

Specification	AXLE145HF	Rev.: 5	Date: 2021-07-14
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Oscillator type: High Frequency SMD (VC)TCXO in 9x14 mm Package
High Stability, Ultra-Low Jitter and Low-G Sensitivity

Parameter	min.	typ.	max.	Unit	Condition
Frequency range (Note 2)	60		150	MHz	By multiplication
Nominal frequencies	100.000 / 125.000			MHz	
Frequency stability					
Initial tolerance @ +25°C			±0.5	ppm	@ V _C = V _C typ.
vs. operating temperature range	±0.5 to ±5 See tables 2 & 3			ppm	Option 6 & 7
vs. supply voltage variation			±0.05	ppm	V _S ±5 %
vs. load change			±0.05	ppm	Load ±10 %
Long term (aging) 1 st year			±1	ppm	@ +40°C
Long term (aging) 10 years			±4	ppm	@ +40°C
Frequency adjustment range					
Electronic Frequency Control (EFC)	±5			ppm	Option 2 = "V"
EFC voltage V _C	0.5	1.5	2.5	V	Option 3 = "33"
	0.5	2.5	4.5	V	Option 3 = "50"
EFC slope (Δf / ΔV _C)	Positive				
EFC input impedance	100			kΩ	
RF output					
Signal waveform	Sine Wave (LV)HCMOS				Option 4 = "S" Option 4 = "H"
Load	50 Ω 15 pF				Option 4 = "S" Option 4 = "H"
Output level	+3	+6		dBm	Option 4 = "S"
Harmonics		-40	-30	dBc	
Duty cycle	45		55	%	Option 4 = "H"
Rise/fall time			5	ns	
Sub-Harmonics		-70	-40	dBc	Option 1 = "LN" Option 1 = "ULN"
			-60	dBc	
Spurious			-80	dBc	
Phase noise & RMS Jitter (Note 3)					
Phase noise floor ≥100 kHz @ 100 MHz		-140 -180	-135 -170	dBc/Hz dBc/Hz	Option 1 = "LN" Option 1 = "ULN"
RMS Phase Jitter 12 kHz ~ 20 MHz @ 100 MHz		700 10		fs fs	Option 1 = "LN" Option 1 = "ULN"
G-Sensitivity	See table 1				Option 5
Supply voltage V _S	3.15 4.75	3.3 5.0	3.45 5.25	V V	Option 3 = "33" Option 3 = "50" (Note 4)
Current consumption			50	mA	Option 3 = "33" & "50"
Enclosure (see drawing) (LxWxH)	14.4x9.5x6.5 max.			mm	IEC 61837 CO 27
Weight			5	g	
Packing	Tape & Reel				IEC 60286-3

Notes:

1. Terminology and test conditions are according to IEC60679-1 and MIL-PRF-55310, unless otherwise stated
2. Frequencies up to 200 MHz with sine wave output on request
3. For phase noise & jitter of other frequencies please consult factory – See figure 1 & 2 for typical performance
4. 5V supply is not recommended for new designs and only available on request

Absolute Maximum Ratings

Parameter	min.	max.	Unit	Condition
Supply Voltage V_s	-0.5	$V_s + 10\%$	V	V_s to GND
Control Voltage V_c	-0.5	6	V	V_c to GND
Storage Temperature	-55	+105	°C	

G-Sensitivity

Option 5	G-Sensitivity worst axis	Unit
N	Not required	-
A	0.8	ppb/g
B	0.5	ppb/g
C	0.4	ppb/g
D	0.3	ppb/g
E	0.2	ppb/g

Table 1

Note: Options "C~E" are only available with phase noise option "LN". Consult factory.

Frequency stability vs. temperature

Option 6	Stability [ppm]
05	±0.5
10	±1.0
15	±1.5
20	±2.0
25	±2.5
30	±3.0
35	±3.5
50	±5.0

Table 2

Lower Temperature		Upper Temperature	
Option 7	T [°C]	Option 7	T [°C]
0	0	A	+50
1	-10	B	+60
2	-20	C	+70
3	-30	D	+75
4	-40	E	+80
		F	+85

Table 3

Ordering Code

Model	Option 1 [Phase noise]	Option 2 [EFC]	Option 3 [Supply voltage]	Option 4 [RF output]	Option 5 [G-Sensitivity]
AXLE145HF	"LN" or "ULN"	_ or "V"	33 or 50	"S" or "H"	Table 1

Option 6 [Stability]	Option 7 [Temperature range]	Revision	Frequency [MHz]
Table 2	Table 3	Rev.5	100.000

Example: AXLE145HF-ULN-V-33-S-B-10-4F_Rev.5 – 100.000 MHz

Note: Not all combinations of options may be possible. Consult factory.

