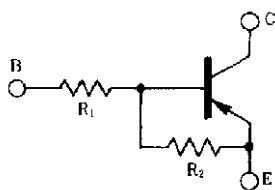


on-chip resistor PNP silicon epitaxial transistor  
For mid-speed switching

FEATURES

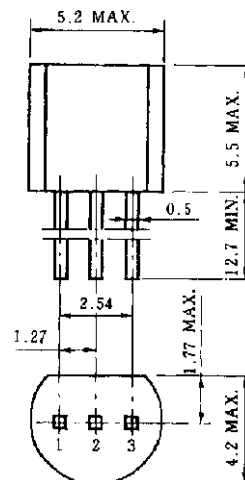
- High current drives such as IC output and actuator available
- On-chip bias resistor
- Low power consumption during drive



AR1 SERIES LISTS

Products	R <sub>1</sub> (KΩ)	R <sub>2</sub> (KΩ)
AR1A3M	1.0	1.0
AR1F3P	2.2	10
AR1L3N	4.7	10
AR1A4M	10	10
AR1L2Q	0.47	4.7
AR1F2Q	0.22	2.2
AR1A4A	—	10

PACKAGE DRAWING (UNIT: mm)



Electrode Connection

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

ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	-60	V
Collector to emitter voltage	V <sub>CEO</sub>	-60	V
Emitter to base voltage	V <sub>EBO</sub>	-10	V
Collector current (DC)	I <sub>C(DC)</sub>	-1.0	A
Collector current (Pulse)	I <sub>C(pulse)</sub> *	-2.0	A
Base current (DC)	I <sub>B(DC)</sub>	-0.02	A
Total power dissipation	P <sub>T</sub>	750	mW
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* PW ≤ 10 ms, duty cycle ≤ 50 %

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

**AR1A3M**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$			-100	nA
DC current gain	$h_{FE1}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	50			—
DC current gain	$h_{FE2}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	$h_{FE3}$ **	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	50			—
Low level output voltage	$V_{OL}$ **	$V_{IN} = -5.0\text{ V}, I_C = -0.4\text{ A}$			-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 $\Omega$
E-to-B resistance	$R_2$		0.7	1.0	1.3	k $\Omega$

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

**AR1F3P**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$			-100	nA
DC current gain	$h_{FE1}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	150			—
DC current gain	$h_{FE2}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	$h_{FE3}$ **	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	50			—
Low level output voltage	$V_{OL}$ **	$V_{IN} = -5.0\text{ V}, I_C = -0.35\text{ A}$			-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 $\Omega$
E-to-B resistance	$R_2$		7	10	13	k $\Omega$

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

**AR1L3N**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$			-100	nA
DC current gain	$h_{FE1}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	150			—
DC current gain	$h_{FE2}$ **	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			—
DC current gain	$h_{FE3}$ **	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	50			—
Low level output voltage	$V_{OL}$ **	$V_{IN} = -5.0\text{ V}, I_C = -0.2\text{ A}$			-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	$R_1$		3.29	4.7	6.11	k $\Omega$
E-to-B resistance	$R_2$		7	10	13	k $\Omega$

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

**AR1A4M**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = -60 V, I <sub>E</sub> = 0			-100	nA
DC current gain	h <sub>FE1</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.1 A	150			-
DC current gain	h <sub>FE2</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.5 A	100			-
DC current gain	h <sub>FE3</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -1.0 A	50			-
Low level output voltage	V <sub>OL</sub> **	V <sub>IN</sub> = -5.0 V, I <sub>C</sub> = -0.1 A			-0.2	V
Low level input voltage	V <sub>IL</sub> **	V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -100 μA			-0.3	V
Input resistance	R <sub>1</sub>		7	10	13	kΩ
E-to-B resistance	R <sub>2</sub>		7	10	13	kΩ

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

**AR1L2Q**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = -60 V, I <sub>E</sub> = 0			-100	nA
DC current gain	h <sub>FE1</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.1 A	150			-
DC current gain	h <sub>FE2</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.5 A	100			-
DC current gain	h <sub>FE3</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -1.0 A	50			-
Low level output voltage	V <sub>OL</sub> **	V <sub>IN</sub> = -5.0 V, I <sub>C</sub> = -0.5 A			-0.55	V
Low level input voltage	V <sub>IL</sub> **	V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -100 μA			-0.3	V
Input resistance	R <sub>1</sub>		329	470	611	Ω
E-to-B resistance	R <sub>2</sub>		3.29	4.7	6.11	kΩ

