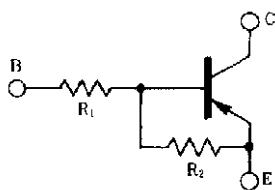


on-chip resistor PNP silicon epitaxial transistor
For mid-speed switching

FEATURES

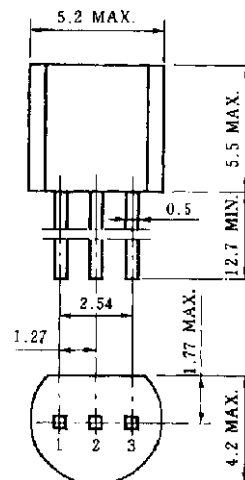
- High current drives such as IC output and actuator available
- On-chip bias resistor
- Low power consumption during drive



AR1 SERIES LISTS

| Products | R ₁ (KΩ) | R ₂ (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 (Ta = 25°C)

| Parameter | Symbol | Ratings | Unit |
|------------------------------|-------------------------|-------------|------|
| Collector to base voltage | V _{CBO} | -60 | V |
| Collector to emitter voltage | V _{CEO} | -60 | V |
| Emitter to base voltage | V _{EBO} | -10 | V |
| Collector current (DC) | I _{C(DC)} | -1.0 | A |
| Collector current (Pulse) | I _{C(pulse)} * | -2.0 | 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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 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 Ω |
| E-to-B resistance | R_2 | | 0.7 | 1.0 | 1.3 | k Ω |

** PW \leq 350 μs , duty cycle \leq 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 Ω |
| E-to-B resistance | R_2 | | 7 | 10 | 13 | k Ω |

** PW \leq 350 μs , duty cycle \leq 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 Ω |
| E-to-B resistance | R_2 | | 7 | 10 | 13 | k Ω |

** PW \leq 350 μs , duty cycle \leq 2 %

AR1A4M

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|---------------------|--|------|------|------|------|
| Collector cutoff current | I _{CB0} | V _{CB} = -60 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 = -0.5 A | 100 | | | - |
| DC current gain | h _{FE3} ** | V _{CE} = -2.0 V, I _C = -1.0 A | 50 | | | - |
| Low level output voltage | V _{OL} ** | V _{IN} = -5.0 V, I _C = -0.1 A | | | -0.2 | V |
| Low level input voltage | V _{IL} ** | V _{CE} = -5.0 V, I _C = -100 μA | | | -0.3 | V |
| Input resistance | R ₁ | | 7 | 10 | 13 | kΩ |
| E-to-B resistance | R ₂ | | 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 _{CB0} | V _{CB} = -60 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 = -0.5 A | 100 | | | - |
| DC current gain | h _{FE3} ** | V _{CE} = -2.0 V, I _C = -1.0 A | 50 | | | - |
| Low level output voltage | V _{OL} ** | V _{IN} = -5.0 V, I _C = -0.5 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 %

AR1F2Q

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|---------------------|--|------|------|-------|------|
| Collector cutoff current | I _{CB0} | V _{CB} = -60 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 = -0.5 A | 100 | | | - |
| DC current gain | h _{FE3} ** | V _{CE} = -2.0 V, I _C = -1.0 A | 50 | | | - |
| Low level output voltage | V _{OL} ** | V _{IN} = -5.0 V, I _C = -0.5 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 %

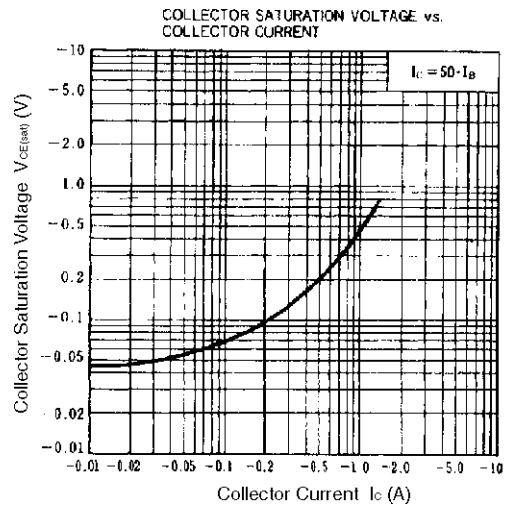
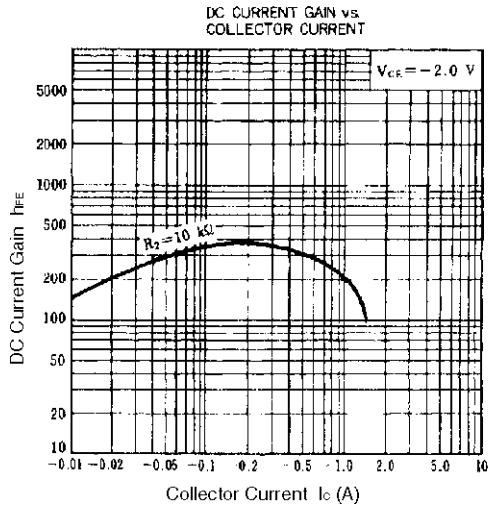
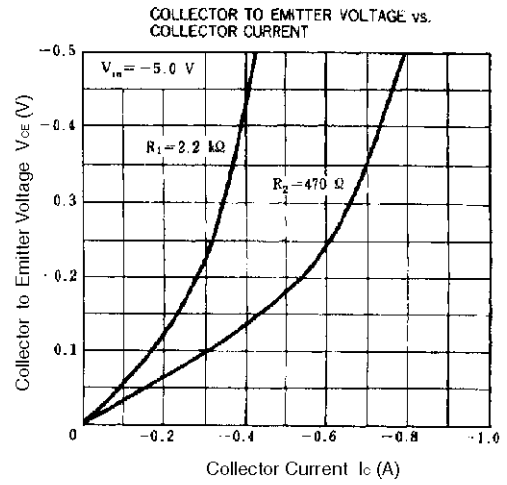
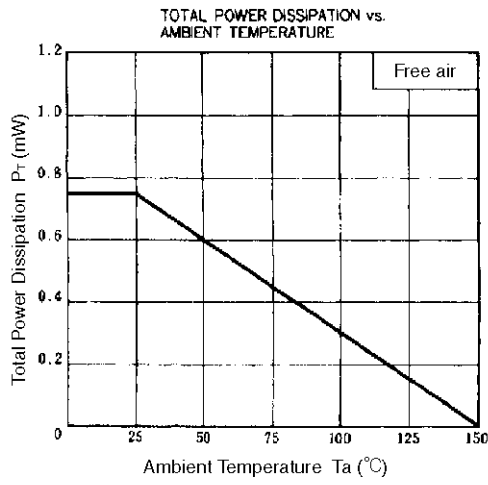
AR1A4A

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 | | - | - | - | Ω |
| E-to-B resistance | R_2 | | 7 | 10 | 13 | k Ω |

** PW ≤ 350 μs, duty cycle ≤ 2 %

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



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