

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT MULTI CHIP

# TD62M3704F

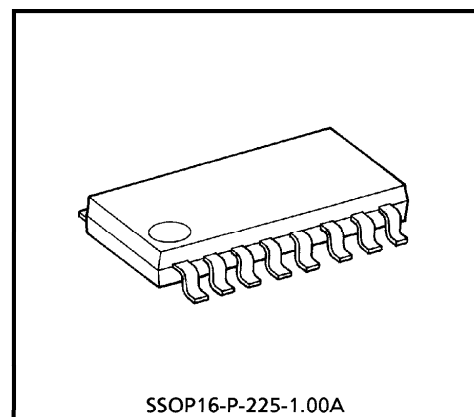
## LOW SATURATION VOLTAGE H-BRIDGE DRIVER FOR MOTOR

TD62M3704F is Multi Chip IC incorporates 5 low saturation discrete transistors which equipped fly-wheeling diodes and bias resistor.

This IC is suitable for a battery use motor drive applications.

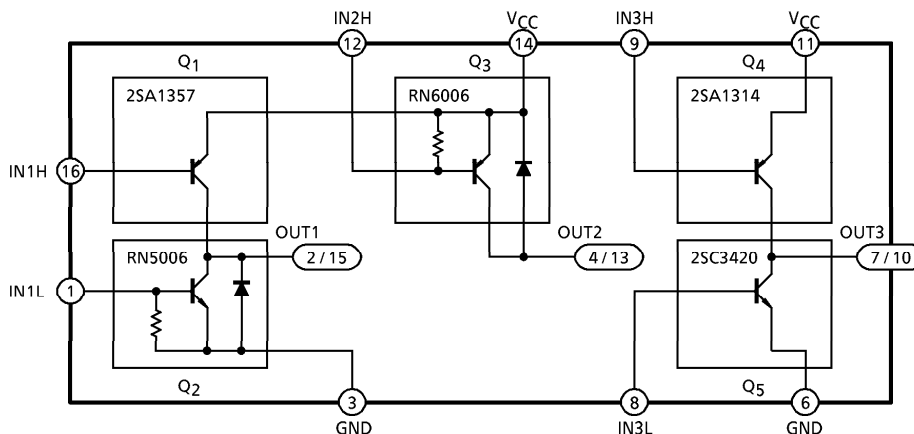
### FEATURES

- ch1 (Upper) : 2SA1357  
ch1 (Lower) : RN5006-Fly-wheeling Diode and Bias Resistor equipped
- ch2 (Upper) : RN6006-Fly-wheeling Diode and Bias Resistor equipped
- ch3 (Upper) : 2SA1314  
ch3 (Lower) : 2SC3420
- Suitable for High Efficiency Motor drive circuit
- External Input Resistor
- SSOP16 1mm pitch small package sealed



Weight : 0.14g (Typ.)

### BLOCK DIAGRAM



961001EBA2

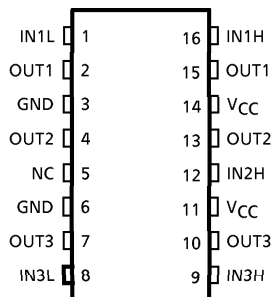
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**PIN CONNECTION (TOP VIEW)**



