



## LN-532 Series Audiophile Grade Crystal Oscillator

### Features

- Extremely low Near band phase noise, designed for Audiophile, Professional audio, Studio applications.  
Phase noise:  
Typical -85dBc @ 10Hz;  
Typical -100dBc @ 100Hz;  
Typical -145dBc @ 1KHz ;  
Typical -150dBc @ 10KHz;  
Typical -160dBc @ 100KHz ;
- 8mA typical current consumption on 15pF load, 3.3V supply voltage @12.288MHz & @24.576MHz & @49.152MHz
- Select (-S) version: 100% Phase Noise Test and selected on @10Hz  $\nu = \text{í}r \% \% u \& \text{OE} \text{ } \mu \text{ } \nu$  accuracy @25°C
- Very low rms phase jitter:  
Typical 0.5pSec @12kHz - 20MHz
- Typical SMD-5032 package

### Pin Definition on SMD-5032 Package

Pin No#	Pin Definition
1	OE
2	GND
3	OUTPUT
4	VDD

\* By default, the OE is pulled up to VDD, Oscillation output ON



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Symbol	Description	Conditions	Min	Typical	Max	Unit
Vdd	Supply Voltage (3.3V)	LN-532 parts	3.0	3.3	3.6	V
Iosc	Supply Current (3.3V)	3.3V, 15pF Load, 12.288MHz		8	10	mA
		3.3V, 15pF Load, 24.576MHz		8	10	mA
		3.3V, 15pF Load, 49.152MHz		8	10	mA
	Output Wave Form	CMOS				
	Output Level "0"				10%Vd d	
	Output Level "1"		90%Vd d			
	Rise/Fall time	@20%-80Vdd			5	ns
	Startup time				5	ms
	Operating Temperature		-40		85	°C
	Storage Temperature Range		-55		125	°C
CL	Load				15	pF
	Clock Duty Cycle		45	50	55	%
	Oscillation output ON	OE=Level H (0.7 Vdd ≤ VIH ≤ VDD) or OPEN is selected.				
	High impedance	OE=Level L (VIL ≤ 0.3 Vdd) is selected				
	Nominal Frequency			12.288		MHz
	Frequency Stability	at 25°C ±2°C	-10		10	ppm
	Temperature Drift	at -40~85 °C	-30		30	ppm
	Phase Noise	at 10Hz offset		-85		dBc/ Hz
		at 100Hz offset		-100		
		at 1KHz offset		-145		
		at 10KHz offset		-150		
		at 100KHz offset		-160		
	RMS Phase Jitter	12KHz-20MHz		0.5		pSec
	Aging	1st. Year at 25°C	-3		3	ppm



