

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

**2SC380TM**

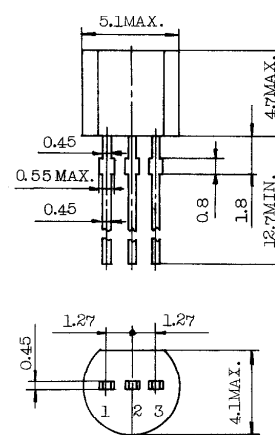
HIGH FREQUENCY AMPLIFIER APPLICATIONS.

Unit in mm

- High Power Gain :  $G_{pe} = 29\text{dB}$  (Typ.) ( $f = 10.7\text{MHz}$ )
- Recommended for FM IF, OSC Stage and AM CONV. IF Stage.

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

| CHARACTERISTIC              | SYMBOL    | RATING  | UNIT             |
|-----------------------------|-----------|---------|------------------|
| Collector-Base Voltage      | $V_{CBO}$ | 35      | V                |
| Collector-Emitter Voltage   | $V_{CEO}$ | 30      | V                |
| Emitter-Base Voltage        | $V_{EBO}$ | 4       | V                |
| Collector Current           | $I_C$     | 50      | mA               |
| Emitter Current             | $I_E$     | -50     | mA               |
| Collector Power Dissipation | $P_C$     | 300     | mW               |
| Junction Temperature        | $T_j$     | 125     | $^\circ\text{C}$ |
| Storage Temperature Range   | $T_{stg}$ | -55~125 | $^\circ\text{C}$ |



1. EMITTER
2. COLLECTOR
3. BASE

JEDEC TO-92

EIAJ SC-43

TOSHIBA 2-5F1B

Weight : 0.21g

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

| CHARACTERISTIC                       | SYMBOL              | TEST CONDITION                                                              | MIN. | TYP. | MAX. | UNIT          |
|--------------------------------------|---------------------|-----------------------------------------------------------------------------|------|------|------|---------------|
| Collector Cut-off Current            | $I_{CBO}$           | $V_{CB} = 35\text{V}$ , $I_E = 0$                                           | —    | —    | 0.1  | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$           | $V_{EB} = 4\text{V}$ , $I_C = 0$                                            | —    | —    | 0.1  | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$<br>(Note)  | $V_{CE} = 12\text{V}$ , $I_C = 2\text{mA}$                                  | 40   | —    | 240  | —             |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$       | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                                    | —    | —    | 0.4  | V             |
| Base-Emitter Voltage                 | $V_{BE}$            | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                                    | —    | —    | 1.0  | V             |
| Transition Frequency                 | $f_T$               | $V_{CE} = 10\text{V}$ , $I_C = 1\text{mA}$                                  | 100  | —    | 400  | MHz           |
| Collector Output Capacitance         | $C_{ob}$            | $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$                       | 1.4  | 2.0  | 3.2  | pF            |
| Collector-Base Time Constant         | $C_c \cdot r_{bb'}$ | $V_{CE} = 10\text{V}$ , $I_E = -1\text{mA}$ ,<br>$f = 30\text{MHz}$         | 10   | —    | 50   | ps            |
| Power Gain                           | $G_{pe}$            | $V_{CC} = 6\text{V}$ , $I_E = -1\text{mA}$ ,<br>$f = 10.7\text{MHz}$ (Fig.) | 27   | 29   | 33   | dB            |

Note :  $h_{FE}$  classification    R : 40~80,    O : 70~140,    Y : 120~240

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## y PARAMETERS (Typ.)

(1) (COMMON EMITTER  $f = 455\text{kHz}$ ,  $T_a = 25^\circ\text{C}$ )

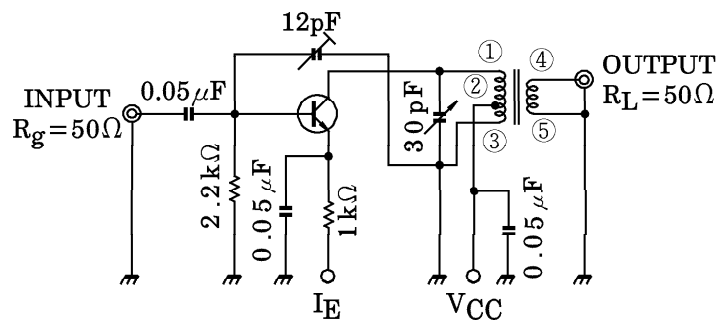
| CHARACTERISTIC                             | SYMBOL        | 2SC380TM-R | 2SC380TM-O | 2SC380TM-Y | UNIT          |
|--------------------------------------------|---------------|------------|------------|------------|---------------|
| Collector-Emitter Voltage                  | $V_{CE}$      | 6          | 6          | 6          | V             |
| Emitter Current                            | $I_E$         | -1         | -1         | -1         | mA            |
| Input Conductance                          | $g_{ie}$      | 0.58       | 0.41       | 0.26       | mS            |
| Input Capacitance                          | $C_{ie}$      | 53         | 46         | 38         | pF            |
| Output Conductance                         | $g_{oe}$      | 1.9        | 2.7        | 4.8        | $\mu\text{S}$ |
| Output Capacitance                         | $C_{oe}$      | 2.6        | 2.8        | 3.6        | pF            |
| Forward Transfer Admittance                | $ y_{fe} $    | 38         | 38         | 38         | mS            |
| Phase Angle of Forward Transfer Admittance | $\theta_{fe}$ | -0.79      | -0.83      | -0.92      | °             |
| Reverse Transfer Admittance                | $ y_{re} $    | 5.7        | 5.7        | 6.2        | $\mu\text{S}$ |
| Phase Angle of Reverse Transfer Admittance | $\theta_{re}$ | -90        | -90        | -90        | °             |

(2) (COMMON EMITTER  $f = 10.7\text{MHz}$ ,  $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC                             | SYMBOL        | 2SC380TM-R | 2SC380TM-O | 2SC380TM-Y | UNIT          |
|--------------------------------------------|---------------|------------|------------|------------|---------------|
| Collector-Emitter Voltage                  | $V_{CE}$      | 6          | 6          | 6          | V             |
| Emitter Current                            | $I_E$         | -1         | -1         | -1         | mA            |
| Input Conductance                          | $g_{ie}$      | 1.04       | 0.85       | 0.65       | mS            |
| Input Capacitance                          | $C_{ie}$      | 49         | 43         | 36         | pF            |
| Output Conductance                         | $g_{oe}$      | 10         | 15         | 28         | $\mu\text{S}$ |
| Output Capacitance                         | $C_{oe}$      | 2.7        | 2.9        | 3.6        | pF            |
| Forward Transfer Admittance                | $ y_{fe} $    | 37         | 37         | 37         | mS            |
| Phase Angle of Forward Transfer Admittance | $\theta_{fe}$ | -9.6       | -10.4      | -11.5      | °             |
| Reverse Transfer Admittance                | $ y_{re} $    | 120        | 120        | 140        | $\mu\text{S}$ |
| Phase Angle of Reverse Transfer Admittance | $\theta_{re}$ | -90        | -90        | -90        | °             |

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T : ①-② 0.1mmφ UEW 20T  
②-③ 0.1mmφ UEW 8T  
④-⑤ 0.1mmφ UEW 2T

Fig.1 G<sub>pe</sub> TEST CIRCUIT

