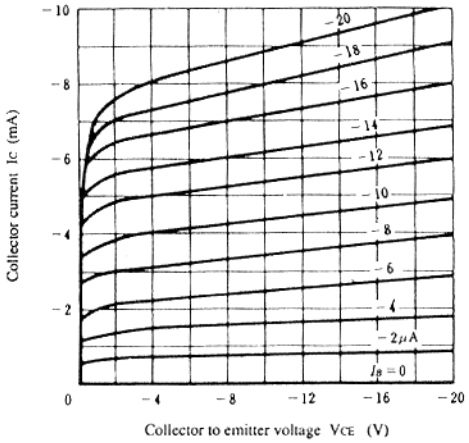
** Pulse Test

2SA1190, 2SA1191

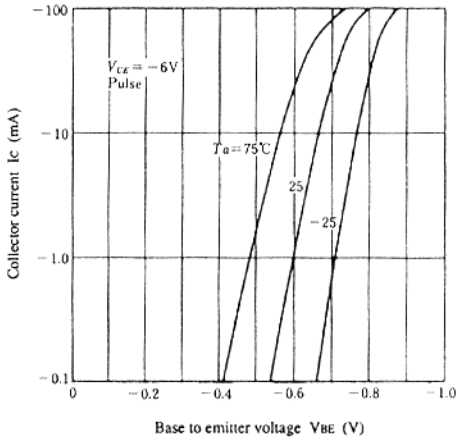
TYPICAL OUTPUT CHARACTERISTICS (1)



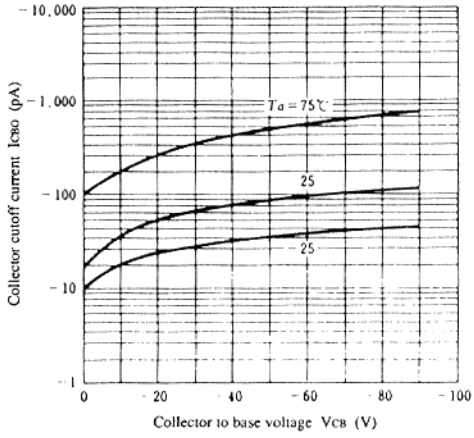
TYPICAL OUTPUT CHARACTERISTICS (2)



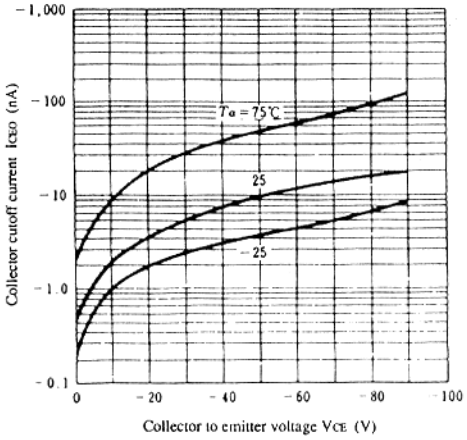
TYPICAL TRANSFER CHARACTERISTICS



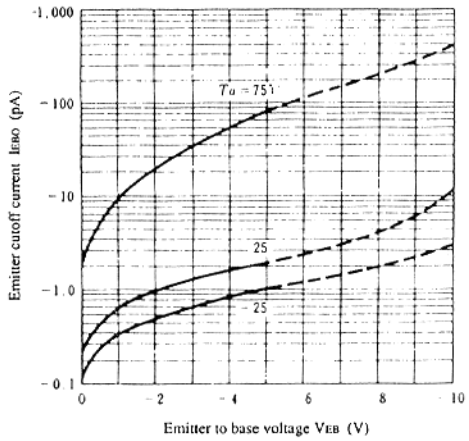
COLLECTOR CUTOFF CURRENT VS. COLLECTOR TO BASE VOLTAGE



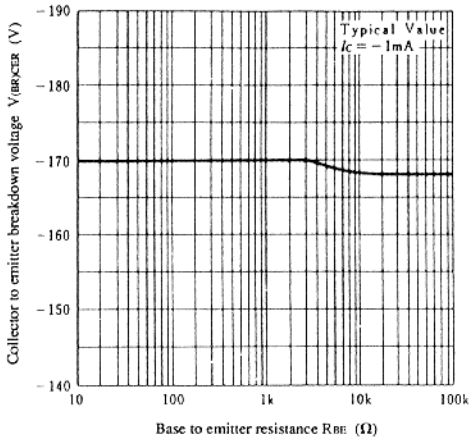
COLLECTOR CUTOFF CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



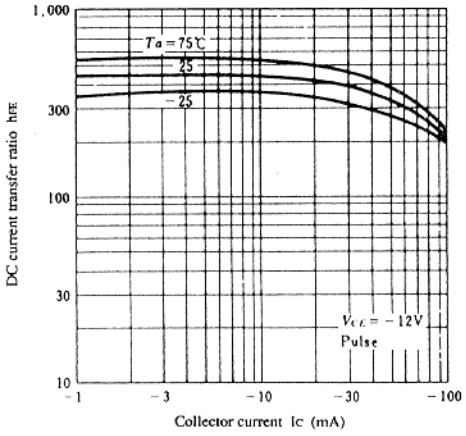
EMITTER CUTOFF CURRENT VS. EMITTER TO BASE VOLTAGE



