

# PNP General Purpose Transistor

## UMT3906 / SST3906 / MMST3906 (NRND)

### ●Features

- 1)  $BV_{CEO} > -40V$  ( $I_C = -1mA$ )
- 2) Complements the T3904/SST3904/MMST3909.
- 3) Low capacitance.

### ●Package, marking, and packaging specifications

| Type                         | UMT3906 | SST3906 | MMST3906 (NRND) |
|------------------------------|---------|---------|-----------------|
| Packaging type               | UMT3    | SST3    | SMT3            |
| Marking                      | R2A     | R2A     | R2A             |
| Code                         | T106    | T116    | T146            |
| Basic ordering unit (pieces) | 3000    | 3000    | 3000            |

### ●Absolute maximum ratings ( $T_a = 25^\circ C$ )

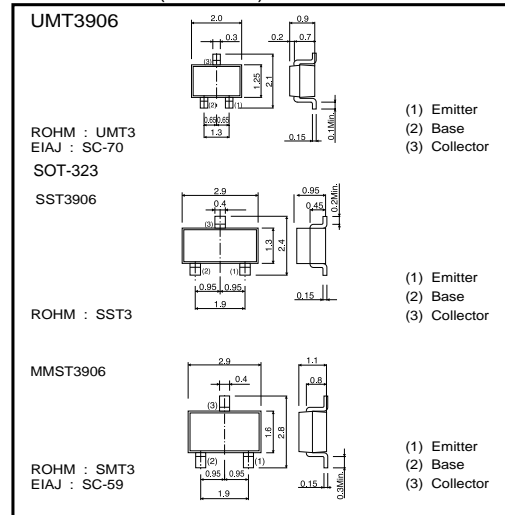
| Parameter                   | Symbol                      | Limits      | Unit       |
|-----------------------------|-----------------------------|-------------|------------|
| Collector-base voltage      | $V_{CBO}$                   | -40         | V          |
| Collector-emitter voltage   | $V_{CEO}$                   | -40         | V          |
| Emitter-base voltage        | $V_{EBO}$                   | -5          | V          |
| Collector current           | $I_C$                       | -0.2        | A          |
| Collector Power dissipation | UMT3906<br>SST3906,MMST3906 | 6.2         | W          |
|                             | SST3906,MMST3906            | 0.35        | W *        |
| Junction temperature        | $T_j$                       | 150         | $^\circ C$ |
| Storage temperature         | $T_{stg}$                   | -55 to +150 | $^\circ C$ |

\* When mounted on a 7x5x0.6mm ceramic board.

### ●Electrical characteristics ( $T_a = 25^\circ C$ )

| Parameter                            | Symbol        | Min.  | Typ. | Max.  | Unit | Conditions  |
|--------------------------------------|---------------|-------|------|-------|------|---|
| Collector-base breakdown voltage     | $BV_{CBO}$    | -40   | -    | -     | V    | $I_C = -10\mu A$  |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | -40   | -    | -     | V    | $I_C = -1mA$  |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | -5    | -    | -     | V    | $I_E = -10\mu A$  |
| Collector cutoff current             | $I_{CES}$     | -     | -    | -50   | nA   | $V_{CB} = -30V$   |
| Emitter cutoff current               | $I_{EBO}$     | -     | -    | -50   | nA   | $V_{EB} = -3V$  |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | -     | -    | -0.25 | V    | $I_C/I_E = -10mA/-1mA$  |
|                                      |               | -     | -    | -0.4  | V    | $I_C/I_E = -50mA/-5mA$  |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | -0.65 | -    | -0.85 | V    | $I_C/I_E = -10mA/-1mA$  |
|                                      |               | -     | -    | -0.95 | V    | $I_C/I_E = -50mA/-5mA$  |
| DC current transfer ratio            | $h_{FE}$      | 60    | -    | -     | -    | $V_{CE} = -1V, I_C = -0.1mA$                                    |
|                                      |               | 80    | -    | -     | -    | $V_{CE} = -1V, I_C = -1mA$                                      |
|                                      |               | 100   | -    | 300   | -    | $V_{CE} = -1V, I_C = -10mA$                                     |
|                                      |               | 60    | -    | -     | -    | $V_{CE} = -1V, I_C = -50mA$                                     |
|                                      |               | 30    | -    | -     | -    | $V_{CE} = -1V, I_C = -100mA$                                    |
| Transition frequency                 | $f_T$         | 250   | -    | -     | MHz  | $V_{CE} = -20V, I_E = 10mA, f = 100MHz$                         |
| Collector output capacitance         | $C_{ob}$      | -     | -    | 4.5   | pF   | $V_{CB} = -10V, f = 100kHz, I_E = 0A$                           |
| Emitter input capacitance            | $C_{ib}$      | -     | -    | 10    | pF   | $V_{CB} = -0.5V, f = 100kHz, I_C = 0A$                          |
| Delay time                           | $t_d$         | -     | -    | 35    | ns   | $V_{CC} = -3V, V_{BE(OFF)} = -0.5V, I_C = -10mA, I_{B1} = -1mA$ |
| Rise time                            | $t_r$         | -     | -    | 35    | ns   | $V_{CC} = -3V, V_{BE(OFF)} = -0.5V, I_C = -10mA, I_{B1} = -1mA$ |
| Storage time                         | $t_{stg}$     | -     | -    | 225   | ns   | $V_{CC} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA$            |
| Fall time                            | $t_f$         | -     | -    | 75    | ns   | $V_{CC} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA$            |

