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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

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SILICON TRANSISTOR FN4xxx

RESISTOR BUILT-IN TYPE PNP TRANSISTOR

FEATURES

- Compact package
- Resistors built-in type
- Complementary to FA4xxx

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|---------|
| FN4xxx | SC-59 |

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

| | | | |
|--|-----------------------|-------------|----|
| Collector to Base Voltage | V _{CB0} | -60 | V |
| Collector to Emitter Voltage | V _{CE0} | -50 | V |
| <R> Emitter to Base Voltage | V _{EBO} | Note1 | V |
| Collector Current (DC) | I _C | -0.1 | A |
| Collector Current (pulse) ^{Note2} | I _{C(pulse)} | -0.2 | A |
| Total Power Dissipation | P _T | 0.2 | W |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

<R> Note 1.

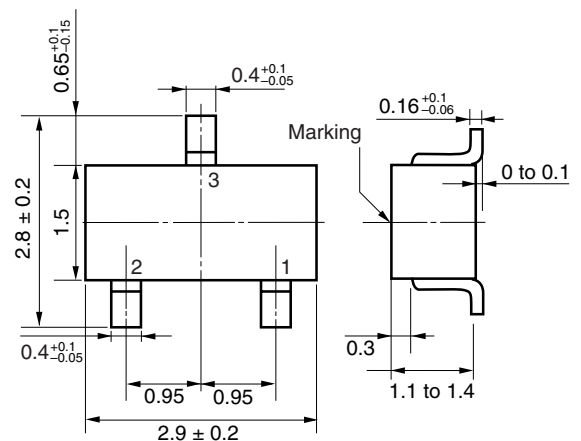
| PART NUMBER | V _{EBO} (V) | MARK | R ₁ (kΩ) | R ₂ (kΩ) |
|-------------|-------------------------|------|------------------------|------------------------|
| FN4A4M | -10 | NA1 | 10.0 | 10.0 |
| FN4F4M | -10 | NB1 | 22.0 | 22.0 |
| FN4L4M | -10 | NC1 | 47.0 | 47.0 |
| FN4L3M | -10 | ND1 | 4.7 | 4.7 |
| FN4L3N | -5 | NE1 | 4.7 | 10.0 |
| FN4L3Z | -5 | NF1 | 4.7 | |
| FN4A3Q | -5 | NG1 | 1.0 | 10.0 |
| FN4A4P | -5 | NH1 | 10.0 | 47.0 |
| FN4F4N | -5 | NJ1 | 22.0 | 47.0 |

Note 2. PW ≤ 10 ms, Duty Cycle ≤ 50%

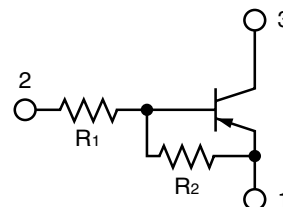
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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



PIN CONNECTION

- 1: Emitter
- 2: Base
- 3: Collector

| PART NUMBER | V _{EBO} (V) | MARK | R ₁ (kΩ) | R ₂ (kΩ) |
|-------------|-------------------------|------|------------------------|------------------------|
| FN4L4L | -15 | NK1 | 47.0 | 22.0 |
| FN4A4Z | -5 | NL1 | 10.0 | |
| FN4F4Z | -5 | NM1 | 22.0 | |
| FN4L4Z | -5 | NN1 | 47.0 | |
| FN4F3M | -10 | NP1 | 2.2 | 2.2 |
| FN4F3P | -5 | NQ1 | 2.2 | 10.0 |
| FN4F3R | -5 | NR1 | 2.2 | 47.0 |
| FN4A4L | -15 | NS1 | 10.0 | 4.7 |
| FN4L4K | -25 | NT1 | 47.0 | 10.0 |

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------------------------|----------------------|---|--------------|------|------|------|
| Collector Cut-off Current | I _{CBO} | V _{CB} = -50 V, I _E = 0 | | | -100 | nA |
| DC Current Gain | h _{FE1} | V _{CE} = -5.0 V, I _C = -5.0 mA | Note1 | | | - |
| | h _{FE2} | V _{CE} = -5.0 V, I _C = -50 mA | | | | - |
| Collector Saturation Voltage | V _{CE(sat)} | I _C = -5.0 mA, I _B = -0.25 mA | | | -0.2 | V |
| Low-level Input Voltage | V _{IL} | V _{CE} = -5.0 V, I _C = -100 μA | Note2 | | | V |
| High-level Input Voltage | V _{IH} | V _{CE} = -0.2 V, I _C = -5.0 mA | | | | V |
| Input Resistor | R ₁ | | Note3 | | | kΩ |
| Emitter to Base Resistor | R ₂ | | | | | kΩ |

