

TFS10-15 - Frequency synthesizer

The TFS10-15 Frequency Synthesizer is a compact, surface-mount (SMD) RF signal generator optimized for high-frequency precision and rapid frequency agility. Operating across a broad range of 200 MHz to 15 GHz with a minimum frequency step of 10 MHz, it utilizes advanced digital phase-locked loop (PLL) technology to deliver stable and flexible frequency control.



The device achieves ultra-low phase noise (e.g., -113 dBc/Hz @1 kHz at 1 GHz) and robust spurious/harmonic suppression (≤ -65 dBc spurious, ≤ -7 dBc harmonic). Its ultra-compact design (20×16×4 mm, ≤ 5 g) ensures seamless integration into space-constrained systems, while industrial-grade temperature resilience (-40°C to +70°C) guarantees reliability in harsh environments.

Applications Include:

Wireless Communication Systems:

Local oscillators for 5G/6G transceivers, satellite modems, and microwave links.

Test & Measurement Equipment:

Signal sources for spectrum analyzers, vector network analyzers, and RF test benches.

Defense & Aerospace:

Radar systems, electronic warfare (EW), and frequency-hopping applications.

Embedded RF Solutions:

Integration into IoT devices, wireless sensors, and compact digital acquisition systems.

Consumer Electronics:

High-frequency modules for drones, automotive radar, and smart home devices.

Research & Prototyping:

Precision frequency synthesis in RF circuit

General Specifications

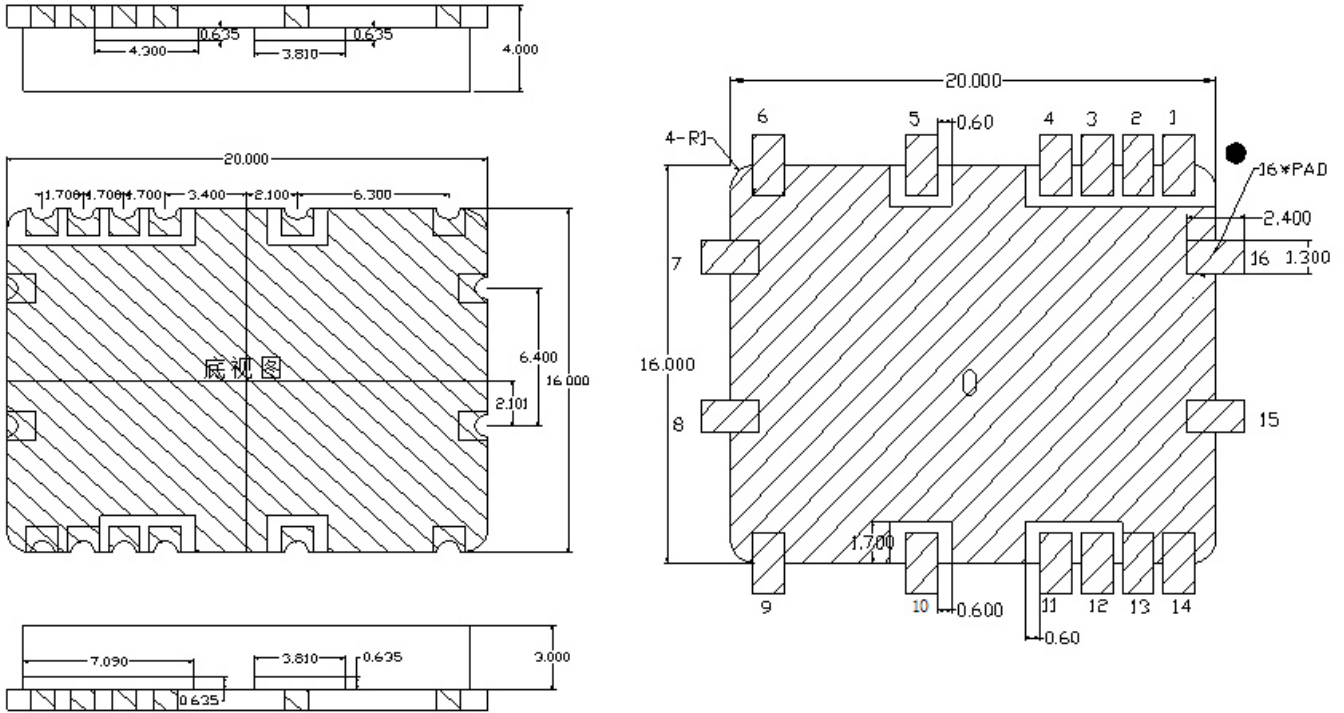
- Output frequency: 200MHz~15GHz;
- Frequency step: 10MHz;
- Small size: 20*16*4mm;
- Control mode: SPI control;

kTB Frequency synthesizer

The TFS10-15 supports SPI control for precise tuning and is ideal for applications demanding high spectral purity and rapid frequency switching.