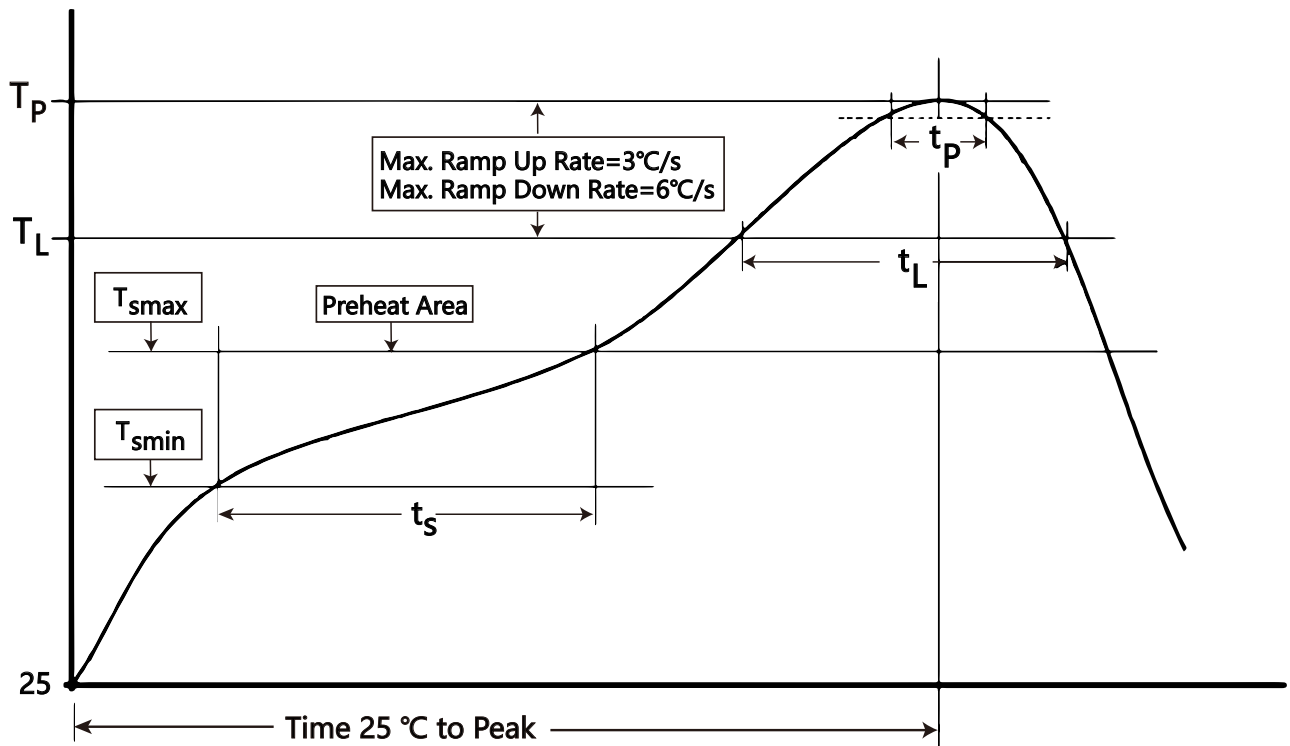
## RELIABILITY

NO.	ITEM	CONDITIONS	BASIS OF VERDICT
1	Drop	100cm;Thickness:3cm;3 times.	$\Delta FL \leq \pm 5 \text{ppm}$
2	Vibration	Frequency:10~500Hz: speed : 11min/cycle Amplitude:1.5mm (10~55Hz) acceleration rate:200m/s <sup>2</sup> (55~500Hz) Direction:X,Y, Z Test cycle : 10cycles	$\Delta FL \leq \pm 5 \text{ppm}$
3	Low Temperature Storage	Temp:-40°C±2°C;Times:96h	$\Delta FL \leq \pm 5 \text{ppm}$
4	High Temperature Storage	Temp:125°C±2°C;Times:96h	$\Delta FL \leq \pm 5 \text{ppm}$
5	High Temp&Homidity	Temp:80°C±2°C;Humidity:85%±5%;Times:1000h	$\Delta FL \leq \pm 5 \text{ppm}$
6	Thermal Shock	-40°C±2°C (30min) ←→85°C±2°C (30min) ;For 100 cycles	$\Delta FL \leq \pm 5 \text{ppm}$
7	Reflow	Keep 150 °C ± 5 °C 120s and then rose to 265 °C ± 5 °C for 10s, warming and holding time is less than the 200s, placed at room temperature 1 ~ 2h after test	$\Delta FL \leq \pm 5 \text{ppm}$
8	Salt Spray	Salt density:5%;Temp:35°C;Times:24h	Visual no significant corrosion.
9	Aging	Temp:85°C;Times:30days	$\Delta FL \leq \pm 5 \text{ppm}$
10	Leakage Test	Measured by the helium leak detector.	<1.0x10 <sup>-9</sup> Pa m <sup>3</sup> /s.
11	Soldering Test	Dipping in solder bath at 245deg.C ±5deg.C for 3±0.5 sec.	Soldering tin rate greater than 95%



