# RFS-3G

3.0 GHz RF Field Sensor with Current Loop Interface

## Features

- RF dynamic 45 dB typ.
- including monopole antenna
- suppression for cellular and DECT phones
- suppression for Wi-Fi
- analogue current loop

## Applications

- personal security
- radio monitoring


## Overview

RFS-3G is a RF field sensor for frequencies in the range of 3 GHz. The module measures the field strength and provides the measured data via an analogue current loop.

The integrated monopole antenna makes RFS-3G a compact solution for RF field measurements.

The RFS-3G module is used e.g. for leak detection in electron accelerators to guarantee personal security.

## Suppression of Unwanted Signals

Unwanted adjacent signals like GSM or DECT are effectively suppressed. This way, the field sensor is not influenced by devices like mobile phones. RFS-3G also features Wi-Fi suppression.

## RF Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| center frequency | $f_c$ | | 3000 | | MHz | |
| bandwidth | BW | | 10 | | MHz | |
| GSM900 suppression | a | | -30 | | dB | 880 MHz ≤ f ≤ 960 MHz |
| GSM1800 suppression | a | | -30 | | dB | 1710 MHz ≤ f ≤ 1785 MHz |
| DECT suppression | a | | -30 | | dB | 1880 MHz ≤ f ≤ 1900 MHz |
| LTE Band 7 suppression | a | | -30 | | dB | 2500 MHz < f ≤ 2690 MHz |
| Wi-Fi 802.11 suppression | a | | -30 | | dB | 2400 MHz < f < 2484 MHz<br>5850 MHz < f < 5925 MHz |
| minimum RF level[1] | $P_{min}$ | | -3 | | dBm | 3 m distance from RF field sensor |
| rise time of current loop response | $tr_{CL}$ | | 100 | 350 | µs | |
| fall time of current loop response | $tf_{CL}$ | | 8 | | ms | |
| min. measureable RF pulse width[2] | | 0.3 | 1 | | µs | |
| dynamic range | | | 45 | | dB | |
| type of antenna | | | | | | λ/4 monopole |
| video output | | | | | | D-SUB, 9 pole, male (DE-9) |
| loop current | $I_L$ | 4 | | 20 | mA | typ., logarithmic proportional to RF field strength |
| lower loop current | $I_{L\ low}$ | | 4.0 | | mA | loop current without stimulus |
| loop voltage | $U_L$ | 5 | 15 | 18 | V | voltage drop across device |

Note 1: radiated with λ/4 monopole vertical orientation (antenna gain < 2.5 dBi)

