

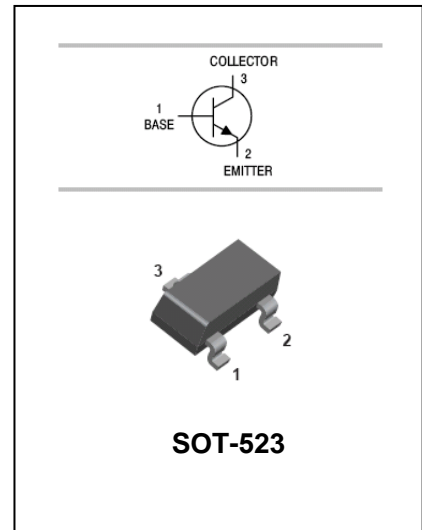
NPN SWITCHING TRANSISTOR

FEATURES

- Epitaxial planar die construction.
- Complementary PNP type available (MMBT3906).
- Collector Current Capability $I_{CM} = 200\text{mA}$.
- Collector-emitter Voltage $V_{CEO} = 40\text{V}$.
- MSL 3



Lead-free



APPLICATIONS

- General switching and amplification

ORDERING INFORMATION

| Type No. | Marking | Package Code |
|------------|---------|--------------|
| MMBT3904FX | 1AF | SOT-523 |

MAXIMUM RATING @ $T_a = 25^\circ\text{C}$ unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | Value | UNIT |
|-----------|-------------------------------|---------------------------------|-------------|------------------|
| V_{CBO} | collector-base voltage | open emitter | 60 | V |
| V_{CEO} | collector-emitter voltage | open base | 40 | V |
| V_{EBO} | emitter-base voltage | open collector | 6 | V |
| I_C | collector current (DC) | | 200 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25^\circ\text{C}$ | 200 | mW |
| T_{stg} | storage temperature | | -55 to +150 | $^\circ\text{C}$ |
| T_j | junction temperature | | 150 | $^\circ\text{C}$ |
| T_{amb} | operating ambient temperature | | -55 to +150 | $^\circ\text{C}$ |