### ●Dimensions (Unit : mm)



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●Electrical characteristics curves

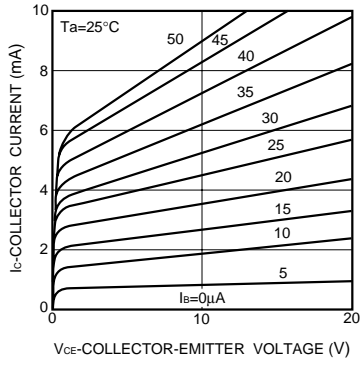


Fig.1 Grounded emitter output characteristics

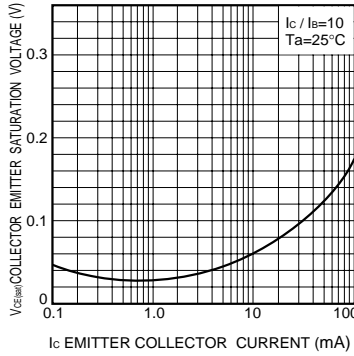


Fig.2 Collector-emitter saturation voltage vs. collector current

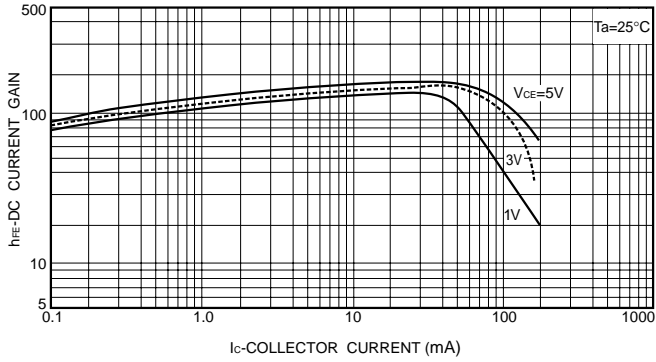


Fig.3 DC current gain vs. collector current ( I )

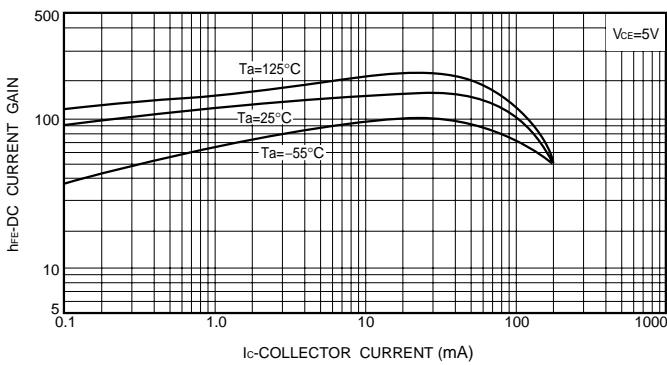


Fig.4 DC current gain vs. collector current ( II )

