2SC460, 2SC461

Silicon NPN Epitaxial Planar

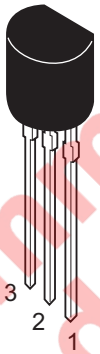
REJ03G0682-0200
(Previous ADE-208-1046)
Rev.2.00
Aug.10.2005

Application

- 2SC460 high frequency amplifier, mixer
- 2SC461 VHF amplifier, mixer

Outline

RENESAS Package code: PRSS0003DA-C
(Package name: TO-92 (2))



1. Emitter
2. Collector
3. Base

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	2SC460	2SC461	Unit
Collector to base voltage	V_{CBO}	30	30	V
Collector to emitter voltage	V_{CEO}	30	30	V
Emitter to base voltage	V_{EBO}	5	5	V
Collector current	I_C	100	100	mA
Collector power dissipation	P_C	200	200	mW
Junction temperature	Tj	150	150	°C
Storage temperature	Tstg	–55 to +150	–55 to +150	°C

Electrical Characteristics

(Ta = 25°C)

Item	Symbol	2SC460			2SC461			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	30	—	—	30	—	—	V	I_C = 10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	30	—	—	30	—	—	V	I_C = 1 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	5	—	—	5	—	—	V	I_E = 10 µA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	0.5	—	—	0.5	µA	V_{CB} = 18 V, I_E = 0
Emitter cutoff current	I_{EBO}	—	—	0.5	—	—	0.5	µA	V_{EB} = 2 V, I_C = 0
Base to emitter voltage	V_{BE}	—	0.63	0.75	—	0.63	0.75	V	V_{CE} = 12 V, I_C = 2 mA
DC current transfer ratio	h_{FE}*[1]	100	—	200	35	—	200		V_{CE} = 12 V, I_C = 2 mA
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	0.6	1.1	—	0.6	1.1	V	I_C = 10 mA, I_B = 1 mA
Gain bandwidth product	f_T	—	230	—	—	230	—	MHz	V_{CE} = 12 V, I_C = 2 mA
Collector output capacitance	C_{ob}	—	1.8	3.5	—	1.8	3.5	pF	V_{CB} = 10 V, I_E = 0, f = 1 MHz
10.7 MHz power gain	PG	26	29	—	—	—	—	dB	V_{CE} = 6 V, I_E = –1 mA f = 10.7 MHz
100 MHz power gain	PG	—	—	—	13	17	—	dB	V_{CE} = 6 V, I_E = –1 mA f = 100 MHz
Noise figure	NF	—	2.0	—	—	—	—	dB	V_{CE} = 6 V, I_E = –1 mA f = 1MHz R_g = 500Ω

Note: 1. The 2SC461 is grouped by h_{FE} as follows.

B	C
60 to 120	100 to 200

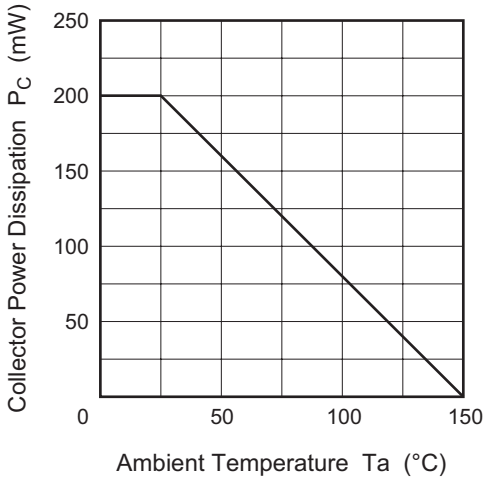
Small Signal y Parameters

(V_{CE} = 6 V, I_C = 1 mA, Emitter Common)

