

# Miniature Transistors

## General purpose

| TYPE NO.<br>NPN<br>PNP | Maximum Ratings                     |            |            |            | Electrical Characteristics @ $T_A = 25^\circ\text{C}$ |                                   |                  |                     |                  | CASE  |
|------------------------|-------------------------------------|------------|------------|------------|-------------------------------------------------------|-----------------------------------|------------------|---------------------|------------------|-------|
|                        | $P_D$<br>@ $T_A = 25^\circ\text{C}$ | $BV_{CBO}$ | $LV_{CEO}$ | $BV_{EBO}$ | $h_{FE} @ V_{CE} @ I_C$<br>min./max.                  | $V_{CE(sat)} @ I_C / I_B$<br>max. | $C_{ob}$<br>max. | $f_T @ I_C$<br>min. | $NF @ f$<br>max. |       |
| MT 146                 | 50mW                                | 20V        | 20V        | 4V         | 80/550 @ 0.5V @ 0.2mA                                 | 0.18V (VCEK)                      | 4.0pF            | 100MHz* @ 2.0mA     | 2dB* WB          | MT-42 |
| MT 121                 | 50mW                                | 5V         | 5V         | 5V         | 75/900 @ 0.5V @ 0.5mA                                 | 0.20V @ 10/0.5mA                  | 11.0pF           | 250MHz* @ 10.0mA    | 5dB @ 1kHz       | MT-42 |
| MT 1075                | 50mW                                | 75V        | 75V        | 4V         | 20/ — @ 10.0V @ 10.0mA                                | 1.00V @ 5/0.5mA                   | 4.0pF            | 60MHz @ 1.0mA       | — —              | MT-42 |
| MT 1100                | 50mW                                | 100V       | 100V       | 4V         | 20/ — @ 10.0V @ 10.0mA                                | 1.00V @ 5/0.5mA                   | 4.0pF            | 60MHz @ 1.0mA       | — —              | MT-42 |
| MT 4101                | 50mW                                | 20V        | 20V        | 5V         | 70/300 @ 5.0V @ 1.0mA                                 | 0.25V @ 10/0.5mA                  | 3.5pF            | 60MHz @ 0.5mA       | 4dB @ 1kHz       | MT-42 |
| MT 4102                | 50mW                                | 20V        | 20V        | 5V         | 200/600 @ 5.0V @ 1.0mA                                | 0.25V @ 10/0.5mA                  | 3.5pF            | 60MHz @ 0.5mA       | 3dB @ 1kHz       | MT-42 |
| MT 4103                | 50mW                                | 20V        | 20V        | 4V         | 100/600 @ 5.0V @ 1.0mA                                | 0.25V @ 10/0.5mA                  | 3.5pF            | 60MHz @ 0.5mA       | 4dB @ 1kHz       | MT-42 |
| MT 4104                | 50mW                                | 25V        | 25V        | 4V         | 50/500 @ 5.0V @ 1.0mA                                 | 0.30V @ 1/0.1mA                   | 3.0pF            | 40MHz @ 1.0mA       | 4dB @ 1kHz       | MT-42 |
| MT 6001                | 50mW                                | 30V        | 30V        | 5V         | 30/200 @ 1.0V @ 50.0mA                                | 0.30V @ 50/2.5mA                  | 10.0pF           | — —                 | — —              | MT-42 |
| MT 6002                | 50mW                                | 30V        | 30V        | 5V         | 75/300 @ 1.0V @ 50.0mA                                | 0.30V @ 50/2.5mA                  | 10.0pF           | — —                 | — —              | MT-42 |
| MT 6003                | 50mW                                | 20V        | 20V        | 4V         | 30/300 @ 5.0V @ 50.0mA                                | 0.35V @ 50/5.0mA                  | 12.0pF           | — —                 | — —              | MT-42 |
| MT 200                 | 50mW                                | 20V        | 20V        | 5V         | 50/400 @ 0.5V @ 0.2mA                                 | 0.18V (VCEK)                      | 12.0pF           | 90MHz* @ 2.0mA      | 2dB* WB          | MT-42 |
| MT 0404                | 50mW                                | 25V        | 25V        | 4V         | 30/300 @ 1.0V @ 50.0mA                                | 0.30V @ 50/5.0mA                  | 12.0pF           | — —                 | — —              | MT-42 |
| MT 0404-1              | 50mW                                | 40V        | 30V        | 5V         | 30/200 @ 1.0V @ 50.0mA                                | 0.25V @ 50/2.5mA                  | 10.0pF           | — —                 | — —              | MT-42 |
| MT 0404-2              | 50mW                                | 40V        | 30V        | 5V         | 75/300 @ 1.0V @ 50.0mA                                | 0.25V @ 50/2.5mA                  | 10.0pF           | — —                 | — —              | MT-42 |
| MT 0411                | 50mW                                | 20V        | 20V        | 5V         | 100/300 @ 5.0V @ 1.0mA                                | 0.25V @ 10/0.5mA                  | 5.0pF            | 40MHz @ 0.5mA       | 4dB @ 1kHz       | MT-42 |
| MT 0412                | 50mW                                | 20V        | 20V        | 5V         | 200/600 @ 5.0V @ 1.0mA                                | 0.25V @ 10/0.5mA                  | 5.0pF            | 40MHz @ 0.5mA       | 3dB @ 1kHz       | MT-42 |
| MT 0413                | 50mW                                | 20V        | 20V        | 4V         | 60/ — @ 5.0V @ 1.0mA                                  | 0.25V @ 10/0.5mA                  | 8.0pF            | 40MHz @ 0.5mA       | 4dB @ 1kHz       | MT-42 |
| MT 0414                | 50mW                                | 20V        | 20V        | 4V         | 50/500 @ 5.0V @ 1.0mA                                 | 0.30V @ 1/0.1mA                   | 9.0pF            | 40MHz @ 1.0mA       | 4dB @ 1kHz       | MT-42 |

