

ST5771-1



PNP Switching Transistor

This device is designed for high speed saturated switching applications at currents to 100mA. Sourced from Process 65. See PN4258 for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|-----------------------------------|--------------------------------------------------|-------------|-------|
| V _{CEO} | Collector-Emitter Voltage | 15 | V |
| V _{CB0} | Collector-Base Voltage | 15 | V |
| V _{EBO} | Emitter-Base Voltage | 4.5 | V |
| I _C | Collector Current - Continuous | 200 | mA |
| T _J , T _{stg} | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | Units |
|------------------|-----------------------------------------------|----------|-------|
| | | ST5771-1 | |
| P _D | Total Device Dissipation Derate above 25°C | 350 | mW |
| | | 2.8 | mW/°C |
| R _{θJC} | Thermal Resistance, Junction to Case | 125 | °C/W |
| R _{θJA} | Thermal Resistance, Junction to Ambient | 357 | °C/W |

PNP Switching Transistor

(continued)

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Electrical Characteristics

TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|--------|-----------|-----------------|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-------|

OFF CHARACTERISTICS

| | | | | | |
|---------------|--------------------------------------|----------------------------------------------------------------------------------------------------------|-----|-----------|---------------------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C = 3.0 \text{ mA}, I_B = 0$ | 15 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C = 100 \mu\text{A}, I_E = 0$ | 15 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E = 100 \mu\text{A}, I_C = 0$ | 4.5 | | V |
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage | $I_C = 100 \mu\text{A}$ | 15 | | V |
| I_{CBO} | Collector Cutoff Current | $V_{CB} = 8.0 \text{ V}, I_E = 0$ | | 10 | nA |
| I_{CES} | Collector Cutoff Current | $V_{CE} = 8.0 \text{ V}, I_E = 0$ $V_{CE} = 8.0 \text{ V}, I_E = 0, T_A = 125 \text{ }^\circ\text{C}$ | | 10 5.0 | nA μA |
| I_{EBO} | Emitter Cutoff Current | $V_{EB} = 4.5 \text{ V}, I_C = 0$ | | 1.0 | μA |

ON CHARACTERISTICS*

| | | | | | |
|---------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|-------------|
| h_{FE} | DC Current Gain | $I_C = 10 \text{ mA}, V_{CE} = 0.3 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 0.3 \text{ V}, T_A = -55 \text{ }^\circ\text{C}$ $I_C = 1.0 \text{ mA}, V_{CE} = 0.5 \text{ V}$ $I_C = 50 \text{ mA}, V_{CE} = 1.0 \text{ V}$ | 30 15 30 20 | 150 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 1.0 \text{ mA}, I_B = 0.1 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$ | | 0.15 0.18 0.6 | V V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 1.0 \text{ mA}, I_B = 0.1 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$ | 0.8 | 0.8 0.95 1.5 | V V V |

SMALL SIGNAL CHARACTERISTICS

| | | | | | |
|----------|----------------------------|-------------------------------------------------------------------|-----|-----|----|
| C_{cb} | Collector-Base Capacitance | $V_{CB} = 5.0 \text{ V}, f = 1.0 \text{ MHz}$ | | 3.0 | pF |
| C_{eb} | Emitter-Base Capacitance | $V_{EB} = 0.5 \text{ V}, f = 1.0 \text{ MHz}$ | | 3.5 | pF |
| h_{fe} | Small-Signal Current Gain | $I_C = 10 \text{ mA}, V_{CE} = 10 \text{ V}, f = 100 \text{ MHz}$ | 7.0 | | |

SWITCHING CHARACTERISTICS

| | | | | | |
|-----------|---------------|------------------------------------------------------------------------|--|----|----|
| t_s | Storage Time | $V_{CC} = 3.0 \text{ V}$ $I_C = I_{B1} = I_{B2} = 1.0 \text{ mA}$ | | 20 | ns |
| t_{on} | Turn-on Time | $V_{CC} = 1.5 \text{ V}, I_C = 10 \text{ mA}, I_{B1} = 1.0 \text{ mA}$ | | 15 | ns |
| t_d | Delay Time | | | 10 | ns |
| t_r | Rise Time | | | 15 | ns |
| t_{off} | Turn-off Time | $V_{CC} = 1.5 \text{ V}, I_C = 10 \text{ mA}$ | | 20 | ns |
| t_s | Storage Time | $I_{B1} = I_{B2} = 1.0 \text{ mA}$ | | 20 | ns |
| t_f | Fall Time | | | 10 | ns |

* Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$