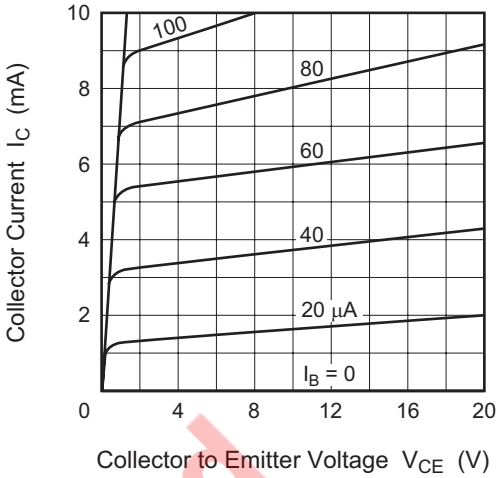
Item	Symbol	f	2SC460A, 2S461A	2SC460B, 2SC461B	2SC460C, 2SC461C	Unit
Input admittance	yie	455 kHz	0.58 + j0.074	0.42 + j0.068	0.30 + j0.051	mS
		4.5 MHz	0.65 + j0.79	0.50 + j0.7	0.35 + j0.57	
		10.7 MHz	0.91 + j2.0	0.61 + j1.9	0.39 + j1.3	
		100 MHz	7.4 + j14	5.6 + j12	3.8 + j6.0	
Reverse transfer admittance	yre	455 kHz	–j0.003	–j0.003	–j0.003	mS
		4.5 MHz	–j0.04	–j0.04	–j0.04	
		10.7 MHz	–j0.13	–j0.13	–j0.13	
		100 MHz	–j1.0	–j1.0	–j1.0	
Forward transfer admittance	yfe	455 kHz	38 – j0.1	37 – j0.1	37 – j0.2	mS
		4.5 MHz	35 – j1.0	35 – j1.2	34 – j1.8	
		10.7 MHz	34 – j2.5	34 – j2.5	33 – j4.5	
		100 MHz	28 – j20	28 – j19	20 – j19	
Output admittance	yoe	455 kHz	0.0098 + j0.009	0.013 + j0.009	0.016 + j0.012	mS
		4.5 MHz	0.02 + j0.09	0.023 + j0.092	0.03 + j0.10	
		10.7 MHz	0.11 + j0.4	0.11 + j0.4	0.12 + j0.4	
		100 MHz	0.40 + j1.7	0.50 + j2.0	0.83 + j2.0	

