To our customers,

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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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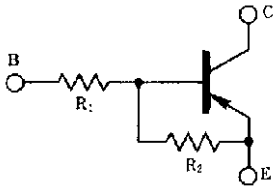
COMPOUND TRANSISTOR
Phase-out/Discontinued
AQ1 SERIES

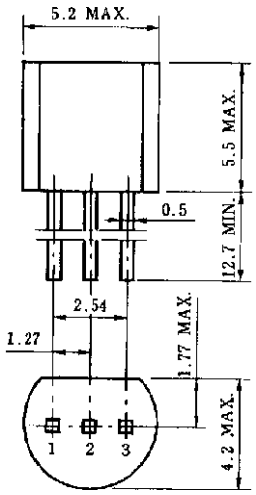
on-chip resistor NPN silicon epitaxial transistor
For mid-speed switching

FEATURES

- High current drives such as IC and motor solenoid available up to 2 A
- On-chip bias resistor
- Low power consumption during drive



PACKAGE DRAWING (UNIT: mm)



Electrode Connection
1. Emitter EIAJ : SC-43B
2. Collector JEDEC: TO-92
3. Base IEC : PA33

AQ1 SERIES LISTS

Products	R_1 (KΩ)	R_2 (KΩ)
AQ1L2N	0.47	1.0
AQ1A3M	1.0	1.0
AQ1F3M	2.2	2.2
AQ1F3P	2.2	10
AQ1L2Q	0.47	4.7
AQ1F2Q	0.22	2.2
AQ1A4A	–	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	750	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 10 ms, duty cycle ≤ 50 %

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AQ1L2N
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	$V_{CE(sat)}$ **	I_C = –5.0 A, 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 %

AQ1A3M
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} **	I_C = –5.0 A, 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 %

AQ1F3M
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} **	I_C = –5.0 A, 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 %

AQ1F3P
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} **	I_C = –5.0 A, 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 %

AQ1L2Q
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} **	I_C = –5.0 A, 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 %

AQ1F2Q
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} **	I_C = –5.0 A, 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	Ω
E-to-B resistance	R_2		1.54	2.2	2.86	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

AQ1A4A

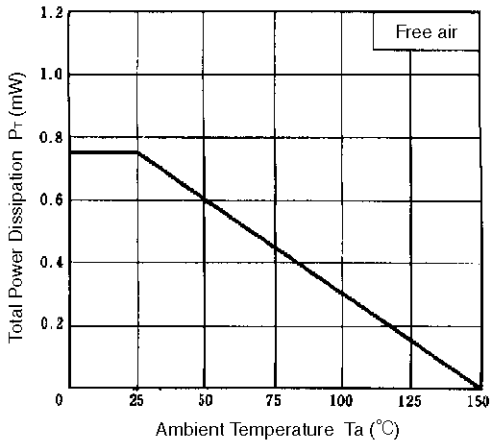
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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_{OL} **	I_C = –1.0 A, I_C = –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

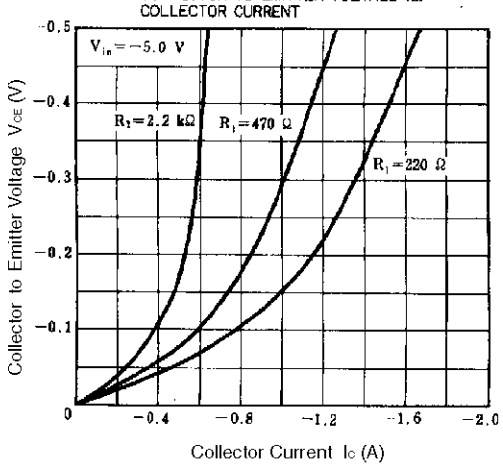
** PW ≤ 350 μs, duty cycle ≤ 2 %

TYPICAL CHARACTERISTICS (T_a = 25°C)

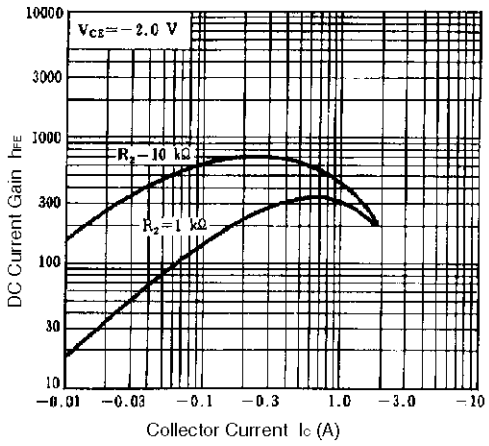
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



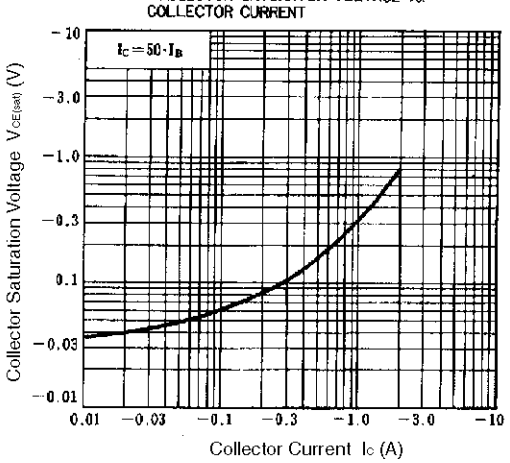
COLLECTOR TO EMITTER VOLTAGE vs. COLLECTOR CURRENT



DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR SATURATON VOLTAGE vs. COLLECTOR CURRENT



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