STP3558 LF / ROX2522S3 Series @ 10MHz 3.3V No EFC



1.0 Specification References

Parameter	*Description*
a. Rakon part number	***STP3558 LF***
b. Description	*ROX2522S3 @ 10MHz OCXO HCMOS 3.3V No EFC*
c. Customer's document	*NA*
d. Package : nominal dimension in mm	*L x W x H: 25.4 x 22.0 x 12.1*

2.0 Absolute Maximum Ratings

Parameter	Min.	Max.	Unit.
a. Storage temperature	-40	+105	°C
b. Supply voltage (V_{cc})	-0.5	5.5	V
c. Power dissipation	-	3.2	W
d. Load	-	50	pF

3.0 Frequency Characteristics -pin4-

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Test conditions					T_a=25°C, V_s=3.3V, C_{load}=15pF unless otherwise stated
b. Nominal frequency (F_n)		10		MHz	
c. Initial Frequency accuracy	-0.5		+0.5	ppm	After frequency recovery (OCXO stabilization)
d. Operating temperature range	-40		+85	°C	
e. Operable temperature range	-40		+90	°C	
f. Frequency stability vs. temperature over operating range			2	ppb $_{pp}$	Temperature variation of 10°C per hour Over -40°C to +85°C
g. Frequency stability vs. supply voltage variation	-0.5		+0.5	ppb	3.3V ± 5% Static effect
h. Frequency stability versus time Slope per day per month per year cumulated over 10 years cumulated			 ± 0.3 ± 10 ± 50 ± 350	 ppb ppb ppb ppb	Ageing performance at +25°C Measured before shipment Extrapolation after 14 days of continuous operation min. Same as above
i. Short term stability 1s integration		5		ppt	100 samples (ADEV)
j. 24 hours Frequency drift			± 0.5	ppb	With ± 2.8°C variation (per Telcordia GR-1244)
k. Overall frequency accuracy over 10 years lifetime (df/f) from 1h post-reflow frequency			± 1.0	ppm	After warm-up time including all frequency drift effects

4.0 Power Supply -pin-3

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (Vcc)		3.3		V	± 5%
b. Power consumption (steady state in still air)			1.5 2.5	W W	@ +25°C, after warm-up time, calm air @ -40°C, after warm-up time, calm
c. Power consumption			3.5	W	during warm-up time, within -40°C to +85°C
d. Current stabilisation time		90		Second	@ +25°C

5.0 Oscillator Output (HCMOS compatible) – pin-4 (with 15pF load)

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output voltage level low (V_{OL})			+0.4	V	
b. Output voltage level high (V_{OH})	+2.4			V	
c. Rise and fall time		2	5	ns	From 10% to 90% of output level
d. Duty cycle	40	50	60	%	At 50% of output level
e. Load	10	15	30	pF	Nominal
f. RF output current			4	mA	
g. Subharmonics & Spurs			-35	dBc	
Phase Noise SSB (steady state conditions over -40°C to +85°C)					
h. 1Hz offset		- 85		dBc/Hz	
i. 10Hz offset		-115		dBc/Hz	
j. 100Hz offset		-140		dBc/Hz	
k. 1kHz offset		-145		dBc/Hz	
l. 10kHz offset		-150		dBc/Hz	
m. 100kHz offset		-150		dBc/Hz	

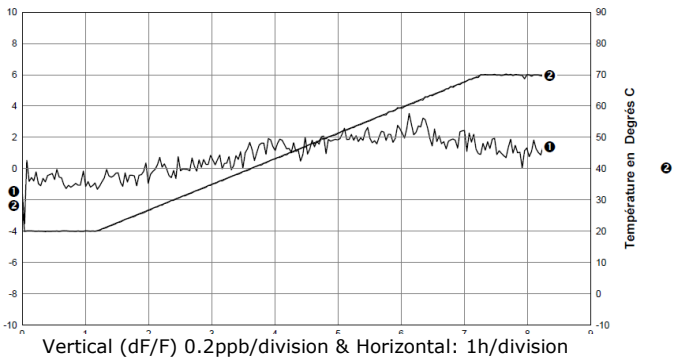
6.0 Warm up

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Start-up time			1.5	Sec	@-40°C to +85°C
Warm-up time to (f ± 100 ppb) Referring to frequency f reached after 24 hours of operation		 2.0	 ≤ 7.0 ≤ 5.0	 minutes	 @ -40°C @ +25°C

