



TSC2059

General Purpose NPN Transistor

SOT-23



Pin assignment:

1. Base
2. Emitter
3. Collector

$BV_{CEO} = 40V$

$I_C = 50mA$

$V_{CE(SAT)}, = 0.2V(\text{typ.}) @ I_C / I_B = 500mA / 50mA$

Features

- ✧ High transition frequency
- ✧ Very low capacitance
- ✧ Small $r_{bb'}$ - C_c and high gain
- ✧ Small NF.

Ordering Information

| Part No. | Packing | Package | Marking |
|-----------|--------------|---------|---------|
| TSC2059CX | 3kpcs / Reel | SOT-23 | 3E |

Absolute Maximum Rating ($T_a = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|-----------|--------------|------------|
| Collector-Base Voltage | V_{CBO} | 18V | V |
| Collector-Emitter Voltage | V_{CEO} | 25V | V |
| Emitter-Base Voltage | V_{EBO} | 3 | V |
| Collector Current | I_C | 50 | mA |
| Collector Power Dissipation | P_D | 225 | mW |
| Operating Junction Temperature | T_J | +150 | $^\circ C$ |
| Operating Junction and Storage Temperature Range | T_{STG} | - 55 to +150 | $^\circ C$ |

Electrical Characteristics

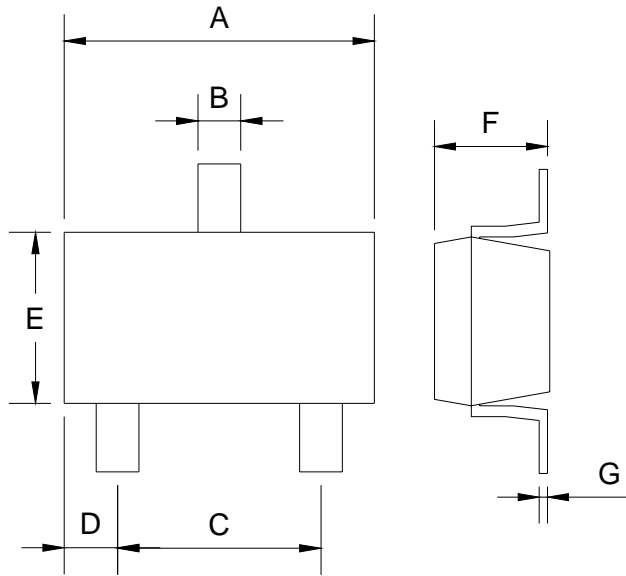
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------------|--|-------------------|-----|------|-----|---------|
| Static | | | | | | |
| Collector-Base Voltage | $I_C = 10\mu A, I_E = 0$ | BV_{CBO} | 25 | -- | -- | V |
| Collector-Emitter Breakdown Voltage | $I_C = 1mA, I_B = 0$ | BV_{CEO} | 18 | -- | -- | V |
| Emitter-Base Breakdown Voltage | $I_E = 10\mu A, I_C = 0$ | BV_{EBO} | 3 | -- | -- | V |
| Collector Cutoff Current | $V_{CB} = 10V, I_E = 0$ | I_{CBO} | -- | -- | 0.5 | μA |
| Emitter Cutoff Current | $V_{EB} = 2V, I_C = 0$ | I_{EBO} | -- | -- | 0.5 | μA |
| Collector-Emitter Saturation Voltage | $I_C / I_B = 20mA / 4mA$ | $V_{CE(SAT)1}$ | -- | -- | 0.5 | V |
| DC Current Transfer Ratio | $V_{CE} = 10V, I_C = 10mA$ | h_{FE} | 52 | -- | 270 | |
| Transition Frequency | $V_{CE} = 10V, I_C = 10mA,$ $f = 200MHz$ | f_T | -- | 1000 | -- | MHz |
| Output Capacitance | $V_{CB} = 10V, f = 1MHz$ | C_{ob} | -- | 1.4 | 2.0 | pF |
| | $V_{CB} = 10V, I_C = 10mA,$ $f = 31.8MHz$ | $R_{bb'}$ - C_c | -- | 8 | 15 | pF |
| | $V_{CE} = 12V, I_C = 2mA,$ $f = 200MHz, R_g = 50\Omega$ | NF | -- | 5.5 | -- | dB |

Note : pulse test: pulse width $\leq 380\mu s$, duty cycle $\leq 2\%$

Classification Of h_{FE}

| Rank | K | P | Q |
|-------|----------|----------|-----------|
| Range | 52 - 120 | 82 - 180 | 120 - 270 |

SOT-23 Mechanical Drawing



| SOT-23 DIMENSION | | | | |
|------------------|-------------|------|--------|-------|
| DIM | MILLIMETERS | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 2.80 | 3.04 | 0.110 | 0.120 |
| B | 0.30 | 0.50 | 0.012 | 0.020 |
| C | 1.70 | 2.30 | 0.067 | 0.091 |
| D | 0.25 | 0.65 | 0.010 | 0.026 |
| E | 1.2 | 1.60 | 0.047 | 0.063 |
| F | 0.89 | 1.30 | 0.035 | 0.051 |
| G | 0.08 | 0.17 | 0.003 | 0.006 |