**MAXIMUM RATINGS (Ta = 25°C)**

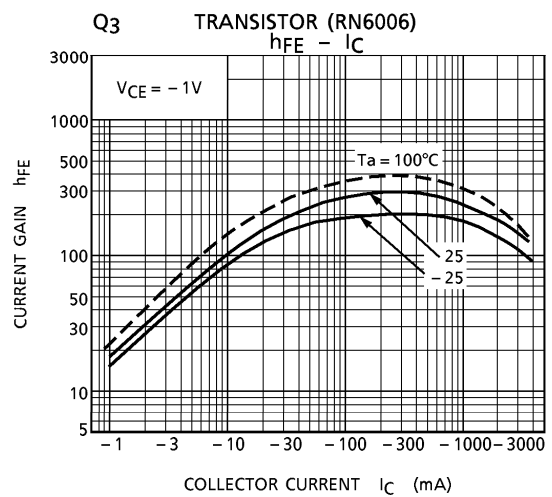
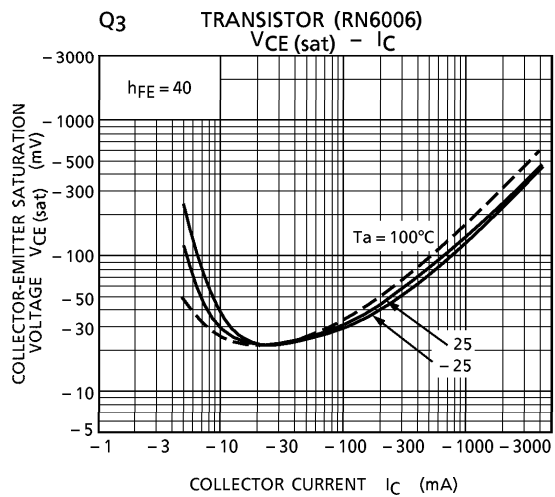
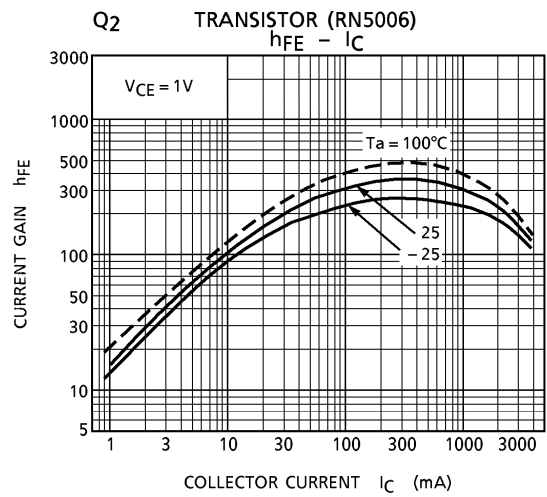
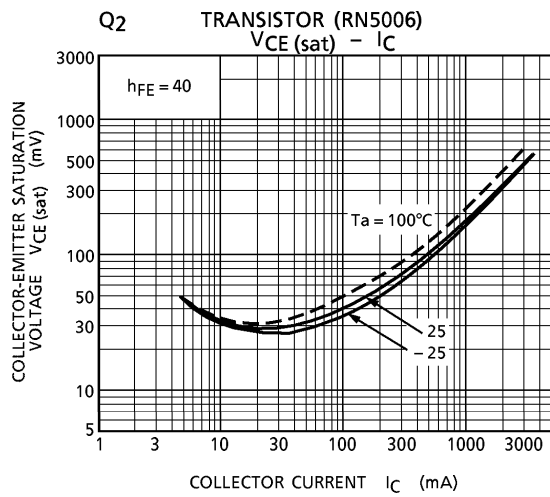
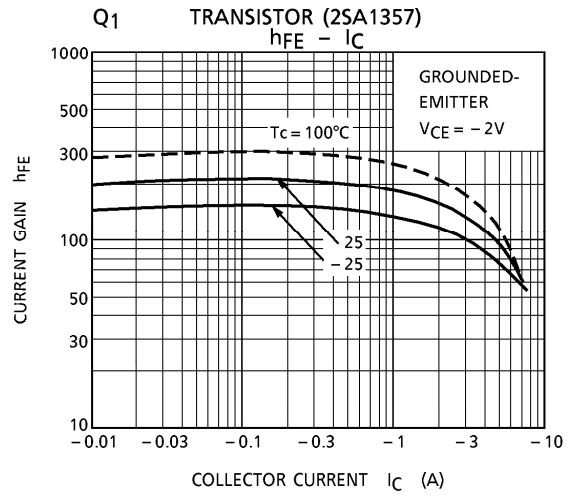
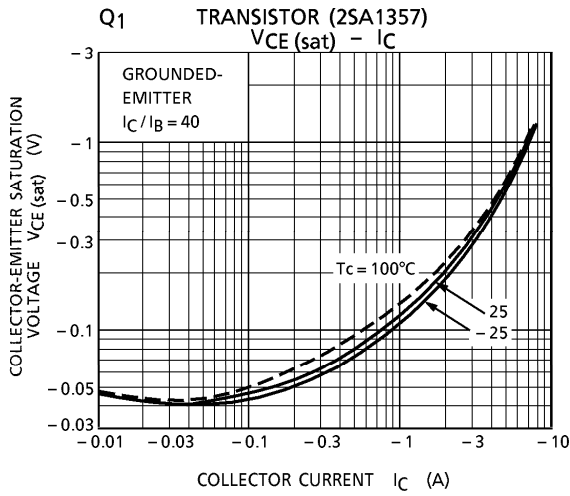
| CHARACTERISTIC        | SYMBOL                            | RATING  | UNIT |   |
|-----------------------|-----------------------------------|---------|------|---|
| Supply Voltage        | VCC                               | 10      | V    |   |
| Breakdown Voltage     | V <sub>CBO</sub>                  | 10      | V    |   |
|                       | V <sub>CEO</sub> (Note 2)         | 10      |      |   |
|                       | V <sub>EBO</sub>                  | Q1, Q5  |      | 8 |
|                       |                                   | Q2, Q3  |      | 6 |
|                       | Q4                                | 7       |      |   |
| Output Current        | I <sub>O</sub> (AVE)              | Q1, Q5  | 5    | A |
|                       |                                   | Q2~Q4   | 2    |   |
|                       | I <sub>O</sub> (PEAK)<br>(Note 1) | Q1, Q5  | 8    | A |
|                       |                                   | Q2~Q4   | 4    |   |
| Base Current          | I <sub>B</sub>                    | Q1, Q5  | 1    | A |
|                       |                                   | Q2~Q4   | 0.4  |   |
| Power Dissipation     | P <sub>D</sub>                    | 490     | mW   |   |
| Junction Temperature  | T <sub>j</sub>                    | 150     | °C   |   |
| Operating Temperature | T <sub>opr</sub>                  | -40~85  | °C   |   |
| Storage Temperature   | T <sub>stg</sub>                  | -55~150 | °C   |   |

