

PNP General Purpose Transistor

UMT3906/SST3906/MMST3906/RXT3906/2N3906

●Features

- 1) $BV_{CE0} < -40V$ ($I_C = -1mA$)
- 2) Complements the UMT3904/SST3904/MMST3904/RXT3904/PN3904.

●Package, marking and packaging specifications

| Type | UMT3906 | SST3906 | MMST3906 | RXT3906 | 2N3906 |
|------------------------------|---------|---------|----------|---------|--------|
| Package | UMT3 | SST3 | SMT3 | MPT3 | TO-92 |
| Marking | R2A | R2A | R2A | AD* | — |
| Code | T106 | T116 | T146 | T100 | T93 |
| Basic ordering unit (pieces) | 3000 | 3000 | 3000 | 1000 | 3000 |

* Indicates lot number.

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

| Parameter | Symbol | Limits | Unit |
|-----------------------------|-------------------|---------|------------|
| Collector-base voltage | V_{CB0} | -40 | V |
| Collector-emitter voltage | V_{CE0} | -40 | V |
| Emitter-base voltage | V_{EB0} | -5 | V |
| Collector current | I_C | -0.2 | A |
| Collector power dissipation | UMT3906 | 0.2 | W |
| | SST3906, MMST3906 | 0.3 | |
| | RXT3906 | 0.5 | |
| | 2N3906 | 0.625 | |
| Junction temperature | T_J | 150 | $^\circ C$ |
| Storage temperature | T_{stg} | -55~150 | $^\circ C$ |

●External dimensions (Units : mm)

UMT3906

ROHM : UMT3
EIAJ : SC-70

(1) Emitter
(2) Base
(3) Collector

SST3906

ROHM : SST3

(1) Emitter
(2) Base
(3) Collector

MMST3906

ROHM : SMT3
EIAJ : SC-59

(1) Emitter
(2) Base
(3) Collector

RXT3906

ROHM : MPT3
EIAJ : SC-62

(1) Base
(2) Collector
(3) Emitter

2N3906

ROHM : TO-92
EIAJ : SC-43

(1) Base
(2) Collector
(3) Emitter

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------------|---------------|------|------|-------|------|---|
| Collector-base breakdown voltage | BV_{CB0} | -40 | — | — | V | $I_C = -10 \mu A$ |
| Collector-emitter breakdown voltage | BV_{CE0} | -40 | — | — | V | $I_C = -10mA$ |
| Emitter-base breakdown voltage | BV_{EB0} | -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 | $I_C/I_B = -10mA/-1mA$ |
| | | — | — | -0.4 | V | $I_C/I_B = -50mA/-5mA$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | 0.65 | — | -0.85 | V | $I_C/I_B = -10mA/-1mA$ |
| | | — | — | -0.95 | V | $I_C/I_B = -50mA/-5mA$ |
| DC current transfer ratio | h_{FE} | 60 | — | — | — | $V_{CE} = -1V, I_C = -0.1mA$ |
| | | 60 | — | — | — | $V_{CE} = -1V, I_C = -1mA$ |
| | | 100 | — | 300 | — | $V_{CE} = -1V, I_C = -10mA$ |
| | | 60 | — | — | — | $V_{CE} = -1V, I_C = -60mA$ |
| | | 30 | — | — | — | $V_{CE} = -1V, I_C = -100mA$ |
| Transition frequency | f_T | 250 | — | — | MHz | $V_{CE} = -20V, I_E = 10mA, f = 100MHz$ |
| Output capacitance | C_{ob} | — | — | 4.5 | pF | $V_{CB} = -10V, f = 100KHz$ |
| Emitter input capacitance | C_{ib} | — | — | 10 | pF | $V_{EB} = -0.5V, f = 100KHz$ |
| Delay time | t_d | — | — | 35 | ns | $V_{CB} = -3V, V_{BE(OFF)} = -0.5V, I_C = -10mA, I_{B1} = -1mA$ |
| Rise time | t_r | — | — | 35 | ns | $V_{CB} = -3V, V_{BE(OFF)} = -0.5V, I_C = -10mA, I_{B1} = -1mA$ |
| Storage time | t_{stg} | — | — | 225 | ns | $V_{CB} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA$ |
| Fall time | t_f | — | — | 75 | ns | $V_{CB} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA$ |

