

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC5232

General Purpose Amplifier Applications  
Switching and Muting Switch Application

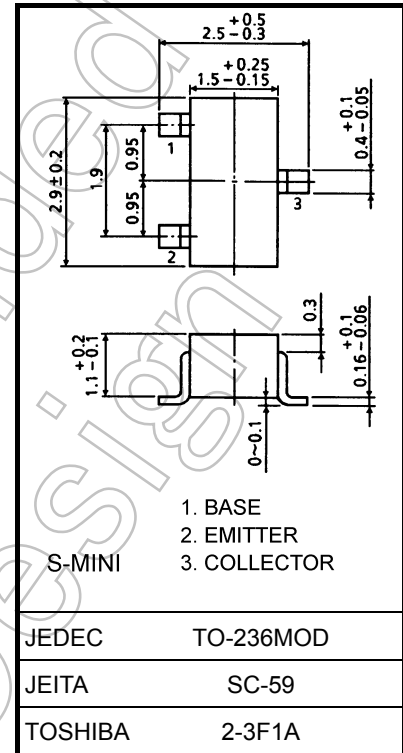
- Low saturation voltage:  $V_{CE(sat)}(1) = 15 \text{ mV (typ.)}$   
@ $I_C = 10 \text{ mA}/I_B = 0.5 \text{ mA}$
- Large collector current:  $I_C = 500 \text{ mA (max)}$

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Characteristics             | Symbol    | Rating     | Unit             |
|-----------------------------|-----------|------------|------------------|
| Collector-base voltage      | $V_{CBO}$ | 15         | V                |
| Collector-emitter voltage   | $V_{CEO}$ | 12         | V                |
| Emitter-base voltage        | $V_{EBO}$ | 5          | V                |
| Collector current           | $I_C$     | 500        | mA               |
| Base current                | $I_B$     | 50         | mA               |
| Collector power dissipation | $P_C$     | 150        | mW               |
| Junction temperature        | $T_j$     | 125        | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55 to 125 | $^\circ\text{C}$ |

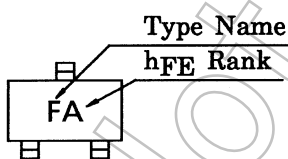
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm



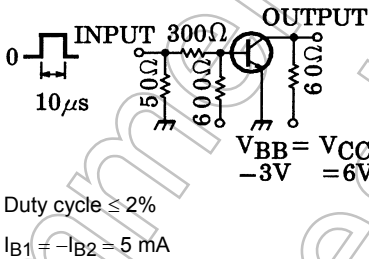
Weight: 12 mg (typ.)

## Marking

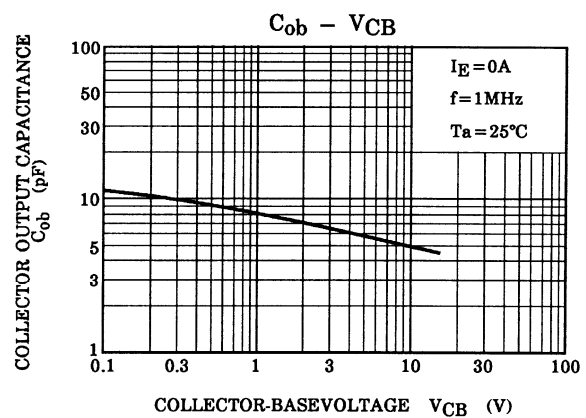
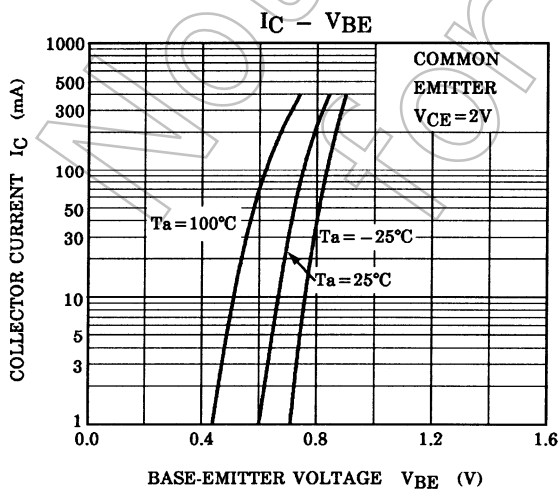
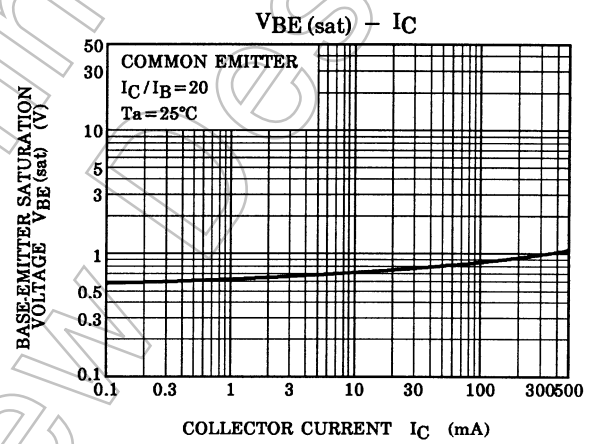
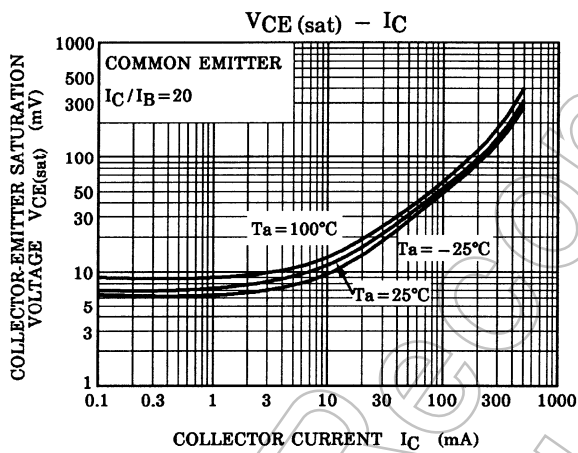
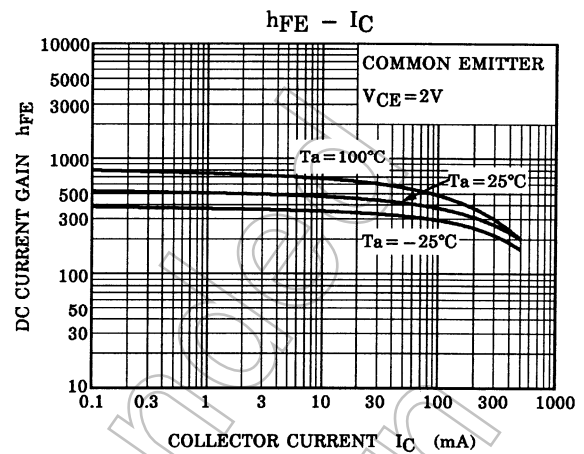
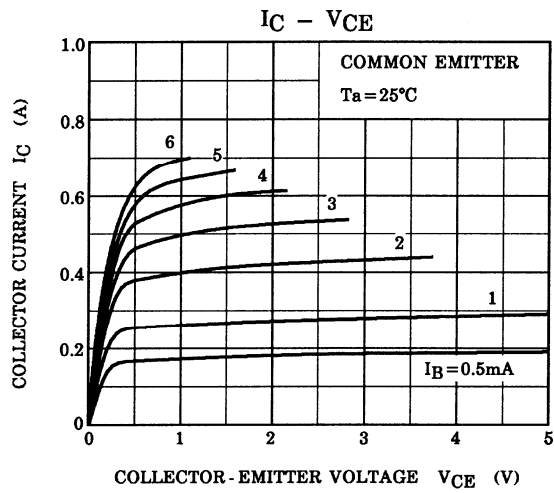