Product Features:	Specification name	Indicator parameters				remark
External references	Enter the frequency	100MHz				
	Input power	$3 \pm 5\text{dBm}$ (0.2~14GHz) $-5 \pm 5\text{dBm}$ (14~15GHz)				
	Frequency stability	Synchronized with external references				
	Frequency accuracy	Synchronized with external reference, synchronization accuracy 0.02Hz				
	Phase noise	-153dBc/Hz@1kHz				
	Input impedance	50 Ω				
Frequency output	Output frequency	200~15000MHz				
	Output power	$3 \pm 5\text{dBc}$ (200MHz~14GHz) $-5 \pm 5\text{dBc}$ (14GHz~15GHz)				
	Frequency stepping	10MHz				
	Frequency hopping time	200us				The time interval between the receipt of the command and the frequency stabilization to the target frequency error is less than 1MHz
	Phase noise	Frequency offset	1GHz	5GHz	10GHz	15GHz
		dBc/Hz@100Hz	≤ -100	≤ -88	≤ -82	≤ -79
		dBc/Hz@1kHz	≤ -113	≤ -99	≤ -93	≤ -91
		dBc/Hz@10kHz	≤ -120	≤ -105	≤ -99	≤ -96
		dBc/Hz@100kHz	≤ -120	≤ -105	≤ -100	≤ -96
		dBc/Hz@1MHz	≤ -138	≤ -124	≤ -118	≤ -114
	Spurious	(200MHz~14GHz) $\leq -65\text{dBc}$ (14GHz~15GHz) $\leq -60\text{dBc}$				When the frequency step is less than 10MHz, the correct frequency output can still be obtained,

Dimensions:



Installation Diagram The pad is recommended in shape

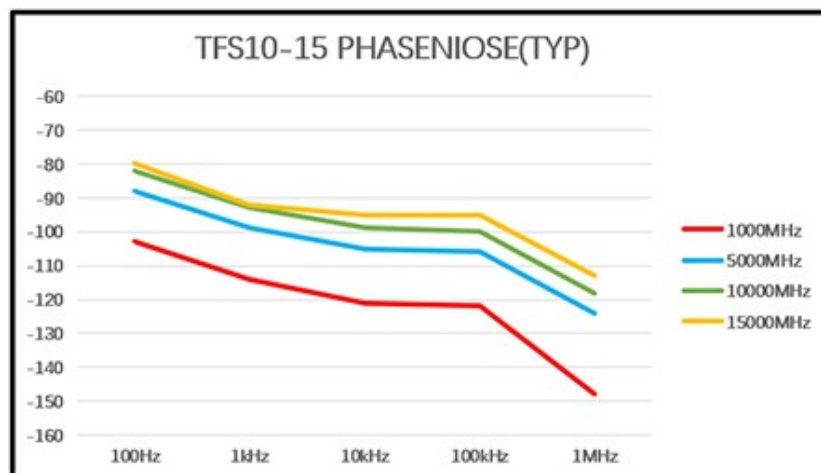
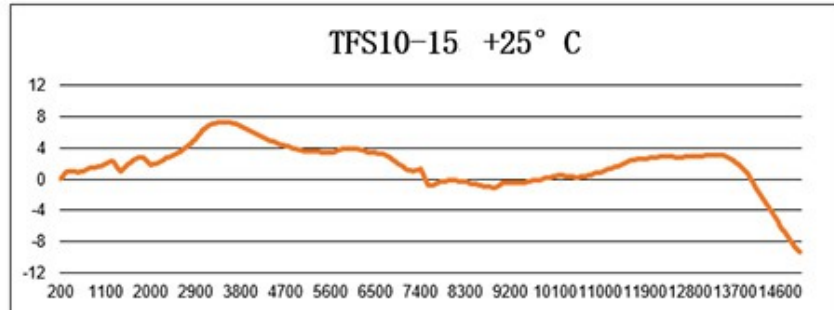
Pin Definition:

