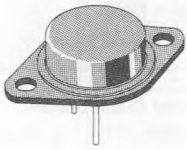
SGS-THOMSON MICROELECTRONICS

# 2N5875-2N5876
# 2N5877-2N5878

## SILICON HIGH POWER TRANSISTORS

### DESCRIPTION

The 2N5877 and 2N5878 are silicon epitaxial-base NPN power transistors in Jedec TO-3 metal case. They are intended for use in power linear and switching applications. The complementary PNP types are the 2N5875 and 2N5876 respectively.



TO-3

### INTERNAL SCHEMATIC DIAGRAMS


### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | NPN / PNP | 2N5877 / 2N5875 | 2N5878 / 2N5876 | Unit |
|---|---|---|---|---|---|
| $V_{CBO}$ | Collector-base Voltage ($I_E$ = 0) | | 60 | 80 | V |
| $V_{CEO}$ | Collector-emitter Voltage ($I_B$ = 0) | | 60 | 80 | V |
| $V_{EBO}$ | Emitter-base Voltage ($I_C$ = 0) | | 5 | | V |
| $I_C$ | Collector Current | | 10 | | A |
| $I_{CM}$ | Collector Peak Current | | 20 | | A |
| $I_B$ | Base Current | | 4 | | A |
| $P_{tot}$ | Total Power Dissipation at $T_{case} \leq 25°C$ | | 150 | | W |
| $T_{stg}$ | Storage Temperature | | – 65 to 200 | | °C |
| $T_j$ | Junction Temperature | | 200 | | °C |

* For PNP types voltage and current values are negative.

## THERMAL DATA

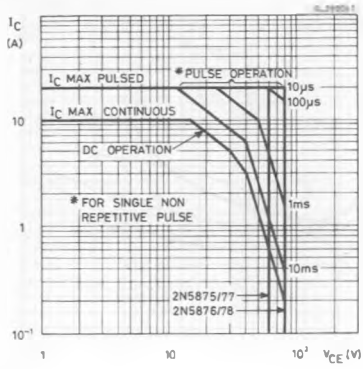
| | | | | |
|---|---|---|---|---|
| $R_{th\ j\text{-}case}$ | Thermal Resistance Junction-case | Max | 1.17 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25°C unless otherwise specified)

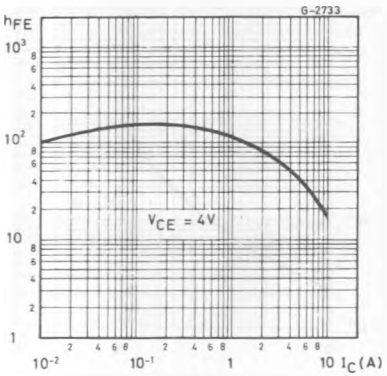
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | Collector Cutoff Current ($I_E$ = 0) | for **2N5877/75** $V_{CB}$ = 60V<br>for **2N5878/76** $V_{CB}$ = 80V | | | 0.5<br>0.5 | mA<br>mA |
| $I_{CEO}$ | Collector Cutoff Current ($I_B$ = 0) | for **2N5877/75** $V_{CE}$ = 30V<br>for **2N5878/76** $V_{CE}$ = 40V | | | 1<br>1 | mA<br>mA |
| $I_{CEX}$ | Collector Cutoff Current ($V_{BE}$ = 1.5V) | for **2N5877/75** $V_{CE}$ = 60V<br>for **2N5878/76** $V_{CE}$ = 80V<br>Tcase = 150°C<br>for **2N5877/75** $V_{CE}$ = 60V<br>for **2N5878/76** $V_{CE}$ = 80V | | | 0.5<br>0.5<br><br>5<br>5 | mA<br>mA<br><br>mA<br>mA |
| $I_{EBO}$ | Emitter Cutoff Current ($I_C$ = 0) | $V_{EB}$ = 5V | | | 1 | mA |
| $V_{CEO(sus)}$* | Collector-emitter Sustaining Voltage ($I_B$ = 0) | $I_C$ = 200mA for **2N5877/75**<br>for **2N5878/76** | 60<br>80 | | | V<br>V |
| $V_{CE(sat)}$* | Collector-emitter Saturation Voltage | $I_C$ = 5A $I_B$ = 0.5A<br>$I_C$ = 10A $I_B$ = 2.5A | | | 1<br>3 | V<br>V |
| $V_{BE(sat)}$* | Base-emitter Satuation Voltage | $I_C$ = 10A $I_C$ = 2.5A | | | 2.5 | V |
| $V_{BE}$* | Base-emitter Voltage | $I_C$ = 4A $V_{CE}$ = 4V | | | 1.5 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 4A $V_{CE}$ = 4V<br>$I_C$ = 10A $V_{CE}$ = 4V | 20<br>4 | | 100 | |
| $f_T$ | Transition Frequency | $I_C$ = 0.5V $V_{CE}$ = 10V | 4 | | | MHz |
| $C_{CBO}$ | Collector-base Capacitance | $V_{CB}$ = 10V<br>f = 1MHz $I_E$ = 0<br>for **2N5877/2N5878**<br>for **2N5875/2N5876** | | | <br><br>300<br>500 | <br><br>pF<br>pF |
| $t_r$ | Rise Time | $I_C$ = 4A $V_{CC}$ = 30V<br>$I_{B1}$ = 0.4A | | | 0.7 | µs |
| $t_s$ | Storage Time | $I_C$ = 4A $V_{CC}$ = 30V<br>$I_{B1}$ = − $I_{B2}$ = 0.4A | | | 1 | µs |
| $t_f$ | Fall Time | | | | 0.8 | µs |

* Pulsed : pulse duration = 300µs, duty cycle = 1.5%.
For PNP types voltage and current values are negative.