Note 1.

| PART NUMBER | h _{FE1} | | | h _{FE2} | | | UNIT |
|-------------|------------------|------|------|------------------|------|------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | 35 | | 100 | 80 | | | - |
| FN4F4M | 60 | | 195 | 90 | | | - |
| FN4L4M | 85 | | 340 | 95 | | | - |
| FN4L3M | 20 | | 80 | 80 | | | - |
| FN4L3N | 35 | | 100 | 80 | | | - |
| FN4L3Z | 135 | | 600 | 100 | | | - |
| FN4A3Q | 35 | | 100 | 80 | | | - |
| FN4A4P | 85 | | 340 | 95 | | | - |
| FN4F4N | 85 | | 340 | 95 | | | - |
| FN4L4L | 60 | | 195 | 90 | | | - |
| FN4A4Z | 135 | | 600 | 100 | | | - |
| FN4F4Z | 135 | | 600 | 100 | | | - |
| FN4L4Z | 135 | | 600 | 100 | | | - |
| FN4F3M | 8 | | 50 | 50 | | | - |
| FN4F3P | 35 | | 100 | 80 | | | - |
| FN4F3R | 85 | | 340 | 95 | | | - |
| FN4A4L | 20 | | 80 | 80 | | | - |
| FN4L4K | 35 | | 100 | 80 | | | - |

Note 2.

| PART NUMBER | V _{IL} | | | V _{IH} | | | UNIT |
|-------------|-----------------|------|------|-----------------|------|------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | | | -0.8 | -3.0 | | | V |
| FN4F4M | | | -0.8 | -4.0 | | | V |
| FN4L4M | | | -0.8 | -5.0 | | | V |
| FN4L3M | | | -0.8 | -3.0 | | | V |
| FN4L3N | | | -0.6 | -3.0 | | | V |
| FN4L3Z | | | -0.5 | -1.2 | | | V |
| FN4A3Q | | | -0.5 | -2.0 | | | V |
| FN4A4P | | | -0.5 | -3.0 | | | V |
| FN4F4N | | | -0.6 | -3.0 | | | V |
| FN4L4L | | | -0.9 | -6.0 | | | V |
| FN4A4Z | | | -0.5 | -2.0 | | | V |
| FN4F4Z | | | -0.5 | -3.0 | | | V |
| FN4L4Z | | | -0.5 | -4.0 | | | V |
| FN4F3M | | | -0.8 | -3.0 | | | V |
| FN4F3P | | | -0.5 | -2.0 | | | V |
| FN4F3R | | | -0.5 | -2.0 | | | V |
| FN4A4L | | | -0.9 | -6.0 | | | V |
| FN4L4K | | | -2.0 | -8.0 | | | V |

Note 3.

| PART NUMBER | R ₁ | | | R ₂ | | | UNIT |
|-------------|----------------|-------|-------|----------------|-------|-------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| FN4A4M | 7.00 | 10.00 | 13.00 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4F4M | 15.40 | 22.00 | 28.60 | 15.40 | 22.00 | 28.60 | kΩ |
| FN4L4M | 32.90 | 47.00 | 61.10 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4L3M | 3.29 | 4.70 | 6.11 | 3.29 | 4.70 | 6.11 | kΩ |
| FN4L3N | 3.29 | 4.70 | 6.11 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4L3Z | 3.29 | 4.70 | 6.11 | | | | kΩ |
| FN4A3Q | 0.70 | 1.00 | 1.30 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4A4P | 7.00 | 10.00 | 13.00 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4F4N | 15.40 | 22.00 | 28.60 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4L4L | 32.90 | 47.00 | 61.10 | 15.40 | 22.00 | 28.60 | kΩ |
| FN4A4Z | 7.00 | 10.00 | 13.00 | | | | kΩ |
| FN4F4Z | 15.40 | 22.00 | 28.60 | | | | kΩ |
| FN4L4Z | 32.90 | 47.00 | 61.10 | | | | kΩ |
| FN4F3M | 1.54 | 2.20 | 2.86 | 1.54 | 2.20 | 2.86 | kΩ |
| FN4F3P | 1.54 | 2.20 | 2.86 | 7.00 | 10.00 | 13.00 | kΩ |
| FN4F3R | 1.54 | 2.20 | 2.86 | 32.90 | 47.00 | 61.10 | kΩ |
| FN4A4L | 7.00 | 10.00 | 13.00 | 3.29 | 4.70 | 6.11 | kΩ |
| FN4L4K | 32.90 | 47.00 | 61.10 | 7.00 | 10.00 | 13.00 | kΩ |