Main Characteristics

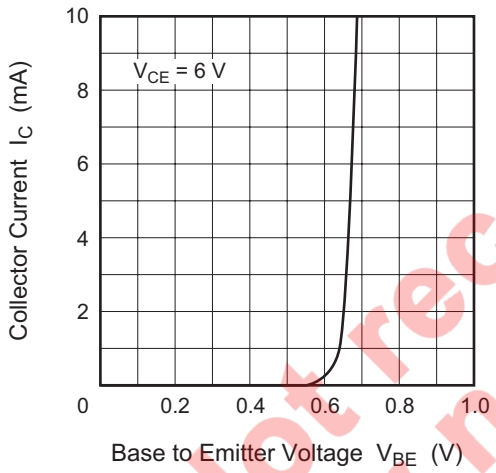
Maximum Collector Dissipation Curve



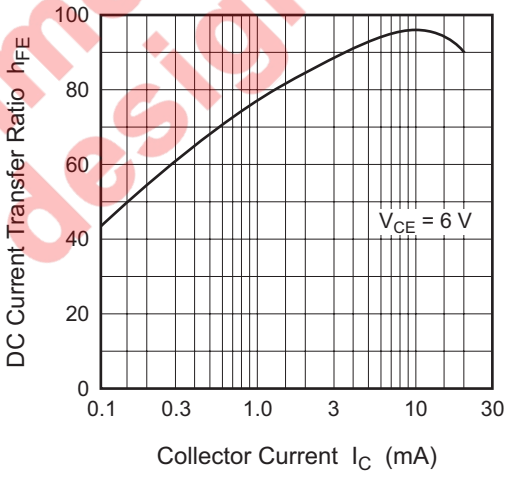
Typical Output Characteristics



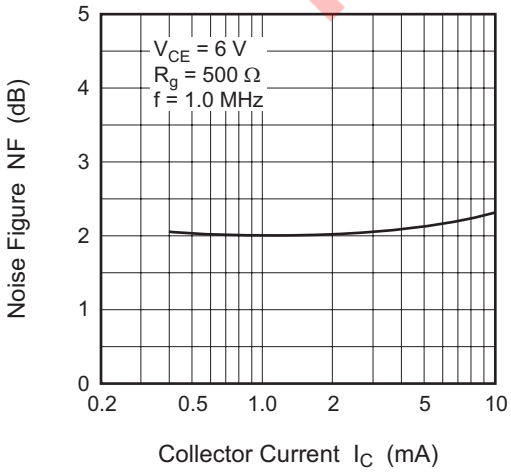
Typical Transfer Characteristics



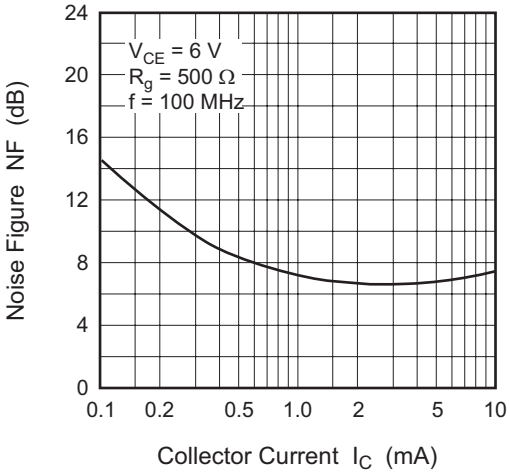
DC Current Transfer Ratio vs. Collector Current



Noise Figure vs. Collector Current



Noise Figure vs. Signal Source Resistance



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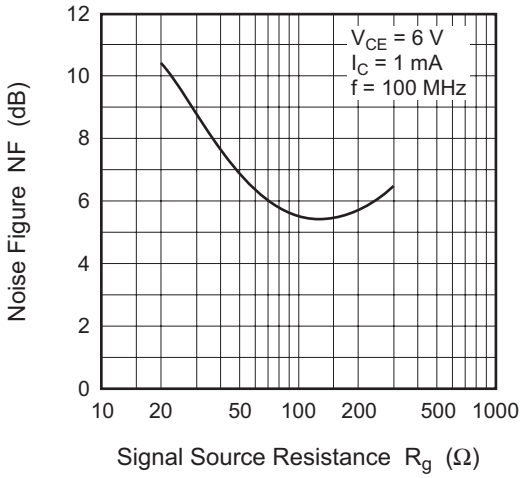
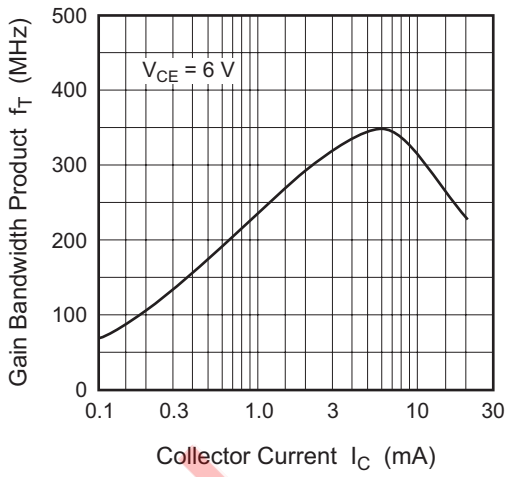
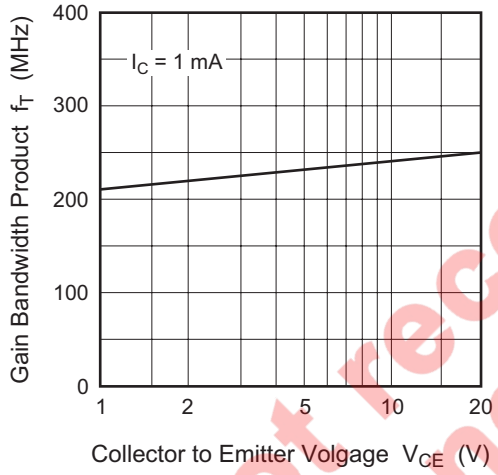


