2SC454

Silicon NPN Epitaxial

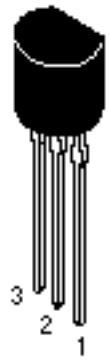
HITACHI

Application

High frequency amplifier, mixer

Outline

TO-92 (2)



1. Emitter
2. Collector
3. Base

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	30	V
Collector to emitter voltage	V_{CEO}	30	V
Emitter to base voltage	V_{EBO}	5	V
Collector current	I_C	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)

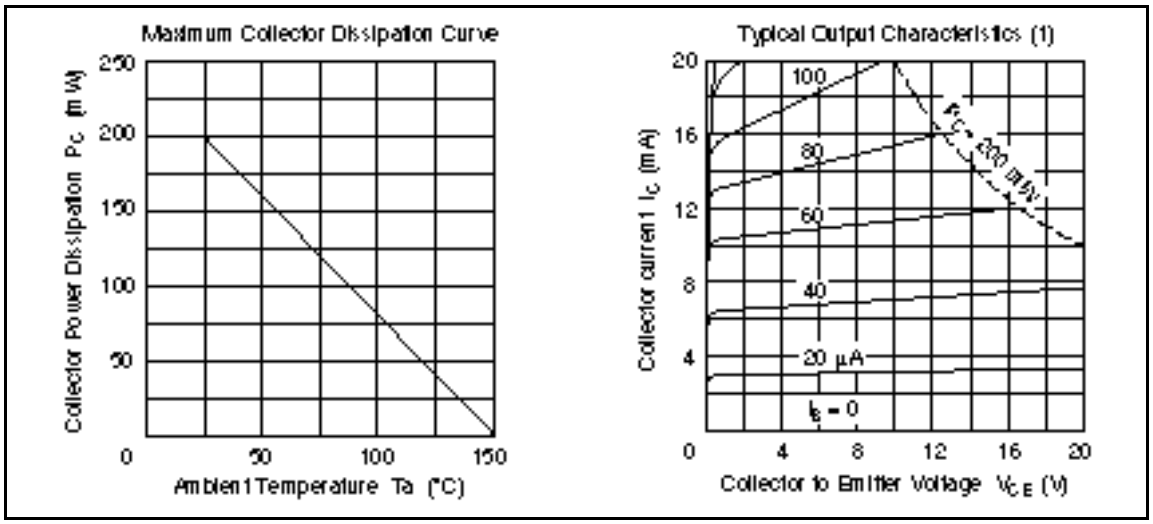
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	V	I_C = 10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	30	—	—	V	I_C = 1 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	5	—	—	V	I_E = 10 µA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	0.5	µA	V_{CB} = 18 V, I_E = 0
Emitter cutoff current	I_{EBO}	—	—	0.5	µA	V_{EB} = 2 V, I_C = 0
DC current transfer ratio	h_{FE}*[1]	100	—	500		V_{CE} = 12 V, I_C = 2 mA
Base to emitter voltage	V_{BE}	—	0.63	0.75	V	V_{CE} = 12 V, I_C = 2 mA
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	0.2	V	I_C = 10 mA, I_B = 1 mA
Gain bandwidth product	f_T	—	230	—	MHz	V_{CE} = 12 V, I_C = 2 mA
Collector output capacitance	Cob	—	—	3.5	pF	V_{CB} = 10 V, I_E = 0, f = 1 MHz
Noise figure	NF	—	—	25	dB	V_{CE} = 6 V, I_C = 0.1 mA, f = 1 kHz, R_g = 500 Ω
IF power gain	IFG	—	35	—	dB	V_{CE} = 12 V, I_C = 1 mA, f = 455 kHz, Rg = 1.5 kΩ, R_L = 40 kΩ

