

To our customers,

Old Company Name in Catalogs and Other Documents

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

April 1st, 2010
Renesas Electronics Corporation

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

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Phase-out/Discontinued

SILICON POWER TRANSISTOR
2SC4346,4346-ZNPN SILICON TRIPLE DIFFUSED TRANSISTOR
FOR HIGH SPEED SWITCHING, HIGH VOLTAGE SWITCHING

DESCRIPTION

The 2SC4346 is a mold power transistor developed for high-speed switching, high voltage switching, and is ideal for use as a driver in devices such as switching regulators, DC/DC converters, and high-frequency power amplifiers.

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|----------------|
| 2SC4346 | TO-251 (MP-3) |
| 2SC4346-Z | TO-252 (MP-3Z) |

FEATURES

- Small package, but can control for high-current
- Low collector saturation voltage
 $V_{CE(sat)} = 1.0 \text{ V MAX. (} I_c = 2.0 \text{ A)}$
- Ultra high-speed switching
 $t_f = 0.3 \mu\text{s MAX. (} I_c = 2.0 \text{ A)}$
- Base reverse bias safe operating area is wide
 $V_{CEX(SUS)} = 450 \text{ V MIN. (} I_c = 2.0 \text{ A)}$

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

| | | | |
|------------------------------|-----------------------------------|---|------------------|
| Collector to Base Voltage | V_{CBO} | 500 | V |
| Collector to Emitter Voltage | V_{CEO} | 400 | V |
| Emitter to Base Voltage | V_{EBO} | 8.0 | V |
| Collector Current (DC) | $I_{C(DC)}$ | 5.0 | A |
| Collector Current (pulse) | $I_{C(pulse)}$ ^{Note1} | 10 | A |
| Base Current (DC) | $I_{B(DC)}$ | 2.5 | A |
| Total Power Dissipation | $P_{T1} (T_C = 25^\circ\text{C})$ | 18 | W |
| Total Power Dissipation | $P_{T2} (T_A = 25^\circ\text{C})$ | 1.0 ^{Note2} , 2.0 ^{Note3} | W |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Notes 1. PW $\leq 10 \text{ ms}$, Duty Cycle $\leq 50\%$
2. Mounted on print board
3. Mounted on ceramic substrate of $7.5 \text{ cm}^2 \times 0.7 \text{ mm}$

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

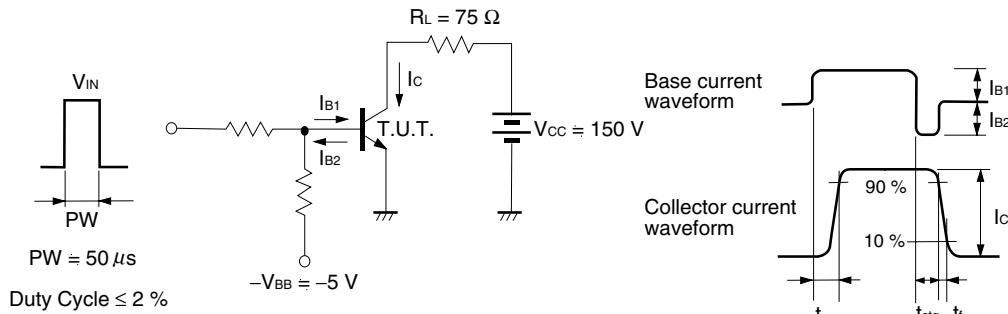
| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|------------------------|---|------------------|------|------|---------------|
| Collector to Emitter Voltage | $V_{CEO(\text{SUS})}$ | $I_C = 2.0 \text{ A}, I_{B1} = 0.4 \text{ A}, L = 1 \text{ mH}$ | 400 | | | V |
| | $V_{CEX(\text{SUS})1}$ | $I_C = 2.0 \text{ A}, I_{B1} = -I_{B2} = 0.4 \text{ A}, L = 180 \mu\text{H}, \text{Clamped}$ | 450 | | | V |
| | $V_{CEX(\text{SUS})2}$ | $I_C = 4.0 \text{ A}, I_{B1} = 1.0 \text{ A}, -I_{B2} = 0.4 \text{ A}, L = 180 \mu\text{H}, \text{Clamped}$ | 400 | | | V |
| Collector Cut-off Current | I_{CBO} | $V_{CB} = 400 \text{ V}, I_E = 0$ | | | 10 | μA |
| | I_{CER} | $V_{CB} = 400 \text{ V}, R_{BE} = 51 \Omega, T_A = 125^\circ\text{C}$ | | | 1.0 | mA |
| | I_{CEX1} | $V_{CB} = 400 \text{ V}, V_{BE(\text{OFF})} = -5 \text{ V}$ | | | 100 | μA |
| | I_{CEX2} | $V_{CB} = 400 \text{ V}, V_{BE(\text{OFF})} = -5 \text{ V}, T_A = 125^\circ\text{C}$ | | | 1.0 | mA |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = 5.0 \text{ V}, I_C = 0$ | | | 10 | μA |
| DC Current Gain <small>Note</small> | h_{FE1} | $V_{CE} = 5.0 \text{ V}, I_C = 5 \text{ mA}$ | 15 | | | |
| | h_{FE2} | $V_{CE} = 5.0 \text{ V}, I_C = 0.5 \text{ A}$ | 20 | | 80 | |
| | h_{FE3} | $V_{CE} = 5.0 \text{ V}, I_C = 2.0 \text{ A}$ | 10 | | | |
| Collector Saturation Voltage <small>Note</small> | $V_{CE(\text{sat})}$ | $I_C = 2.0 \text{ A}, I_B = 0.4 \text{ A}$ | | 0.5 | 1.0 | V |
| Base Saturation Voltage <small>Note</small> | $V_{BE(\text{sat})}$ | $I_C = 2.0 \text{ A}, I_B = 0.4 \text{ A}$ | | 1.0 | 1.5 | V |
| Turn-on Time | t_{on} | $I_C = 2.0 \text{ A}, R_L = 75 \Omega$ $I_{B1} = -I_{B2} = 0.4 \text{ A}, V_{CC} = 150 \text{ V}$ | | | 0.7 | μs |
| Storage Time | t_{stg} | | | | 2.5 | μs |
| Fall Time | t_f | | See Test Circuit | | 0.3 | μs |

