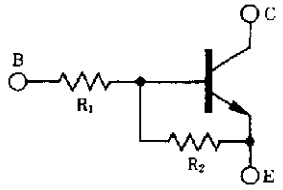
NEC

# COMPOUND TRANSISTOR
# AB1 SERIES

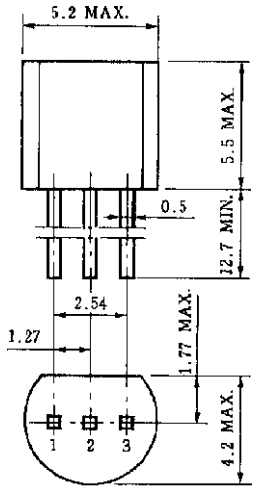
## on-chip resistor NPN silicon epitaxial transistor
## For mid-speed switching

### FEATURES

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




### PACKAGE DRAWING (UNIT: mm)




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

### AB1 SERIES LISTS

| Products | $R_1$ (KΩ) | $R_2$ (KΩ) |
|---|---|---|
| AB1A4A | – | 10 |
| AB1L2Q | 0.47 | 4.7 |
| AB1A3M | 1.0 | 1.0 |
| AB1F3P | 2.2 | 10 |
| AB1J3P | 3.3 | 10 |
| AB1L3N | 4.7 | 10 |
| AB1A4M | 10 | 10 |

### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | 30 | 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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### AB1A4A
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 100 | nA |
| DC current gain | $h_{FE1}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.1 A | 300 | | | – |
| DC current gain | $h_{FE2}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.5 A | 300 | | | – |
| DC current gain | $h_{FE3}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.7 A | 135 | | | – |
| Collector saturation voltage | $V_{CE(sat)}$ ** | $I_C$ = 5.0 A, $I_C$ = 5 mA | | 0.27 | 0.4 | V |
| Low level input voltage | $V_{IL}$ ** | $V_{CE}$ = 5.0 V, $I_C$ = 100 μA | | | 0.3 | V |
| Input resistance | $R_1$ | | – | – | – | Ω |
| E-to-B resistance | $R_2$ | | 7 | 10 | 13 | kΩ |

** PW ≤ 350 μs, duty cycle ≤ 2 %

### AB1L2Q
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 100 | nA |
| DC current gain | $h_{FE1}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.1 A | 150 | 400 | | – |
| 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, $I_C$ = 0.5 A | | 0.2 | 0.3 | V |
| Low level input voltage | $V_{IL}$ ** | $V_{CE}$ = 5.0 V, $I_C$ = 100 μA | | | 0.3 | V |
| Input resistance | $R_1$ | | 329 | 470 | 611 | Ω |
| E-to-B resistance | $R_2$ | | 3.29 | 4.7 | 6.11 | kΩ |

** PW ≤ 350 μs, duty cycle ≤ 2 %

### AB1A3M
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 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, $I_C$ = 0.7 A | 135 | | | – |
| Low level output voltage | $V_{OL}$ ** | $V_{IN}$ = 5.0 V, $I_C$ = 0.5 A | | 0.3 | 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 %

### AB1F3P
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 100 | nA |
| DC current gain | $h_{FE1}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.1 A | 300 | | | – |
| DC current gain | $h_{FE2}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.5 A | 300 | | | – |
| DC current gain | $h_{FE3}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.7 A | 135 | | | – |
| 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 $\mu$A | | | 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 $\mu$s, duty cycle ≤ 2 %

### AB1J3P
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 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, $I_C$ = 0.2 A | | 0.14 | 0.3 | V |
| Low level input voltage | $V_{IL}$ ** | $V_{CE}$ = 5.0 V, $I_C$ = 100 $\mu$A | | | 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 $\mu$s, duty cycle ≤ 2 %

### AB1L3N
### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 100 | nA |
| DC current gain | $h_{FE1}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.1 A | 300 | | | – |
| DC current gain | $h_{FE2}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.5 A | 300 | | | – |
| DC current gain | $h_{FE3}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.7 A | 135 | | | – |
| Low level output voltage | $V_{OL}$ ** | $V_{IN}$ = 5.0 V, $I_C$ = 0.2 A | | | 0.3 | V |
| Low level input voltage | $V_{IL}$ ** | $V_{CE}$ = 5.0 V, $I_C$ = 100 $\mu$A | | | 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 $\mu$s, duty cycle ≤ 2 %