Typical phase noise @ 100 MHz

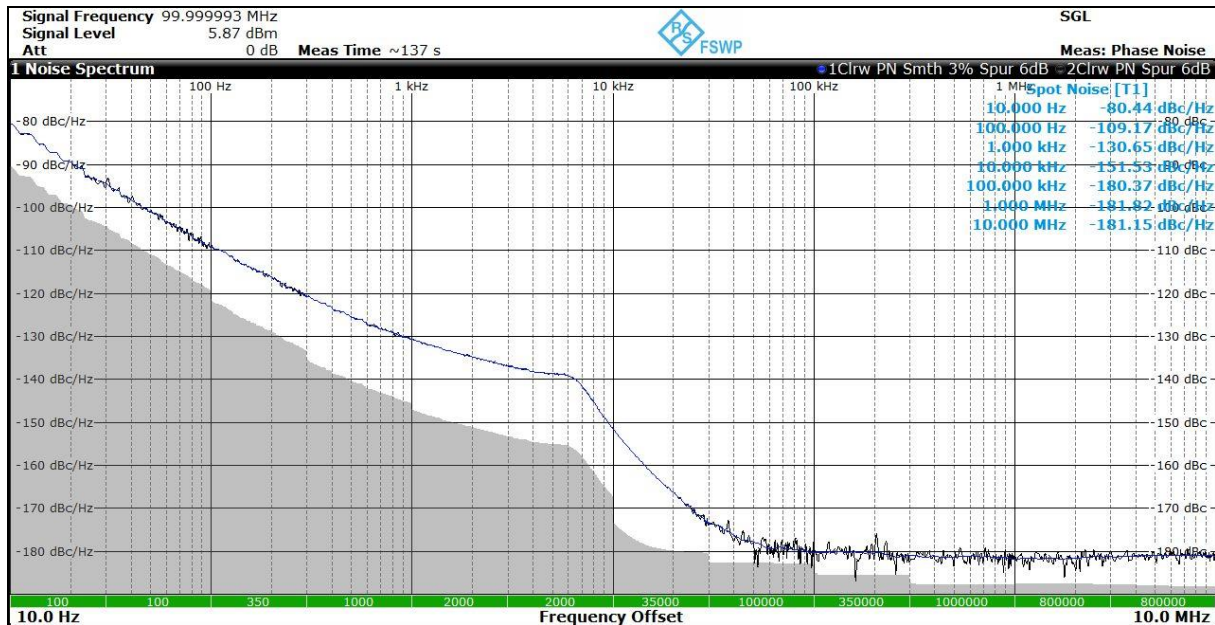
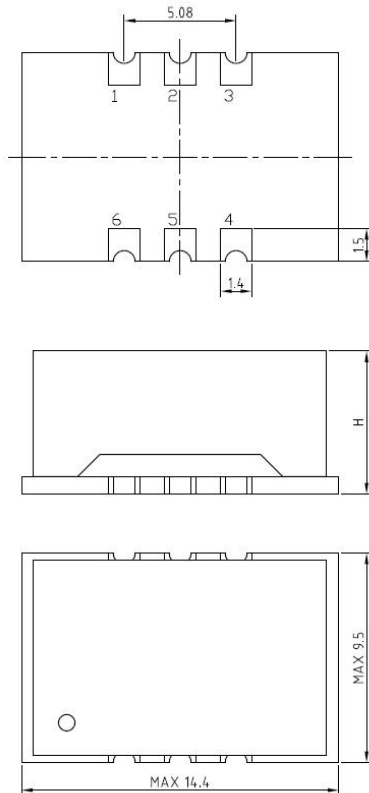


Figure 1 – “ULN” option



Figure 2 – “LN” option

Enclosure drawing



Pin connections

Pin #	Symbol	Function
1	V _c	Control Voltage (EFC)
2	D.N.C.	Do Not Connect
3	GND	Ground
4	RF OUT	RF Output
5	D.N.C.	Do Not Connect
6	V _s	Supply Voltage

Handling and Testing

Parameter	Procedure		Source
Handling and Testing	Application Note AXAN-011		www.axtal.com
Processing	Application Note AXAN-012		www.axtal.com
Parameter	Procedure		Condition
Electrostatic discharge (ESD)			
THD devices	IEC60749-26	HBM	2000 V
SMD devices	IEC60749-27	MM	200 V
Washable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
RoHS compliant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Environmental conditions

Test	IEC 60068 Part ...	IEC 60679-1 Clause	MIL-STD- 202G Method	MIL-STD- 810F Method	MIL-PRF- 55310D Clause	Test conditions (IEC)
Sealing tests (if applicable)	2-17	5.6.2	112E		3.6.1.2	Gross leak: Test Qc, Fine leak: Test Qk
Solderability Resistance to soldering heat	2-20 2-58	5.6.3	208H 210F		3.6.52 3.6.48	Test Ta Method 1 Test Td ₁ Method 2 Test Td ₂ Method 2
Shock	2-27	5.6.8	213B	516.4	3.6.40	Test Ea, 3 x per axes 100g, 6 ms half-sine pulse
Vibration, sinusoidal	2-6	5.6.7.1	201A 204D	516.4-4	3.6.38.1 3.6.38.2	Test Fc, 30 min per axes, 10 Hz - 55 Hz 0,75mm; 55 Hz - 2 kHz, 10g
Vibration, random	2-64	5.6.7.3	214A	514.5	3.6.38.3 3.6.38.4	Test Fdb
Endurance tests - ageing - extended aging		5.7.1 5.7.2	108A		4.8.35	30 days @ 85°C, OCOXO @25°C 1000h, 2000h, 8000h @85°C

Other environmental conditions on request

Data sheet is for information purposes only and may be subject to modifications or may be discontinued without notice.

Revision History

Rev.	Drawing	Date [dd.mm.yyyy]	Remarks	Author	Checked
1	D0	07.11.2018	First issue	HH	HH
2	D0	05.03.2019	Options for supply voltage and stability over temperature range added	BN	BN
3	D0	24.04.2019	Current consumption corrected, typical values updated, package drawing updated	HH	HH
4	D0	09.01.2020	Phase noise options added, editorial changes	HH	HH
5	D0	14.07.2021	Phase noise performance updated, additional notes added	HH	KS