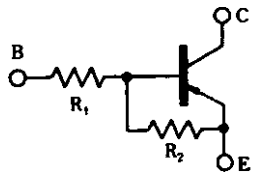
NEC

COMPOUND TRANSISTOR
HQ1 SERIES

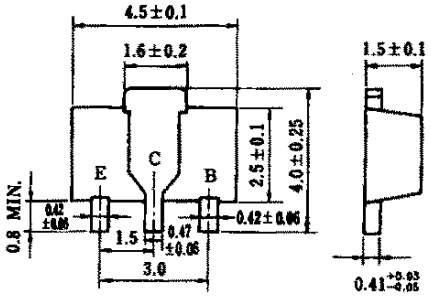
on-chip resistor PNP silicon epitaxial transistor
For mid-speed switching

FEATURES

- Up to 2A high current drives such as ICs, motors, and solenoids available
- On-chip bias resistor
- Low power consumption during drive



PACKAGE DRAWING (UNIT: mm)



Electrode Connection

E : Emitter
C : Collector (Fin)
B : Base

HQ1 SERIES LISTS

Products	Marking	R_1 (KΩ)	R_2 (KΩ)
HQ1L2N	DP	0.47	1.0
HQ1A3M	DQ	1.0	1.0
HQ1F3M	DR	2.2	2.2
HQ1F3P	DS	2.2	10
HQ1L2Q	DT	0.47	4.7
HQ1F2Q	DU	0.22	2.2
HQ1A4A	DX	–	10

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	–20	V
Collector to emitter voltage	V_{CEO}	–20	V
Emitter to base voltage	V_{EBO}	–10	V
Collector current (DC)	$I_{C(DC)}$	–2.0	A
Collector current (Pulse)	$I_{C(pulse)}$ *	–3.0	A
Base current (DC)	$I_{B(DC)}$	–0.04	A
Total power dissipation	P_T **	2.0	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 10 ms, duty cycle ≤ 50 %

** When 0.7 mm × 16 cm^2 ceramic board is used

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HQ1L2N
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	50			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.7 A			–0.55	V
Low level input voltage	V_{IL} **	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		0.7	1.0	1.3	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1A3M
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	50			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	100			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.5 A			–0.4	V
Low level input voltage	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
E-to-B resistance	R_2		0.7	1.0	1.3	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1F3M
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	80			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.3 A			–0.3	V
Low level input voltage	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
E-to-B resistance	R_2		1.54	2.2	2.86	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1F3P
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	200			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.3 A			–0.3	V
Low level input voltage	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
E-to-B resistance	R_2		7	10	13	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1L2Q
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	150			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.7 A			–0.55	V
Low level input voltage	V_{IL} **	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

** PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1F2Q
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	80			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Low level output voltage	V_{OL} **	V_{IN} = –5.0 V, I_C = –0.7 A			–0.55	V
Low level input voltage	V_{IL} **	V_{CE} = –5.0 V, I_C = –100 μA			–0.3	V
Input resistance	R_1		154	220	286	kΩ
E-to-B resistance	R_2		1.54	2.2	2.86	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

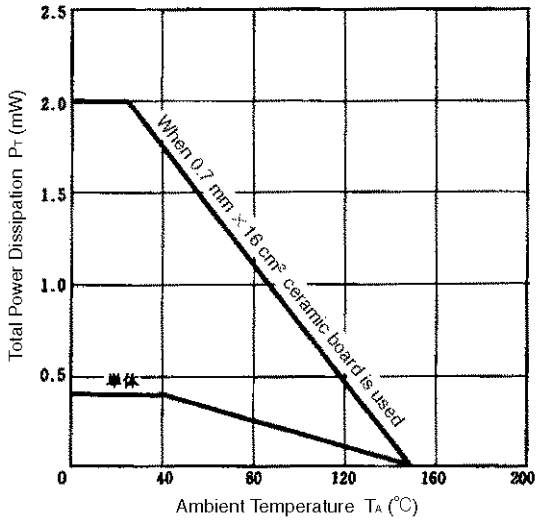
HQ1A4A
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –20 V, I_E = 0			–100	nA
DC current gain	h_{FE1} **	V_{CE} = –2.0 V, I_C = –0.1 A	200			–
DC current gain	h_{FE2} **	V_{CE} = –2.0 V, I_C = –1.0 A	150			–
DC current gain	h_{FE3} **	V_{CE} = –2.0 V, I_C = –2.0 A	50			–
Collector saturation voltage	$V_{CE(sat)}$ **	I_C = –1.0 A, I_B = –20 mA		–0.35	–0.45	V
Low level input voltage	V_{IL} **	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

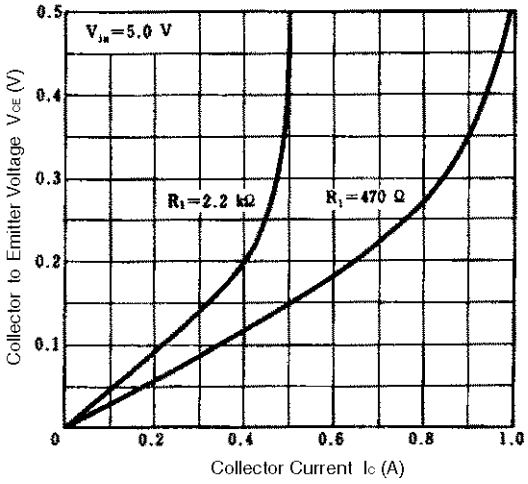
** PW ≤ 350 μs, duty cycle ≤ 2 %

TYPICAL CHARACTERISTICS (T_a = 25°C)

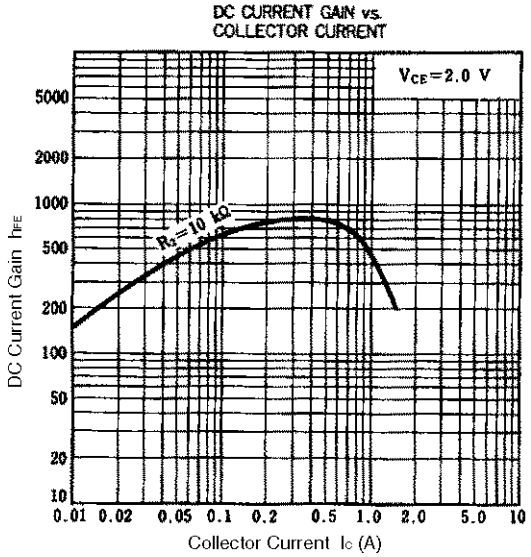
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



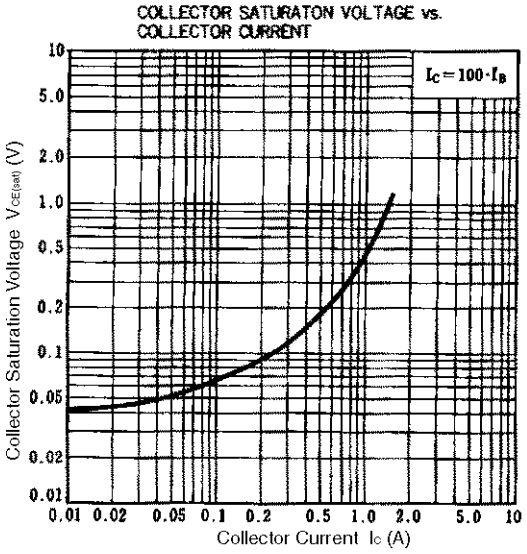
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR SATURATON VOLTAGE vs. COLLECTOR CURRENT



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