## REFLOW PROFILES

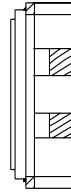
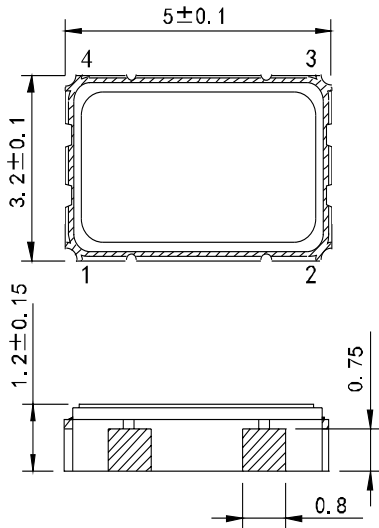
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak		
● Temperature Min ( $T_s$ min)	100 °C	150 °C
● Temperature Max ( $T_s$ max)	150 °C	200 °C
● Time ( $T_s$ min to $T_s$ max)	60-120 seconds	60-120 seconds
Ramp-up rate ( $T_L$ to $T_p$ )	3 °C/second max.	3 °C/second max.
Time maintained above		
● Liquidous temperature ( $T_L$ )	183 °C	217 °C
● Time ( $t_L$ ) maintained above $T_L$	60-150 seconds	60-150 seconds
Peak package body temperature ( $T_p$ )	235 °C	260 °C
Time within 5 °C of the specified classification temperature ( $T_p$ )	20 seconds	30 seconds
Ramp-down rate ( $T_p$ to $T_L$ )	6 °C/second max.	6 °C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.
<b>Suggest reflow times</b>	<b>3 Times max.</b>	





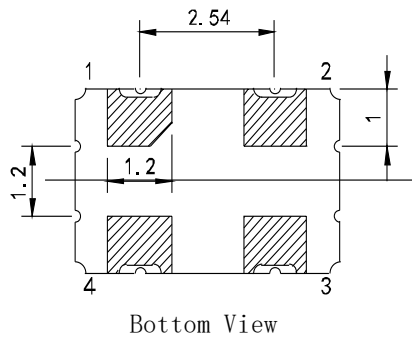
## 5032 Package Dimension(mm)

Units: mm

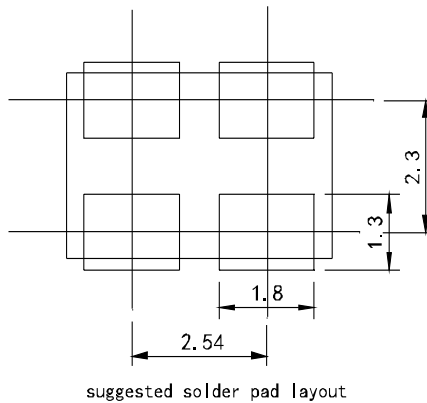


Pad Functions:

