1.2 mm x 1.0 mm Crystal

1.0 ELECTRICAL CHARACTERISTICS

ELECTRICAL PERFORMANCE

Parameter	Symbol	Min.	Typ.	Max.	Units
Nominal Frequency	f_{NOM}	24.000	—	80.000	MHz
Mode	—	Fundamental, AT - Cut			—
Operating Temperature Range	T_{OP}	–20	—	+70	°C
		–30	—	+85	
Stability over T_{OP} (Note 1) *ordering option*	f_{STAB}	±10, ±15, ±20			ppm
Frequency Tolerance (Note 2)	f_{TOL}	—	±10	±20	ppm
Load Capacitance, *ordering option*	C_L	Series, 6, 8, 10, or 12			pF
Shunt Capacitance	C_O	—	—	3.0	pF
Drive Level	—	—	10	100	µW
Aging, 1st Year (at +25°C)	f_{AGE}	—	—	±3	ppm
Insulation Resistance	—	500	—	—	MΩ
Storage Temperature	T_{STO}	–40	—	+85	°C
Equivalent Series Resistance					
Crystal Freq: 24.000 MHz to 27.120 MHz	ESR	—	—	150	Ω
Crystal Freq: 27.121 MHz to 37.400 MHz		—	—	100	Ω
Crystal Freq: 37.401 MHz to 80.000 MHz		—	—	60	Ω

Note 1: Referenced to the frequency at +25°C.

2: Frequency measured at +25°C, ±3°C.

3: Product is compliant with RoHS directive and fully compatible with lead-free assembly.

TABLE 1-1: PINOUT

Pin Number	Function
1	Crystal
2	Connected to cover (Connect to GND)
3	Crystal
4	Connect to GND

2.0 RELIABILITY AND IR COMPLIANCE

TABLE 2-1: ENVIRONMENTAL COMPLIANCE

Parameter	Conditions
Mechanical Shock	MIL-STD-883, Method 2002, Condition A
Mechanical Vibration	MIL-STD-883, Method 2007, Condition A
Temperature Cycle	MIL-STD-883, Method 1010, Condition B
Solderability	MIL-STD-202-210, Condition B
Gross and Fine Leak	MIL-STD-883, Method 1014
Altitude	MIL-STD-883, Method 1001, Condition B
Moisture Sensitivity Level	MSL 1
Contact Pads	Gold (0.2 µm min.) over Nickel
Weight	1.3 mg