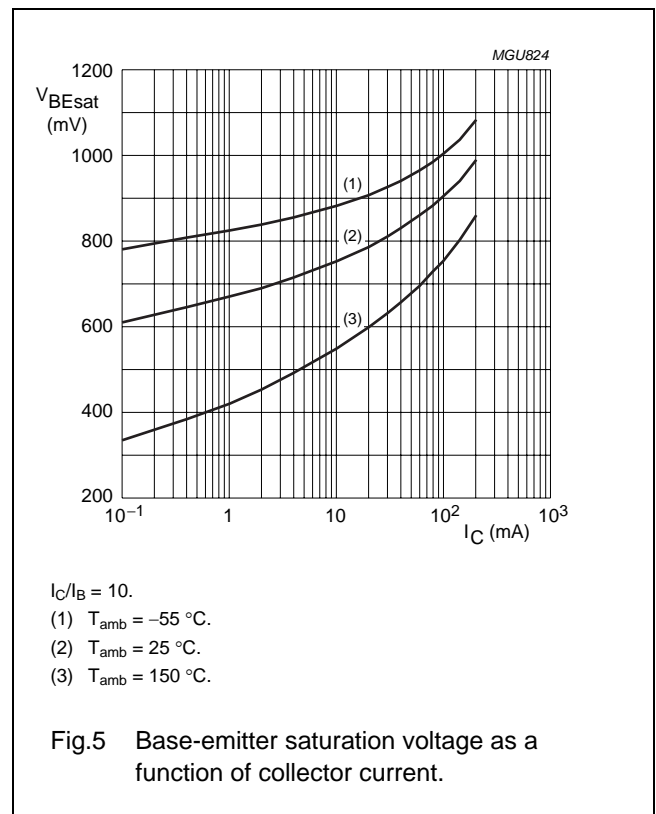
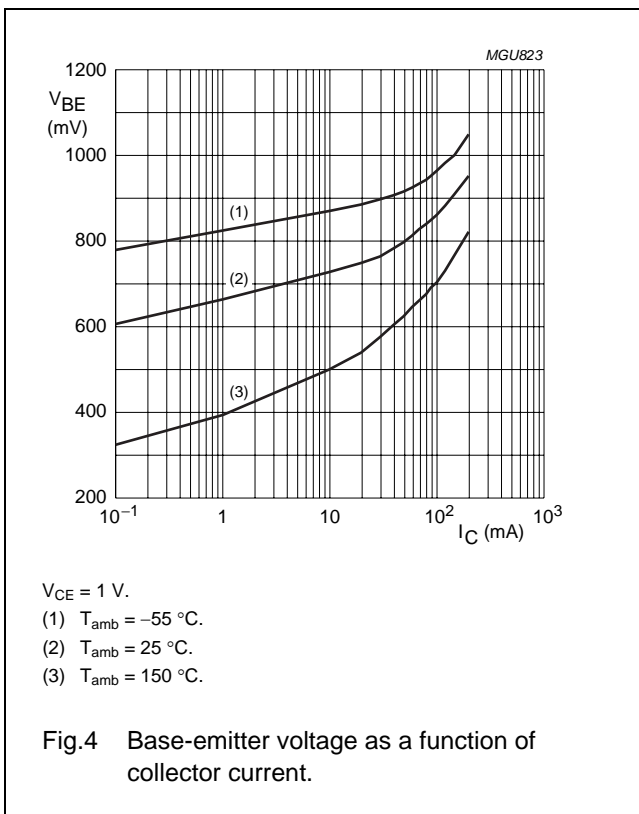
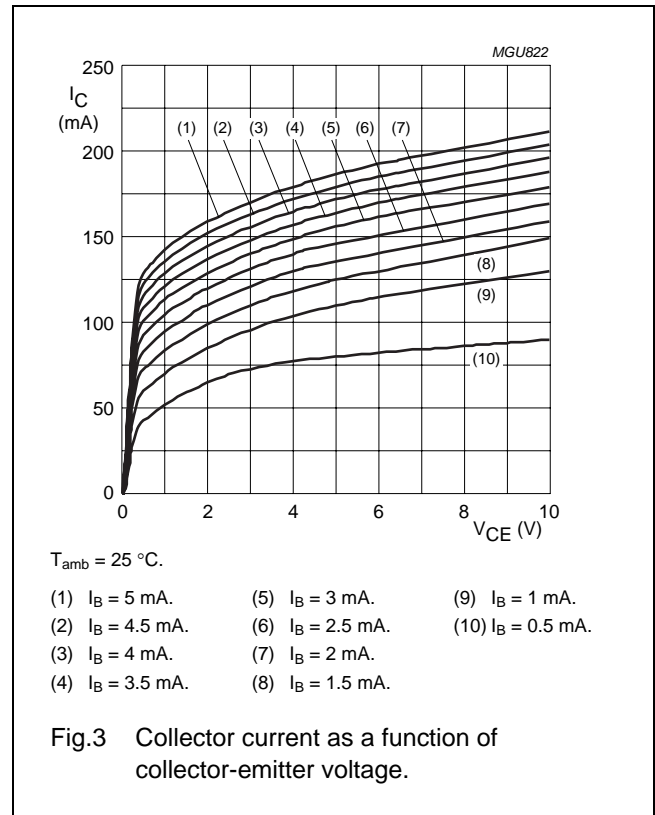
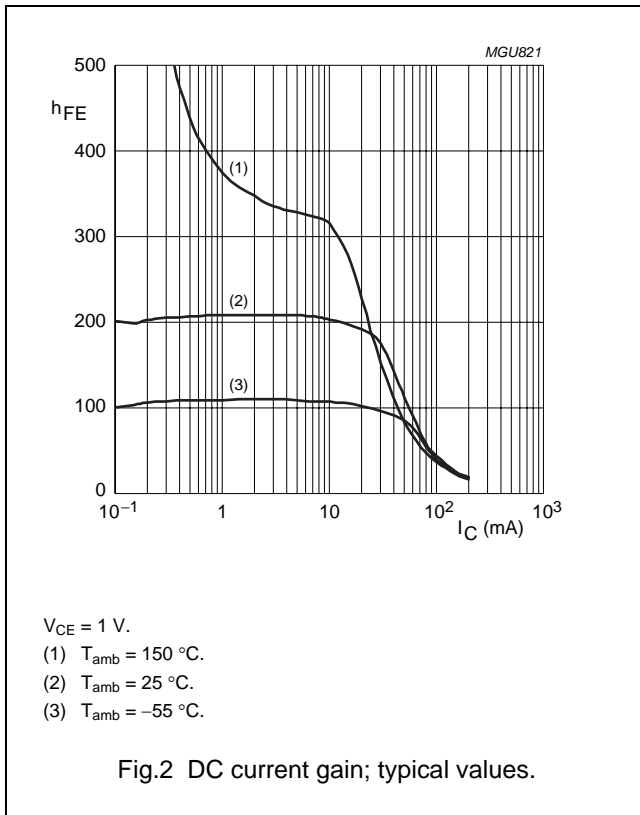
NPN SWITCHING TRANSISTOR
ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|--------------------------------------|--|-----------------|---------------|---------|
| I_{CBO} | collector cut-off current | $I_E = 0; V_{CB} = 60 V$ | - | 0.1 | μA |
| I_{EBO} | emitter cut-off current | $I_C = 0; V_{EB} = 5 V$ | - | 0.1 | μA |
| h_{FE} | DC current gain | $V_{CE} = 1 V;$ $I_C = 10mA$ $I_C = 50mA$ $I_C = 100mA$ | 100 60 30 | - 300 - | |
| $V_{CE(sat)}$ | collector-emitter saturation voltage | $I_C = 10mA; I_B = 1mA$ | - | 200 | mV |
| | | $I_C = 50mA; I_B = 5mA$ | - | 300 | mV |
| $V_{BE(sat)}$ | base-emitter saturation voltage | $I_C = 10mA; I_B = 1mA$ | 650 | 850 | mV |
| | | $I_C = 50mA; I_B = 5mA$ | - | 950 | mV |
| f_T | transition frequency | $I_C = 10mA; V_{CE} = 20V;$ $f = 100MHz$ | 300 | - | MHz |
| Switching times (between 10% and 90% levels); | | | | | |
| t_d | delay time | $V_{CC} = 3V_{dc}, V_{BE} = -0.5V_{dc}$ | - | 35 | ns |
| t_r | rise time | $I_C = 10mA_{dc}, I_B = 1mA_{dc}$ | - | 35 | ns |
| t_s | storage time | $V_{CC} = 3V_{dc}, I_C = 10mA_{dc}$ | - | 200 | ns |
| t_f | fall time | $I_B = I_{B2} = 1mA_{dc}$ | - | 50 | ns |