1. ENABLE CONTROL
2. GND
3. OUT PUT
4. VDD

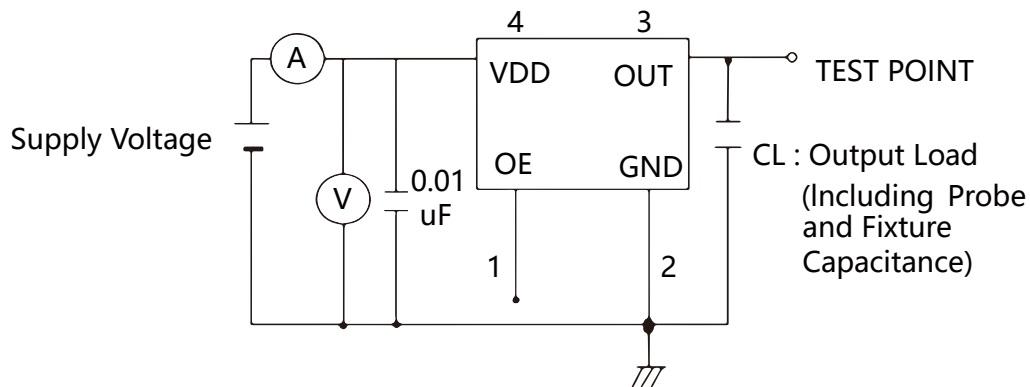


Bottom View



suggested solder pad layout

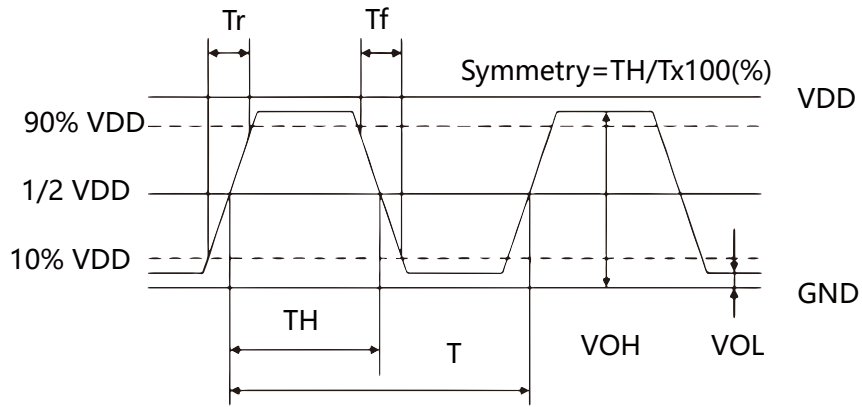
## TESTING CIRCUIT



※ Notes: PIN 1 connected to Vdd or floating, the product is working properly;connected to GND,stops working.

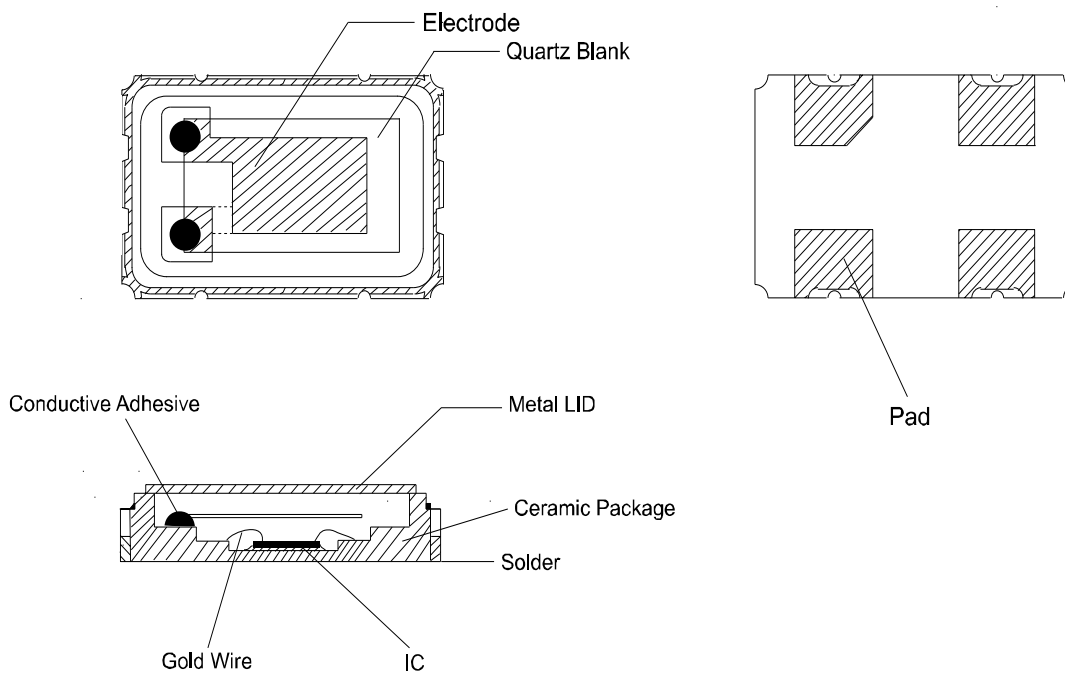


## WAVEFORM CONDITIONS



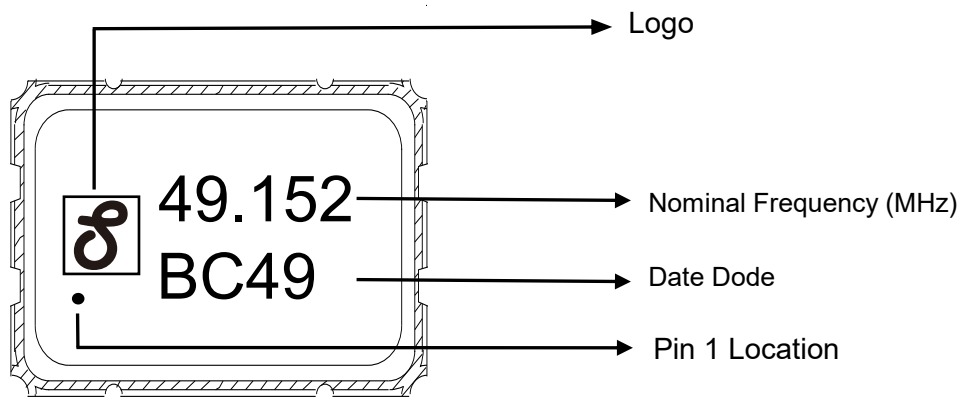
Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.

