

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC1815

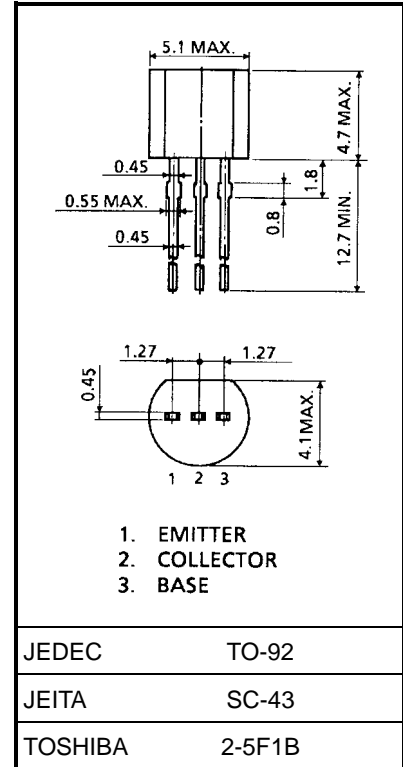
Audio Frequency General Purpose Amplifier Applications  
 Driver Stage Amplifier Applications

Unit: mm

- High voltage and high current:  $V_{CE0} = 50\text{ V (min)}$ ,  
 $I_C = 150\text{ mA (max)}$
- Excellent  $h_{FE}$  linearity:  $h_{FE} (2) = 100\text{ (typ.)}$   
 at  $V_{CE} = 6\text{ V}$ ,  $I_C = 150\text{ mA}$   
 :  $h_{FE} (I_C = 0.1\text{ mA})/h_{FE} (I_C = 2\text{ mA})$   
 $= 0.95\text{ (typ.)}$
- Low noise:  $NF = 1\text{ dB (typ.)}$  at  $f = 1\text{ kHz}$
- Complementary to 2SA1015 (O, Y, GR class)

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

| Characteristics             | Symbol    | Rating  | Unit             |
|-----------------------------|-----------|---------|------------------|
| Collector-base voltage      | $V_{CBO}$ | 60      | V                |
| Collector-emitter voltage   | $V_{CEO}$ | 50      | V                |
| Emitter-base voltage        | $V_{EBO}$ | 5       | V                |
| Collector current           | $I_C$     | 150     | mA               |
| Base current                | $I_B$     | 50      | mA               |
| Collector power dissipation | $P_C$     | 400     | mW               |
| Junction temperature        | $T_j$     | 125     | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55~125 | $^\circ\text{C}$ |