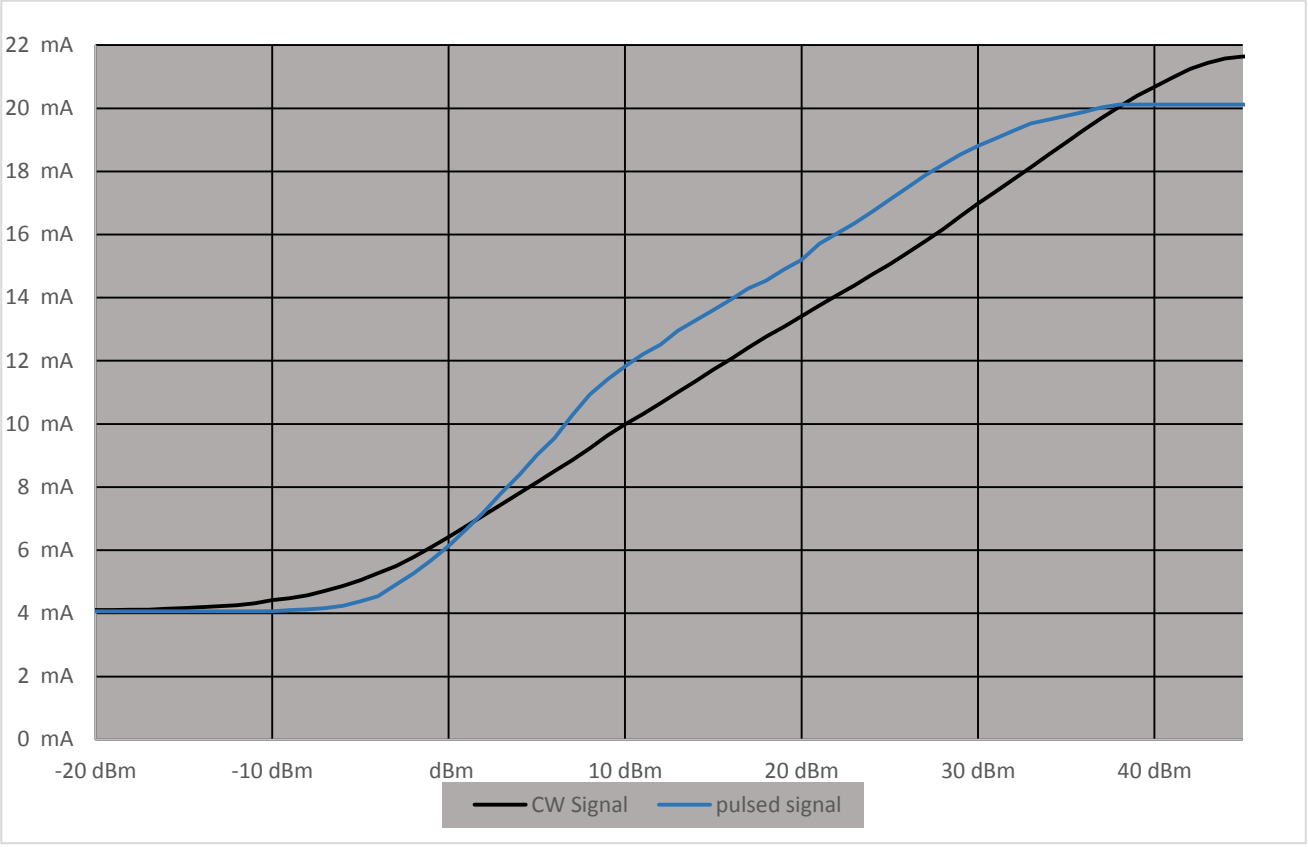
Note 2: tested with 300 ns – 3 µs RF pulses at 10 Hz repetition rate

## Common Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| power supply | | | | | | same connector as video out |
| supply voltage | U | 9 | 15 | 18 | V | DC |
| supply current | I | | 17[3] | | mA | |
| dimensions | L x W x H | approx. 95 x 90 x 23 | | | mm | including antenna, excl. connector |
| weight | m | | 145 | | g | |
| operating temperature | | +5 | | +40 | °C | |
| storage temperature | | -40 | | +70 | °C | |
| part number | | RFS-3G | | 1414.8001.1 | | |

Note 3: quiescent current

## Response (typical)

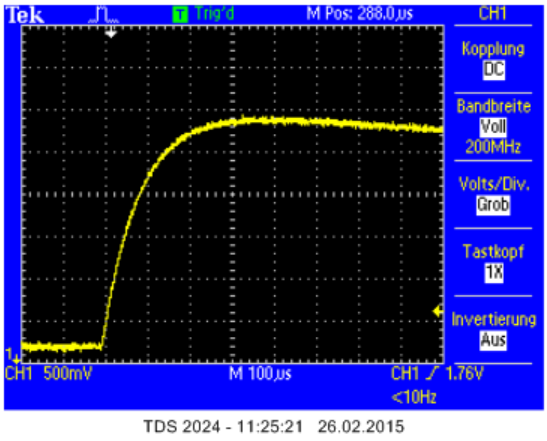



3 m distance from RF Field Sensor, radiated with λ/4 monopole vertical orientation (antenna gain <2.5 dBi). Value for pulsed signal [pulse width ≤ 5 µs] measured at peak level.