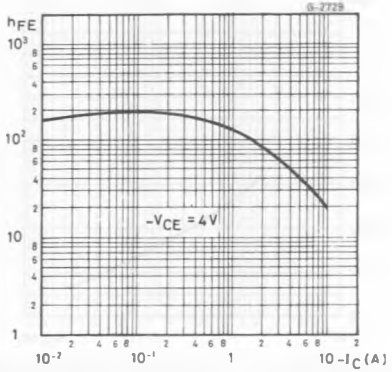
Safe Operating Areas.



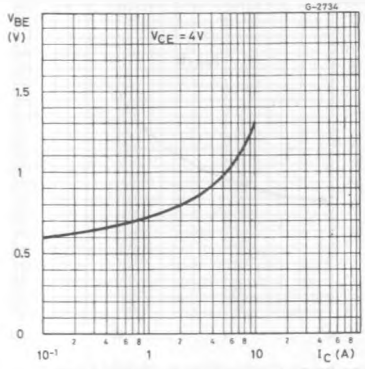

DC Current Gain (NPN types).



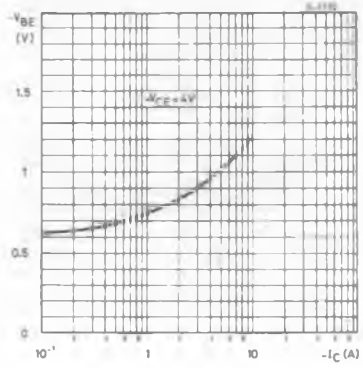

DC Current Gain (PNP types).



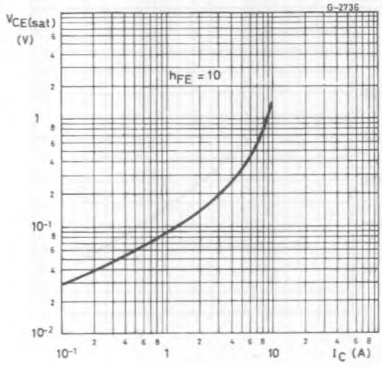

DC Transconductance (NPN types).



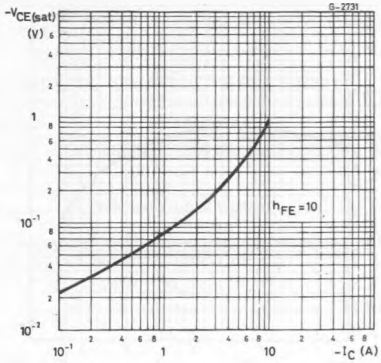

DC Transconductance (PNP types).



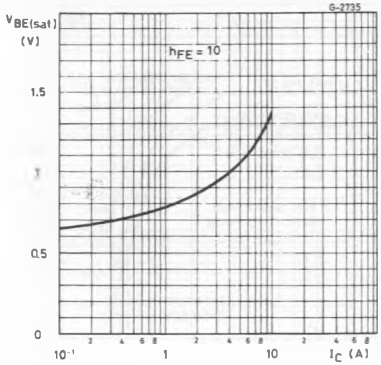

Collector-emitter Saturation Voltage (NPN types).



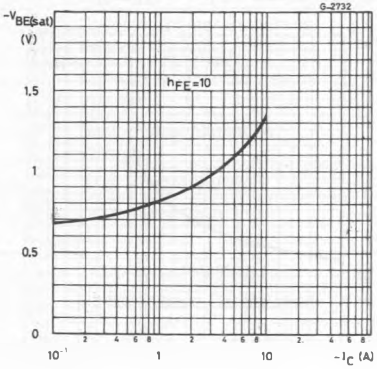
Collector-emitter Saturation Voltage (PNP types).



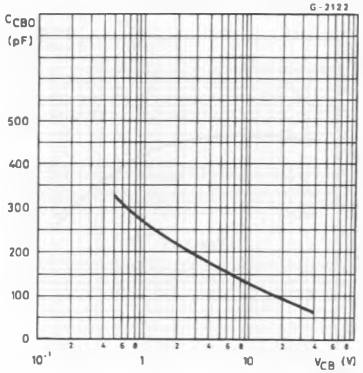

Base-emitter Saturation Voltage (NPN types).



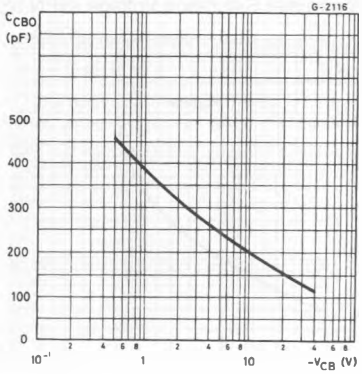

Base-emitter Saturation Voltage (PNP types).



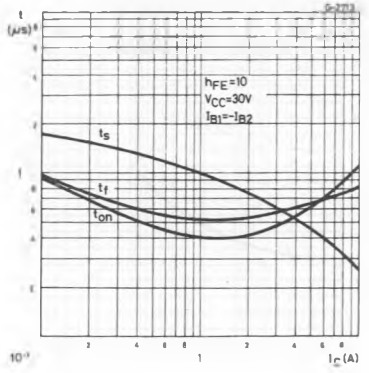

Collector-base Capacitance (NPN types).




Collector-base Capacitance (NPN types).




Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).