Pins	Pin name	Pin definition	Pins	Pin name	Pin definition
6, 7, 8, 9, 13, 14, 15, 16	GND	earth	4	LE	SPI communication enabled
5	RFOUT	RF output	3	DATA	SPI communication data input
11	REF IN	Reference inputs	2	SCK	SPI communication clock
12	VCC1	Digitally powered 3.3V/30mA	1	LD	Lock indication, TTLhigh lock
10	VCC2	Analog power supply 3.3V/400mA			

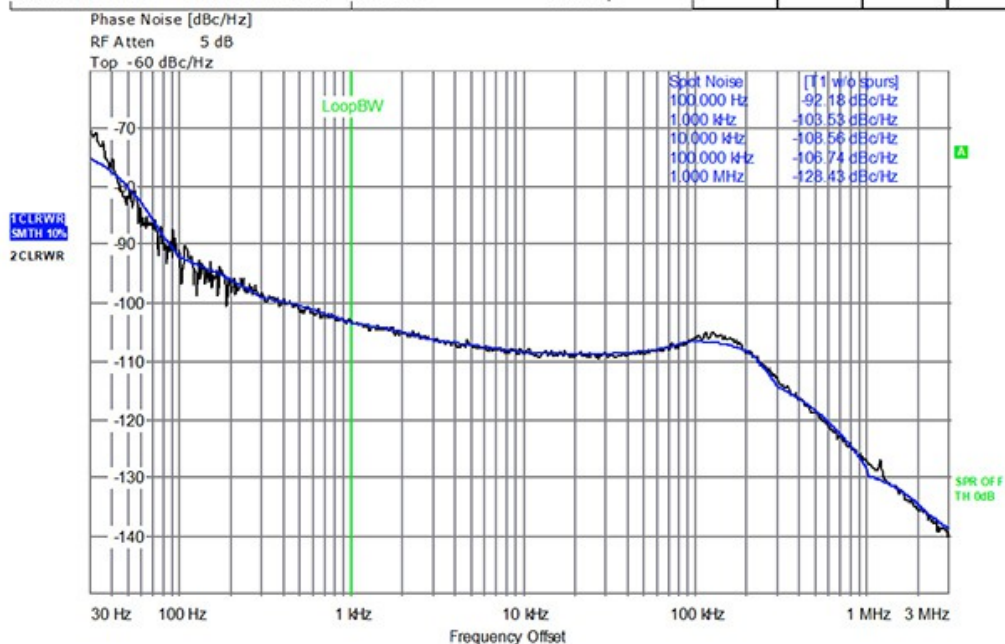
Warning: TFS10-15 is assembled with a solder paste with a melting point of 230°C, so the TFS10-15 should be assembled by hand soldering or reflow soldering, and the temperature should not exceed 220°C.

Note: 1: After powering on, you need to delay 1S before sending control commands to the frequency synthesizer to ensure that the initialization of the phase-locked loop chip and the single-chip microcomputer of the frequency synthesizer module is completed.

Typical Test Curves:



