

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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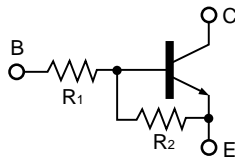
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COMPOUND TRANSISTOR FB1 SERIES

ON-CHIP RESISTOR NPN SILICON EPITAXIAL TRANSISTOR FOR MID-SPEED SWITCHING

FEATURES

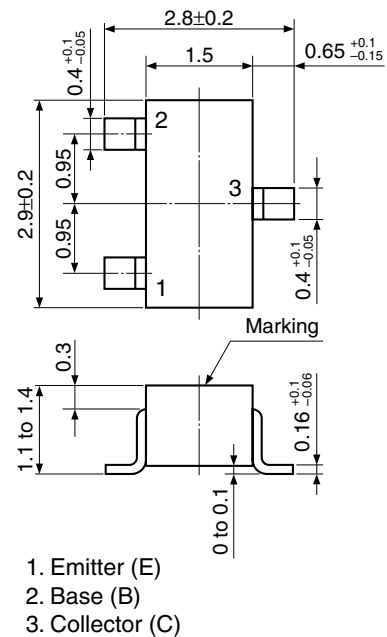
- Up to 0.7 A current drive available
 - On-chip bias resistor
 - Low power consumption during drive
- <R>
- Package: 3-pin Mini Mold (SC-59)



FB1 SERIES LISTS

Products	Marking	R ₁ (kΩ)	R ₂ (kΩ)
FB1A4A	P30	–	10
FB1L2Q	P31	0.47	4.7
FB1A3M	P32	1.0	1.0
FB1F3P	P33	2.2	10
FB1J3P	P36	3.3	10
FB1L3N	P34	4.7	10
FB1A4M	P35	10	10

PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V _{CB0}	30	V
Collector to Emitter Voltage	V _{CE0}	25	V
Emitter to Base Voltage	V _{EB0}	10	V
Collector Current (DC)	I _{C(DC)}	0.7	A
Collector Current (pulse) ^{Note}	I _{C(pulse)}	1.0	A
Base Current (DC)	I _{B(DC)}	20	mA
Total Power Dissipation	P _T	200	mW
Junction Temperature	T _J	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

Note PW ≤ 10 ms, Duty Cycle ≤ 50%

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

FB1A4A

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	I _{CB0}	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	300			–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	300			–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135			–
Collector Saturation Voltage ^{Note}	V _{CE(sat)}	I _C = 0.5 A, I _B = 5 mA		0.27	0.4	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA			0.3	V
Input Resistance	R ₁		–	–	–	Ω
Emitter to Base Resistance	R ₂		7	10	13	kΩ

Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1L2Q

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	I _{CB0}	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	150	400		–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	300	700		–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135	600		–
Low Level Output Voltage ^{Note}	V _{OL}	V _{IN} = 5.0 V, I _C = 0.5 A		0.2	0.3	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA		0.62	0.3	V
Input Resistance	R ₁		329	470	611	Ω
Emitter to Base Resistance	R ₂		3.29	4.7	6.11	kΩ

Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1A3M

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	I _{CB0}	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	80			–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	100			–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135			–
Low Level Output Voltage ^{Note}	V _{OL}	V _{IN} = 5.0 V, I _C = 0.5 A		0.3	0.4	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA			0.3	V
Input Resistance	R ₁		0.7	1.0	1.3	kΩ
Emitter to Base Resistance	R ₂		0.7	1.0	1.3	kΩ

Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1F3P

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	ICBO	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	300			–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	300			–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135			–
Low Level Output Voltage ^{Note}	V _{OL}	V _{IN} = 5.0 V, I _C = 0.3 A			0.3	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA			0.3	V
Input Resistance	R ₁		1.54	2.2	2.86	kΩ
Emitter to Base Resistance	R ₂		7	10	13	kΩ

Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1J3P

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	ICBO	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	300	600		–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	300	700		–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135	600		–
Low Level Output Voltage ^{Note}	V _{OL}	V _{IN} = 5.0 V, I _C = 0.2 A		0.14	0.3	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA		0.6	0.3	V
Input Resistance	R ₁		2.31	3.3	4.29	kΩ
Emitter to Base Resistance	R ₂		7	10	13	kΩ

Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1L3N

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	ICBO	V _{CB} = 30 V, I _E = 0 A			100	nA
DC Current Gain ^{Note}	h _{FE1}	V _{CE} = 2.0 V, I _C = 0.1 A	300			–
	h _{FE2}	V _{CE} = 2.0 V, I _C = 0.5 A	300			–
	h _{FE3}	V _{CE} = 2.0 V, I _C = 0.7 A	135			–
Low Level Output Voltage ^{Note}	V _{OL}	V _{IN} = 5.0 V, I _C = 0.2 A			0.3	V
Low Level Input Voltage ^{Note}	V _{IL}	V _{CE} = 5.0 V, I _C = 100 μA			0.3	V
Input Resistance	R ₁		3.29	4.7	6.11	kΩ
Emitter to Base Resistance	R ₂		7	10	13	kΩ