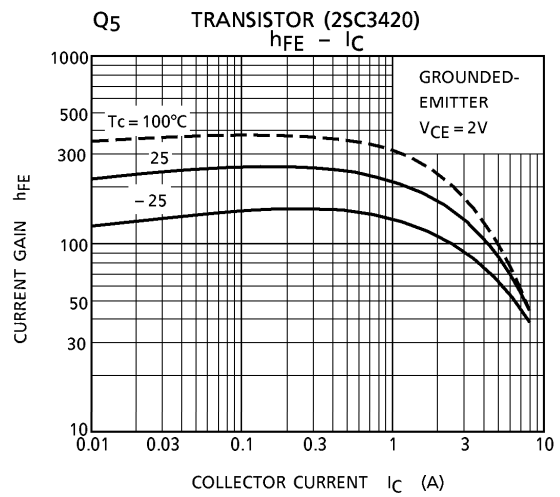
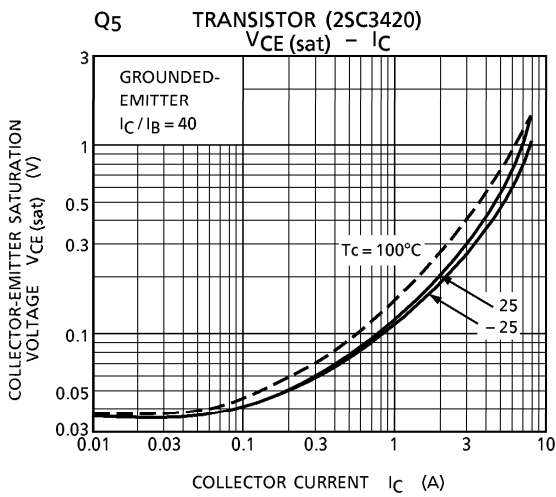
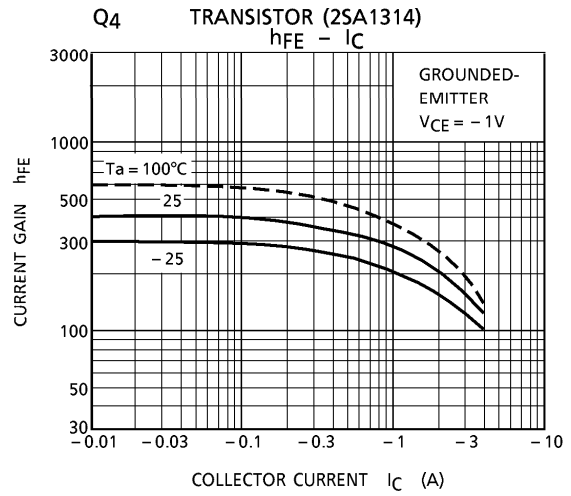
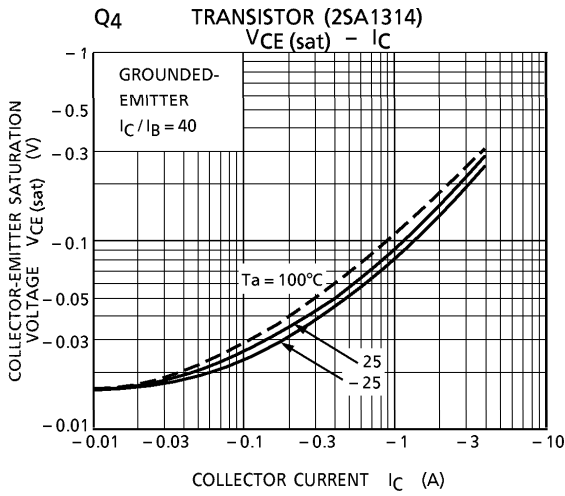
(Note 1) T = 10ms MAX. and maximum duty is less than 30%.