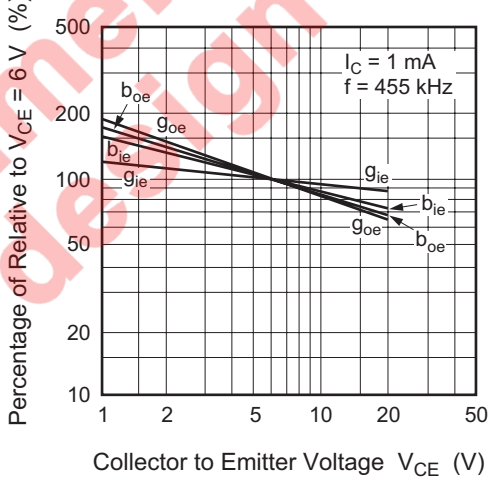
Gain Bandwidth Product vs. Collector Current



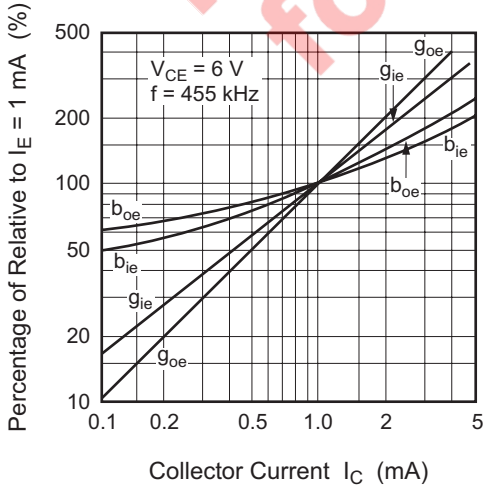
Gain Bandwidth Product vs. Collector to Emitter Voltage



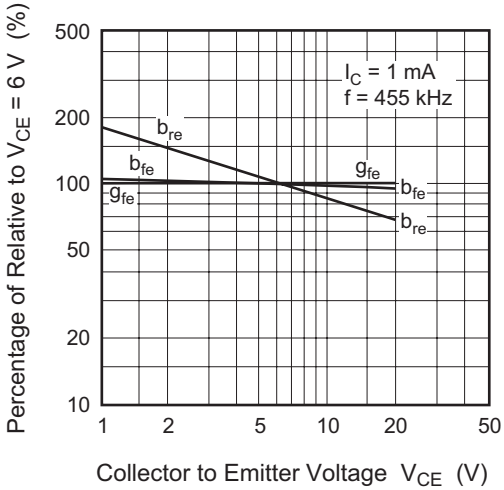
Input/Output Admittance vs. Collector to Emitter Voltage



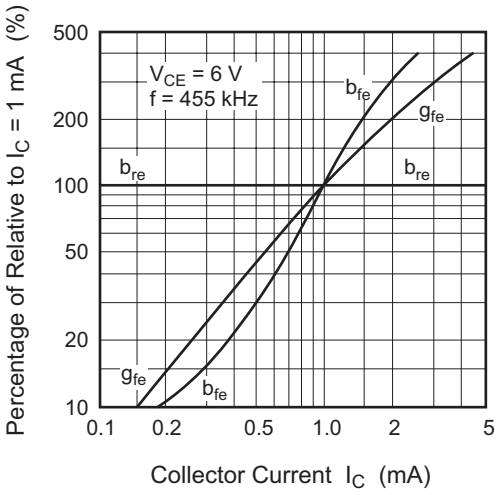
Input/Output Admittance vs. Collector Current