(SPEC-A38)

●Electrical characteristic curves

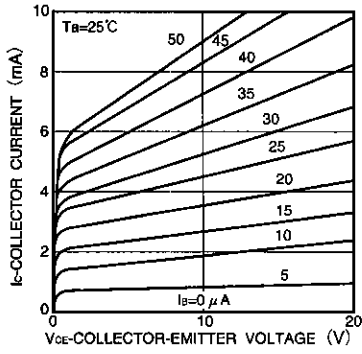


Fig.1 Grounded emitter output characteristics

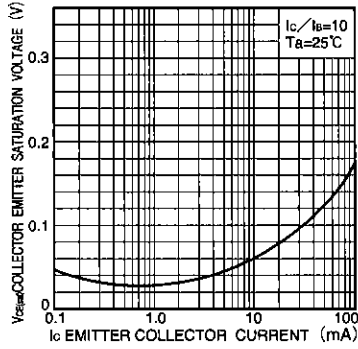


Fig.2 Collector-emitter saturation voltage vs. collector current

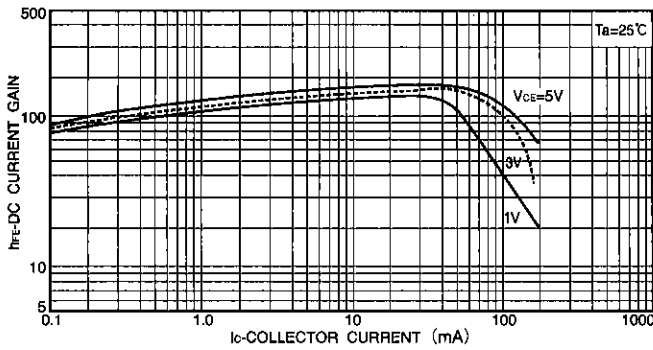


Fig.3 DC current gain vs. collector current (I)

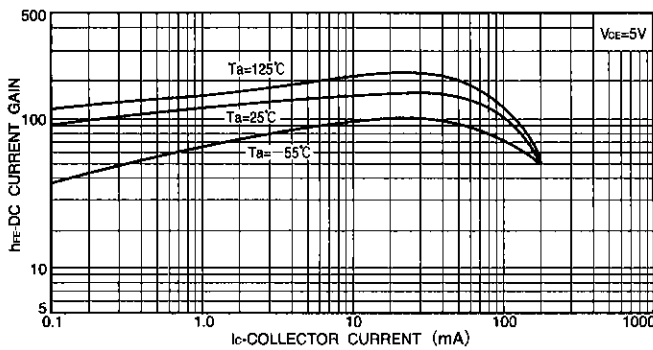


Fig.4 DC current gain vs. collector current (II)