WB = Wide Band

## High frequency

| TYPE NO.<br>NPN<br>PNP | Maximum Ratings                     |            |            |            | Electrical Characteristics @ $T_A = 25^\circ\text{C}$ |                                   |                  |                     |                  | CASE  |
|------------------------|-------------------------------------|------------|------------|------------|-------------------------------------------------------|-----------------------------------|------------------|---------------------|------------------|-------|
|                        | $P_D$<br>@ $T_A = 25^\circ\text{C}$ | $BV_{CBO}$ | $LV_{CEO}$ | $BV_{EBO}$ | $h_{FE} @ V_{CE} @ I_C$<br>min./max.                  | $V_{CE(sat)} @ I_C / I_B$<br>max. | $C_{ob}$<br>max. | $f_T @ I_C$<br>min. | $NF @ f$<br>max. |       |
| MT 3001                | 50mW                                | 30V        | 12V        | 3V         | 20/200 @ 10V @ 8mA                                    | 0.25V @ 10/0.1mA                  | 1.85pF           | 600MHz @ 8mA        | 4dB* @ 60MHz     | MT-42 |
| MT 3002                | 50mW                                | 30V        | 12V        | 3V         | 20/200 @ 10V @ 8mA                                    | 0.25V @ 10/0.1mA                  | 1.60pF           | 900MHz @ 8mA        | 4dB* @ 60MHz     | MT-42 |
| MT 3011                | 50mW                                | 20V        | 12V        | 2V         | 20/ — @ 10V @ 8mA                                     | 0.60V @ 10/0.1mA                  | 1.70pF           | 600MHz @ 8mA        | 4dB* @ 60MHz     | MT-42 |
| MT 0461                | 50mW                                | 60V        | 50V        | 6V         | 50/200 @ 1V @ 10mA                                    | 0.15V @ 10/1.0mA                  | 6.00pF           | 300MHz @ 10mA       | 6dB @ 1 kHz      | MT-42 |
| MT 0462                | 50mW                                | 50V        | 40V        | 6V         | 100/300 @ 1V @ 10mA                                   | 0.15V @ 10/1.0mA                  | 6.00pF           | 300MHz @ 10mA       | 6dB @ 1 kHz      | MT-42 |

\* Typical Value

## High speed switching

| TYPE NO.<br>NPN<br>PNP | Maximum Ratings                     |            |            |            | Electrical Characteristics @ $T_A = 25^\circ\text{C}$ |                                   |                                |                  |                     | CASE     |
|------------------------|-------------------------------------|------------|------------|------------|-------------------------------------------------------|-----------------------------------|--------------------------------|------------------|---------------------|----------|
|                        | $P_D$<br>@ $T_A = 25^\circ\text{C}$ | $BV_{CBO}$ | $LV_{CEO}$ | $BV_{EBO}$ | $h_{FE} @ V_{CE} @ I_C$<br>min./max.                  | $V_{CE(sat)} @ I_C / I_B$<br>max. | $t_{on} \quad t_{off}$<br>max. | $C_{ob}$<br>max. | $f_T @ I_C$<br>min. |          |
| MT 9001                | 50mW                                | 40V        | 15V        | 4.5V       | 40/120 @ 1V @ 10mA                                    | 0.25V @ 10/1.0mA                  | 12ns 18ns                      | 4pF              | 650MHz @ 10mA       | MICROMIN |
| MT 9002                | 50mW                                | 30V        | 12V        | 4.5V       | 30/150 @ 1V @ 10mA                                    | 0.25V @ 10/1.0mA                  | 15ns 20ns                      | 4pF              | 650MHz @ 10mA       | MICROMIN |
| MT 9003                | 50mW                                | 18V        | 12V        | 4.0V       | 25/200 @ 1V @ 10mA                                    | 0.40V @ 10/1.0mA                  | 15ns 20ns                      | 4pF              | 650MHz @ 10mA       | MICROMIN |
| MT 0491                | 50mW                                | 30V        | 20V        | 5.0V       | 30/120 @ 1V @ 30mA                                    | 0.20V @ 30/3.0mA                  | 25ns 35ns                      | 4pF              | 700MHz @ 30mA       | MICROMIN |
| MT 0492                | 50mW                                | 25V        | 16V        | 5.0V       | 50/150 @ 1V @ 30mA                                    | 0.20V @ 30/3.0mA                  | 25ns 35ns                      | 4pF              | 700MHz @ 30mA       | MICROMIN |
| MT 0493                | 50mW                                | 15V        | 12V        | 5.0V       | 30/150 @ 1V @ 30mA                                    | 0.40V* @ 30/3.0mA                 | 60ns 90ns                      | 9pF              | 600MHz @ 50mA       | MICROMIN |