## Mechanical



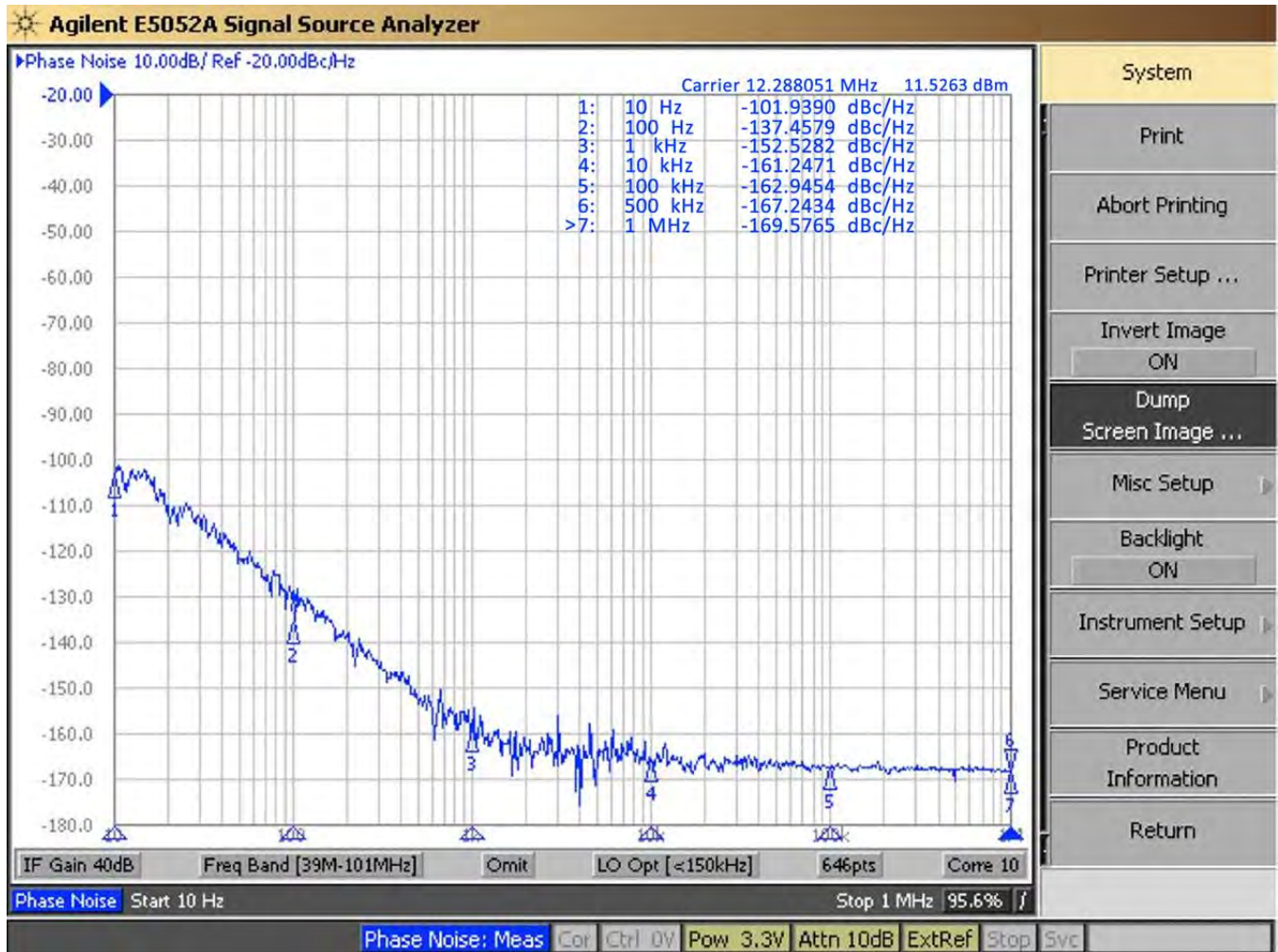


## Marking





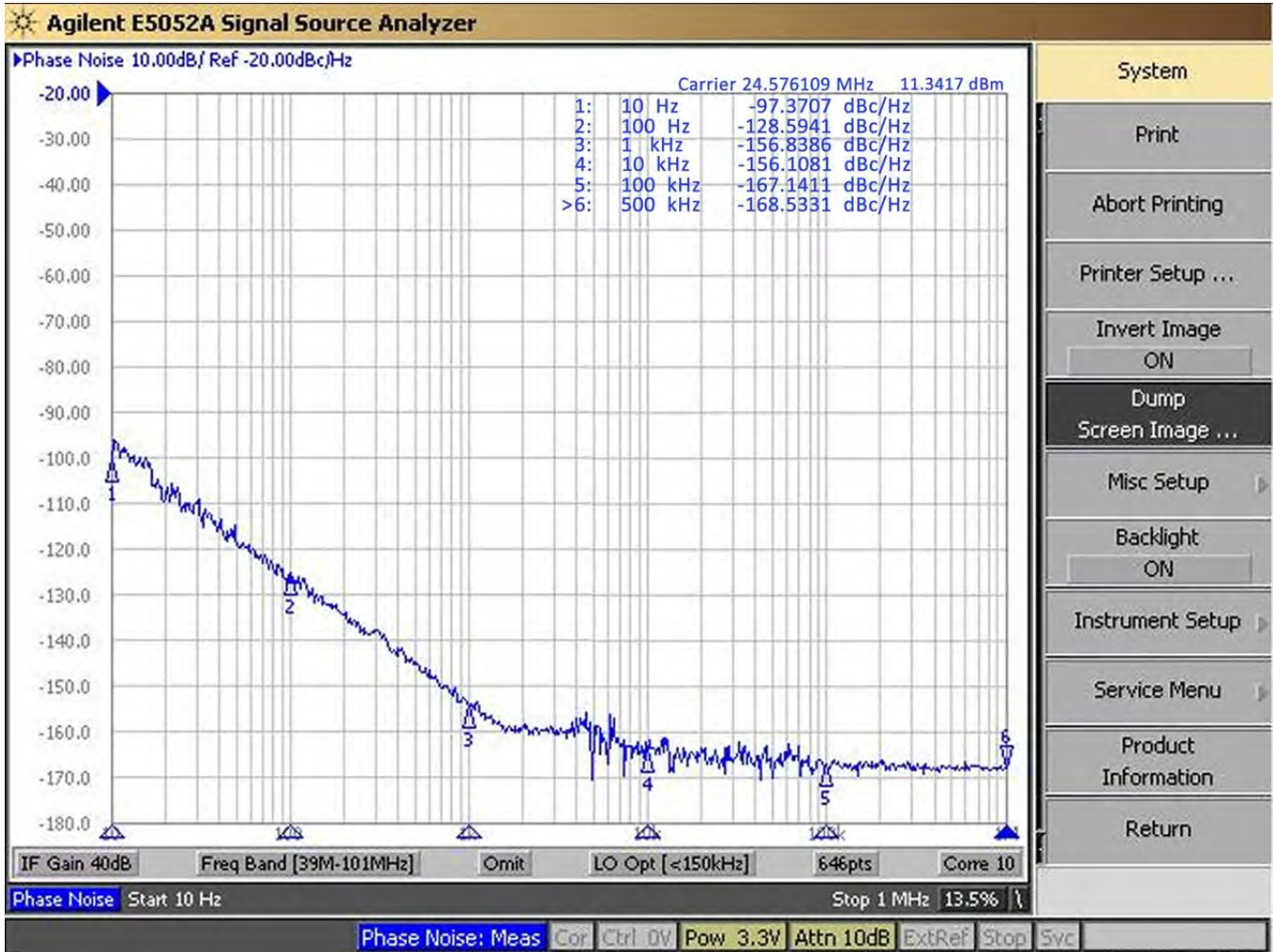
## Tested on 12.288MHz





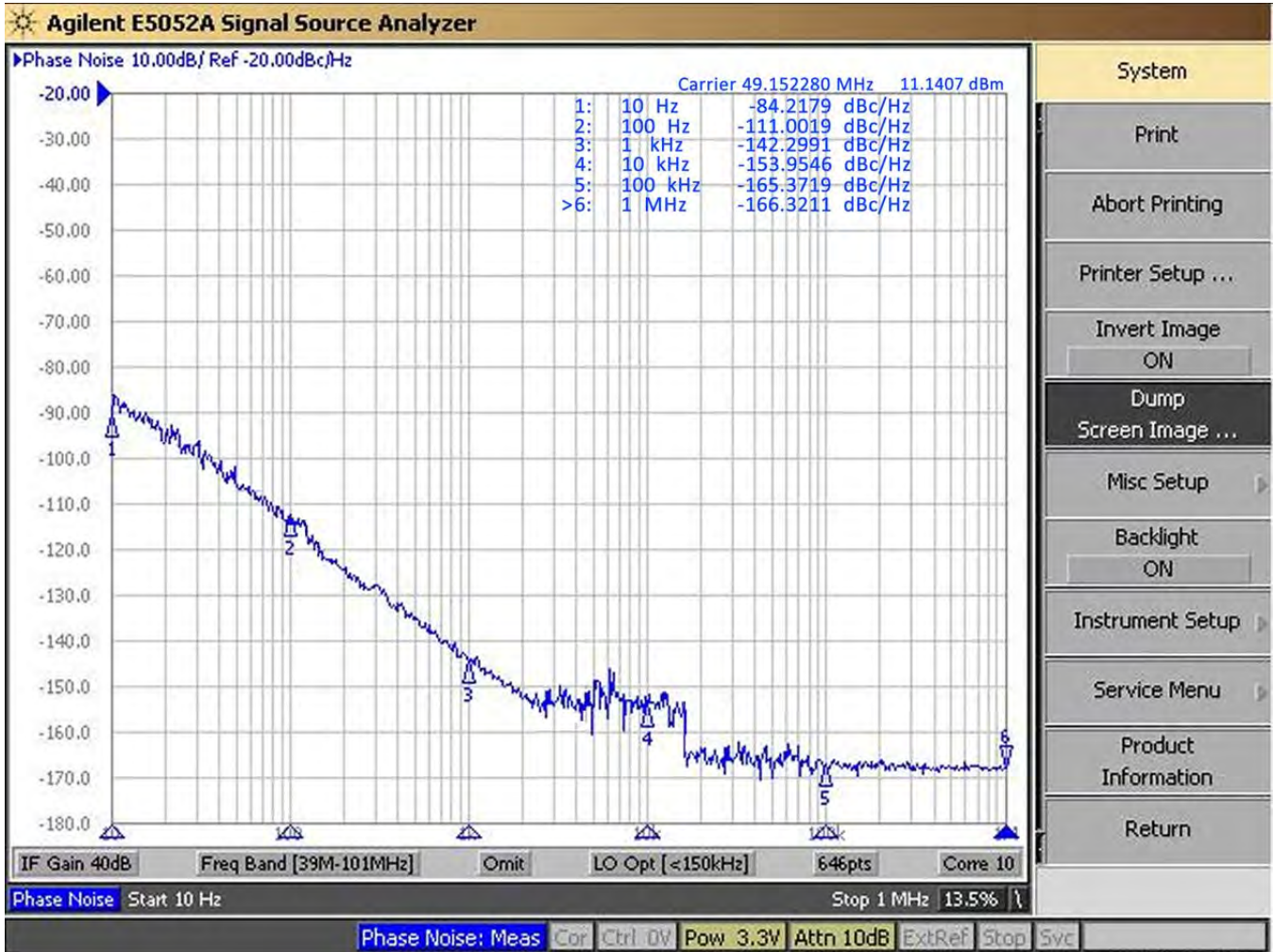


## Tested on 24.576MHz





## Tested on 49.152MHz





## List of available part numbers

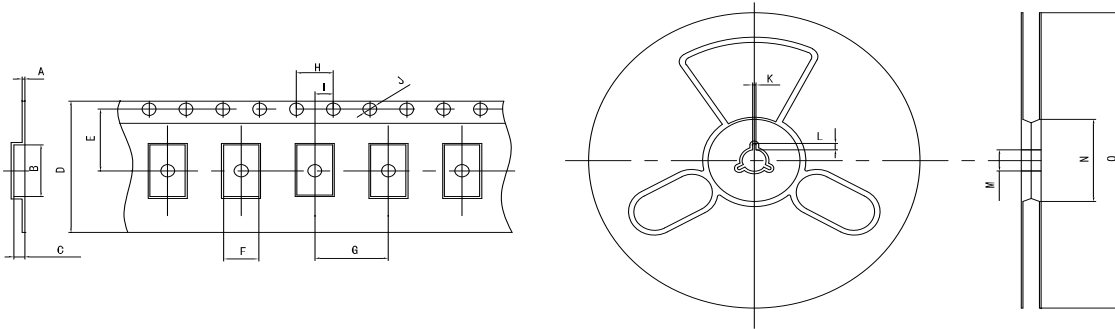