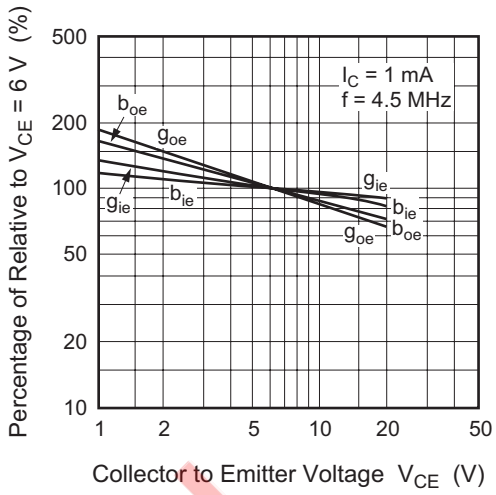
Transfer Admittance vs. Collector to Emitter Voltage



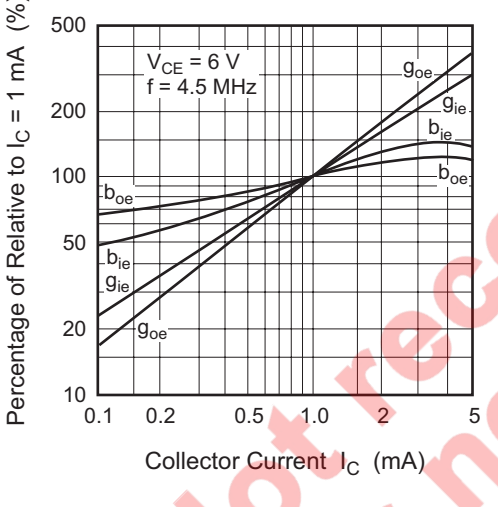
Transfer Admittance vs. Collector Current



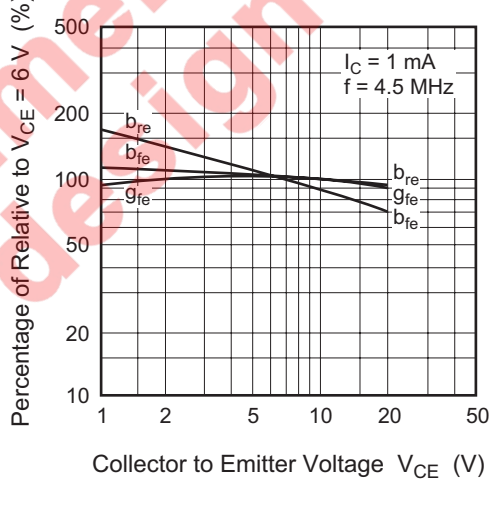
Input/Output Admittance vs. Collector to Emitter Voltage