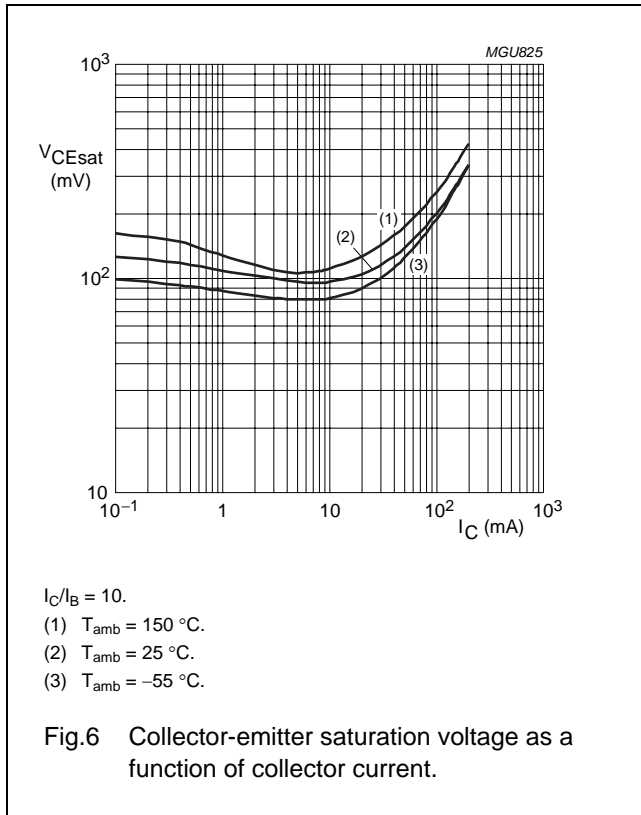
 Note Pulse test: $t_p \leq 300 ms; d \leq 0.02$.