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

**AR1F2Q**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = -60 V, I <sub>E</sub> = 0			-100	nA
DC current gain	h <sub>FE1</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.1 A	80			-
DC current gain	h <sub>FE2</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -0.5 A	100			-
DC current gain	h <sub>FE3</sub> **	V <sub>CE</sub> = -2.0 V, I <sub>C</sub> = -1.0 A	50			-
Low level output voltage	V <sub>OL</sub> **	V <sub>IN</sub> = -5.0 V, I <sub>C</sub> = -0.5 A			-0.55	V
Low level input voltage	V <sub>IL</sub> **	V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -100 μA			-0.3	V
Input resistance	R <sub>1</sub>		154	220	286	Ω
E-to-B resistance	R <sub>2</sub>		1.54	2.2	2.86	kΩ

\*\* PW ≤ 350 μs, duty cycle ≤ 2 %

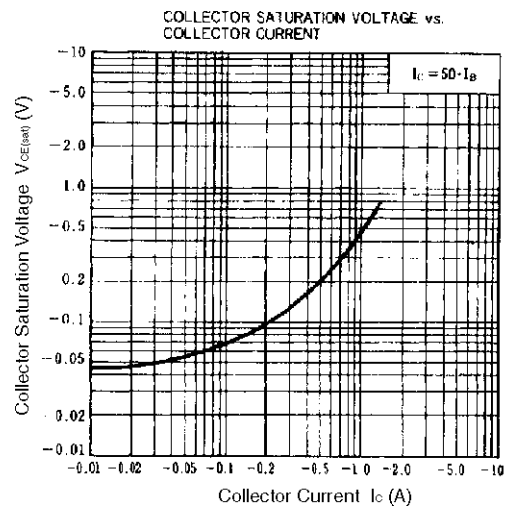
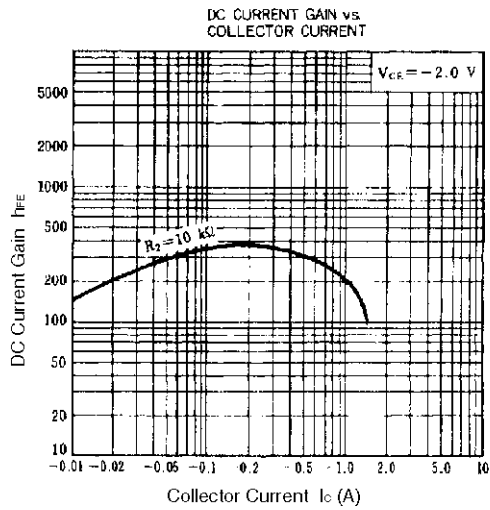
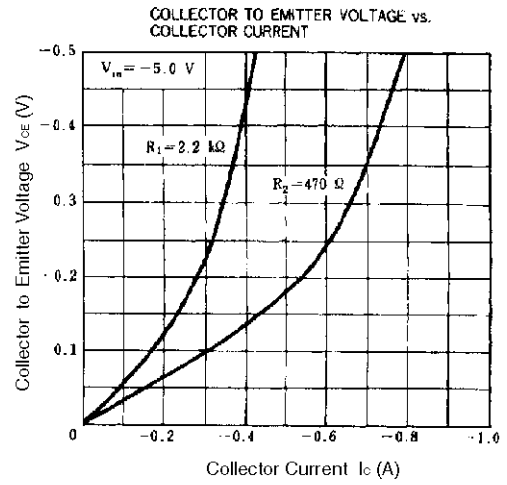
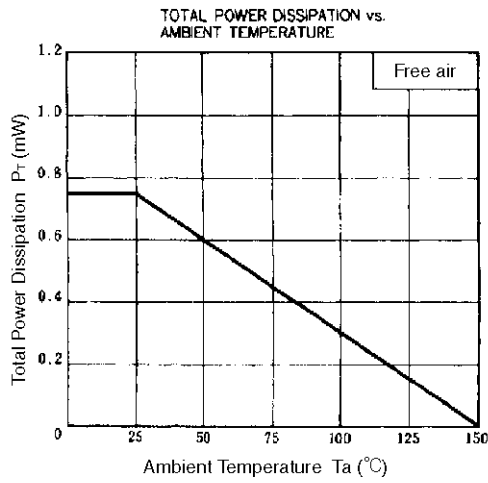
**AR1A4A**

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$			-100	nA
DC current gain	$h_{FE1}^{**}$	$V_{CE} = -2.0\text{ V}, I_C = -0.1\text{ A}$	150			-
DC current gain	$h_{FE2}^{**}$	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	100			-
DC current gain	$h_{FE3}^{**}$	$V_{CE} = -2.0\text{ V}, I_C = -1.0\text{ A}$	50			-
Collector saturation voltage	$V_{CE(sat)}^{**}$	$I_C = -500\text{ mA}, I_B = -10\text{ mA}$		-0.20	-0.35	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	$R_1$		-	-	-	$\Omega$
E-to-B resistance	$R_2$		7	10	13	k $\Omega$

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

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



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