**AB1A4M**

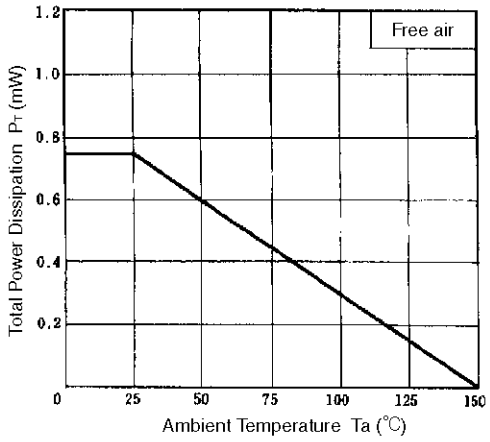
**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 100 | nA |
| DC current gain | $h_{FE1}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.1 A | 300 | | | – |
| DC current gain | $h_{FE2}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.5 A | 300 | | | – |
| DC current gain | $h_{FE3}$ ** | $V_{CE}$ = 2.0 V, $I_C$ = 0.7 A | 135 | | | – |
| Low level output voltage | $V_{OL}$ ** | $V_{IN}$ = 5.0 V, $I_C$ = 0.2 A | | | 0.3 | V |
| Low level input voltage | $V_{IL}$ ** | $V_{CE}$ = 5.0 V, $I_C$ = 100 μA | | | 0.3 | V |
| Input resistance | $R_1$ | | 7 | 10 | 13 | kΩ |
| E-to-B resistance | $R_2$ | | 7 | 10 | 13 | kΩ |

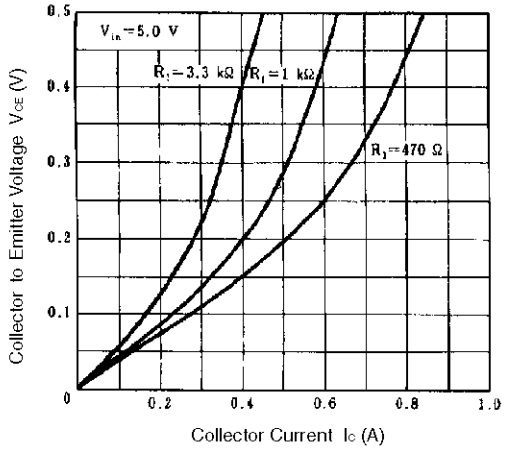
** PW ≤ 350 μs, duty cycle ≤ 2 %

## TYPICAL CHARACTERISTICS ($T_a$ = 25°C)

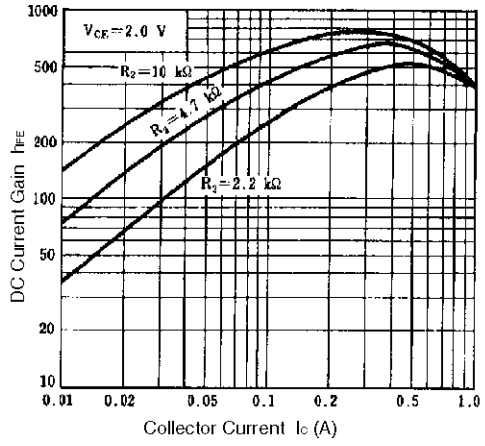
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



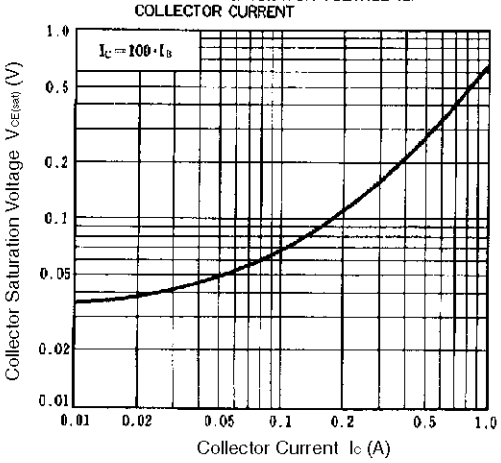

COLLECTOR TO EMITTER VOLTAGE vs.
COLLECTOR CURRENT




DC CURRENT GAIN vs.
COLLECTOR CURRENT




COLLECTOR SATURATON VOLTAGE vs.
COLLECTOR CURRENT



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