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April 1st, 2010
Renesas Electronics Corporation

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

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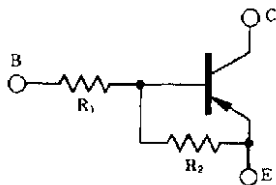
COMPOUND TRANSISTOR AP1 SERIES

Phase-out/Discontinued

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

FEATURES

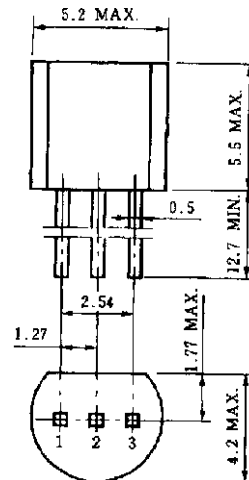
- Current drive available up to 0.7 A
- On-chip bias resistor
- Low power consumption during drive



AP1 SERIES LISTS

Products	R ₁ (KΩ)	R ₂ (KΩ)
AP1A4A	—	10
AP1L2Q	0.47	4.7
AP1A3M	1.0	1.0
AP1F3P	2.2	10
AP1J3P	3.3	10
AP1L3N	4.7	10
AP1A4M	10	10

PACKAGE DRAWING (UNIT: mm)



Electrode Connection

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

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V _{CBO}	−25	V
Collector 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)} *	−1.0	A
Base current (DC)	I _{B(DC)}	−0.02	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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AP1A4A

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -22\text{ V}, I_E = 0$			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}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.7\text{ A}$	50			—
Collector saturation voltage	$V_{CE(sat)}^{**}$	$I_C = -0.3\text{ A}, I_E = -6\text{ A}$		-0.28	-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		—	—	—	Ω
E-to-B resistance	R_2		7	10	13	k Ω

**PW ≤ 350 μs, duty cycle ≤ 2 %

AP1L2Q

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -22\text{ V}, I_E = 0$			-100	nA
DC current gain	h_{FE1}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	150	350		—
DC current gain	h_{FE2}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100	300		—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.7\text{ A}$	50	200		—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.3\text{ A}$		-0.3	-0.4	V
Low level input voltage	V_{IL}^{**}	$V_{CE} = -5.0\text{ V}, I_C = -100\text{ }\mu\text{A}$		-0.65	-0.3	V
Input resistance	R_1		329	470	611	Ω
E-to-B resistance	R_2		3.39	4.7	6.11	k Ω

**PW ≤ 350 μs, duty cycle ≤ 2 %

AP1A3M

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -22\text{ V}, I_E = 0$			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}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.7\text{ A}$	50			—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.2\text{ A}$		-0.3	-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 %

AP1F3P

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I _{CBO}	V _{CB} = -22 V, I _E = 0			-100	nA
DC current gain	h _{FE1} **	V _{CE} = -2.0 V, I _C = -0.1 A	200	470		—
DC current gain	h _{FE2} **	V _{CE} = -2.0 V, I _C = -0.5 A	100	300		—
DC current gain	h _{FE3} **	V _{CE} = -2.0 V, I _C = -0.7 A	50	200		—
Low level output voltage	V _{OL} **	V _{IN} = -5.0 V, I _C = -0.2 A		-0.2	-0.4	V
Low level input voltage	V _{IL} **	V _{CE} = -5.0 V, I _C = -100 μA		-0.65	-0.3	V
Input resistance	R ₁		2.3	3.3	4.3	kΩ
E-to-B resistance	R ₂		7	10	13	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

AP1J3P

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I _{CBO}	V _{CB} = -22 V, I _E = 0			100	nA
DC current gain	h _{FE1} **	V _{CE} = -2.0 V, I _C = -0.1 A	300	600		—
DC current gain	h _{FE2} **	V _{CE} = -2.0 V, I _C = -0.5 A	300	700		—
DC current gain	h _{FE3} **	V _{CE} = -2.0 V, I _C = -0.7 A	135	600		—
Low level output voltage	V _{OL} **	V _{IN} = -5.0 V, I _C = -0.15 A		0.14	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		2.31	3.3	4.29	kΩ
E-to-B resistance	R ₂		7	10	13	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