(Note 2) Q5 : 2SC3420 = 15V

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

| CHARACTERISTIC                     |            | SYMBOL                | TEST CIR-CUIT | TEST CONDITION                              | MIN. | TYP. | MAX. | UNIT |
|------------------------------------|------------|-----------------------|---------------|---|------|------|------|------|
| Current Gain                       | Q1         | h <sub>FE</sub> (1)   | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 0.5A | 100  | —    | 600  | —    |
|                                    |            | h <sub>FE</sub> (2)   | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 4.0A | 70   | —    | —    |      |
|                                    | Q5         | h <sub>FE</sub> (1)   | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 0.5A | 140  | —    | 600  |      |
|                                    |            | h <sub>FE</sub> (2)   | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 4.0A | 70   | —    | —    |      |
|                                    | Q4         | h <sub>FE</sub> (1)   | —             | V <sub>CE</sub> = 1V, I <sub>C</sub> = 0.5A | 200  | —    | 650  |      |
|                                    |            | h <sub>FE</sub> (2)   | —             | V <sub>CE</sub> = 1V, I <sub>C</sub> = 2.0A | 60   | 130  | —    |      |
|                                    | Q2, Q3     | h <sub>FE</sub> (1)   | —             | V <sub>CE</sub> = 1V, I <sub>C</sub> = 0.5A | 160  | —    | 600  |      |
|                                    |            | h <sub>FE</sub> (2)   | —             | V <sub>CE</sub> = 1V, I <sub>C</sub> = 2.0A | 60   | 130  | —    |      |
| Saturation Voltage                 | Q1         | V <sub>CE</sub> (sat) | —             | I <sub>C</sub> = 1A, I <sub>B</sub> = 25mA  | —    | 0.15 | 0.25 | V    |
|                                    |            |                       |               | I <sub>C</sub> = 3A, I <sub>B</sub> = 75mA  | —    | 0.38 | 0.70 |      |
|                                    | Q5         | V <sub>CE</sub> (sat) | —             | I <sub>C</sub> = 1A, I <sub>B</sub> = 25mA  | —    | 0.16 | 0.25 |      |
|                                    |            |                       |               | I <sub>C</sub> = 3A, I <sub>B</sub> = 75mA  | —    | 0.40 | 0.70 |      |
|                                    | Q3, Q4     | V <sub>CE</sub> (sat) | —             | I <sub>C</sub> = 1A, I <sub>B</sub> = 25mA  | —    | 0.14 | 0.25 |      |
|                                    |            |                       |               | I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA  | —    | 0.25 | 0.45 |      |
|                                    | Q2         | V <sub>CE</sub> (sat) | —             | I <sub>C</sub> = 1A, I <sub>B</sub> = 25mA  | —    | 0.17 | 0.32 |      |
|                                    |            |                       |               | I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA  | —    | 0.31 | 0.45 |      |
| Fly-wheeling Diode Forward Voltage | Q2, Q3     | V <sub>F</sub>        | —             | I <sub>F</sub> = 300mA                      | —    | 0.89 | 1.2  | V    |
| Transition Frequency               |            | f <sub>T</sub>        | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 0.5A | —    | 100  | —    | MHz  |
| Leakage Current                    |            | I <sub>OL</sub>       | —             | V <sub>CC</sub> = 10V                       | —    | 0    | 10   | μA   |
| Base-Emitter Forward Voltage       | Q1, Q5     | V <sub>BE</sub>       | —             | V <sub>CE</sub> = 2V, I <sub>C</sub> = 3.0A | —    | 0.84 | 1.5  | V    |
|                                    | Q2, Q3, Q4 |                       |               | V <sub>CE</sub> = 1V, I <sub>C</sub> = 2.0A | —    | 0.84 | 1.5  |      |
| Base-Emitter Resistor              |            | R <sub>BE</sub>       | —             | —   | 7    | 10   | 13   | kΩ   |



