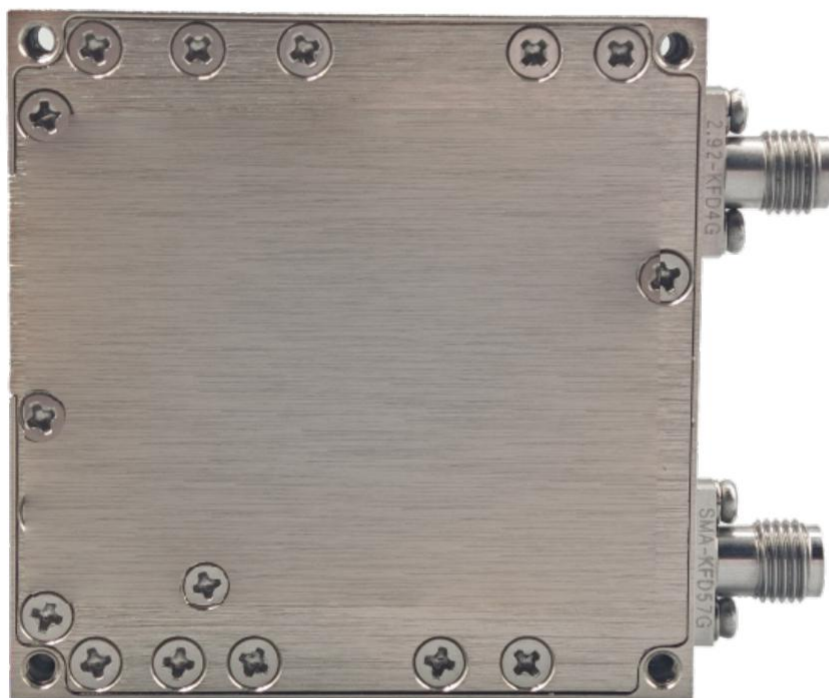


# LOW PHASE NOISE FREQUENCY SYNTHESIZER



## 50 MHz to 22.6 GHz

Low phase noise  
SPI control  
0.1 mHz frequency step  
Switching time:  $\leq 25 \mu\text{s}$   
50 × 50 × 13 mm package  
Weight:  $\leq 80 \text{ g}$

The OTFS21-22L-25 is a low phase noise frequency synthesizer with an output frequency range of 50 MHz to 22.6 GHz. Control interface: SPI. Reference frequency: 100 MHz. The frequency step is 0.1 mHz. Frequency switching time:  $\leq 25 \mu\text{s}$ . Output power:  $4 \pm 5 \text{ dBm}$ . Dimensions: 50 × 50 × 13 mm. Weight:  $\leq 80 \text{ g}$ . Operating temperature: -40 to +70 °C.

# TECHNICAL SPECIFICATIONS

## OTFS21-22L-25

| Property                        | Value                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output frequency range          | 50 MHz-22.6 GHz                                                                                                                                          |
| Frequency step                  | 0.1 mHz                                                                                                                                                  |
| Frequency switching time        | ≤25 μs                                                                                                                                                   |
| Output power                    | 4 ±5 dBm                                                                                                                                                 |
| Spurious level                  | ≤-70 dBc typical; ≤-65 dBc maximum                                                                                                                       |
| Harmonic level                  | ≤-5 dBc                                                                                                                                                  |
| Fractional-frequency components | Components at 1/2 and 3/2 of the output frequency: ≤-20 dBc (11.3-22.6 GHz)                                                                              |
| Reference frequency             | 100 MHz                                                                                                                                                  |
| Reference input power           | 10 ±2 dBm                                                                                                                                                |
| Reference phase noise           | ≤-135 dBc/Hz at 100 Hz offset; ≤-160 dBc/Hz at 1 kHz offset; ≤-170 dBc/Hz at 10 kHz offset; ≤-170 dBc/Hz at 100 kHz offset; ≤-175 dBc/Hz at 1 MHz offset |
| Supply voltage                  | +12 V ±0.5 V; maximum +15 V                                                                                                                              |
| Supply current                  | 0.65 A typical; 0.9 A maximum                                                                                                                            |
| Control interface               | SPI                                                                                                                                                      |
| Operating temperature           | -40 to +70 °C                                                                                                                                            |
| Storage temperature             | -55 to +85 °C                                                                                                                                            |
| Dimensions                      | 50 × 50 × 13 mm                                                                                                                                          |
| Weight                          | ≤80 g                                                                                                                                                    |
| Reference connector             | Removable SMA-K                                                                                                                                          |
| RF output connector             | Removable 2.92 mm female                                                                                                                                 |
| Power/control connector         | 53261-0771-7P; 1.25 mm pitch                                                                                                                             |
| Startup time                    | 10 s                                                                                                                                                     |
| Frequency stability             | Tracks the external reference                                                                                                                            |