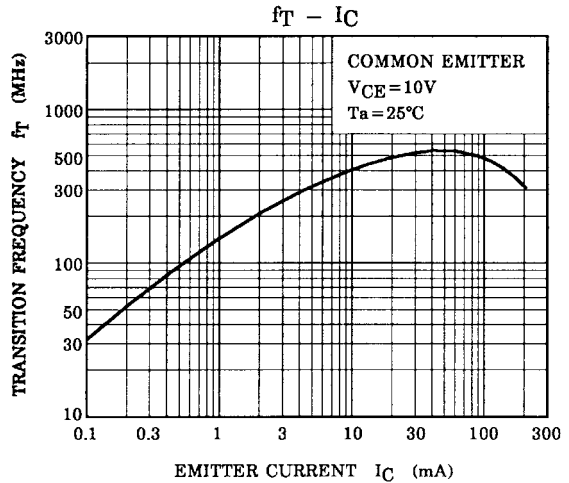
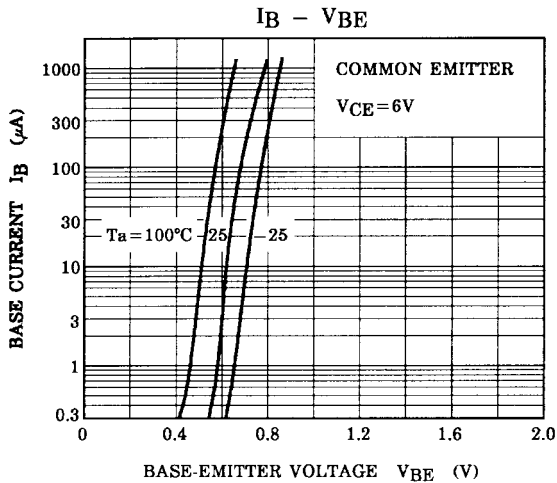
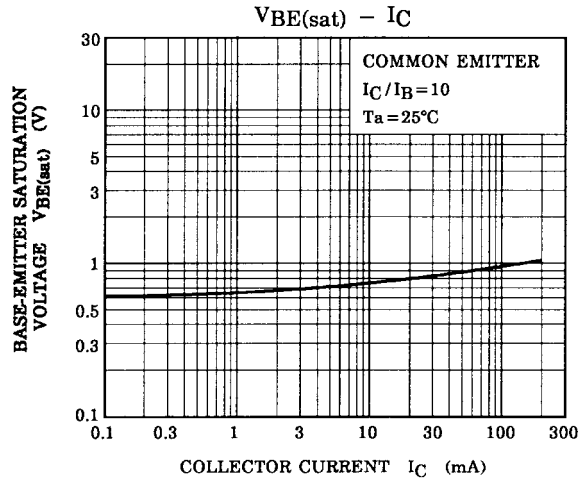
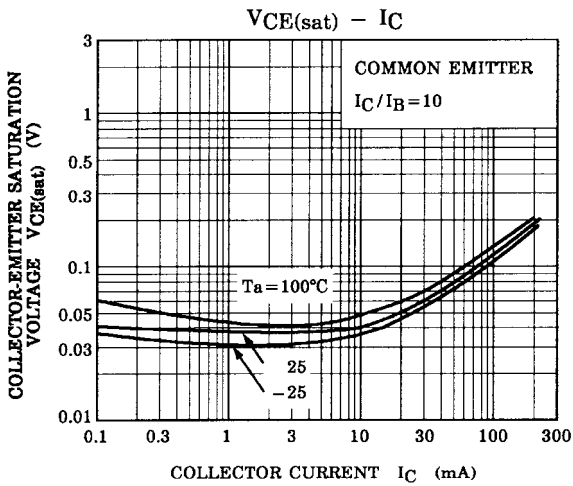
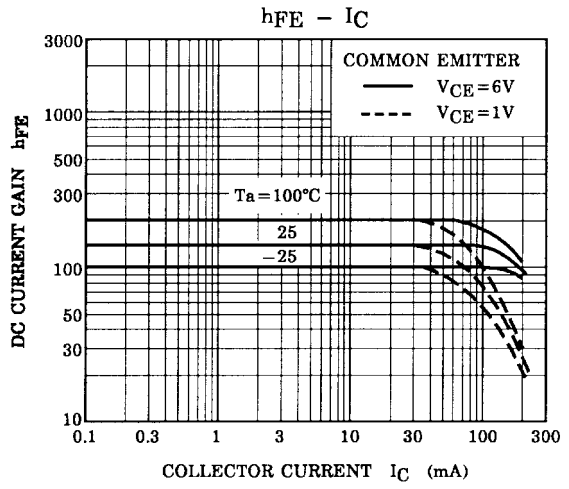
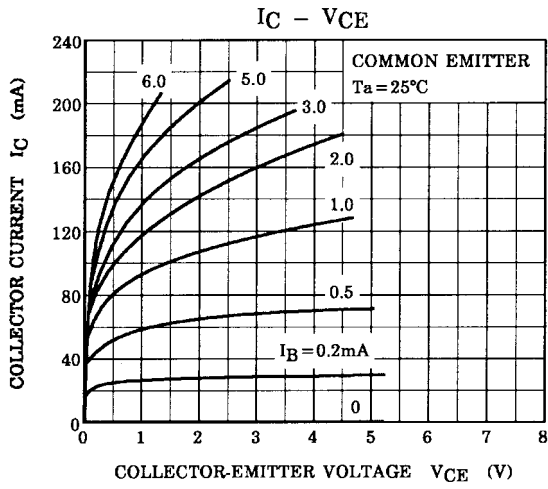