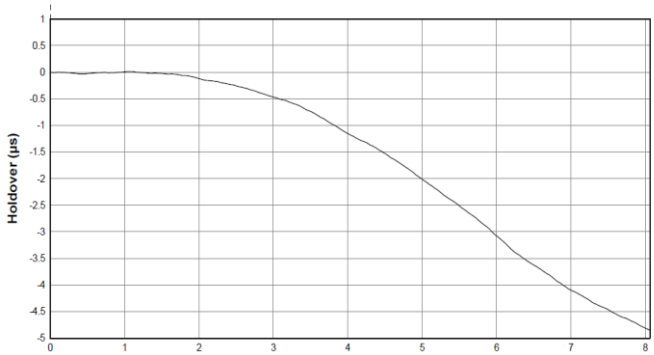
7.0 Phase stability in holdover mode - pin-4

The OCXO must be powered-on (aged) up to 14 days max. for its re-stabilization after storage or powered-off period.
Temperature gradient of 10°C per hour max.

Parameter	Nominal	Variation	Max.	Unit	Test Condition / Description
Holdover over 8 hours of continuous operation		50°C	± 10	µs	Asymmetrical Monotonic temperature change with gradient of 10°C/hour max.



Vertical (dF/F) 0.2ppb/division & Horizontal: 1h/division



Vertical: 0.5µs/division & Horizontal: 1h/division

8.0 Frequency Retrace - pin-4

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Retrace Effect / accuracy (df/f)			± 50	ppb	After 24 hours On, 24 hours Off and 1 hour On Measured after warm-up time

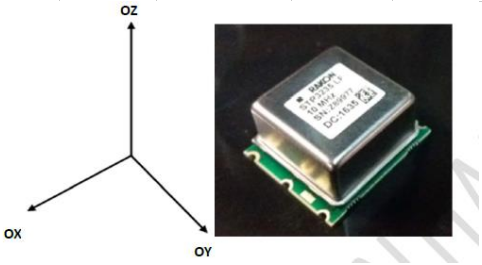
9.0 Environmental specification

Operating

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Operating temperature range	-40		+85	°C	
Temperature variation			10	°C/hour	
Relative Humidity	5		95	%	
Air pressure range	70		106	kPa	

Operable

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Operable temperature range	-40		+90	°C	Still operating but performance not guaranteed
Vibration	10		500	Hz	IEC 68-2-6 test Fc Severity 500/10
Shock			50	m/s²	IEC 68-2-27 test Ea Severity 50A
g sensitivity			± 3	ppb/g	Total Gamma vector
		± 2.2		ppb/g	Ox axis
		± 0.4		ppb/g	Oy & Oz axis



10.0 Marking

Parameter	Description
1. Type	Label
2. Line 1	[Manufacturer Identifier]: **RAKON**
3. Line 2	[Part Number] : **STP3558 LF** (dedicated code registered for SiLabs)
4. Line 3	[Nominal Frequency]: 10MHz
5. Line 4	[Serial Number] 1 Letter + 5 Numerals / SN: L12345
6. Line 5	[Manufacturing Date Code] 4 Digits for Year & Week : DC: YyWw