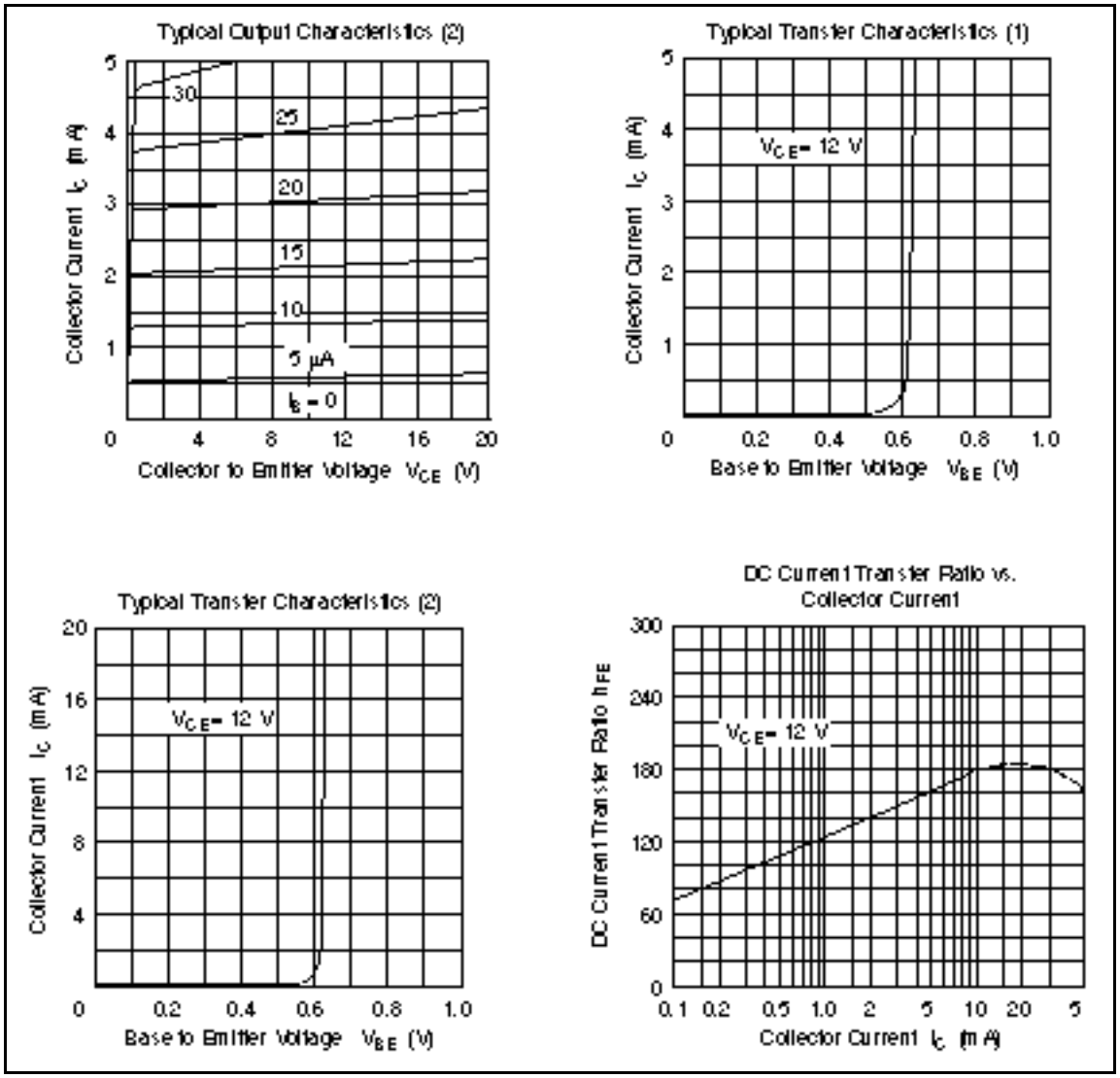
Note: 1. The 2SC454 is grouped by h_{FE} as follows.

B	C	D
100 to 200	160 to 320	250 to 500

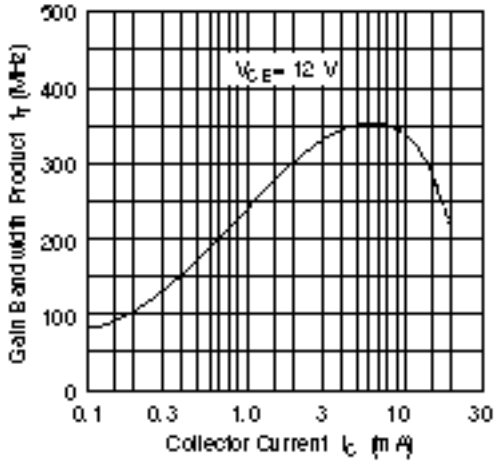
Small Signal y Parameters (V_{CE} = 12 V, I_C = 2mA, Emitter Common)

Item	Symbol	f	2SC454B	2SC454C	Unit
Input admittance	yie	455 kHz	0.35 + j0.074	0.28 + j0.070	mS
		1MHz	0.35 + j0.130	0.28 + j0.125	
Reverse transfer admittance	yre	455 kHz	–j0.005	–j0.005	mS
		1MHz	–j0.013	–j0.013	
Forward transfer admittance	yfe	455 kHz	66 – j2.43	64 – j2.60	mS
		1MHz	66 – j4.27	66 – j5.7	
Output admittance	yoe	455 kHz	0.006 + j0.02	0.007 + j0.022	mS
		1MHz	0.006 + j0.047	0.007 + j0.049	