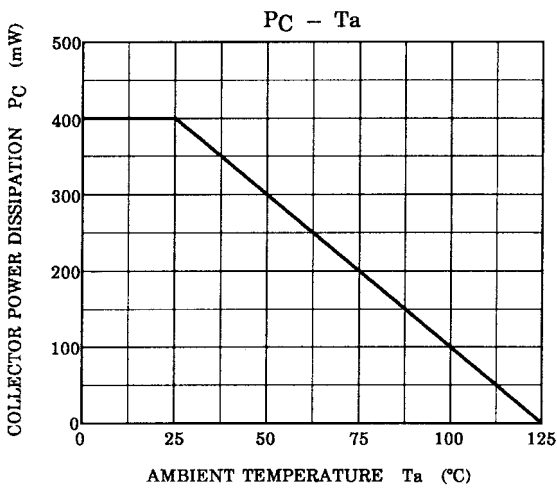
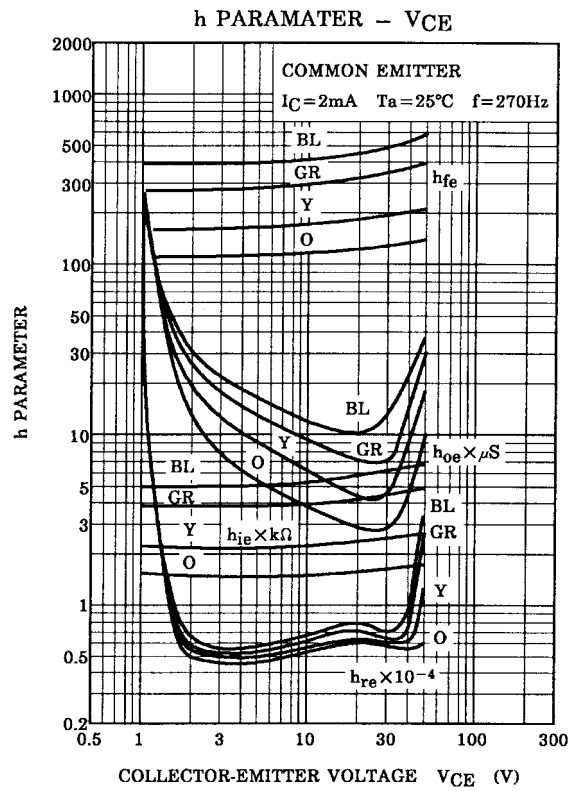
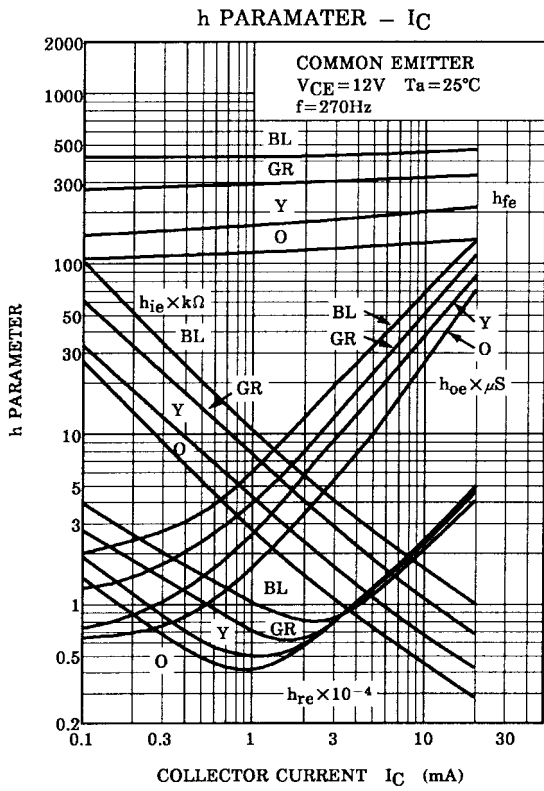
Weight: 0.21 g (typ.)

### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

| Characteristics                      | Symbol                 | Test Condition  | Min | Typ. | Max  | Unit          |
|--------------------------------------|------------------------|---|-----|------|------|---------------|
| Collector cut-off current            | $I_{CBO}$              | $V_{CB} = 60\text{ V}$ , $I_E = 0$  | —   | —    | 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                      | $h_{FE} (1)$<br>(Note) | $V_{CE} = 6\text{ V}$ , $I_C = 2\text{ mA}$   | 70  | —    | 700  |               |
|                                      | $h_{FE} (2)$           | $V_{CE} = 6\text{ V}$ , $I_C = 150\text{ mA}$   | 25  | 100  | —    |               |
| Collector-emitter saturation voltage | $V_{CE (sat)}$         | $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$  | —   | 0.1  | 0.25 | V             |
| Base-emitter saturation voltage      | $V_{BE (sat)}$         | $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$  | —   | —    | 1.0  | V             |
| Transition frequency                 | $f_T$                  | $V_{CE} = 10\text{ V}$ , $I_C = 1\text{ mA}$  | 80  | —    | —    | MHz           |
| Collector output capacitance         | $C_{ob}$               | $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$   | —   | 2.0  | 3.5  | pF            |
| Base intrinsic resistance            | $r_{bb'}$              | $V_{CE} = 10\text{ V}$ , $I_E = -1\text{ mA}$<br>$f = 30\text{ MHz}$                            | —   | 50   | —    | $\Omega$      |
| Noise figure                         | NF                     | $V_{CE} = 6\text{ V}$ , $I_C = 0.1\text{ mA}$<br>$f = 1\text{ kHz}$ , $R_G = 10\text{ k}\Omega$ | —   | 1.0  | 10   | dB            |

Note:  $h_{FE}$  classification O: 70~140, Y: 120~240, GR: 200~400, BL: 350~700





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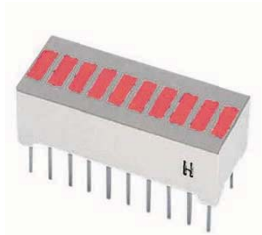
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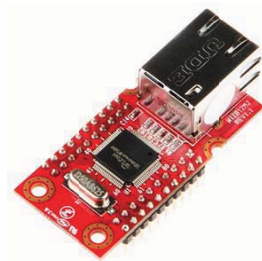
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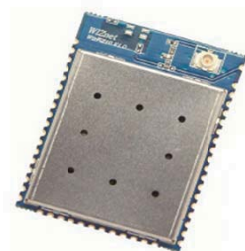
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Arduino Uno



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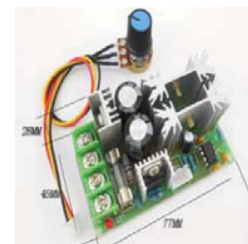
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