Input/Output Admittance vs. Collector Current



Transfer Admittance vs. Collector to Emitter Voltage



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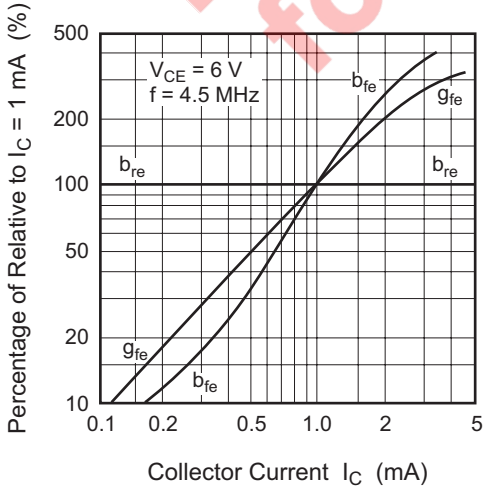
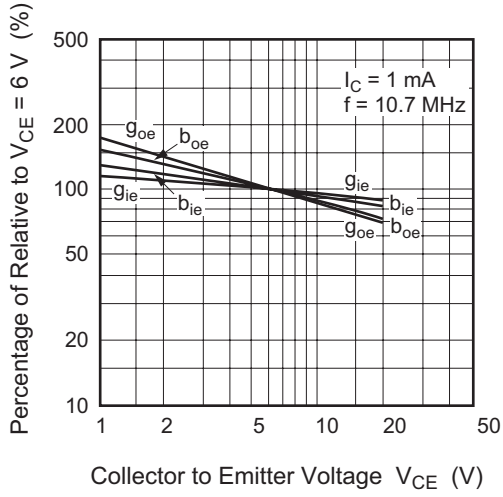
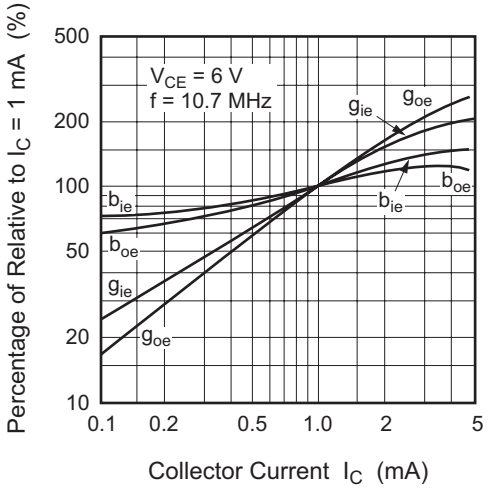


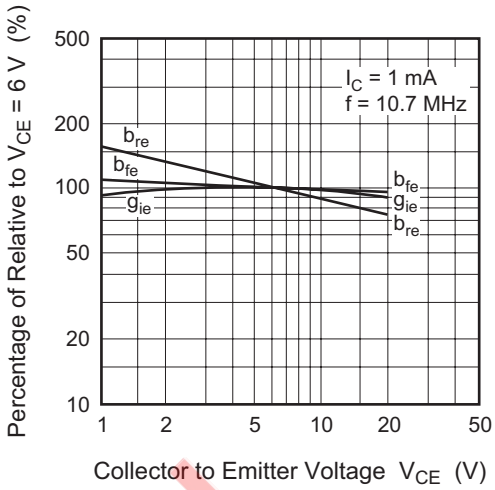
Input/Output Admittance vs. Collector to Emitter Voltage



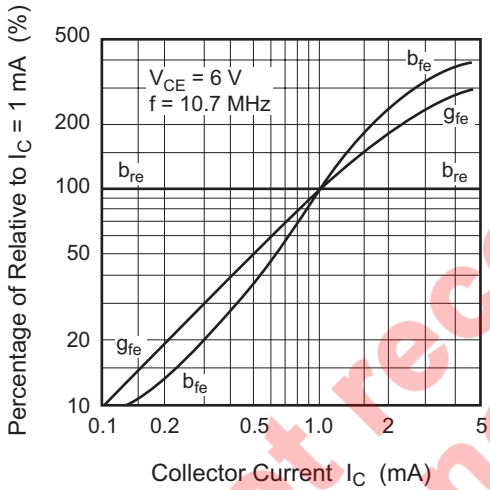
Input/Output Admittance vs. Collector Current



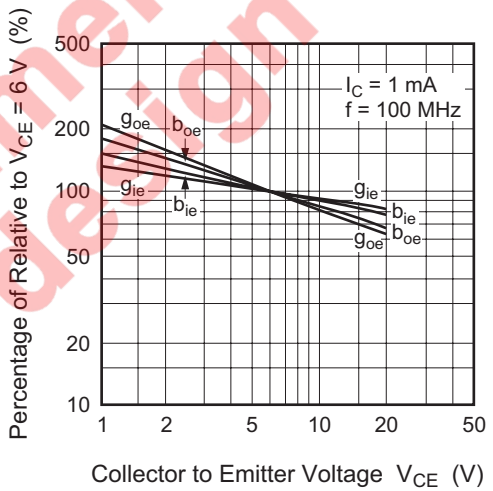
Transfer Admittance vs. Collector to Emitter Voltage