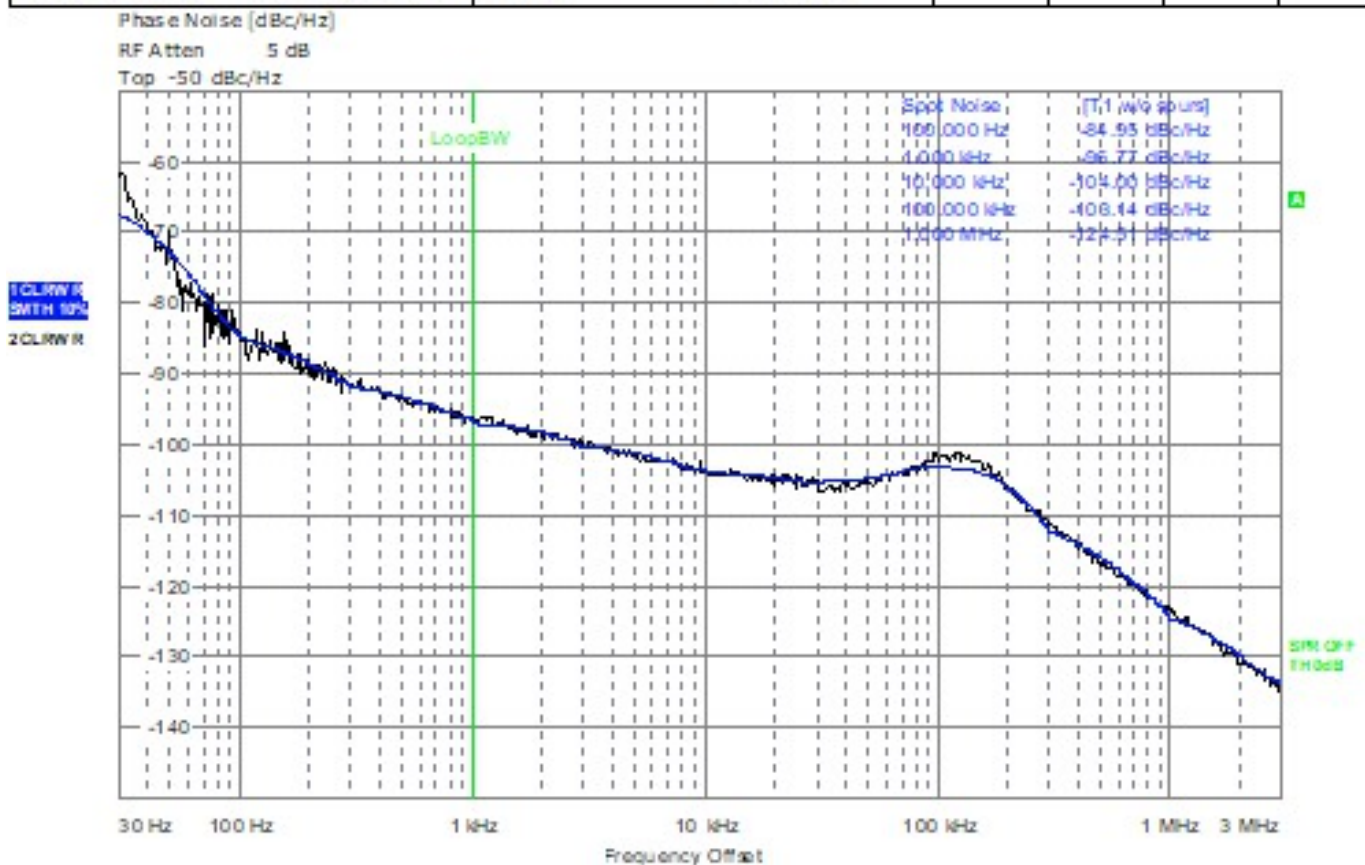
RS	R&S FSUP 26 Signal Source Analyzer			LOCKED
	Settings	Residual Noise [T1 w/o spurs]	Phase Detector +20 dB	
Signal Frequency:	5.010000 GHz	Int PHN (30.0 .. 3.0 M) -52.4 dBc		
Signal Level:	-1.09 dBm	Residual PM 0.195 °		
Cross Corr Mode	Harmonic 1	Residual FM 1.068 kHz		
Internal Ref Tuned	Internal Phase Det	RMS Jitter 0.1081 ps		



5GHz phase noise test graph

Typical Test Curves:

R&S FSUP 26 Signal Source Analyzer				LOCKED			
Settings		Residual Noise [T1 w/o spurs]		Phase Detector +0 dB			
Signal Frequency:	10.000000 GHz	Int PHN (30.0 .. 3.0 M)	-48.4 dBc				
Signal Level:	0.05 dBm	Residual PM	0.307 °				
Cross Corr Mode	Harmonic 1	Residual FM	1.636 kHz				
Internal Ref Tuned	Internal Phase Det	RMS Jitter	0.0854 ps				



List Of Options:

The product order number	
TFS10- 15P- xxxx	The frequency is a fixed frequency output, and XXXX is the output frequency in MHz
TFS10- 15- xxxx	Frequency output range: 200~15000MHz, XXXX is the default initial frequency

Deliverables:

No.	Attachments	Quantity	Remark
1	Factory inspection report	1	
2	Product Certificate	1	
3	Instruction manual for the product	1	Paper/electronic version