Note Pulsed

h_{FE} CLASSIFICATION

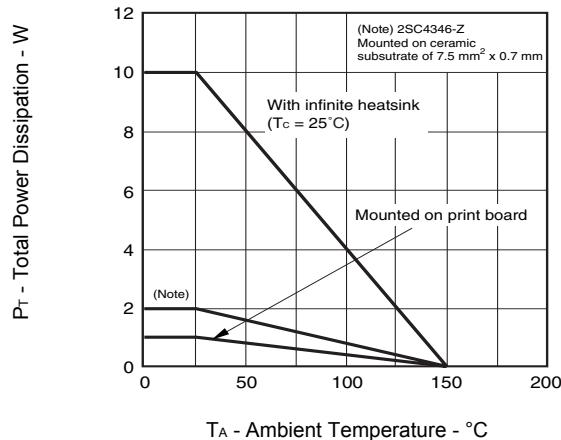
| Marking | M | L | K |
|-----------|----------|----------|----------|
| h_{FE2} | 20 to 40 | 30 to 60 | 40 to 80 |

SWITCHING TIME (t_{on} , t_{stg} , t_f) TEST CIRCUIT

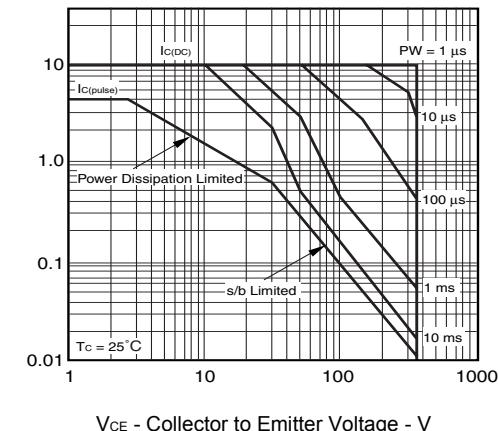


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

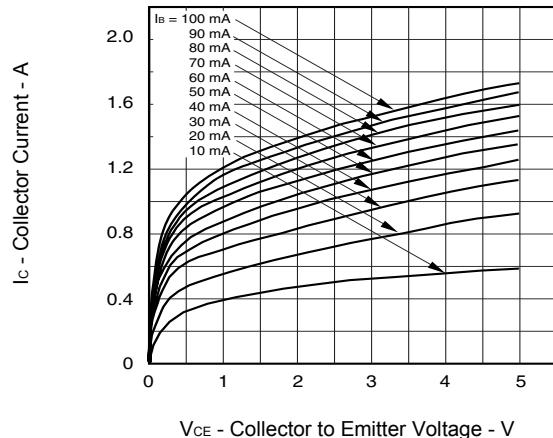
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



