

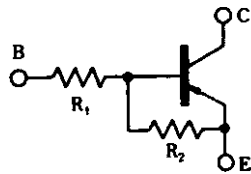
COMPOUND TRANSISTOR HQ1 SERIES

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



HQ1 SERIES LISTS

Products	Marking	R ₁ (K Ω)	R ₂ (K Ω)
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)

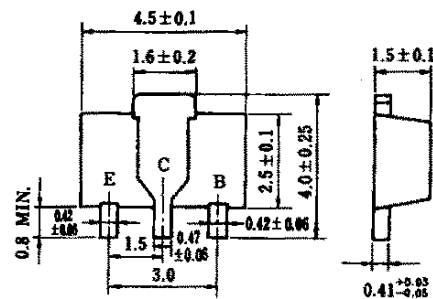
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	-20	V
Collector to emitter voltage	V_{CEO}	-20	V
Emitter to base voltage	V_{EBO}	-10	V
Collector current (DC)	$I_{C(DC)}$	-2.0	A
Collector current (Pulse)	$I_{C(pulse)}$ *	-3.0	A
Base current (DC)	$I_{B(DC)}$	-0.04	A
Total power dissipation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

* PW \leq 10 ms, duty cycle \leq 50 %

** When 0.7 mm \times 16 cm² ceramic board is used

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PACKAGE DRAWING (UNIT: mm)



Electrode Connection

E : Emitter

C : Collector(Fin)

B : Base

HQ1L2N

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -20\text{ V}, I_E = 0$			-100	nA
DC current gain	h_{FE1}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	50			—
DC current gain	h_{FE2}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	150			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	50			—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.7\text{ A}$			-0.55	V
Low level input voltage	V_{IL}^{**}	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$			-0.3	V
Input resistance	R_1		329	470	611	Ω
E-to-B resistance	R_2		0.7	1.0	1.3	k Ω

**PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1A3M

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -20\text{ V}, I_E = 0$			-100	nA
DC current gain	h_{FE1}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	50			—
DC current gain	h_{FE2}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	100			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	50			—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.5\text{ A}$			-0.4	V
Low level input voltage	V_{IL}^{**}	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$			-0.3	V
Input resistance	R_1		0.7	1.0	1.3	k Ω
E-to-B resistance	R_2		0.7	1.0	1.3	k Ω

**PW ≤ 350 μs, duty cycle ≤ 2 %

HQ1F3M

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -20\text{ V}, I_E = 0$			-100	nA
DC current gain	h_{FE1}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	80			—
DC current gain	h_{FE2}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	150			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	50			—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.3\text{ A}$			-0.3	V
Low level input voltage	V_{IL}^{**}	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$			-0.3	V
Input resistance	R_1		1.54	2.2	2.86	k Ω
E-to-B resistance	R_2		1.54	2.2	2.86	k Ω

**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 %

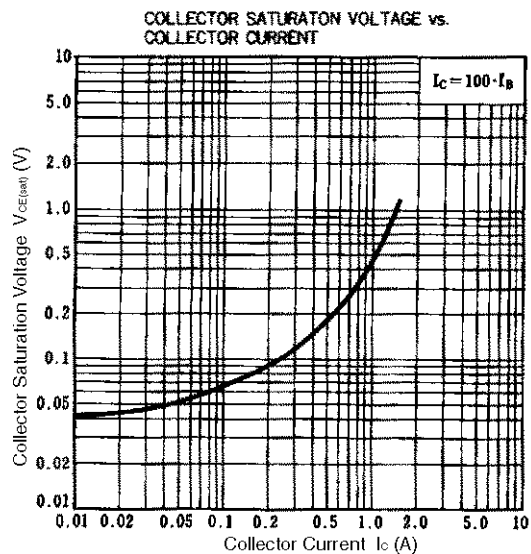
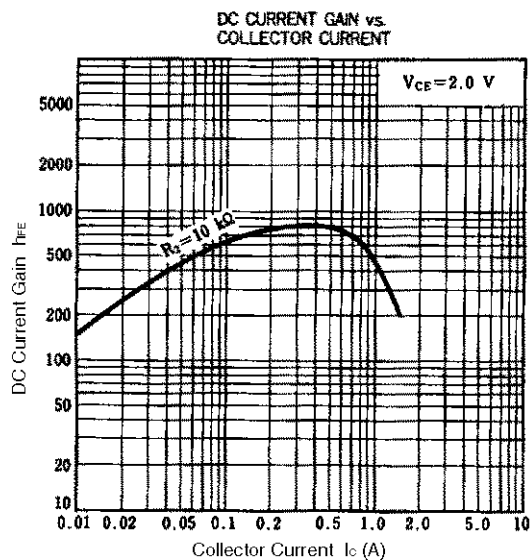
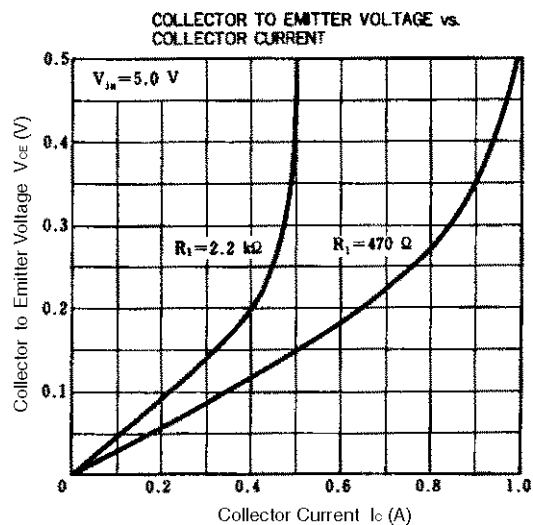
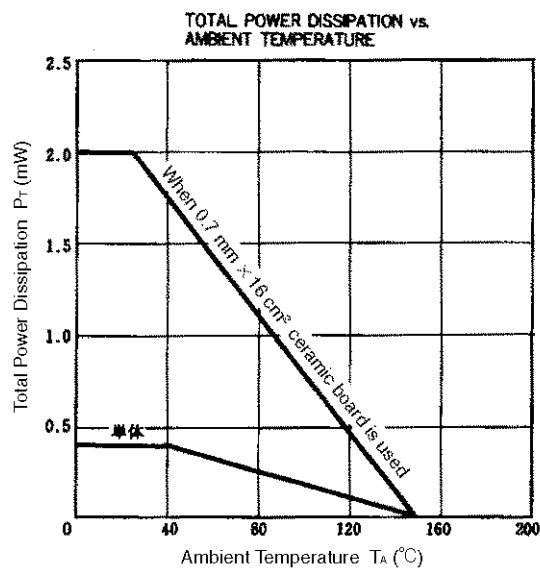
HQ1A4A

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -20\text{ V}, I_E = 0$			-100	nA
DC current gain	h_{FE1}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	200			—
DC current gain	h_{FE2}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	150			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -2.0\text{ A}$	50			—
Collector saturation voltage	$V_{CE(sat)}^{**}$	$I_C = -1.0\text{ A}, I_B = -20\text{ mA}$		-0.35	-0.45	V
Low level input voltage	V_{IL}^{**}	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$			-0.3	V
Input resistance	R_1		—	—	—	Ω
E-to-B resistance	R_2		7	10	13	k Ω

****** $PW \leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



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