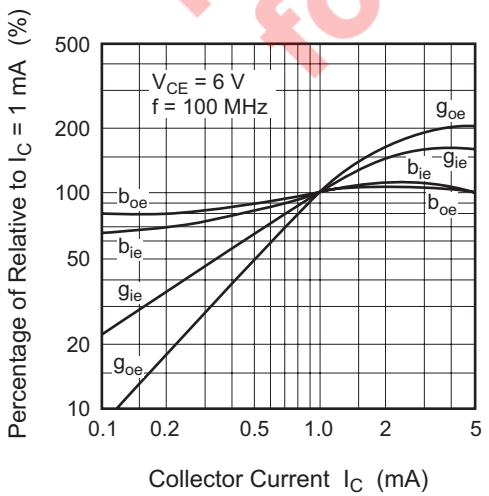
Transfer Admittance vs. Collector Current



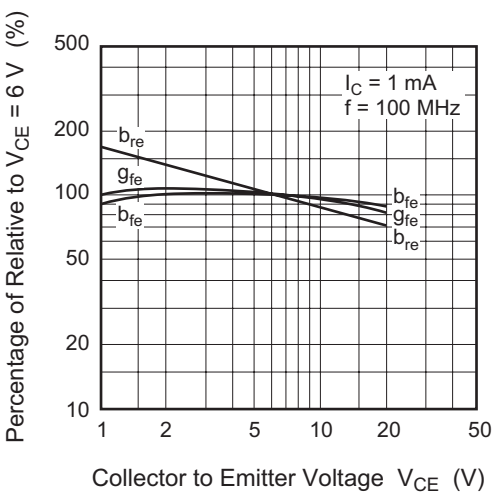
Input/Output Admittance vs. Collector to Emitter Voltage



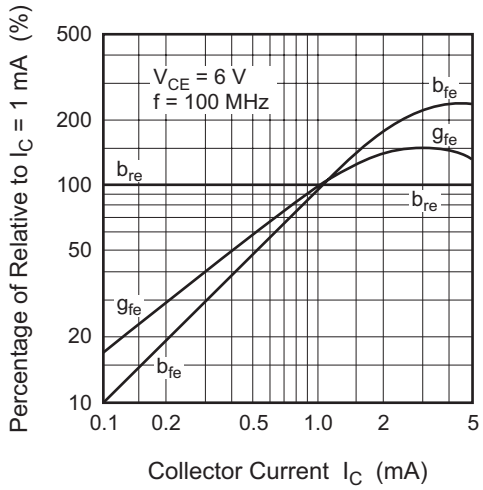
Input/Output Admittance vs. Collector Current



Transfer Admittance vs. Collector to Emitter Voltage



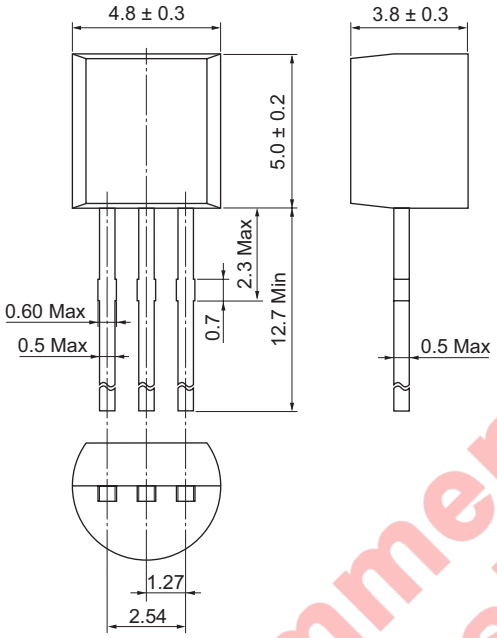
Transfer Admittance vs.
Collector Current



Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
SC-43A	PRSS0003DA-C	TO-92(2) / TO-92(2)V	0.25g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
2SC460CTZ 2SC461BTZ 2SC461CTZ	2500	Hold Box, Radial Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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Colophon .3.0