# TECHNICAL INFORMATION

## OTFS21-22L-25 | Phase Noise (dBc/Hz)

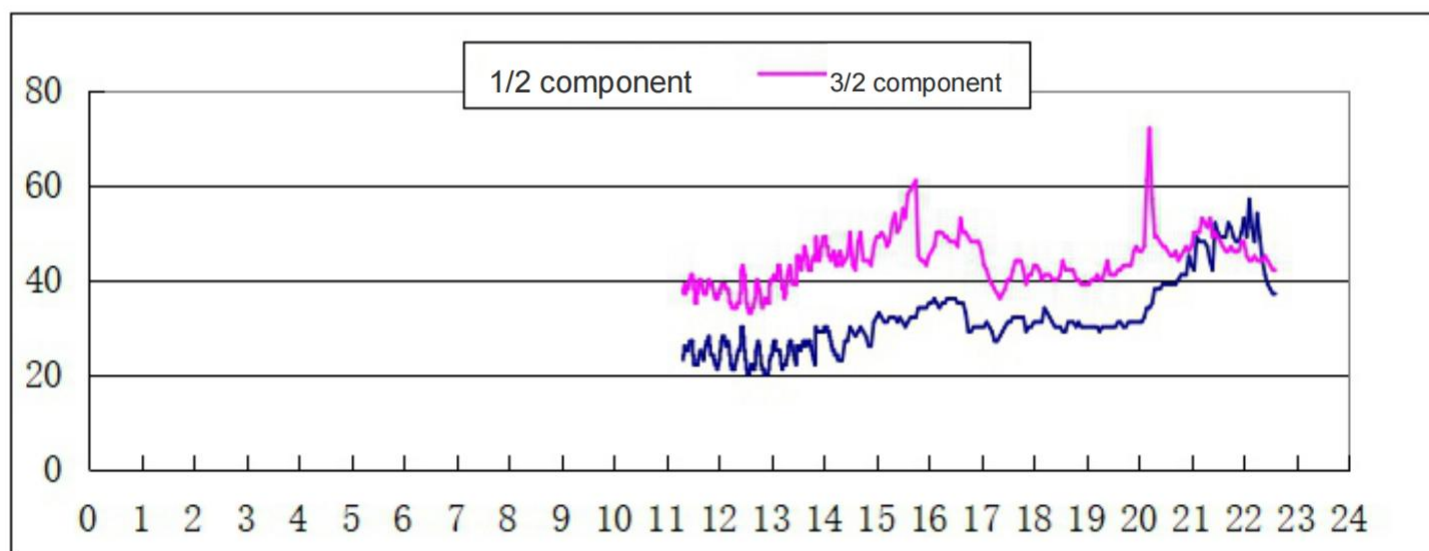
| Output Frequency | 100 Hz | 1 kHz | 10 kHz | 100 kHz | 1 MHz |
|------------------|--------|-------|--------|---------|-------|
| 1 GHz            | -112   | -132  | -143   | -143    | -143  |
| 5 GHz            | -98    | -118  | -128   | -128    | -128  |
| 10 GHz           | -92    | -112  | -123   | -123    | -123  |
| 22.6 GHz         | -85    | -105  | -116   | -116    | -116  |

Column headings specify frequency offset from the carrier. Output frequency is listed in the first column. Values and limit signs follow the source tables.

## Specification Notes

The 25  $\mu$ s switching option requires a 10 s startup period after each power-up.