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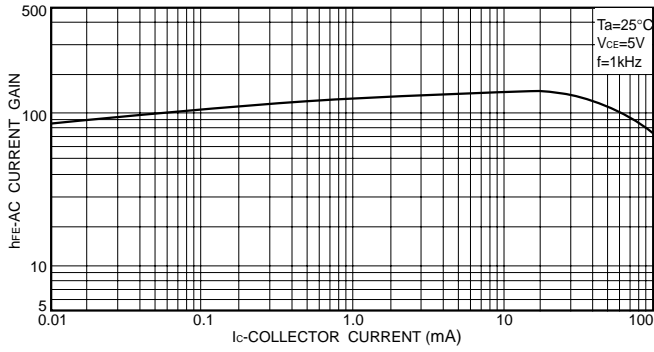


Fig.5 AC current gain vs. collector current

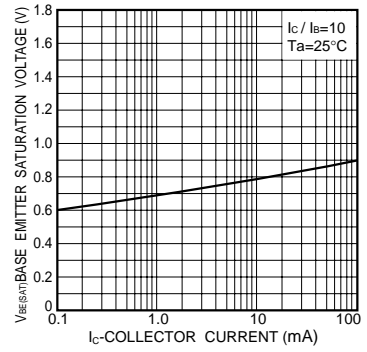


Fig.6 Base-emitter saturation voltage vs. collector current

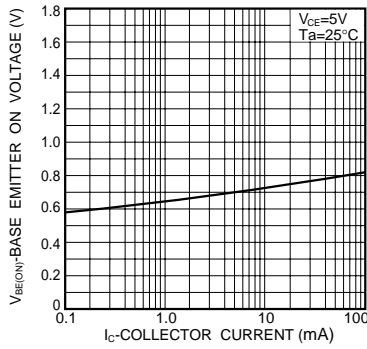


Fig.7 Grounded emitter propagation characteristics

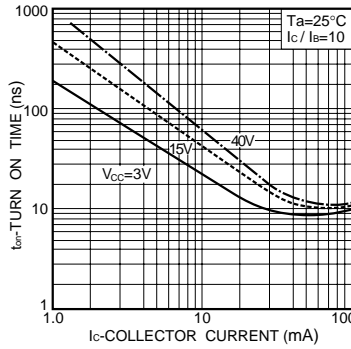


Fig.8 Turn-on time vs. collector current

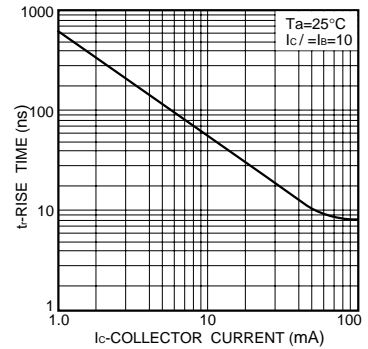


Fig.9 Rise time vs. collector current

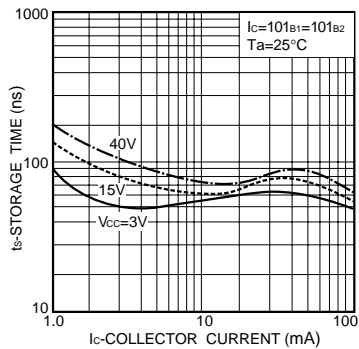


Fig.10 Storage time vs. collector current

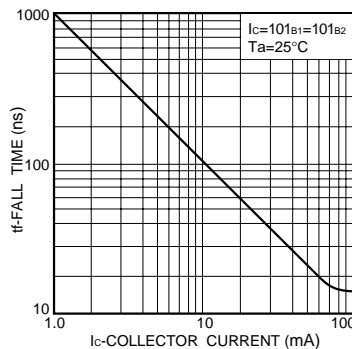


Fig.11 Fall time vs. collector current

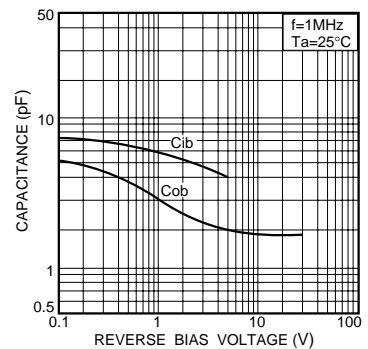


Fig.12 Input/output capacitance vs. voltage

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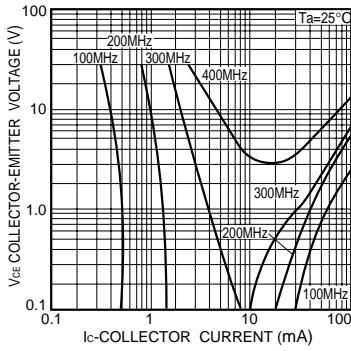


