

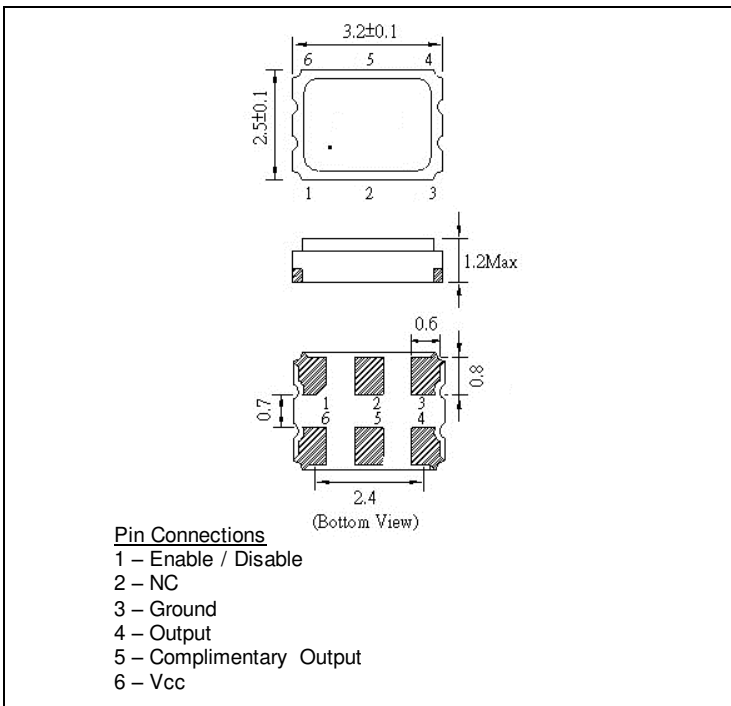
- TS16949
- AEC-Q200



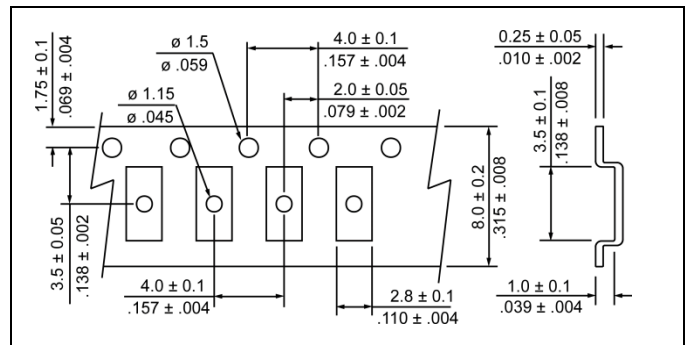
ELECTRICAL SPECIFICATION

PARAMETER	SYMBOL	CONDITIONS	VALUE	UNIT	
Nominal Frequency	f_o	$T_a=25^{\circ}\text{C}$	156.257812	MHz	
Supply Voltage	V_{CC}	$V_{CC} \pm 5\%$	3.3	VDC	
Supply Current, max	I_s	$V_{CC}; T_a=+25^{\circ}\text{C};$	70	mA	
Operating Temperature Range	T_a	---	-40 to +105	$^{\circ}\text{C}$	
Storage Temperature Range	$T_{(sg)}$	Absolute max	-55 to +125	$^{\circ}\text{C}$	
Output Logic Type	---		LVDS		
Frequency Stability, max	$\Delta f/f_o$	Inclusive of 25°C Tolerance, Changes due to Operating Temperature, Aging	-40 to $+85^{\circ}\text{C}$	± 25	ppm
			$+85$ to $+105^{\circ}\text{C}$	± 50	
Output Voltage	V_{OL}	Logic "0" Level, min	0.9	VDC	
	V_{OH}	Logic "1" Level, max	1.6	VDC	
Output Load	---	Connected between Out and Complementary Out	100	Ω	
Enable / Disable Function	E/D	Pin 1: N.C. (Open) or High ($0.7 \times V_{CC}$)	Pin 4 & 5 – Oscillation (Enabled)		
		Pin 1: Low ($0.3 \times V_{CC}$)	Pin 4 & 5 – High Impedance (Disabled)		
Symmetry (Duty Cycle)	DC	@50% Wave form	45 to 55	%	
Rise Time and Fall Time, max	t_r / t_f	@20% to 80% Output Swing Level	0.4	ns	
Jitter, RMS, max.	J	$1\sigma, 12\text{kHz} < F_j < 20\text{MHz}$	0.1	ps	