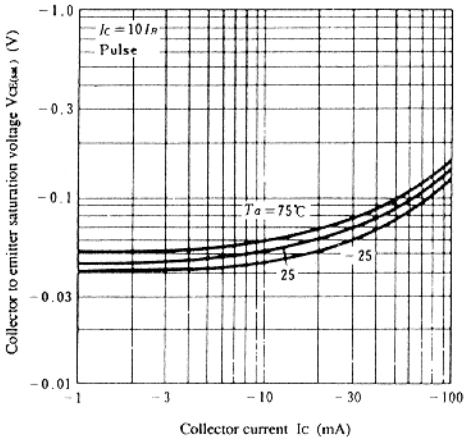
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



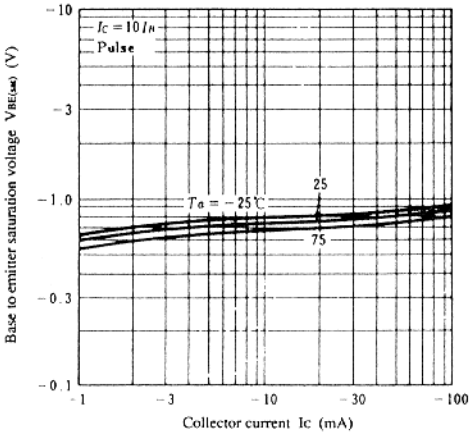
DC CURRENT TRANSFER RATIO VS. COLLECTOR CURRENT



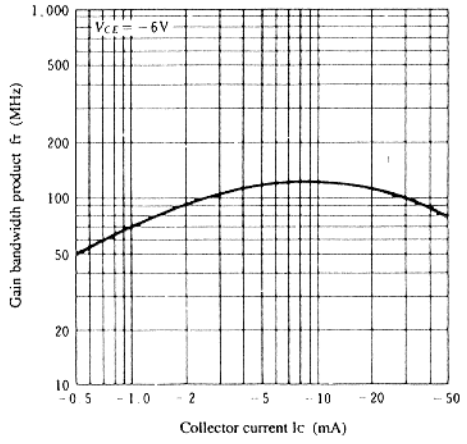
COLLECTOR TO EMITTER SATURATION VOLTAGE VS. COLLECTOR CURRENT



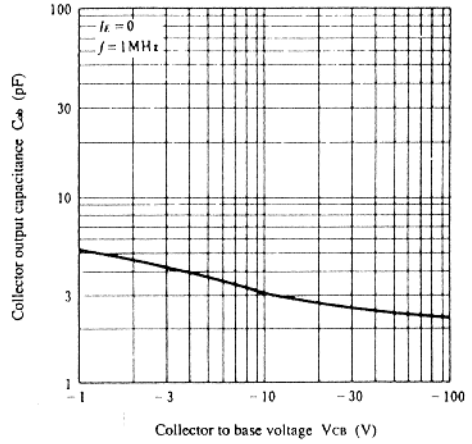
BASE TO EMITTER SATURATION VOLTAGE VS. COLLECTOR CURRENT



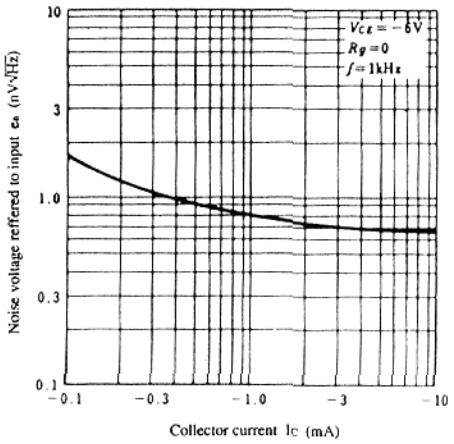
GAIN BANDWIDTH PRODUCT VS. COLLECTOR CURRENT



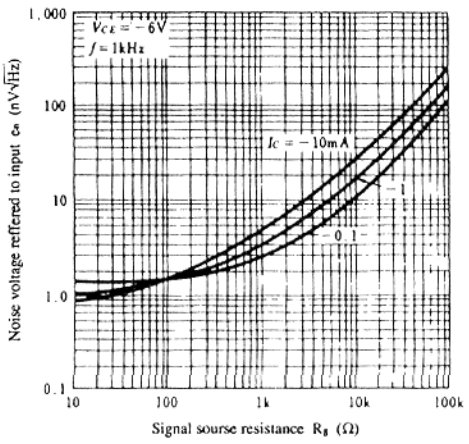
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



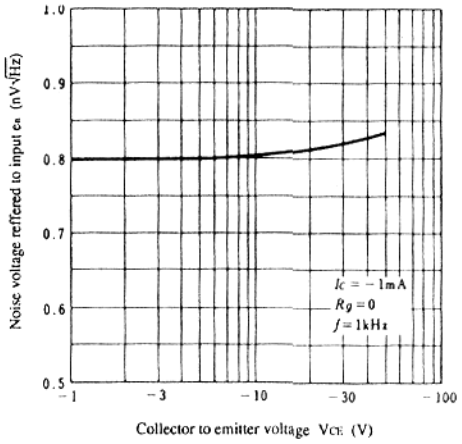
NOISE VOLTAGE REFFERED TO INPUT VS. COLLECTOR CURRENT



NOISE VOLTAGE REFFERED TO INPUT VS. SIGNAL SOURCE RESISTANCE



NOISE VOLTAGE REFFERED TO INPUT VS. COLLECTOR TO EMITTER VOLTAGE



NOISE VOLTAGE REFFERED TO INPUT VS. FREQUENCY