Fig.13 Gain bandwidth product

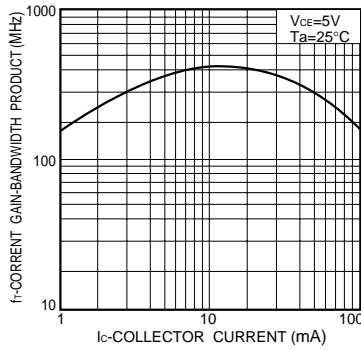


Fig.14 Gain bandwidth product vs. collector current

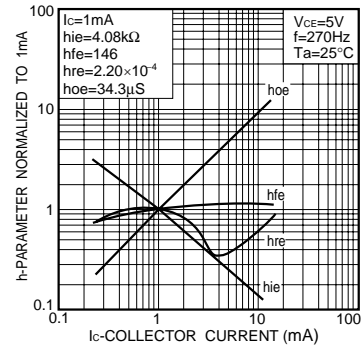


Fig.15 h parameter vs. collector current

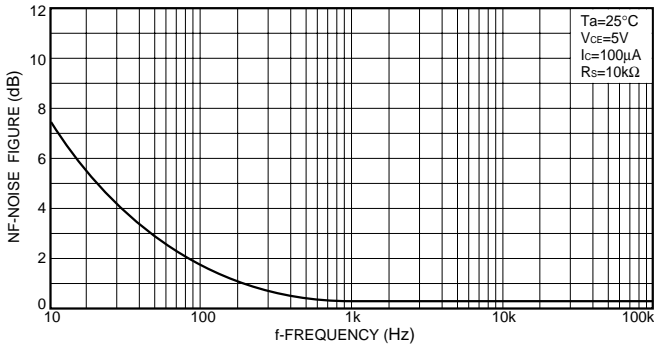


Fig.16 Noise vs. collector current

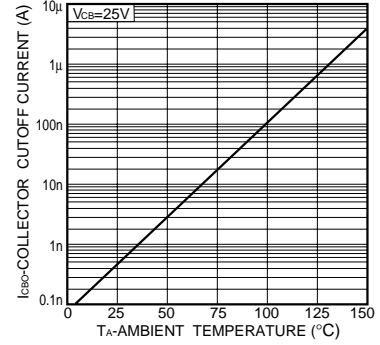


Fig.17 Noise characteristics (I)

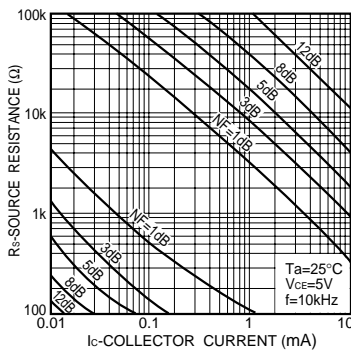


Fig.18 Noise characteristics (II)

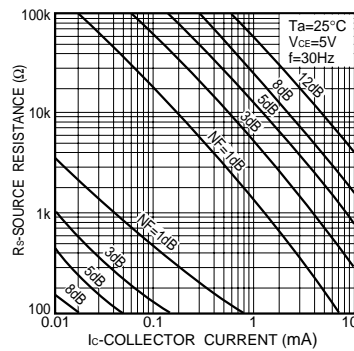


Fig.19 Noise characteristics (III)

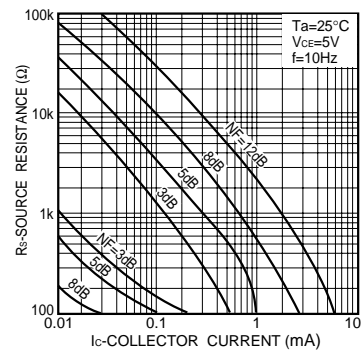


Fig.20 Noise characteristics (IV)

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