AP1L3N

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I _{CBO}	V _{CB} = -22 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 = -0.5 A	100			—
DC current gain	h _{FE3} **	V _{CE} = -2.0 V, I _C = -0.7 A	50			—
Low level output voltage	V _{OL} **	V _{IN} = -5.0 V, I _C = -0.15 A			-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		3.29	4.7	6.11	kΩ
E-to-B resistance	R ₂		7	10	13	kΩ

** PW ≤ 350 μs, duty cycle ≤ 2 %

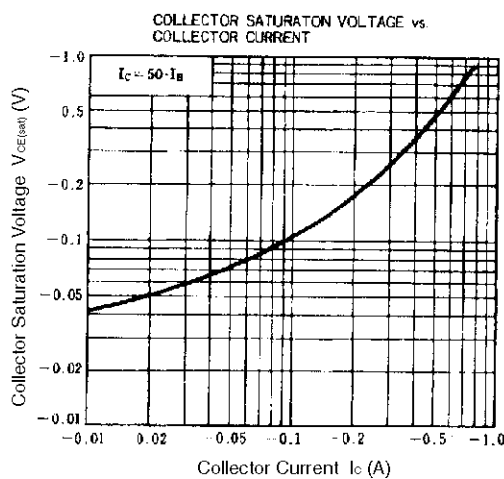
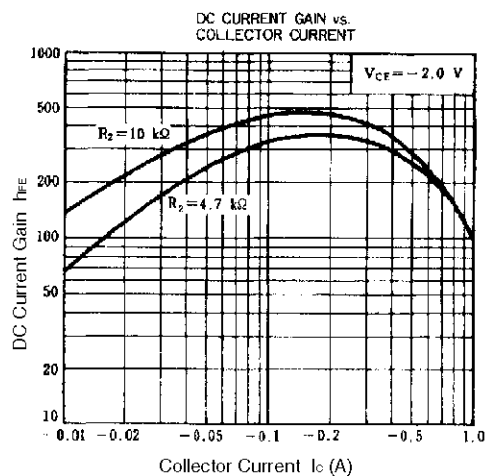
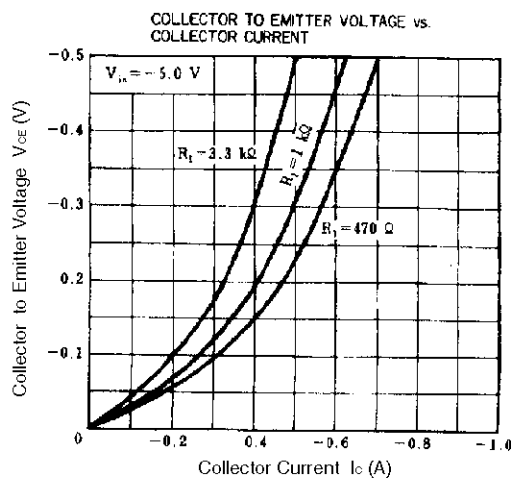
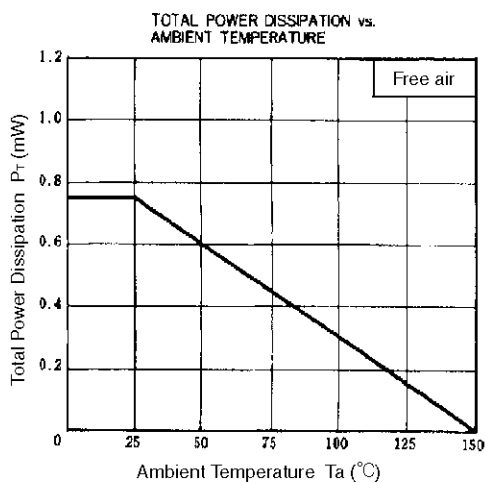
AP1A4M

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -22\text{ V}, I_E = 0$			-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}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	h_{FE3}^{**}	$V_{CE} = -2.0\text{ V}, I_C = -0.7\text{ A}$	50			—
Low level output voltage	V_{OL}^{**}	$V_{IN} = -5.0\text{ V}, I_C = -0.1\text{ A}$			-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		7	10	13	k 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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