

Performance Features

- Operating frequency band: DC~21GHz
- Low power consumption: 30mA@N=1, 43mA@N=8
- Output Power: -2dBm
- Low phase noise: -153 dBc/Hz@100kHz
- Package size: 16-pin QFN, 3mmx3mm

Overview

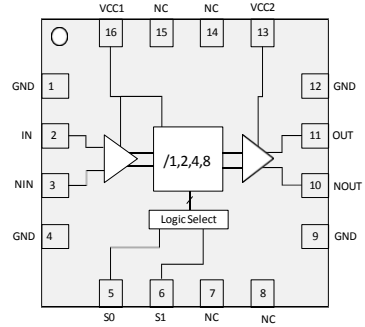
Model CWD027SP3 programmable divider covers 21 GHz input frequency. Programmable for 2Bit bit control. The output has a very low single-sideband phase noise, low power consumption, and simple logic control.

The programmable divider is available in a 16-pin 3mmx3mm surface mount leadless plastic package. The pin pads are plated with Sn.

Typical Applications

- Point-to-Point Communication
- Satellite Communications
- Test measurements
- Instrumentation

Functional Block Diagram



Electrical performance table (TA=+25°C, VCC1=VCC2=3.3V)

Parameter Name		Working conditions	Minimum value	Typical values	Maximum value	Unit
Input Parameters	Maximum RF input frequency (N=1)	Sine wave input	21			GHz
	Minimum RF input frequency (N=1)	Sine wave input			0.2*	GHz
	Maximum RF input frequency (N=2, 4, 8)	Sine wave input	21			GHz
	Minimum RF input frequency (N=2, 4, 8)	Sine wave input			0.5*	GHz
	RF input power range (N=1)	Input frequency $F_{in} \leq 21\text{GHz}$	-15		7	dBm
	RF input power range (N=2, 4, 8)	Input frequency $0.5\text{GHz} \leq F_{in} < 1\text{GHz}$	-10		7	dBm
Input frequency $1\text{GHz} \leq F_{in} \leq 21\text{GHz}$		-15		7	dBm	
Output parameters	Output power (N=1)		-6		1.2	dBm
	Output power (N=2)		-6		1.2	dBm
	Output power (N=4)		-6		1.2	dBm
	Output power (N=8)		-6		1.2	dBm
	SSB Phase Noise@100kHz Offset	$F_{in} = 6\text{GHz}, P_{in} = 0\text{dBm}, N = 2$		-153		dBc/Hz
Logic Input Level	High level		3		3.3	V
	Low Level		0		0.3	V
Current	Icc1	N = 1, S0 = L, S1 = L		12		mA
		N = 2, S0 = H, S1 = L		16		mA
		N = 4, S0 = L, S1 = H		18		mA
		N = 8, S0 = H, S1 = H		20		mA
	Icc2			18.5		mA

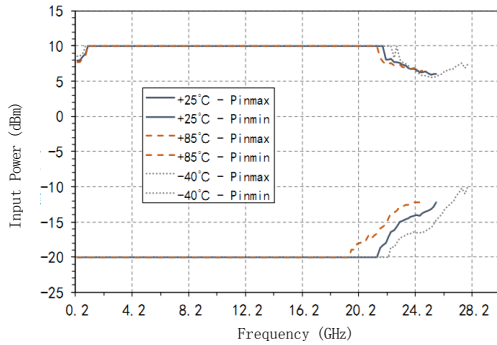
* This indicator is limited by the off-chip input and output capacitance. If the input is a square wave signal, the indicator can reach DC.

Test Curve

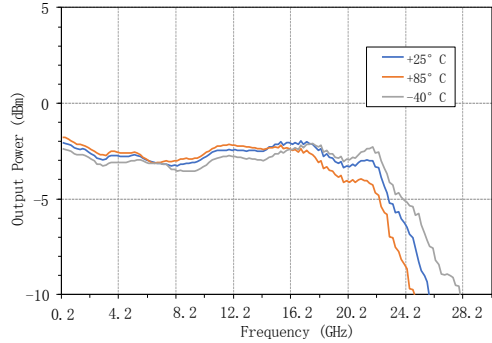
CWD

Programmable Frequency Divider Series

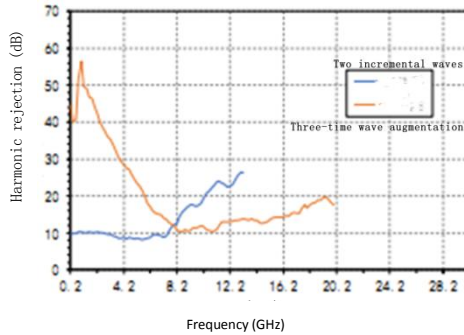
1-division RFOUT Sensitivity vs. frequency