MECHANICAL SPECIFICATION



CARRIER TAPE DIMENSIONS

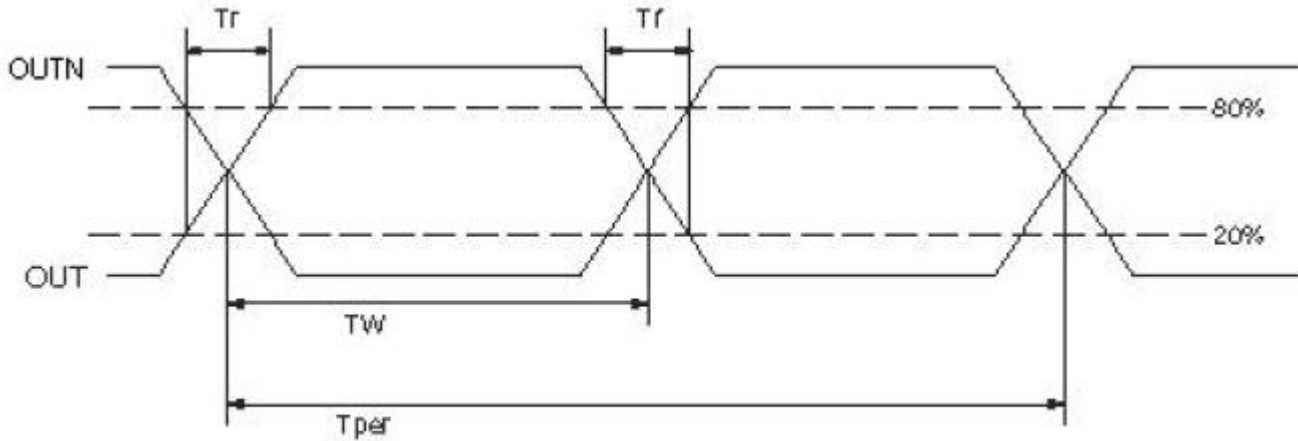


NOTE: REFER TO EIA-481 FOR DIMENSIONS NOT LISTED

PACKAGING

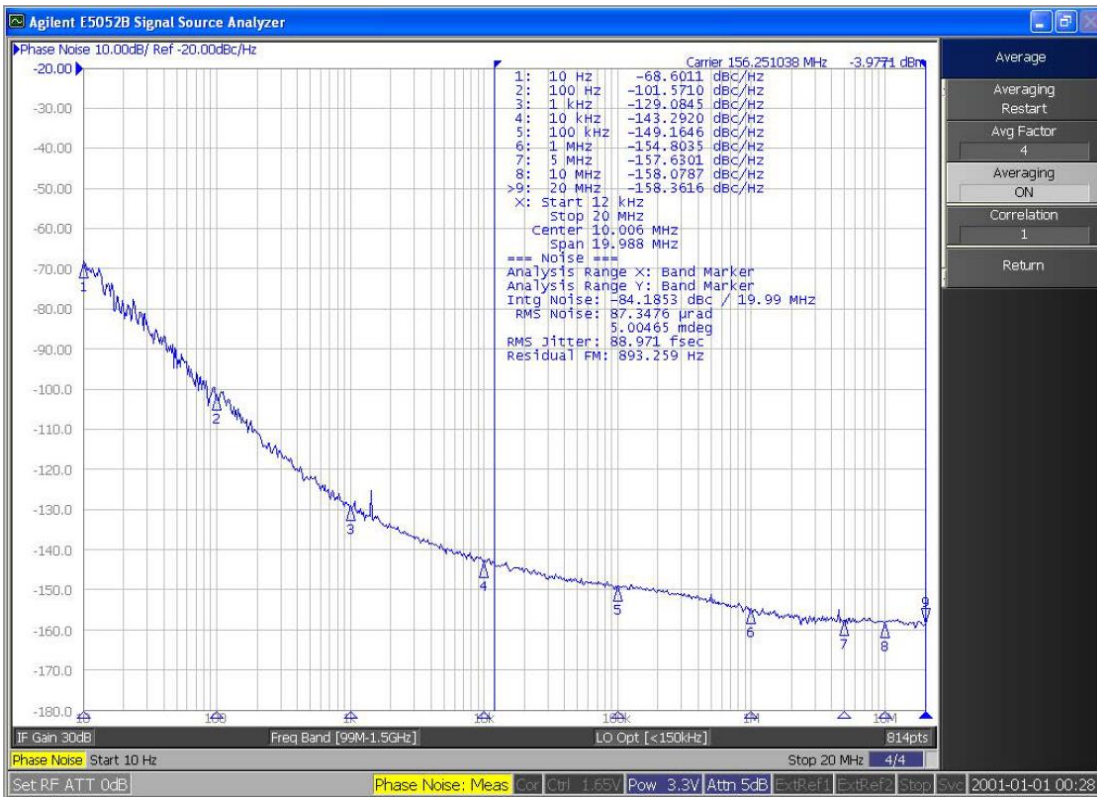
178 mm REEL DIAMETER
8 mm TAPE WIDTH, 4 mm PITCH
QUANTITY: 1000 PIECES PER REEL

