# NPN 2 GHz wideband transistor

T-31-17

**BFW30**



## DESCRIPTION

NPN transistor in a TO-72 metal envelope, with insulated electrodes and a shield lead connected to the case.

The transistor has very low intermodulation distortion and very high power gain. It is primarily intended for wideband vertical amplifiers in high speed oscilloscopes, wideband aerial amplifiers (40 to 860 MHz) and television distribution amplifiers.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | emitter |
| 2 | base |
| 3 | collector |
| 4 | shield lead (connected to case) |

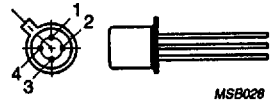


Fig.1 TO-72.

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | open emitter | – | 20 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | 10 | V |
| $I_{CM}$ | peak collector current | f > 1 MHz | – | 100 | mA |
| $P_{tot}$ | total power dissipation | up to $T_s$ = 25 °C (note 1) | – | 250 | mW |
| $f_T$ | transition frequency | $I_C$ = 50 mA; $V_{CE}$ = 5 V; f = 500 MHz; $T_j$ = 25 °C | 1.6 | – | GHz |
| $C_{re}$ | feedback capacitance | $I_C$ = 2 mA; $V_{CE}$ = 5 V; f = 1 MHz | 0.8 | – | pF |
| $G_p$ | power gain | $I_C$ = 30 mA; $V_{CE}$ = 5 V; f = 800 MHz; $T_{amb}$ = 25 °C | 7.5 | – | dB |

## LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | open emitter | – | 20 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | 10 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | – | 2.5 | V |
| $I_C$ | DC collector current | | – | 50 | mA |
| $I_{CM}$ | peak collector current | f > 1 MHz | – | 100 | mA |
| $P_{tot}$ | total power dissipation | up to $T_s$ = 25 °C (note 1) | – | 250 | mW |
| $T_{stg}$ | storage temperature | | –65 | 200 | °C |
| $T_j$ | junction temperature | | – | 200 | °C |

**Note**

1. $T_s$ is the temperature at the soldering point of the collector lead.

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## THERMAL RESISTANCE

| SYMBOL | PARAMETER | CONDITIONS | THERMAL RESISTANCE |
|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to soldering point | up to $T_s$ = 25 °C (note 1) | 500 K/W |

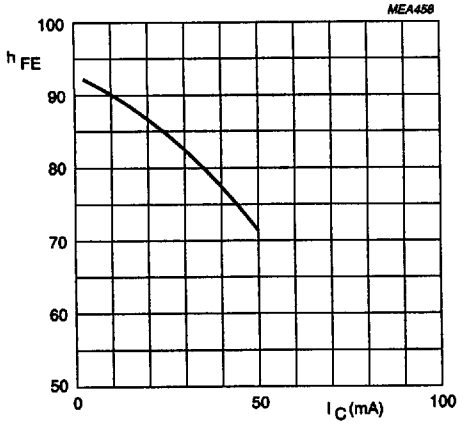
**Note**

1. $T_s$ is the temperature at the soldering point of the collector lead.

## CHARACTERISTICS

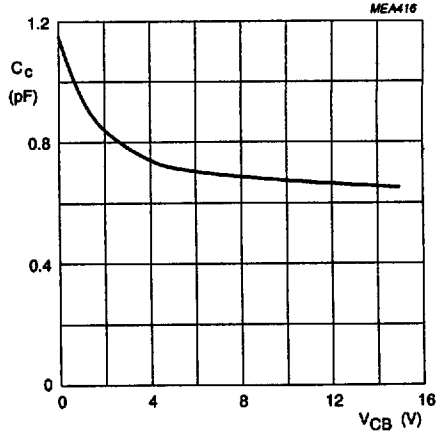
$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector cut-off current | $I_E$ = 0; $V_{CB}$ = 10 V | – | – | 50 | nA |
| $h_{FE}$ | DC current gain | $I_C$ = 25 mA; $V_{CE}$ = 5 V | 25 | – | – | |
| | | $I_C$ = 50 mA; $V_{CE}$ = 5 V | 25 | – | – | |
| $f_T$ | transition frequency | $I_C$ = 50 mA; $V_{CE}$ = 5 V; f = 500 MHz | – | 1.6 | – | GHz |
| $C_c$ | collector capacitance | $I_E = i_e$ = 0; $V_{CB}$ = 5 V; f = 1 MHz | – | – | 1.5 | pF |
| $C_{re}$ | feedback capacitance | $I_C$ = 2 mA; $V_{CE}$ = 5 V; f = 1 MHz | – | 0.8 | – | pF |
| F | noise figure | $I_C$ = 2 mA; $V_{CE}$ = 5 V; $Z_S$ = 50 Ω; f = 500 MHz | – | – | 5 | dB |
| $G_p$ | power gain | $I_C$ = 30 mA; $V_{CE}$ = 5 V; f = 800 MHz; $T_{amb}$ = 25 °C | – | 7.5 | – | dB |



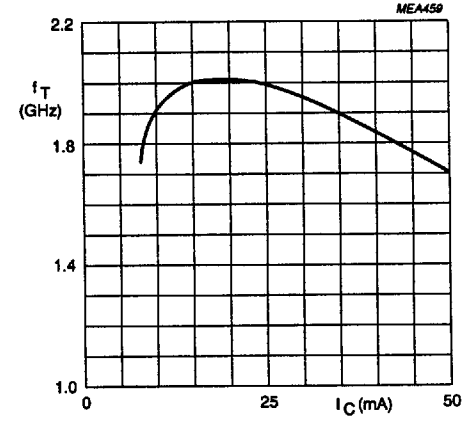

$V_{CE}$ = 5 V; $T_j$ = 25 °C.

Fig.2 DC current gain as a function of collector current.




$I_E = i_e$ = 0; f = 1 MHz; $T_j$ = 25 °C.

Fig.3 Collector capacitance as a function of collector-base voltage.




$V_{CE}$ = 5 V; f = 500 MHz; $T_j$ = 25 °C.

Fig.4 Transition frequency as a function of collector current.