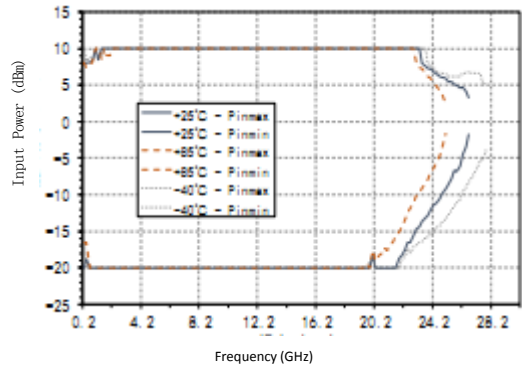
1-division RFOUT output power vs. frequency @Pin=0dBm



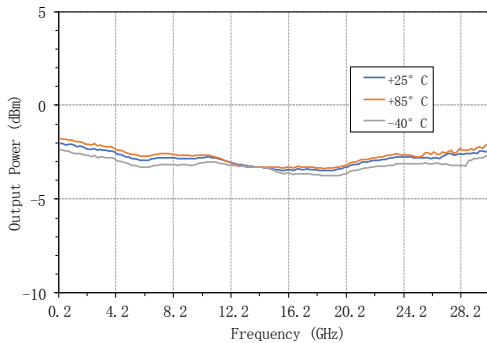
1-division harmonic suppression vs. input frequency



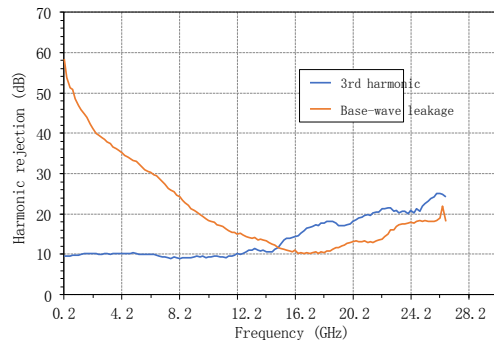
2-way RFOUT crossover sensitivity vs. frequency



2-division RFOUT output power vs. frequency @Pin=0dBm

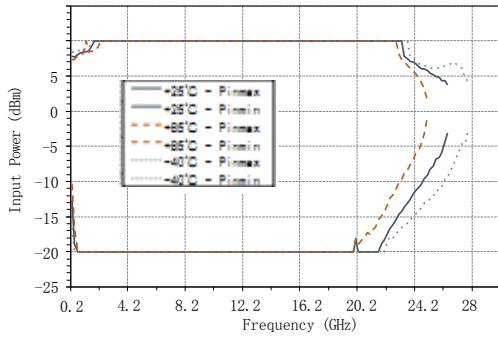


2-division harmonic suppression vs. input frequency

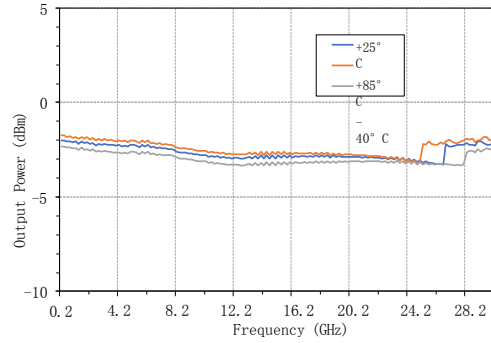


Test Curve

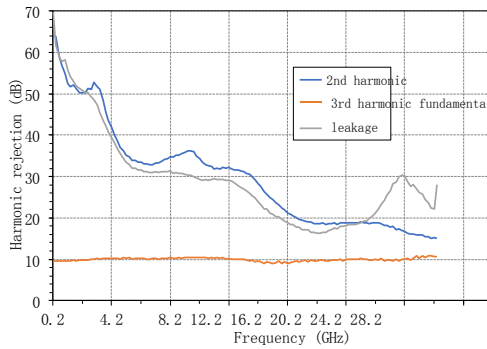
4-way RFOUT crossover sensitivity vs. frequency



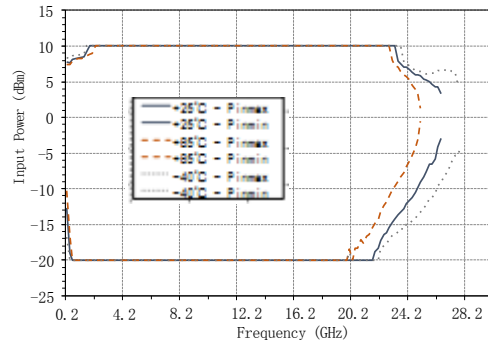
4-division RFOUT output power vs. frequency @Pin=0dBm



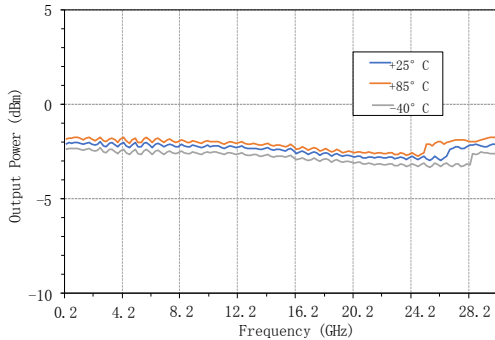
4-division harmonic suppression vs. input frequency