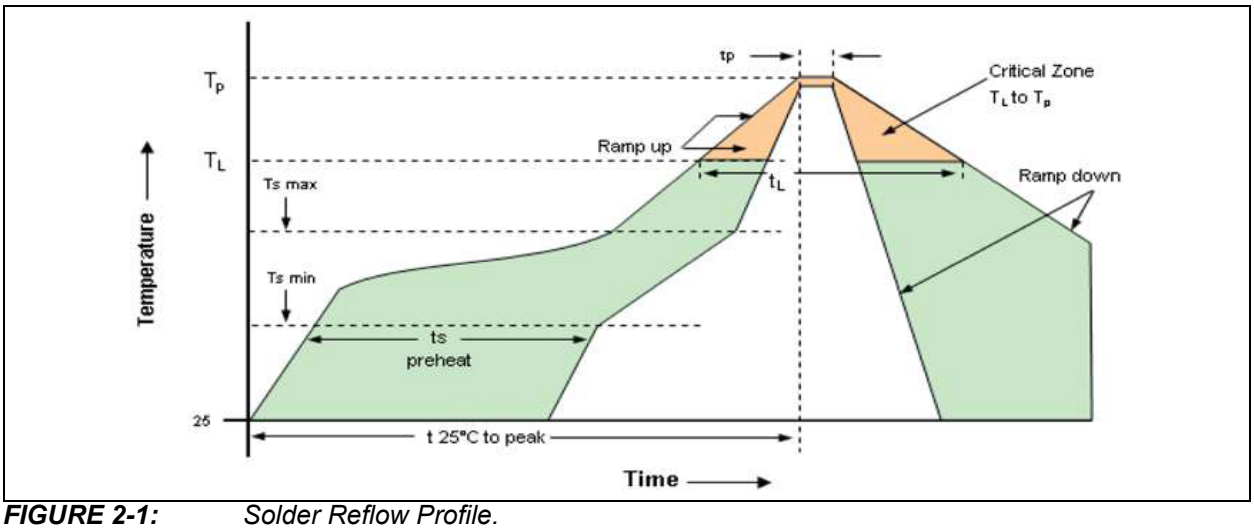


FIGURE 2-1: *Solder Reflow Profile.*

TABLE 2-2: REFLOW PROFILE

Parameter	Symbol	Value
Pre-Heat Time	t_S	60 sec. min.; 260 sec. max.
T_S min.	—	+150°C
T_S max.	—	+200°C
Ramp Up	R_{UP}	3°C/sec. max.
Time Above 217°C	t_L	60 sec. min.; 150 sec. max.
Time to Peak Temperature	t_{AMB-P}	480 sec. max.
Time at 260°C	t_P	30 sec. max.
Ramp Down	R_{DN}	6°C/sec. max.

Pads are Au over Ni and compatible with either SnPb or Pb-Free attachment.

MSL: 1

3.0 TAPE AND REEL

TABLE 3-1: TAPE AND REEL DIMENSIONS

Tape Dimensions (mm)												Reel Dimensions (mm)						
A	B	C	D	E	F	G	H	J	K	L	M	A	B	C	D	E	W	T
1.3	1.1	8.0	4.0	1.75	4.0	4.0	2.0	0.5	1.55	0.25	0.45	178	60	21.0	13.0	2.0	8.0	2.0

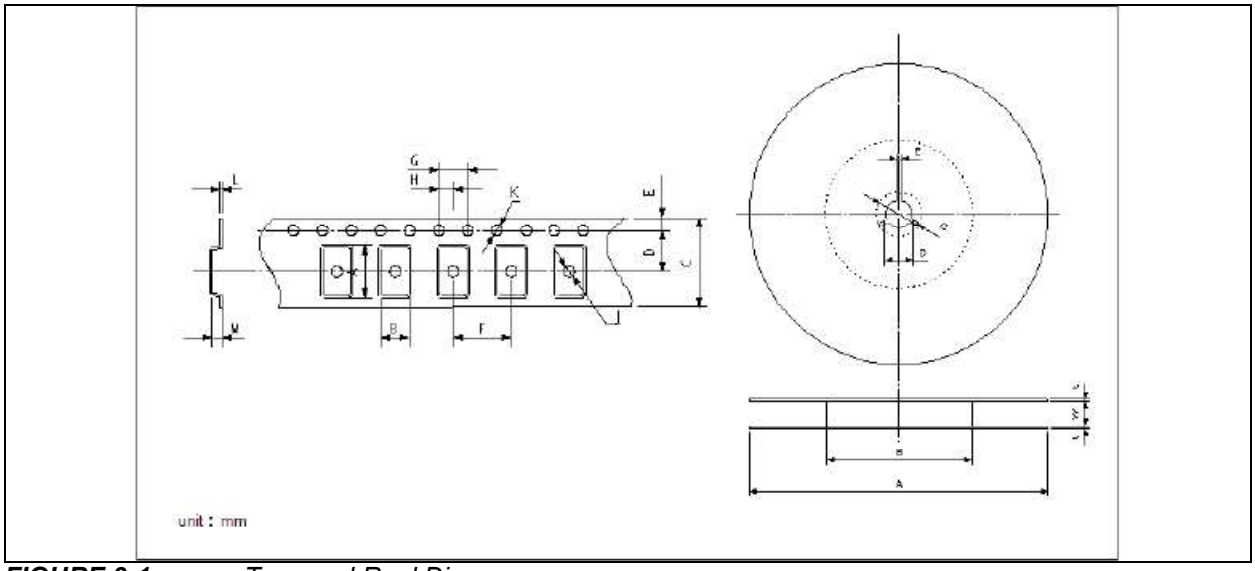
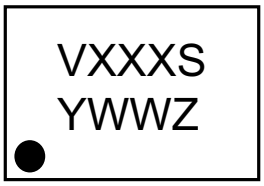