NPN SWITCHING TRANSISTOR

TYPICAL CHARACTERISTICS @ $T_a=25^\circ\text{C}$ unless otherwise specified



NPN SWITCHING TRANSISTOR

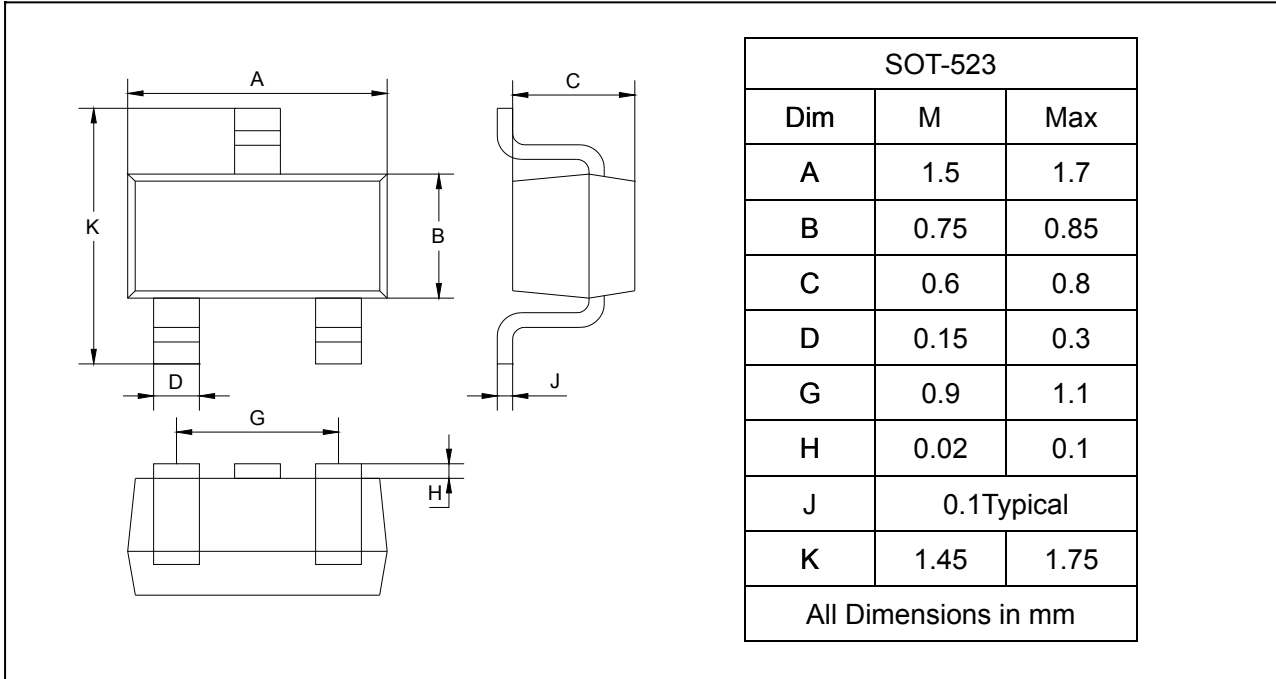


NPN SWITCHING TRANSISTOR

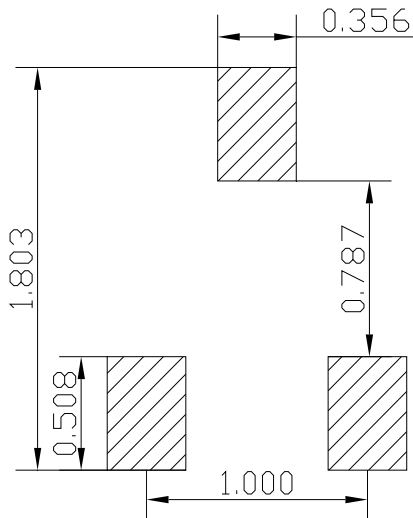
PACKAGE OUTLINE

Plastic surface mounted package

SOT-523



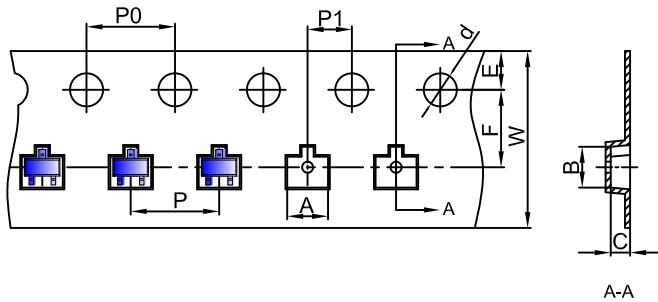
SOLDERING FOOTPRINT



Unit : mm

NPN SWITCHING TRANSISTOR

SOT-523 Embossed Carrier Tape

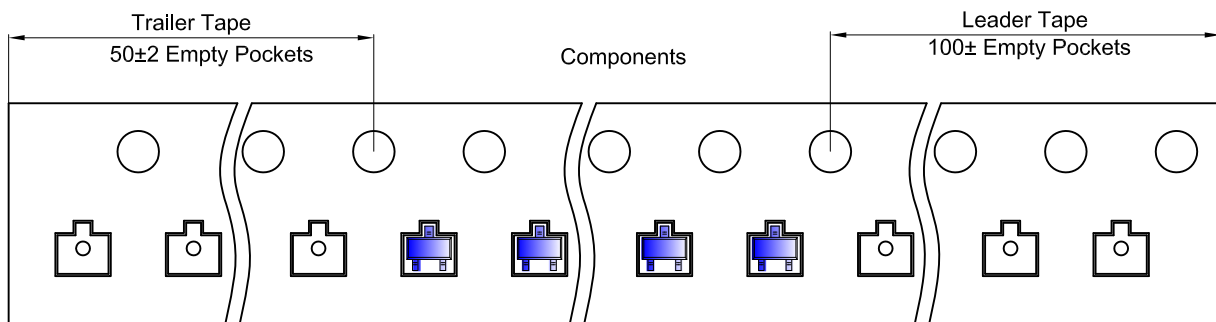


Packaging Description:

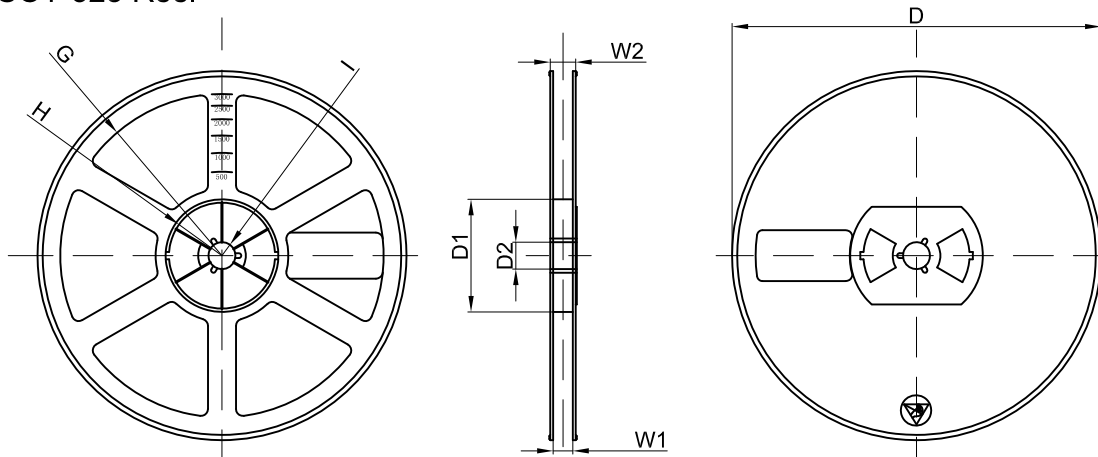
SOT-523 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter | | | | | | | | | | |
|------------------------------|------|------|-------|-------|------|------|------|------|------|------|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-523 | 1.85 | 1.85 | 0.875 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT-523 Tape Leader and Trailer



SOT-523 Reel



| Dimensions are in millimeter | | | | | | | | |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
| 7"Dia | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

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