OUTPUT WAVEFORM

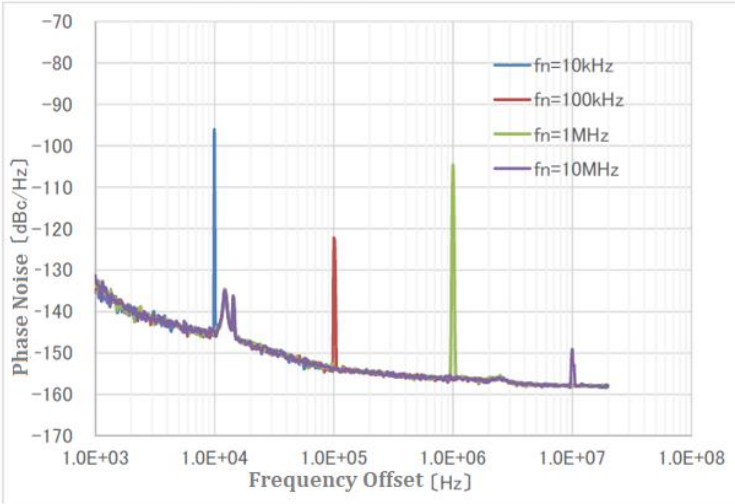


$$DUTY = T_W / T_{per} \times 100$$

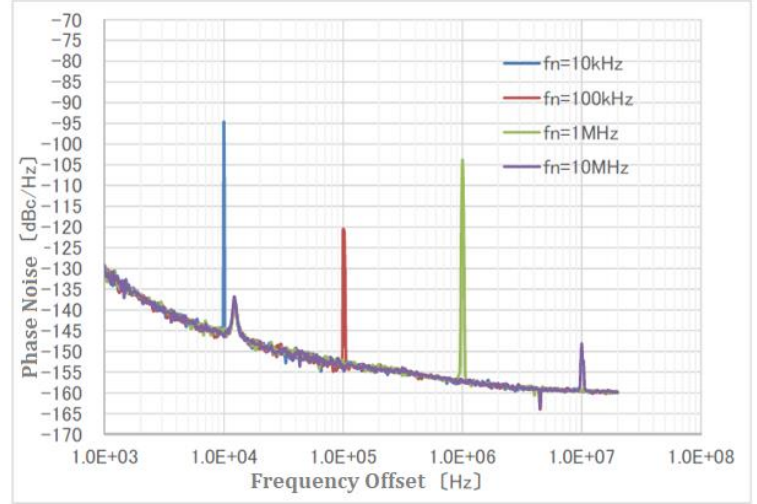
FREQUENCY CHARACTERISTICS



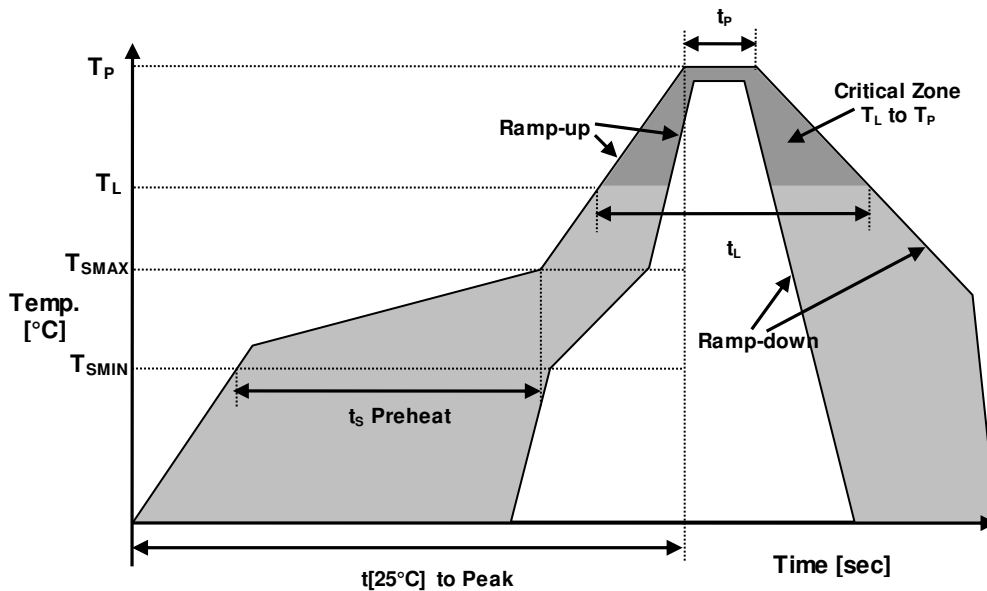
100MHz Ripple Injection



156.25MHz Ripple Injection



REFLOW PROFILE



Reflow profile		
Temperature Min Preheat	T_{SMIN}	150°C
Temperature Max Preheat	T_{SMAX}	200°C
Time (T_{SMIN} to T_{SMAX})	t_s	60-180 sec.
Temperature	T_L	217°C
Peak Temperature	T_P	260°C
Ramp-up rate	R_{UP}	3°C/sec max.
Ramp-down rate	R_{DOWN}	6°C/sec max.
Time within 5°C of Peak Temperature	t_p	10 sec.
Time $t_{[25^\circ\text{C}]}$ to Peak Temperature	$t_{[25^\circ\text{C}]}$ to Peak	480 sec.
Time	t_L	60-150 sec.

■ RELIABILITY TEST

Test Items	Test Condition	Specification	
		OSC	X'tal
1. Pre-and Post-Stress Electrical Test	Test is performed for crystal unit.	In spec	In spec
2. High Temperature Exposure(Storage) Test	1000 Hours at 125°C	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
3. Temperature Cycling Test	1000 Cycles(-40°C to 125°C)	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
4. Biased Humidity Test	1000 Hours 85°C/85%R.H Rated VDD applied with 1M Ω and inverter in parallel	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
5. Operational Life Test	1000 Hours at 125°C Rated VDD applied with 1M Ω and inverter in parallel	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
6. External Visual Test	Inspect device construction, marking and workmanship. Electrical Test not required.	In spec	In spec
7. Physical Dimension	Verify external view and dimension as per the specification. Electrical Test not required.	In spec	In spec
8. Mechanical Shock Test	100g's, 6msec, 1/2sinusoid 3 times for each direction(X, Y, Z)	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
9. Vibration Test	Freq. range: 10~2000Hz Peak to peak amplitude:1.5mm Peak acceleration 5g's for 20 minutes of 3 orientations(X,Y,Z)	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