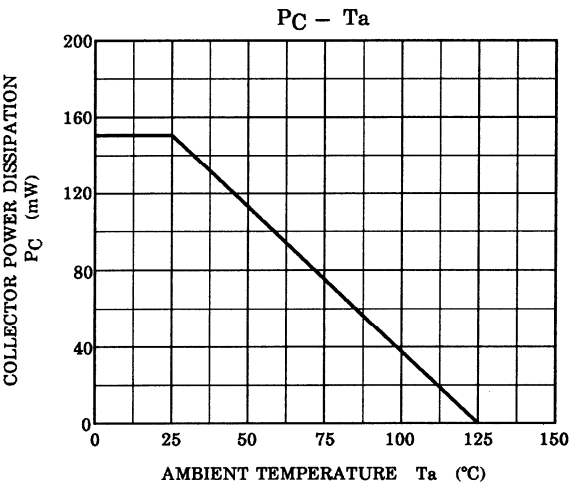
Start of commercial production  
1994-03

## Electrical Characteristics (Ta = 25°C)

| Characteristics                      |              | Symbol             | Test Condition                                                                                                                                                             | Min | Typ. | Max  | Unit          |
|--------------------------------------|--------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|---------------|
| Collector cut-off current            |              | $I_{CBO}$          | $V_{CB} = 15\text{ V}, I_E = 0$                                                                                                                                            | —   | —    | 0.1  | $\mu\text{A}$ |
| Emitter cut-off current              |              | $I_{EBO}$          | $V_{EB} = 5\text{ V}, I_C = 0$                                                                                                                                             | —   | —    | 0.1  | $\mu\text{A}$ |
| DC current gain                      |              | $h_{FE}$<br>(Note) | $V_{CE} = 2\text{ V}, I_C = 10\text{ mA}$                                                                                                                                  | 300 | —    | 1000 |               |
| Collector-emitter saturation voltage |              | $V_{CE(sat)} (1)$  | $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$                                                                                                                                  | —   | 15   | 30   | mV            |
|                                      |              | $V_{CE(sat)} (2)$  | $I_C = 200\text{ mA}, I_B = 10\text{ mA}$                                                                                                                                  | —   | 110  | 250  |               |
| Base-emitter saturation voltage      |              | $V_{BE(sat)}$      | $I_C = 200\text{ mA}, I_B = 10\text{ mA}$                                                                                                                                  | —   | 0.87 | 1.2  | V             |
| Transition frequency                 |              | $f_T$              | $V_{CE} = 2\text{ V}, I_C = 10\text{ mA}$                                                                                                                                  | 80  | 130  | —    | MHz           |
| Collector output capacitance         |              | $C_{ob}$           | $V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$                                                                                                                          | —   | 4.2  | 7    | pF            |
| Collector-emitter on-resistance      |              | $R_{on}$           | $I_B = 1\text{ mA}, V_{in} = 1\text{ V}_{rms}, f = 1\text{ kHz}$                                                                                                           | —   | 0.9  | —    | $\Omega$      |
| Switching time                       | Turn-on time | $t_{on}$           |  <p>Duty cycle <math>\leq 2\%</math><br/><math>I_{B1} = -I_{B2} = 5\text{ mA}</math></p> | —   | 85   | —    | ns            |
|                                      | Storage time | $t_{stg}$          |                                                                                                                                                                            | —   | 170  | —    |               |
|                                      | Fall time    | $t_f$              |                                                                                                                                                                            | —   | 40   | —    |               |

Note:  $h_{FE}$  classification A: 300 to 600, B: 500 to 1000





Not Recommended  
for New Design

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