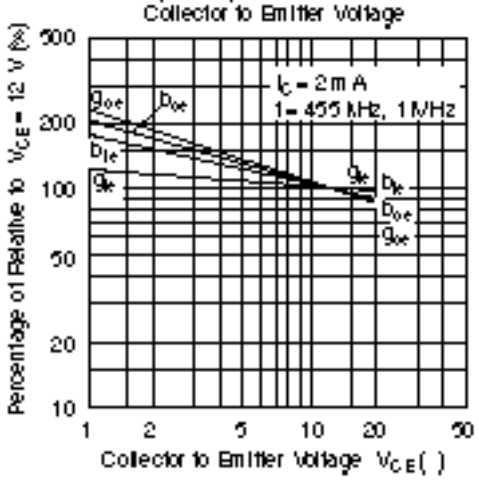



Typical Output Characteristics (2)
Collector Current I_C (mA)
Collector to Emitter Voltage V_{CE} (V)
30
25
20
15
10
5 μA
I_B = 0
Typical Transfer Characteristics (1)
V_{CE}= 12 V
Collector Current I_C (mA)
Base to Emitter Voltage V_{BE} (V)
Typical Transfer Characteristics (2)
V_{CE}= 12 V
Collector Current I_C (mA)
Base to Emitter Voltage V_{BE} (V)
DC Current Transfer Ratio vs. Collector Current
V_{CE}= 12 V
DC Current Transfer Ratio h_{FE}
Collector Current I_C (mA)

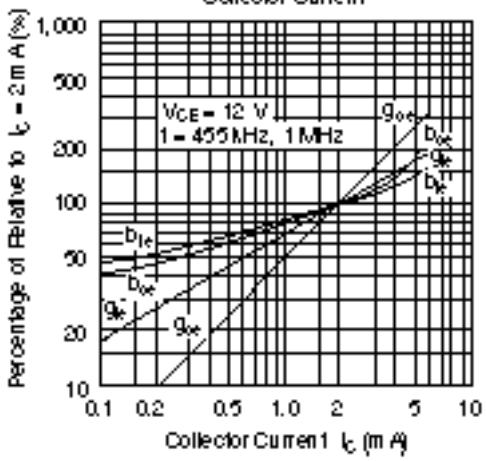
Gain Band width Product vs.
Collector Current



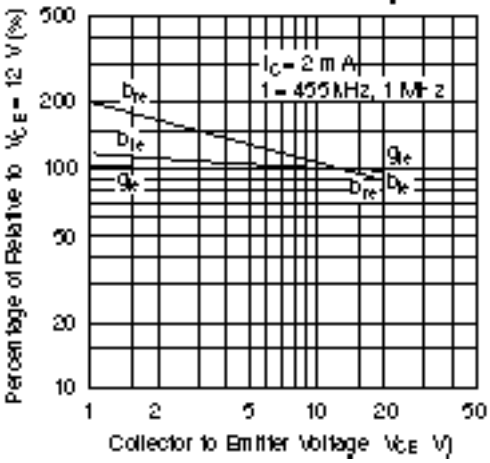
Input/Output Admittance vs.
Collector to Emitter Voltage

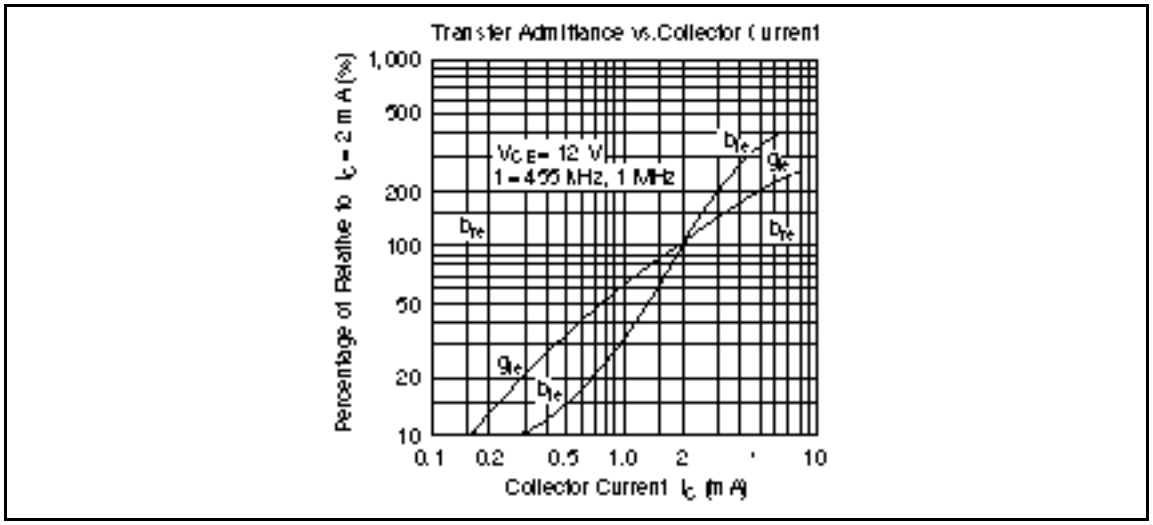


Input/Output Admittance vs.
Collector Current



Transfer Admittance vs.
Collector to Emitter Voltage




Transfer Admittance vs. Collector Current
Percentage of Relative to I_C = 2 mA (%)
1,000
500
200
100
50
20
10
V_{CE} = 12 V
f = 455 kHz, 1 MHz
b_{fe}
g_{fe}
b_{fe}
b_{fe}
g_{fe}
b_{fe}
0.1
0.2
0.5
1.0
2
10
Collector Current I_C (mA)

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