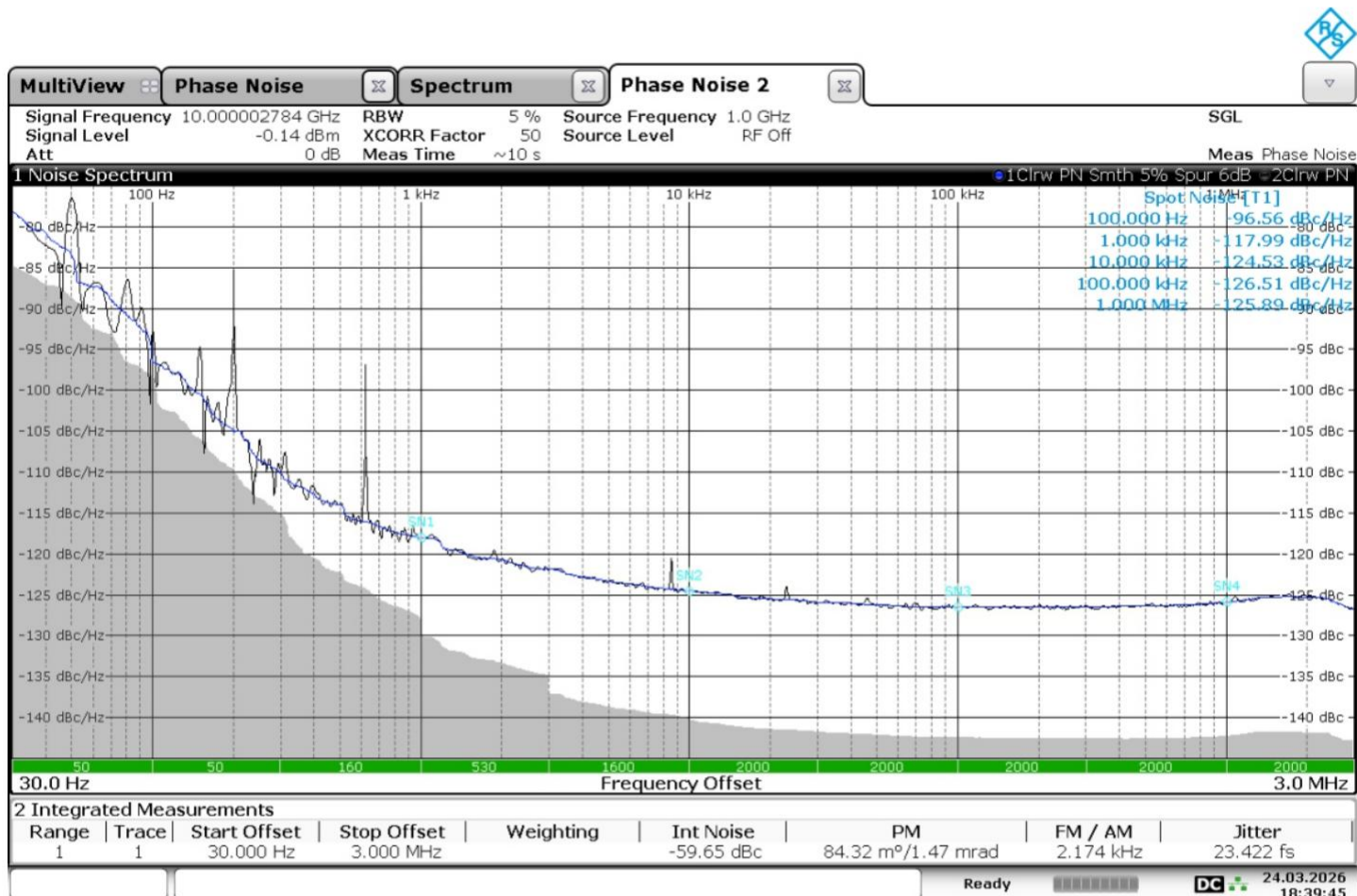
## 1/2 and 3/2 Component Suppression



Source measurement example. Curves represent the illustrated test conditions.