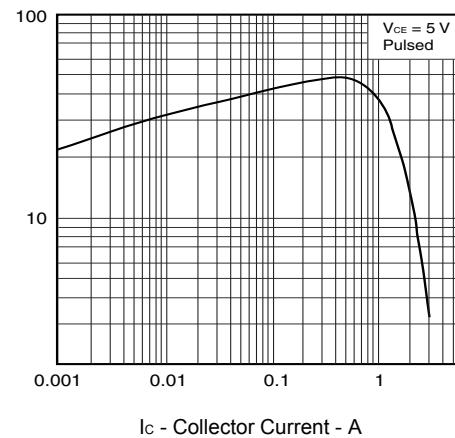
FORWARD BIAS SAFE OPERATING AREA



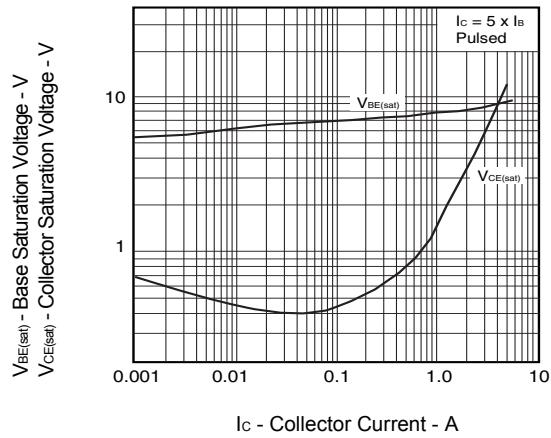
COLLECTOR CURRENT vs.
COLLECTOR TO Emitter VOLTAGE



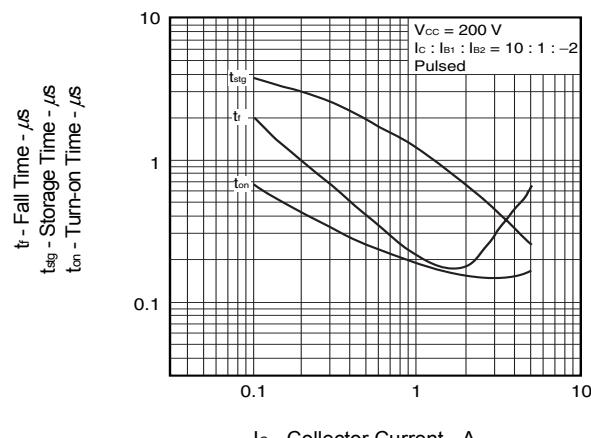
DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR AND BASE SATURATION VOLTAGE vs.
COLLECTOR CURRENT

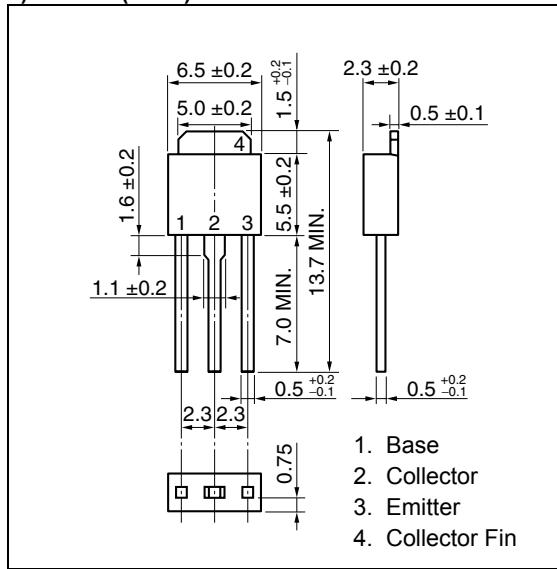
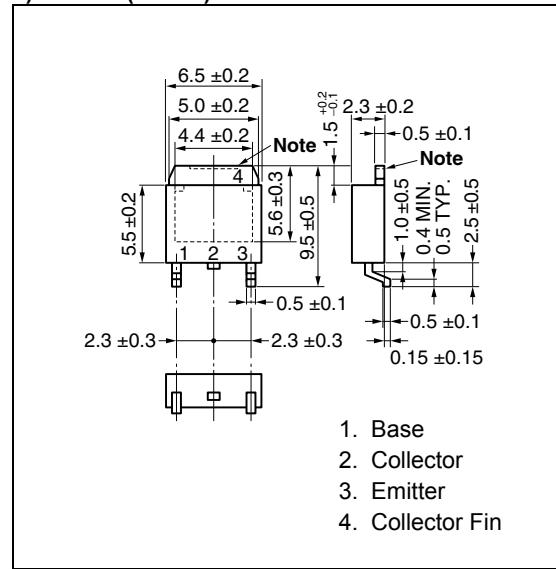


TURN-ON, STORAGE TIME AND FALL TIME vs.
COLLECTOR CURRENT



PACKAGE DRAWINGS (Unit: mm)

<R>

1) TO-251 (MP-3)**2) TO-252 (MP-3Z)**

Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

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