2SA836

Silicon PNP Epitaxial

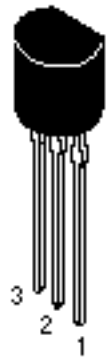
HITACHI

Application

Low frequency low noise amplifier

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

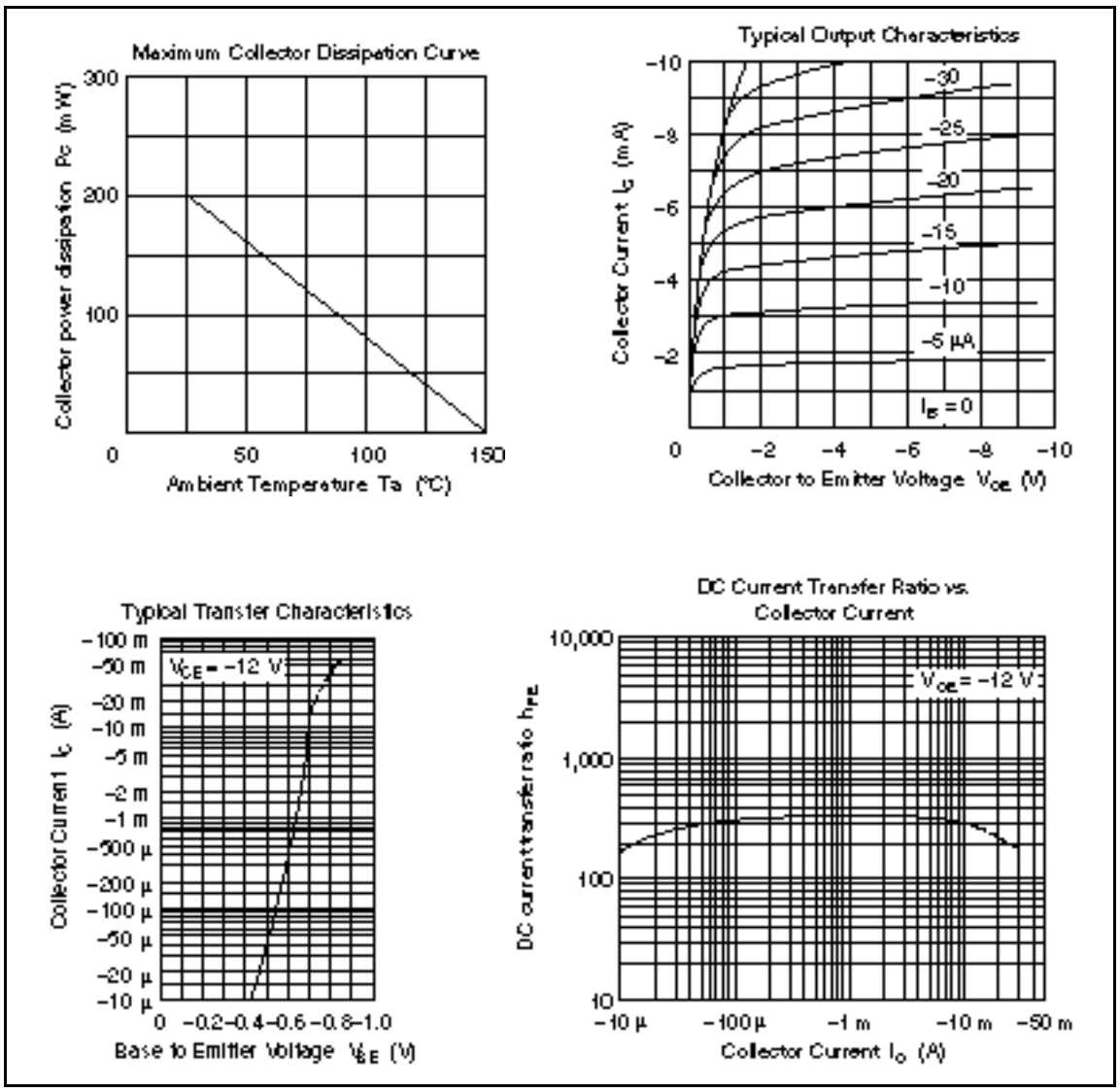
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	–55	V
Collector to emitter voltage	V_{CEO}	–55	V
Emitter to base voltage	V_{EBO}	–5	V
Collector current	I_C	–100	mA
Emitter current	I_E	100	mA
Collector power dissipation	P_C	200	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

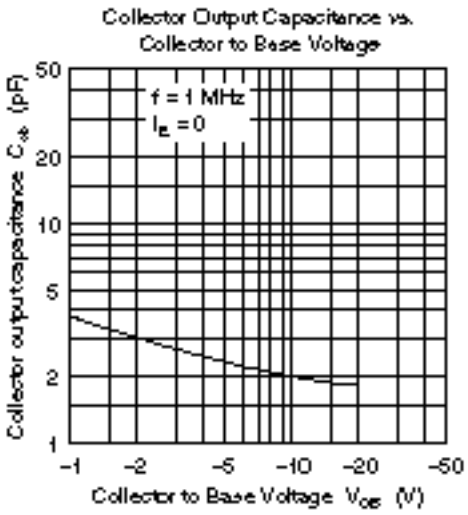
Electrical Characteristics (Ta = 25°C)