FIGURE 3-1: *Tape and Reel Diagram.*

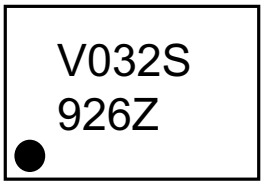
4.0 PACKAGING INFORMATION

4.1 Package Marking Information

4-Lead CDFP*



Example



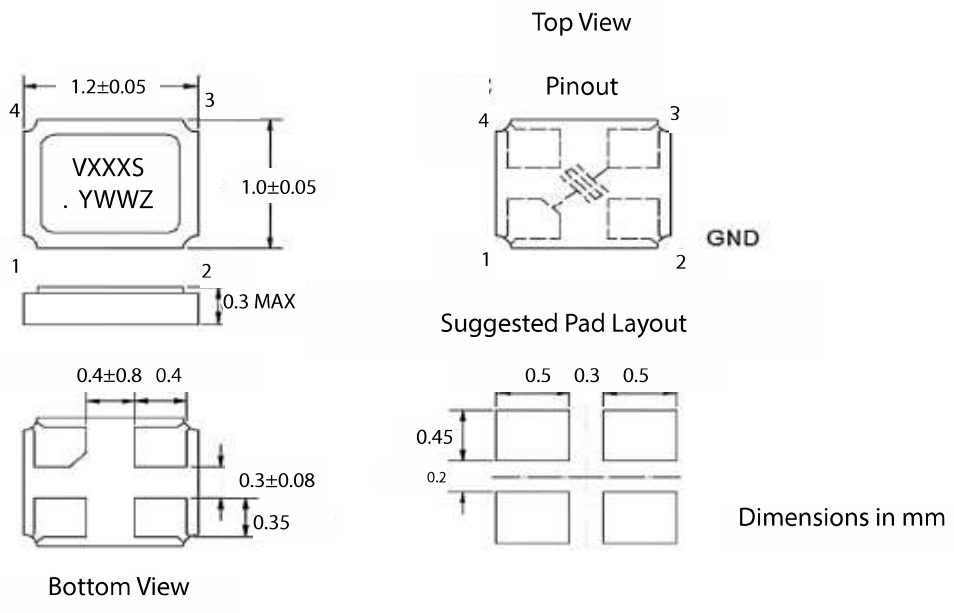
Legend:	XXX	Frequency
	Y	Year code (last digit of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	S	Spec/Load Indicator
	(e3)*	Pb-free JEDEC® designator for Matte Tin (Sn) This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.
	●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (_) and/or Overbar (¯) symbol may not be to scale.

4-Lead CDFP 1.2 mm x 1.0 mm Package Outline and Recommended Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



APPENDIX A: REVISION HISTORY

Revision A (January 2021)

- Initial release of VXN2 as Microchip data sheet DS20006441A.

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

Part No.	-X	X	X	-XX	-XXMXXXXXXX	XX
Device	Mode	Temperature Stability	Operating Temperature	Load Capacitance	Frequency (in MHz)	Media Type

Device:	VXN:		1.2 mm x 1.0 mm Crystal
Mode:	1	=	Fundamental Tuning Fork
Temperature Stability:	C	=	±10 ppm
	H	=	±15 ppm
	E	=	±20 ppm
Operating Temperature:	H	=	–30°C to +85°C
	J	=	–20°C to +70°C
Load Capacitance:	00	=	Series Resonance
	06	=	6 pF
	08	=	8 pF
	10	=	10 pF
	12	=	12 pF
Frequency:	xxMxxxxxxx	=	Frequency in MHz
Packing Option:	<blank>	=	Cut Tape/non-TR Quantities
	TR	=	3000/Reel

Standard Frequencies

24.000 MHz	27.120 MHz	32.000 MHz	37.400 MHz	40.000 MHz	48.000 MHz

Examples:

a) VXN2-1CH-06-24M0000000TR: 1.2 mm x 1.0 mm Crystal, Fundamental, ±10 ppm Stability, –30°C to +85°C Temp. Range, 6 pF Load Capacitance, 24.000 MHz, 3000/Reel

b) VXN2-1EJ-12-37M4000000TR: 1.2 mm x 1.0 mm Crystal, Fundamental, ±20 ppm Stability, –20°C to +70°C Temp. Range, 12 pF Load Capacitance, 37.400 MHz, 3000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods being used in attempts to breach the code protection features of the Microchip devices. We believe that these methods require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Attempts to breach these code protection features, most likely, cannot be accomplished without violating Microchip's intellectual property rights.
- Microchip is willing to work with any customer who is concerned about the integrity of its code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable." Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

ISBN: 978-1-5224-7501-9

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880- 3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820