# TECHNICAL INFORMATION

## 10 GHz Phase Noise Measurement



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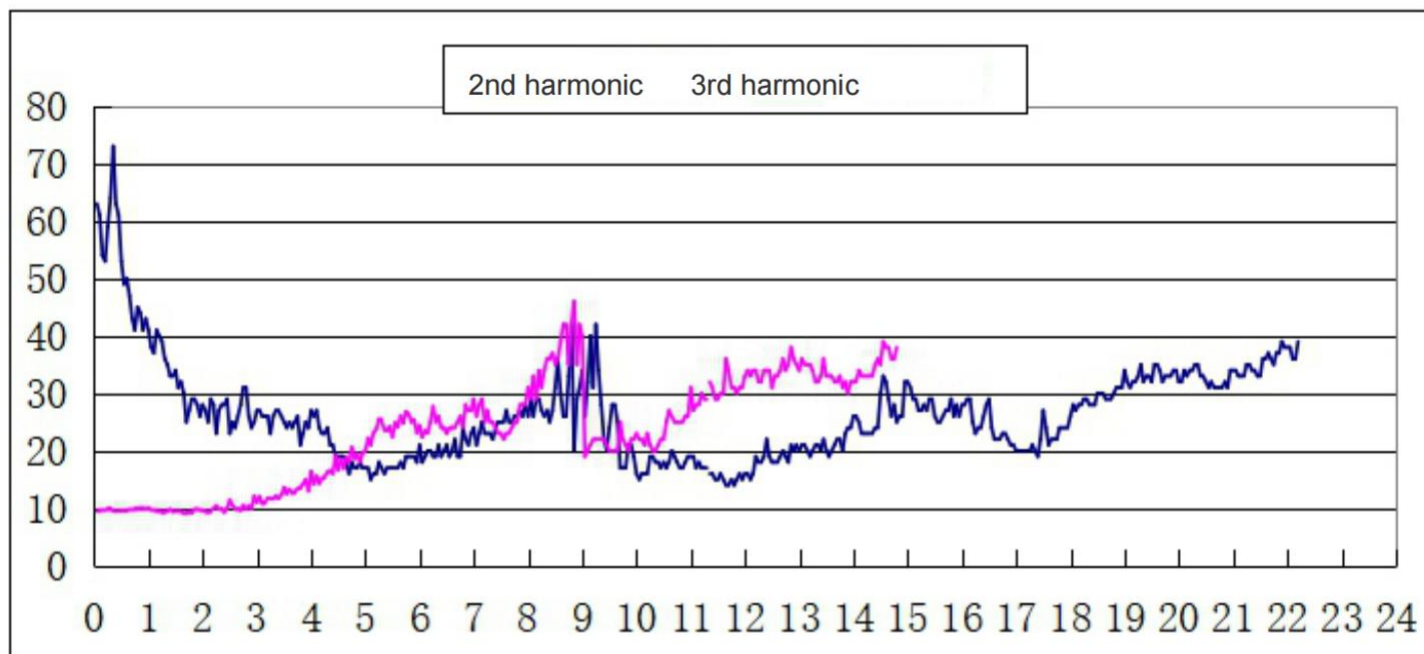
Source measurement example. Curves represent the illustrated test conditions.

## Connector Definitions

| Connector     | Definition                                            |
|---------------|-------------------------------------------------------|
| RF in         | Removable SMA-K; pin diameter 0.38 mm                 |
| RF out        | Removable 2.92 mm female; pin diameter 0.38 mm        |
| Power/control | 53261-0771-7P; 1.25 mm pitch; single-row, right-angle |