11.0 Quality and Reliability requirements

Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2002/95/EC and 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Note the RoHS compliant parts are suitable for assembly using both Lead-free solders and Tin / Lead solders.
b. Free Fall	Height: 300mm / frequency drift ≤ ±0.5ppm
c. Vibration	Mechanical vibration (JESD22-B-103B, MIL-STD-883 Cond. A) From 20Hz to 2kHz / 4 minutes per orthogonal axis with 20g acceleration
d. Shocks	Mechanical shocks (JESD22-B-104C, MIL-STD-202 meth 213 Cond. C) 6 shocks per direction with 100g acceleration - 6ms duration - 6 orthogonal directions
e. Bias Life Test	1008 hours at +125°C (JESD22-A-100D) / Vcc=+3.3V
f. Electro-Static Discharge	ESD-CDM (JSESD22-C101 class C1 / 500V) ESD-HBM (JESD22-A114-F 2kV)
g. Latch-Up Test	JESD78 Class II Forced current limits ± 100mA
h. High Temperature Operating Life Test	HTOL over 1,000hours @ +125°C / Vcc=+3.5V
i. High Temperature Storage	HTS over 1,000hours @ +125°C
j. Low Temperature Storage	LTS @ -40°C 100hours
k. Temperature Cycling Test	TCT from -40°C to +125°C (JESD22-A-104) 500 cycles - 10 minutes Soak time with 2 cycles per hour – transfer ≤ 1 minute
l. Moisture sensitivity	IPC/JEDEC J-STD-020, Class 3

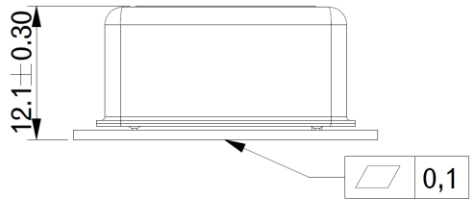
12.0 Disclaimer

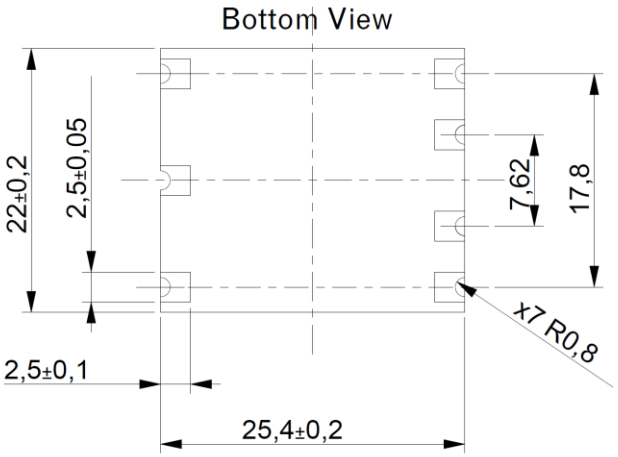
Parameter	Description
a. Disclaimer	"Samples supplied according to this specification are supplied from our development or pre-production programme and as such are not qualification approved products. No condition, warranty or representation regarding quality, suitability, performance, life or continuation of supply is given or implied and Guarantee in clause 6.1 of our standard Conditions of Sale is not applicable. The right is reserved to change the design or specification or cease supply without notice." RAKON Limited

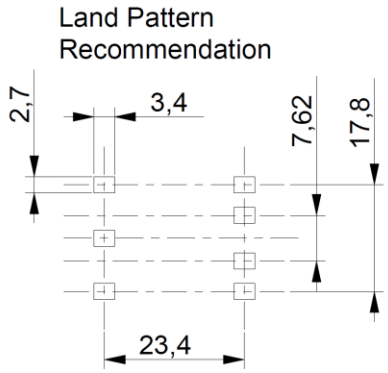
13.0 Model Outline (all dimension in mm):

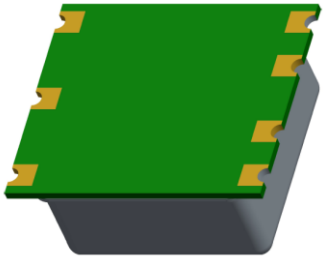


Pin number	Description
1.	To be NOT CONNECTED
2.	To be NOT CONNECTED
3.	+3.3V Supply (V_{cc})
4.	10MHz Output (HCMOS)
5.	To be NOT CONNECTED
6.	To be NOT CONNECTED
7.	Ground (mechanical & electrical)