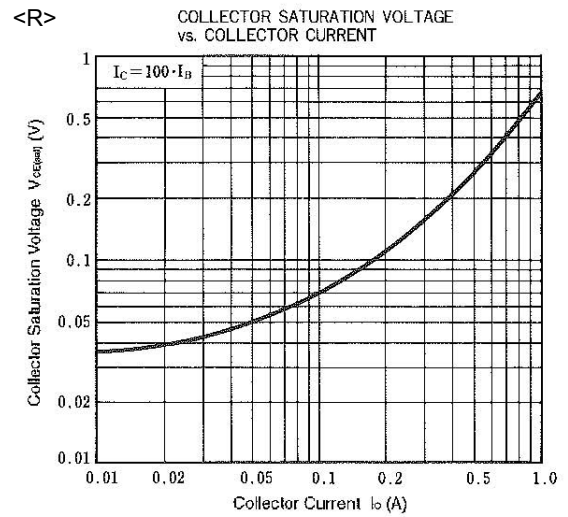
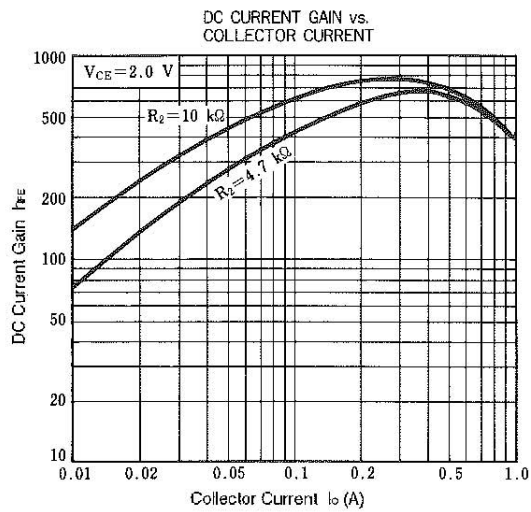
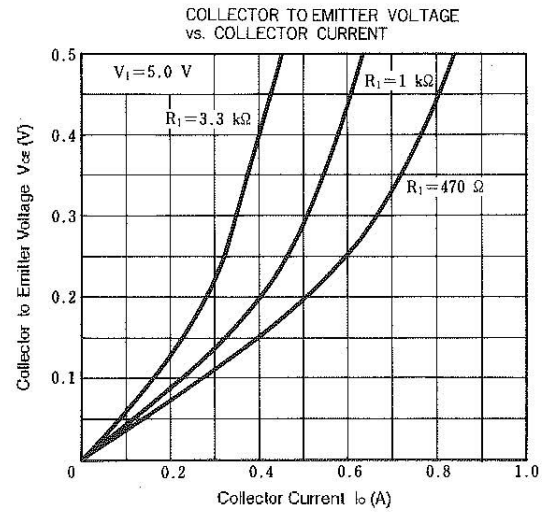
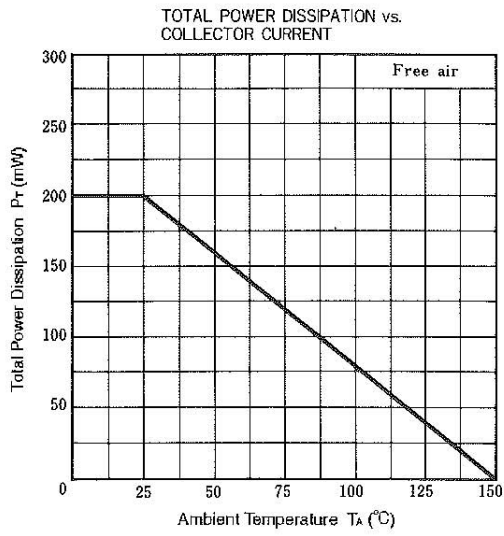
Note PW ≤ 350 μs, Duty Cycle ≤ 2%

FB1A4M

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Base Cut-off Current	I_{CBO}	$V_{CB} = 30\text{ V}, I_E = 0\text{ A}$			100	nA
DC Current Gain ^{Note}	h_{FE1}	$V_{CE} = 2.0\text{ V}, I_C = 0.1\text{ A}$	300			–
	h_{FE2}	$V_{CE} = 2.0\text{ V}, I_C = 0.5\text{ A}$	300			–
	h_{FE3}	$V_{CE} = 2.0\text{ V}, I_C = 0.7\text{ A}$	135			–
Low Level Output Voltage ^{Note}	V_{OL}	$V_{IN} = 5.0\text{ V}, I_C = 0.2\text{ A}$			0.3	V
Low Level Input Voltage ^{Note}	V_{IL}	$V_{CE} = 5.0\text{ V}, I_C = 100\text{ }\mu\text{A}$			0.3	V
Input Resistance	R_1		7	10	13	k Ω
Emitter to Base Resistance	R_2		7	10	13	k Ω

Note $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

TYPICAL CHARACTERISTICS (T_A = 25°C)



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