10. Resistance to Soldering Heat Test	260°C/10sec max twice.	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
11. Thermal Shock Test	100 cycles(-55°C to +125°C) Max transfer time: 20sec.	$\Delta F \leq \pm 10 \text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10 \text{ppm}$, $\Delta C.I. \leq \pm 10 \Omega$
12. Electrical Characterization Test	Sample data is summary to show Min, Max, Mean and Standard deviation. Satisfactory electrical performance.	In spec	In spec
13. Board Flex Test	Apply a force which will bend the board (D)x=2mm Minimum (or as defined in the customer specification or Q200).The duration of the applied forces shall be 60(+5) Sec.	No damaged found in external appearance.	No damaged found in external appearance.

CL3225-156.257812-3.3-50-X6-T-TR-NS8

14. Terminal Strength (SMD)Test	Force: 17.7N(1.8Kg) Test duration: 60+1 sec	$\Delta F \leq \pm 10\text{ppm}$, Duty within spec.	$\Delta F \leq \pm 10\text{ppm}$, $\Delta C.I. \leq \pm 10\Omega$
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ENVIRONMENTAL

PARAMETER	VALUE
MOISTURE SENSITIVITY LEVEL	1
RoHS	Compliant
REACH-SVHC	Compliant
HALOGEN-FREE	Compliant
TERMINATION FINISH	Au



MARKING

Rx156X
•3BEyw

x – Internal Production ID code
y – Year code
w – Week code

YEAR CODE	
Year	Code
2015	5
2016	6
2017	7
2018	8
2019	9
2020	0
2021	1
2022	2
2023	3
2024	4
2025	5

ALPHA WEEK CODE TABLE					
Week	Code	Week	Code	Week	Code
1	a	19	s	37	K
2	b	20	t	38	L
3	c	21	u	39	M
4	d	22	v	40	N
5	e	23	w	41	O
6	f	24	x	42	P
7	g	25	y	43	Q
8	h	26	z	44	R
9	i	27	A	45	S
10	j	28	B	46	T
11	k	29	C	47	U
12	l	30	D	48	V
13	m	31	E	49	W
14	n	32	F	50	X
15	o	33	G	51	Y
16	p	34	H	52	Z
17	q	35	I		
18	r	36	J		

APPROVAL

RALTRON	
DRAWN BY:	CP, August 10, 2021
APPROVED BY:	JL, August 10, 2021
REVISION:	A, Initial Release B, CP November 24, 2021 Corrected Rise/ Fall Time Modified Frequency Stability C, CP, December 02, 2021, Updated Marking

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