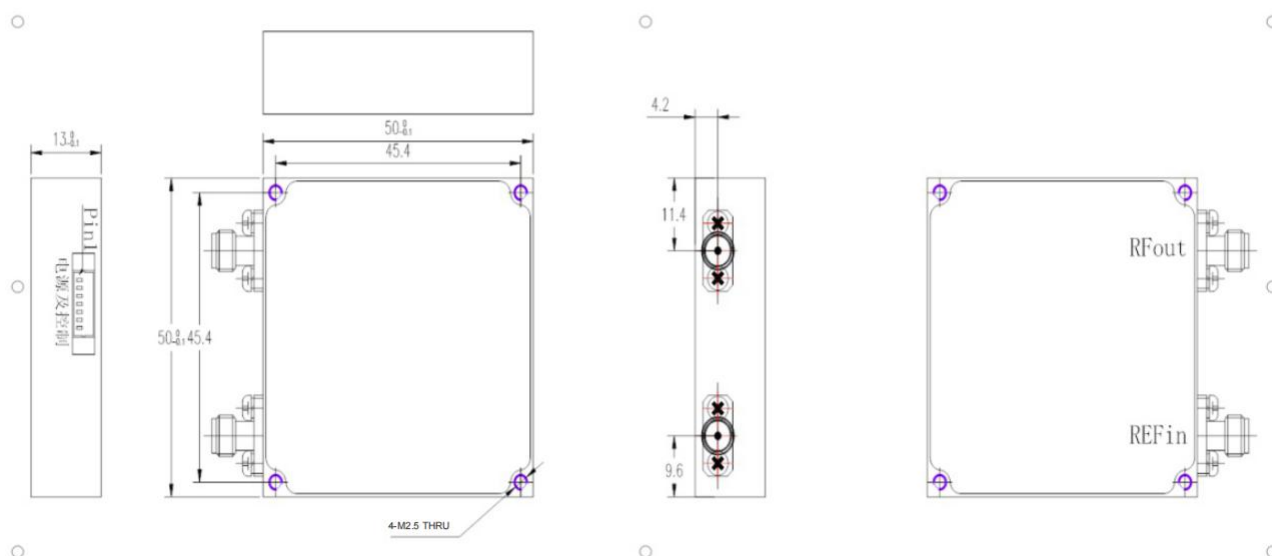
# TECHNICAL INFORMATION

## Second and Third Harmonic Suppression



Source measurement example. Curves represent the illustrated test conditions.

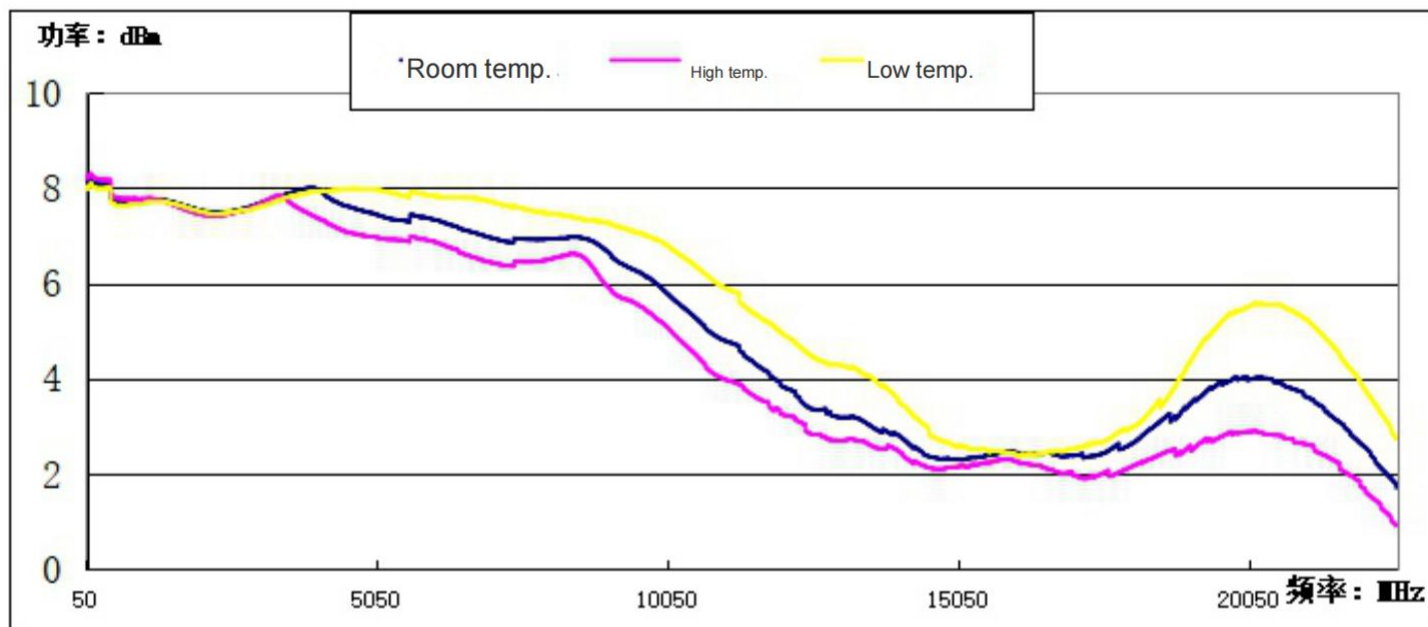
## Mounting Dimensions



Dimensions in mm.

# TECHNICAL INFORMATION

## Output Power vs. Frequency and Temperature



Source measurement example. Curves represent the illustrated test conditions.

## 53261-0771-7P Pin Assignments (1.25 mm pitch, single-row, right-angle)

| Pin | Definition           |
|-----|----------------------|
| 1   | +12 V supply         |
| 2   | GND                  |
| 3   | MOSI: SPI interface  |
| 4   | LE: SPI interface    |
| 5   | MISO: SPI interface  |
| 6   | SCK: SPI interface   |
| 7   | LD: high when locked |