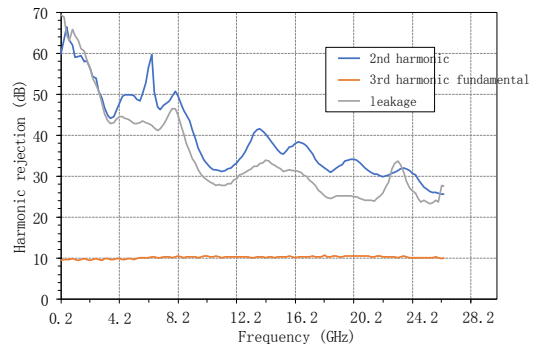
8-way RFOUT crossover sensitivity vs. frequency



8-division RFOUT output power vs. frequency @Pin=0dBm



8-division harmonic rejection vs. input frequency



Pin Definition

Pin Number	Function Symbols	Function Description	Pin Number	Function Symbols	Function Description
1	GND	RF Ground	9	GND	RF Ground
2	IN	RF input	10	NOUT	RF Output
3	NIN	RF input	11	OUT	RF Output
4	GND	RF Ground	12	GND	RF Ground
5	S0	Digital logic side	13	VCC2	DC Bias
6	S1	Digital logic side	14	NC	Vacant
7	NC	Vacant	15	NC	Vacant
8	NC	Vacant	16	VCC1	DC Bias

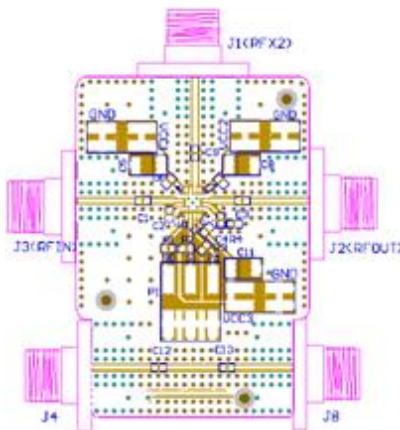
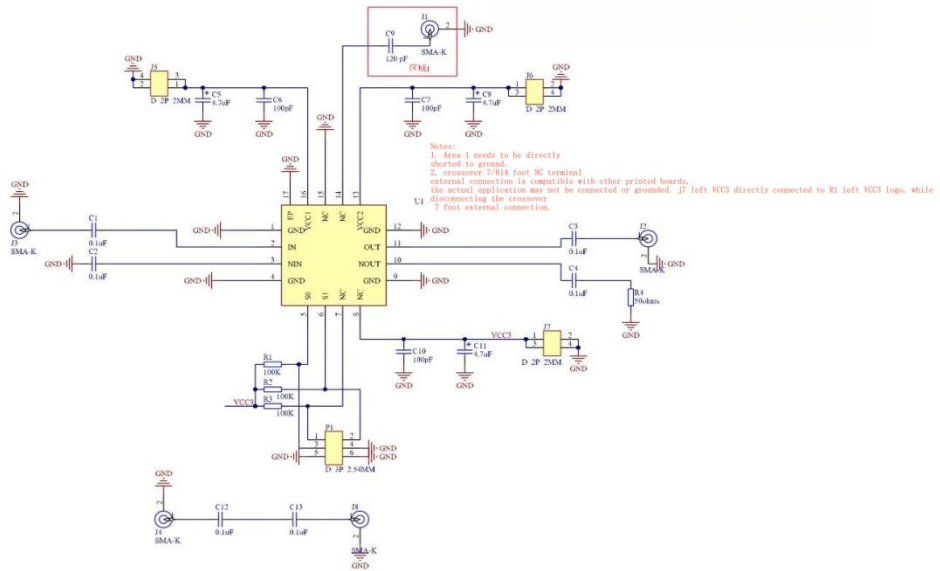
Logic control truth table

Division multiplier selection truth table			Digital logic control level	State	S0, S1
S1	S0	Divider Ratio (N)		L	0 to 0.3V
L	L	1	H	3 to 3.3V	
L	H	2			
H	L	4			
H	H	8			

Evaluation Boards

CWD

Programmable Frequency Divider Series



Designator	Description
C1, C2, C3, C4, C12, C13	Multilayer ceramic capacitor 0402 0.1uF
C5, C8, C11	Tantalum capacitor 1206 4.7uF
C6, C7, C10	Multilayer ceramic capacitor 0402 100pF
C9	Multilayer ceramic capacitor 0402 120pF
J1, J2, J3, J4, J8	2.92mm PCB connector
VCC1, VCC2, VCC3	2 mm DC pins
P1	2.54 mm DC pins
R1, R2, R3	SMD Thick Film Resistors 0402 100K
R4	RF Resistor 0402 50ohms
U1	CWD027SP3
J1, J2, J3, J4, J8 recommended to use Nanjing Aowen D360B12E01-023 type 2.92mm connector	

Circuit board material: Rogers 4350B

The circuit board of the device application should be designed in accordance with the RF circuit design method, the signal line should be designed according to 50 ohm impedance, and the ground pin of the package housing should be grounded nearby.

(similar to the figure), connecting the top floor with the ground floor should have enough grounding holes.