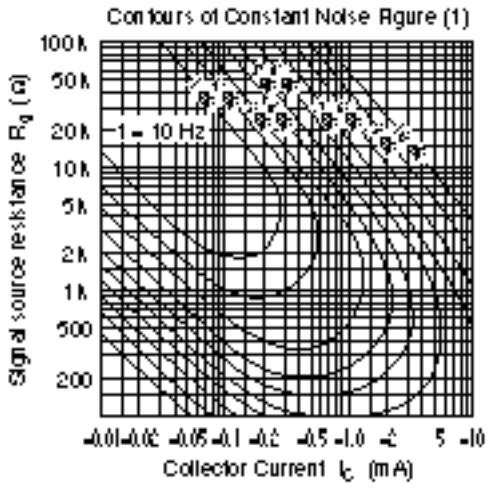
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	–55	—	—	V	I_C = –10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	–55	—	—	V	I_C = –1 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	–5	—	—	V	I_E = –10 µA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	–100	nA	V_{CB} = –18 V, I_E = 0
Emitter cutoff current	I_{EBO}	—	—	–50	nA	V_{EB} = –2 V, I_C = 0
DC current transfer ratio	h_{FE}*[1]	160	—	500		V_{CE} = –12 V, I_C = –2 mA
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	–0.1	–0.5	V	I_C = –10 mA, I_B = –1 mA
Base to emitter voltage	V_{BE}	—	–0.66	–0.75	V	V_{CE} = –12 V, I_C = –2 mA
Gain bandwidth product	f_T	—	200	—	MHz	V_{CE} = –12 V, I_E = –2 mA
Collector output capacitance	Cob	—	2.0	—	pF	V_{CB} = –10 V, I_E = 0, f = 1MHz
Noise figuer	NF	—	1	5	dB	V_{CE} = –6 V, f = 10 Hz
		—	0.5	1	dB	I_C = –0.1mA, R_g = 10 kΩ, f = 1 kHz

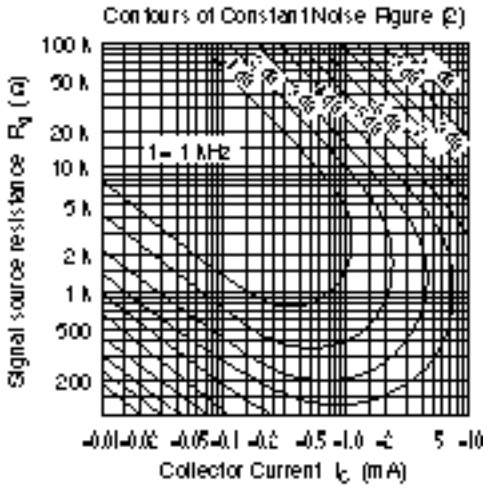
Note: 1. The 2SA836 is grouped by h_{FE} as follows.

C	D
160 to 320	250 to 500


Maximum Collector Dissipation Curve
Collector power dissipation Pc (mW)
300
200
100
0
50
100
150
Ambient Temperature Ta (°C)
Typical Output Characteristics
Collector Current Ic (mA)
-10
-8
-6
-4
-2
-30
-25
-20
-15
-10
-5 μA
IB = 0
0
-2
-4
-6
-8
-10
Collector to Emitter Voltage VCE (V)
Typical Transfer Characteristics
Collector Current Ic (A)
-100 m
-50 m
-20 m
-10 m
-5 m
-2 m
-1 m
-500 μ
-200 μ
-100 μ
-50 μ
-20 μ
-10 μ
VCE = -12 V
0
-0.2
-0.4
-0.6
-0.8
-1.0
Base to Emitter Voltage VBE (V)
DC Current Transfer Ratio vs. Collector Current
DC current transfer ratio hFE
10,000
1,000
100
10
VCE = -12 V
-10 μ
-100 μ
-1 m
-10 m
-50 m
Collector Current IC (A)


Collector Output Capacitance vs.
Collector to Base Voltage
f = 1 MHz
I_E = 0
Collector output capacitance C_{ob} (pF)
50
20
10
5
2
1
−1
−2
−5
−10
−20
−50
Collector to Base Voltage V_{CB} (V)


Contours of Constant Noise Figure (1)
f = 10 Hz
Signal source resistance R_g (Ω)
100 k
50 k
20 k
10 k
5 k
2 k
1 k
500
200
Collector Current I_C (mA)


Contours of Constant Noise Figure (2)
f = 1 MHz
Signal source resistance R_g (Ω)
100 k
50 k
20 k
10 k
5 k
2 k
1 k
500
200
Collector Current I_C (mA)

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