Part No#	Frequency	Supply Voltage	Package
LN-532-112896-1	11.2896 MHz	3.3V	5032
LN-532-120000-1	12MHz	3.3V	5032
LN-532-122880-1	12.288 MHz	3.3V	5032
LN-532-225792-1	22.5792MHz	3.3V	5032
LN-532-240000-1	24MHz	3.3V	5032
LN-532-245760-1	24.576MHz	3.3V	5032
LN-532-270000-1	27MHz	3.3V	5032
LN-532-451584-1	45.1584MHz	3.3V	5032
LN-532-491520-1	49.152MHz	3.3V	5032
LN-532-500000-1	50MHz	3.3V	5032

\*Select (-S) version: 100% Phase Noise Test Passed on Typical Phase Noise @10Hz and +/- 1 ppm  
Frequency accuracy @25°C



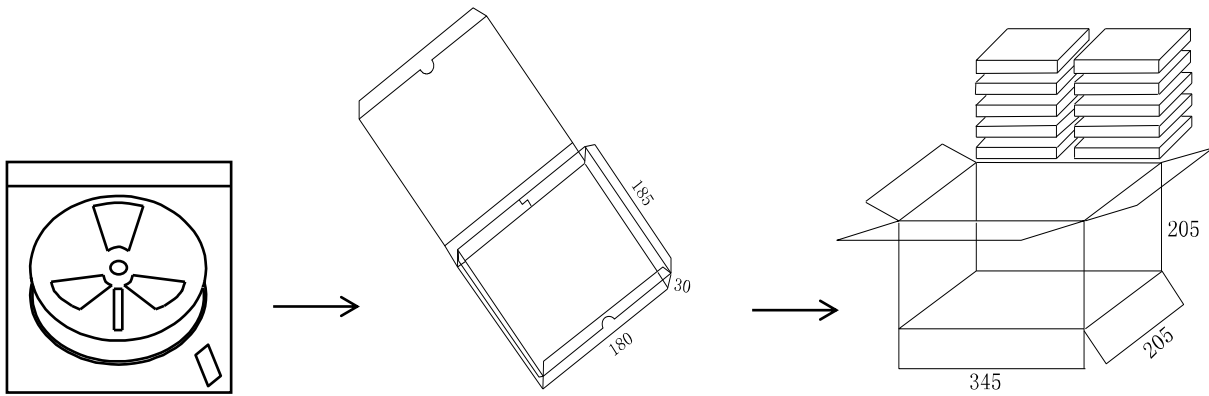
## Taping Specifications

UNIT: mm



TEYE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5×3.2 SMD	0.30	7.50	1.50	12.00	5.50	3.70	8.00	4.00	2.00	1.50	2.00	4.00	13.00	60.00	180.00

## Packaging specifications



Bag

1000pcs = 1 Reel

Inside package

1 Reel=1 box

Outside Package

10 box=1 carton