USA & European specification models

● Electrical characteristic curves

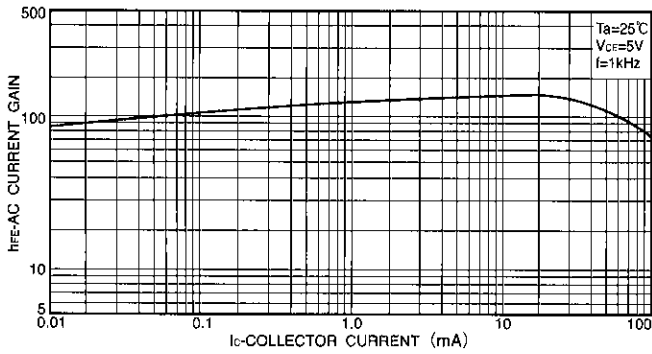


Fig.5 AC current gain vs. collector current

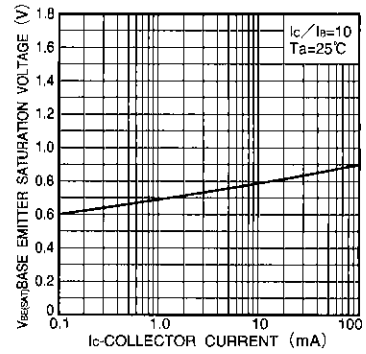


Fig.6 Base-emitter saturation voltage vs. collector current

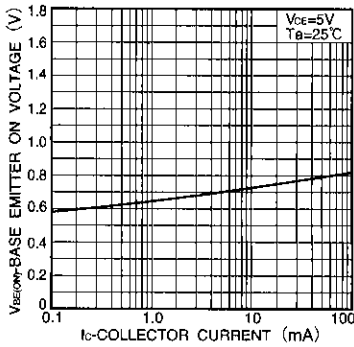


Fig.7 Grounded emitter propagation characteristics

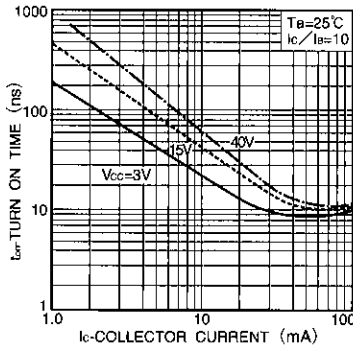


Fig.8 Turn-on time vs. collector current

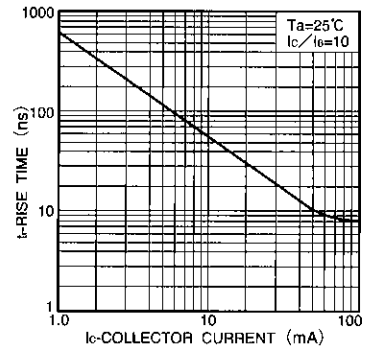


Fig.9 Rise time vs. collector current

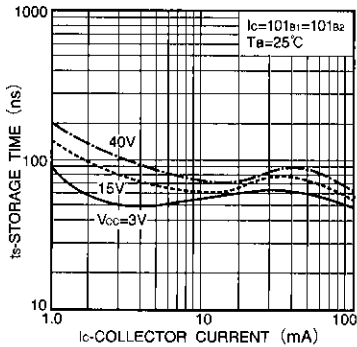


Fig.10 Storage time vs. collector current

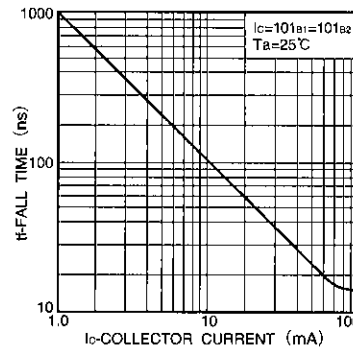


Fig.11 Fall time vs. collector current

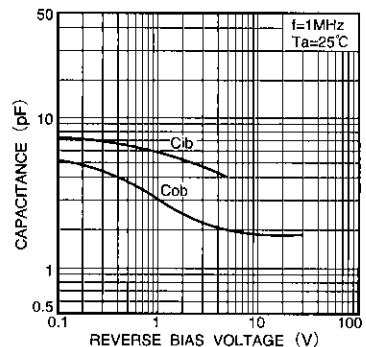


Fig.12 Input/output capacitance vs. voltage

