NEC

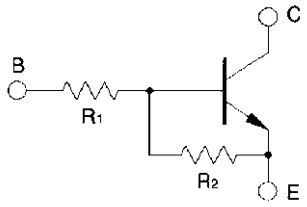
COMPOUND TRANSISTOR
BB1 SERIES

on-chip resistor NPN silicon epitaxial transistor
For mid-speed switching

The BB1 Series is an N type small signal transistor and enables the reduction of component counts and downsizing of sets due to on-chip resistors. This transistor is especially ideal for use in household electronic appliances and OA equipments such as VCRs and TVs.

FEATURES

- Up to 0.7 A current drive available
- On-chip bias resistor
- Low power consumption during drive

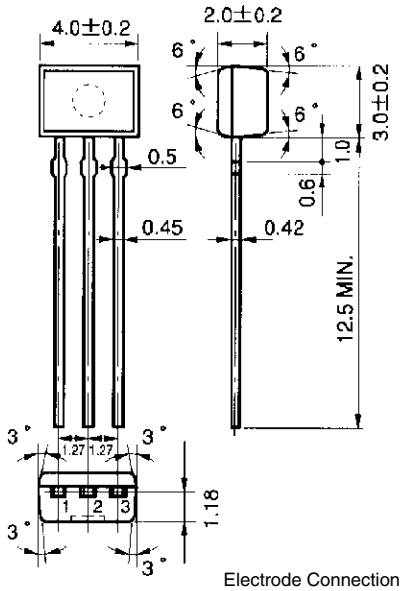


QUALITY GRADES

- Standard

Please refer to “Quality Grades on NEC Semiconductor Devices” (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

PACKAGE DRAWING (UNIT: mm)



Electrode Connection
1. Emitte (E)
2. Collector (C)
3. Base (B)

BB1 SERIES LISTS

Products	R_1 (KΩ)	R_2 (KΩ)
BB1A4A	–	10
BB1L2Q	0.47	4.7
BB1A3M	1.0	1.0
BB1F3P	2.2	10
BB1J3P	3.3	10
BB1L3N	4.7	10
BB1A4M	10	10

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ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base volgate	V_{CBO}	30	V
Colletor to emitter voltage	V_{CEO}	25	V
Emitter to base voltage	V_{EBO}	10	V
Collector current (DC)	$I_{C(DC)}$	0.7	A
Collector current (Pulse)	$I_{C(pulse)}$ Note 1	1.0	A
Base current (DC)	$I_{B(DC)}$	0.02	A
Total power dissipation	P_T	250	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

Note 1 PW ≤ 10 ms, duty cycle ≤ 50 %

BB1A4A
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	300			–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300			–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135			–
Collector saturation voltage	$V_{CE(sat)}$ Note 2	I_C = 0.5 A, I_B = 5 mA		0.27	0.4	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		–	–	–	Ω
E-to-B resistance	R_2		7	10	13	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BB1L2Q
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	150	400		–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300	700		–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135	600		–
Low level output voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.5 A		0.2	0.3	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		329	470	611	Ω
E-to-B resistance	R_2		3.29	4.7	6.11	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BB1A3M
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	80			–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	100			–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135			–
Low level output voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.5 A		0.3	0.4	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		0.7	1.0	1.3	kΩ
E-to-B resistance	R_2		0.7	1.0	1.3	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BB1F3P
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	300			–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300			–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135			–
Low level output voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.3 A			0.3	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		1.54	2.2	2.86	kΩ
E-to-B resistance	R_2		7	10	13	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BP1J3P
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	300	600		–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300	700		–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135	600		–
Low level output voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.2 A		0.14	0.3	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		2.31	3.3	4.29	kΩ
E-to-B resistance	R_2		7	10	13	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BB1L3N

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	300			–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300			–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135			–
Low level output voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.2 A			0.3	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		3.29	4.7	6.11	kΩ
E-to-B resistance	R_2		7	10	13	kΩ

Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

BB1A4M

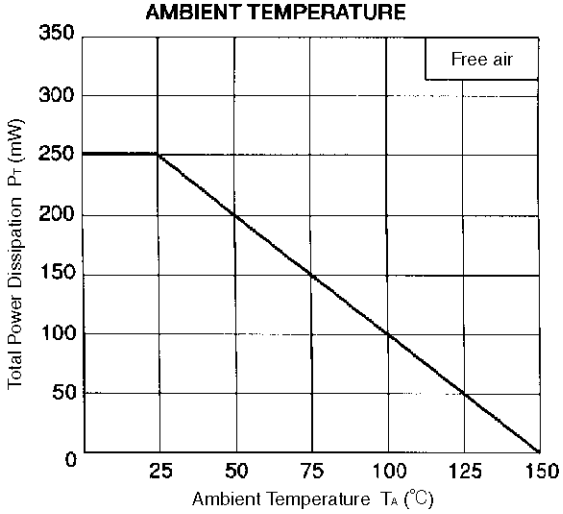
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0			100	nA
DC current gain	h_{FE1} Note 2	V_{CE} = 2.0 V, I_C = 0.1 A	300			–
DC current gain	h_{FE2} Note 2	V_{CE} = 2.0 V, I_C = 0.5 A	300			–
DC current gain	h_{FE3} Note 2	V_{CE} = 2.0 V, I_C = 0.7 A	135			–
Collector saturation voltage	V_{OL} Note 2	V_{IN} = 5.0 V, I_C = 0.2 A			0.3	V
Low level input voltage	V_{IL} Note 2	V_{CE} = 5.0 V, I_C = 100 μA			0.3	V
Input resistance	R_1		7	10	13	kΩ
E-to-B resistance	R_2		7	10	13	kΩ

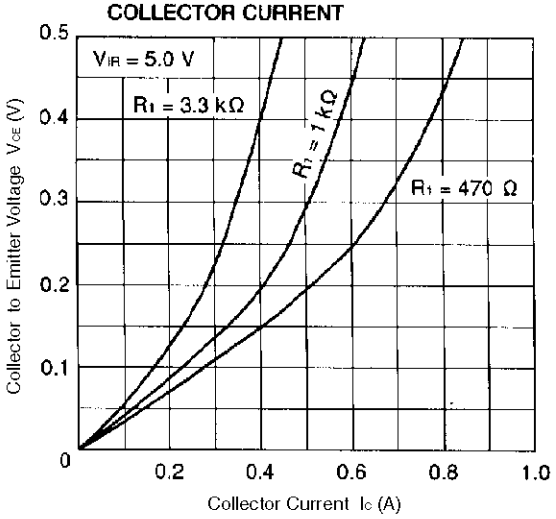
Note 2 PW ≤ 350 μs, duty cycle ≤ 2 %

TYPICAL CHARACTERISTICS (T_a = 25°C)

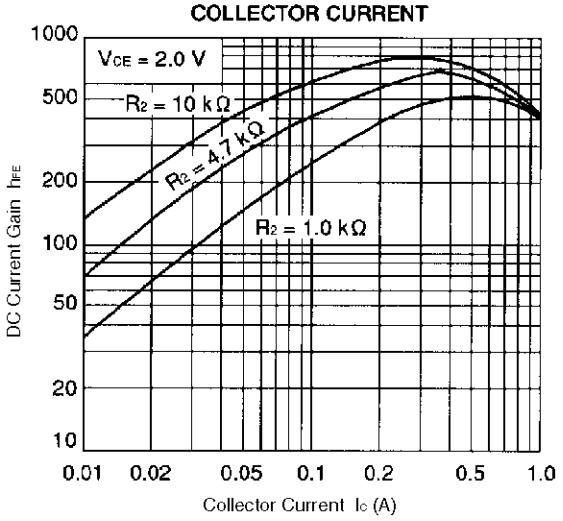
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



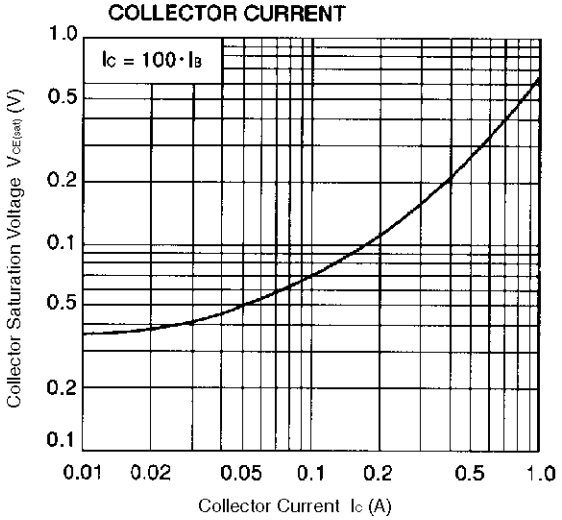
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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