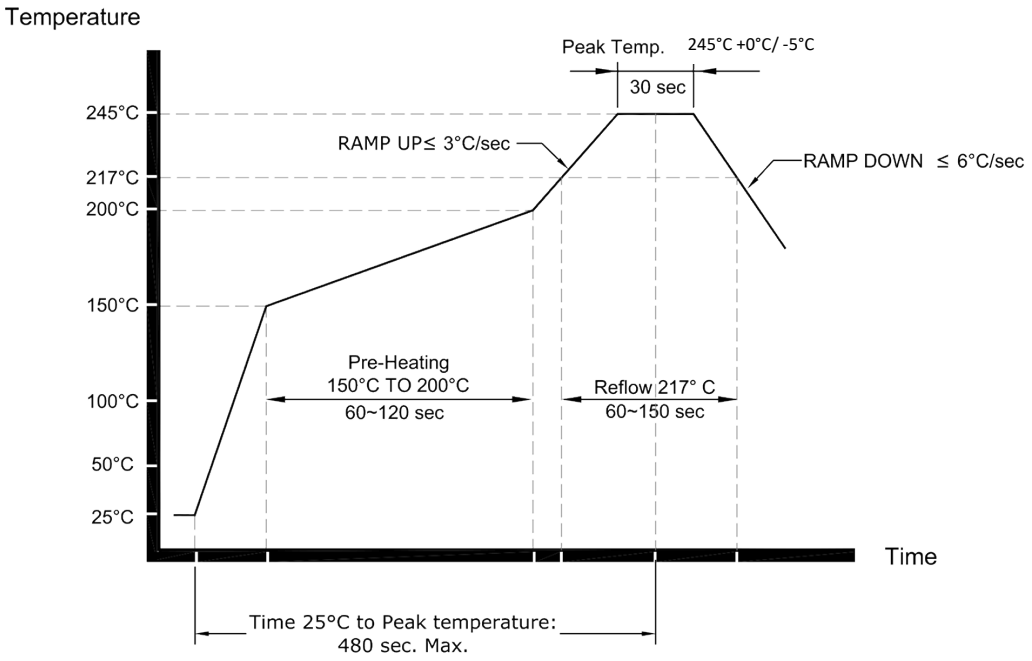






Note: no via, no trace on bottom side

14.0 Recommended reflow profile:

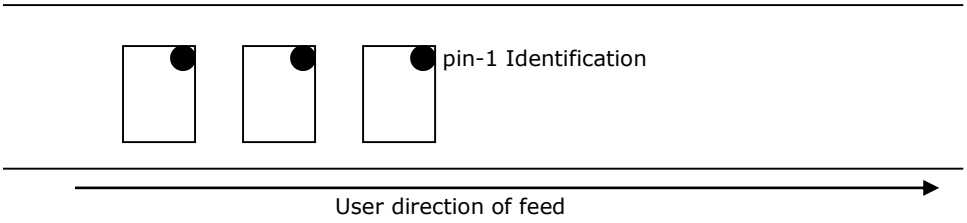


Reflow profile according IPC/JEDEC J-STD-020 with classification temperature Tc 245°C.

This product is specifically designed for pick and place reflow manufacturing process. The Oscillator must be always on top side during the reflow process. The product might be damaged or destroyed when processed top down during second reflow process.

15.0 Tape and reel:

Tape & Reel Packaging: compliant to standard EIA 481-3



P1	W	Quantity per reel	Diameter	Pin-1 Orientation
28mm	44mm	100pcs. min. / 200pcs. max	380 mm	Quadrant-2

16.0 Specification History

Version	Writer	Changes	Approver	Date
-	Frederic VITTRANT	ROX2522S3 Series @ 10MHz HCMOS 3.3V No EFC Preliminary datasheet “STP3558 LF” for customer approval	Said Jabli	2020-05-04