● Electrical characteristic curves

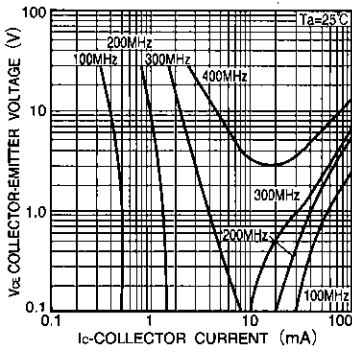


Fig. 13 Gain bandwidth product

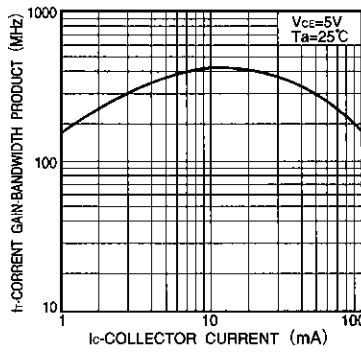


Fig. 14 Gain bandwidth product vs. collector current

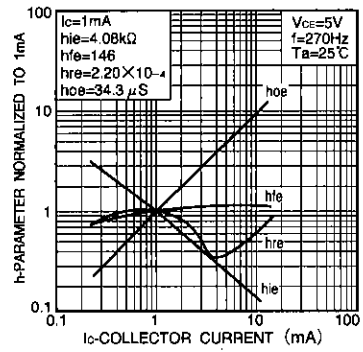


Fig. 15 h value vs. collector current

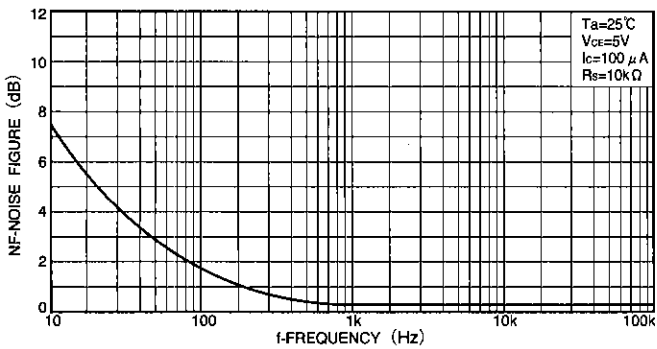


Fig. 16 Noise vs. collector current

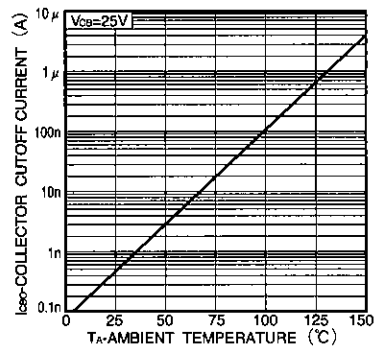


Fig. 17 Noise characteristics (I)

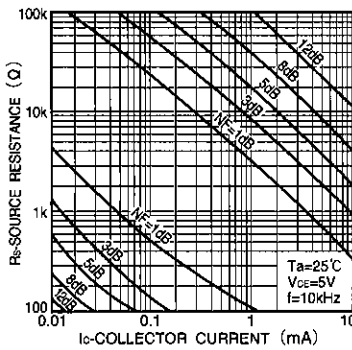


Fig. 18 Noise characteristics (II)

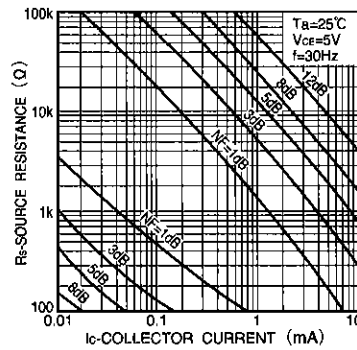


Fig. 19 Noise characteristics (III)

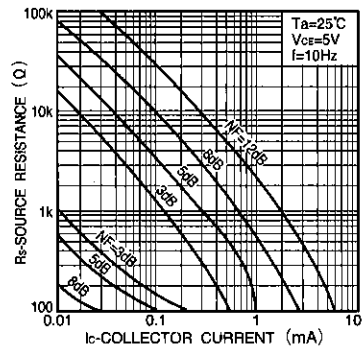


Fig. 20 Noise characteristics (IV)

USA & European specification models

Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.