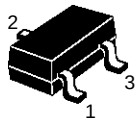
SGS-THOMSON MICROELECTRONICS

# SO5401

## SMALL SIGNAL PNP TRANSISTORS

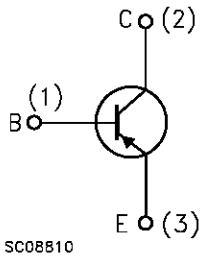
| Type | Marking |
|---|---|
| SO5401 | P33 |

- SILICON EPITAXIAL PLANAR PNP TRANSISTORS
- MINIATURE PLASTIC PACKAGE FOR APPLICATION IN SURFACE MOUNTING CIRCUITS
- GENERAL PURPOSE AND HIGH VOLTAGE AMPLIFIER




**SOT-23**

**INTERNAL SCHEMATIC DIAGRAM**




### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage ($I_E$ = 0) | -160 | V |
| $V_{CEO}$ | Collector-Emitter Voltage ($I_B$ = 0) | -150 | V |
| $V_{EBO}$ | Emitter-Base Voltage ($I_C$ = 0) | -5 | V |
| $I_{CM}$ | Collector Peak Current | -0.6 | A |
| $P_{tot}$ | Total Dissipation at $T_c$ = 25 °C | 200 | mW |
| $T_{stg}$ | Storage Temperature | -65 to 150 | °C |
| $T_j$ | Max. Operating Junction Temperature | 150 | °C |

## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{thj\text{-}amb}$ • | Thermal Resistance Junction-Ambient | Max | 620 | $^oC/W$ |
| $R_{thj\text{-}SR}$ • | Thermal Resistance Junction-Substrate | Max | 400 | $^oC/W$ |

• Mounted on a ceramic substrate area = 7 x 5 x 0.5 mm

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25 $^oC$ unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | Collector Cut-off Current ($I_E$ = 0) | $V_{CB}$ = -120 V | | | -50 | nA |
| $I_{EBO}$ | Collector Cut-off Current ($I_C$ = 0) | $V_{EB}$ = -3 V | | | -50 | nA |
| $V_{(BR)CBO}$* | Collector-Emitter Breakdown Voltage ($I_E$ = 0) | $I_C$ = -100 µA | -160 | | | V |
| $V_{(BR)CEO}$* | Collector-Emitter Breakdown Voltage ($I_B$ = 0) | $I_C$ = -1 mA | -150 | | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage ($I_C$ = 0) | $I_C$ = -10 nA | -5 | | | V |
| $V_{CE(sat)}$* | Collector-Emitter Saturation Voltage | $I_C$ = -10 mA $I_B$ = -1 mA<br>$I_C$ = -50 mA $I_B$ = -5 mA | | | -0.2<br>-0.5 | V<br>V |
| $V_{BE(sat)}$* | Collector-Base Saturation Voltage | $I_C$ = -10 mA $I_B$ = -1 mA<br>$I_C$ = -50 mA $I_B$ = -5 mA | | | -1<br>-1 | V<br>V |
| $h_{FE}$* | DC Current Gain | $I_C$ = -1 mA $V_{CE}$ = -5 V<br>$I_C$ = -10 mA $V_{CE}$ = -5 V<br>$I_C$ = -50 mA $V_{CE}$ = -5 V | 50<br>60<br>50 | 240 | | |
| $f_T$ | Transition Frequency | $I_C$ = -10 mA $V_{CE}$ = -10V f = 1 MHz | 100 | | 400 | MHz |
| $C_{CB}$ | Collector Base Capacitance | $I_E$ = 0 $V_{CE}$ = -10 V f = 1 MHz | | | 6 | pF |
| NF | Noise Figure | $V_{CE}$ = -5 V $I_C$ = -0.25 mA f = 1KHz<br>$\Delta f$ = 200 Hz $R_G$ = 1 KΩ | | 5 | | dB |
| $h_{fe}$* | Small Signal Current Gain | $V_{CE}$ = -5 V $I_C$ = -1 mA f = 1KHz | 40 | | 200 | |

* Pulsed: Pulse duration = 300 µs, duty cycle ≤ 2 %

## SOT-23 MECHANICAL DATA

| DIM. | mm | | | mils | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 0.85 | | 1.1 | 33.4 | | 43.3 |
| B | 0.65 | | 0.95 | 25.6 | | 37.4 |
| C | 1.20 | | 1.4 | 47.2 | | 55.1 |
| D | 2.80 | | 3 | 110.2 | | 118 |
| E | 0.95 | | 1.05 | 37.4 | | 41.3 |
| F | 1.9 | | 2.05 | 74.8 | | 80.7 |
| G | 2.1 | | 2.5 | 82.6 | | 98.4 |
| H | 0.38 | | 0.48 | 14.9 | | 18.8 |
| L | 0.3 | | 0.6 | 11.8 | | 23.6 |
| M | 0 | | 0.1 | 0 | | 3.9 |
| N | 0.3 | | 0.65 | 11.8 | | 25.6 |
| O | 0.09 | | 0.17 | 3.5 | | 6.7 |