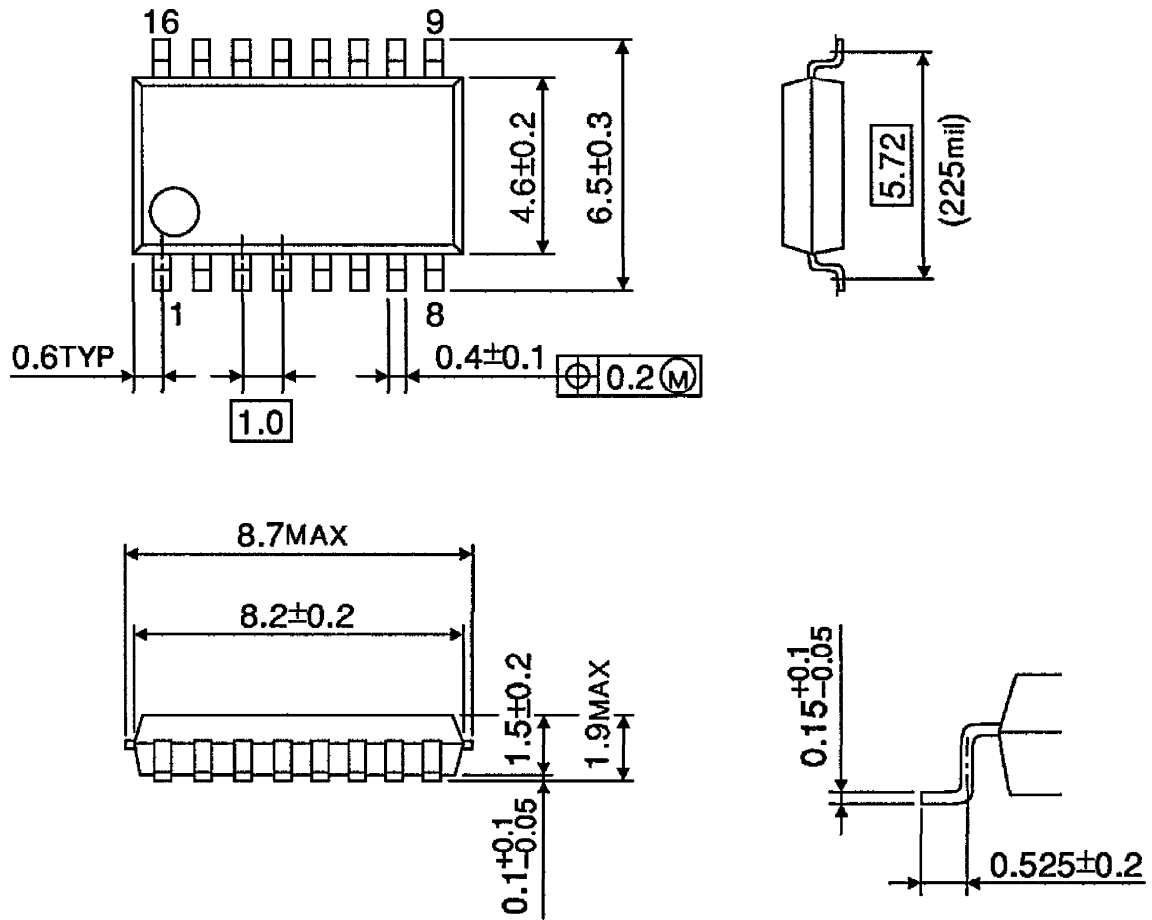


PRECAUTIONS for USING

Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

**OUTLINE DRAWING**  
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)