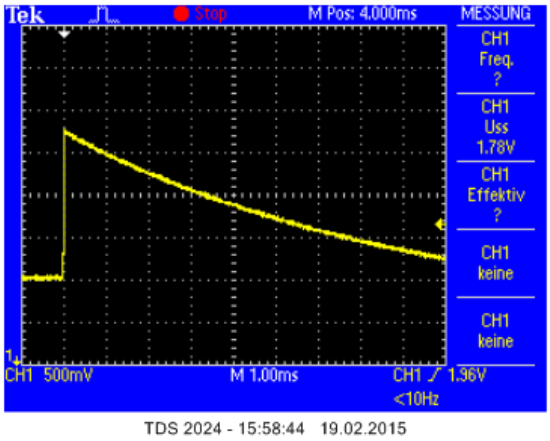
Recommended linear approximation:

| | |
|---|---|
| CW signals: | P[dBm] = -18 dBm + I_LOOP * 2.8 dBm / mA |
| pulsed signals with T < 5 µs: | P[dBm] = -20 dBm + I_LOOP * 2.6 dBm / mA |

## Response at Current Loop for Pulsed Signals (typical)



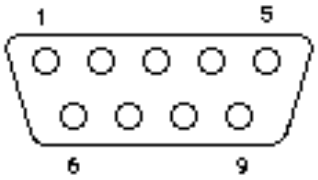

rise time for RF signal with 1µs pulse width[1]




fall time for RF signal with 1µs pulse width[1]

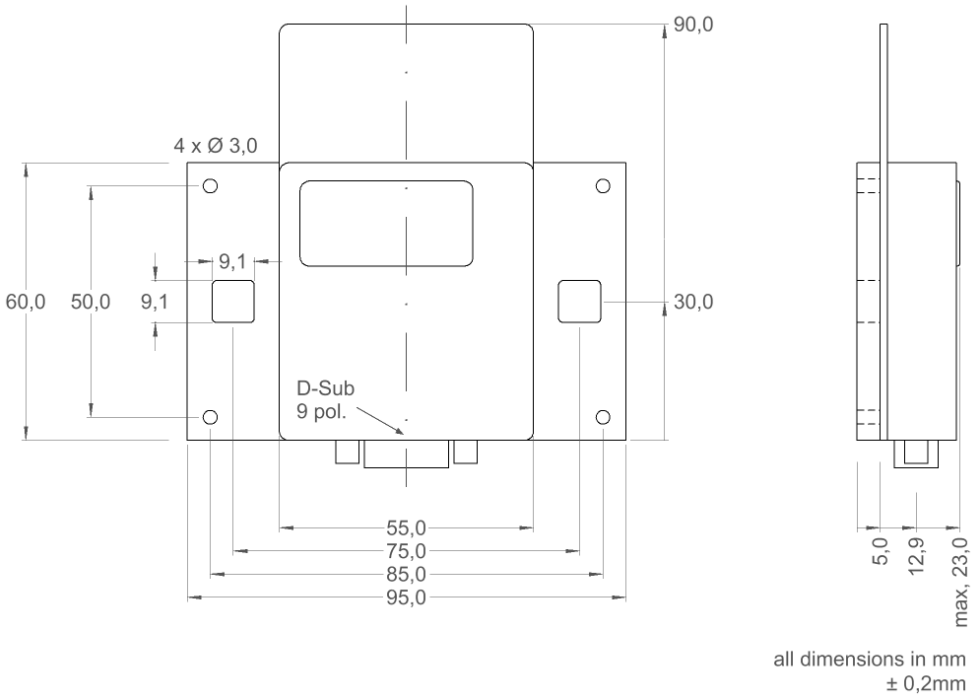
Note 1: measured at current loop output with 332 Ω resistor

## Connector




| | |
|---|---|
| 1 | +Vb |
| 2 | |
| 3 | N.C. |
| 4 | I_OUT |
| 5 | I_IN |
| 6 | GND |
| 7 | |
| 8 | |
| 9 | |

## Dimensions




all dimensions in mm
± 0,2mm

## Related Products

| Product | Description | P/N |
|---|---|---|
| RFS-1G3 | 1.3 GHz RF Field Sensor with Current Loop Interface | 1106.8001.1 |