

CMOS Crystal Oscillator

Features

- CMOS Output XO
- Output Frequencies from 625 kHz to 32.5 kHz
- 3.3V, 2.5V, and 1.8V Operation
- Low Jitter Performance
- Output Disable Feature
- Operating Temperature Ranging from -55°C to $+125^{\circ}\text{C}$
- Small Industry Standard Package, 3.2 mm × 2.5 mm × 1.2 mm VDFN
- Product is RoHS Compliant and Fully Compatible with Lead-free Assembly

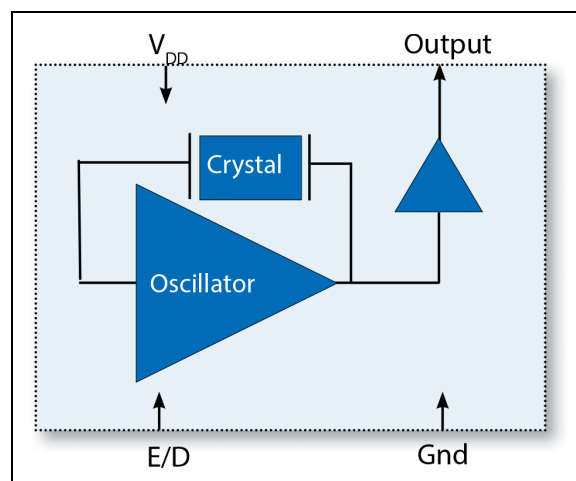
Applications

- SONET/SDH/DWDM
- Ethernet, GE, SynchE
- Storage Area Networking
- Fiber Channel
- Digital Video
- Broadband Access
- Base Stations, Picocells

General Description

Microchip's VC-820 Crystal Oscillator (XO) is a quartz stabilized square wave generator with a CMOS output. The VC-820 uses a fundamental or a third overtone crystal, oscillating in a fundamental tone, resulting in very low jitter performance, and a monolithic IC which improves reliability and reduces cost.

Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Storage Temperature (T_S)	–55°C to +125°C
Soldering Temp/Time (T_{LS})	+260°C/30 seconds
ESD Rating, Human Body Model (Note 1)	1500V
ESD Rating, Charged Device Model (Note 1)	1000V

† **Notice:** Stresses in excess of the Absolute Maximum Ratings can permanently damage the device. Functional operation is not implied at these or any other conditions in excess of conditions represented in the operational sections of this data sheet. Exposure to Absolute Maximum Ratings for extended periods may adversely affect device reliability. Permanent damage is also possible if E/D is applied before V_{DD}

Note 1: Although ESD protection circuitry has been designed into the VC-820, proper precautions should be taken when handling and mounting. Microchip employs a Human Body Model (HBM) and a Charged Device Model (CDM) for ESD susceptibility testing and design protection evaluation. Human Body Model tested to MIL-STD-883, Method 3015 conditions. Charged Device Model tested to JESD22-C101 conditions.

ELECTRICAL CHARACTERISTICS, 3.3V OPTION

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply						
Voltage	V_{DD}	3.15	3.3	3.45	V	Note 1
Max. Supply Voltage	—	–0.5	—	5.0	V	—
Current (Note 2)	I_{DD}	—	—	6	mA	≤20.000 MHz
		—	—	7		20.000 MHz to 39.999 MHz
		—	—	8		40.000 MHz to 49.999 MHz
		—	—	9		50.000 MHz to 79.999 MHz
		—	—	10		80.000 MHz to 99.999 MHz
		—	—	40		100.000 MHz to 133.000 MHz
Current, Output Disabled	—	—	—	5	μA	—

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 μF and 0.01 μF.
- 2:** Parameters are tested with the test circuit shown in Figure 1-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 1-2.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ±50 ppm and ±100 ppm stability options are available for –40/+105 °C, –40/+125 °C, –55/+105 °C, and –55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 3.3V OPTION (CONTINUED)

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Frequency						
Nominal Frequency	f _{NOM}	0.032768	—	133.000	MHz	Note 3
Stability (Note 4, Note 8)	—	—	—	±20	ppm	Ordering Option
		—	—	±25		
		—	—	±50		
		—	—	±100		
Outputs						
Output Logic Level High, < 40 MHz	V _{OH}	0.9 × V _{DD}	—	—	V	Note 2
Output Logic Level Low, < 40 MHz	V _{OL}	—	—	0.1 × V _{DD}		
Output Logic High Drive, < 40 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, < 40 MHz	I _{OL}	4	—	—		
Output Logic Level High, 40.00 MHz–99.99 MHz	V _{OH}	V _{DD} – 0.4	—	—	V	Note 2
Output Logic Level Low, 40.00 MHz–99.99 MHz	V _{OL}	—	—	0.4		
Output Logic High Drive, 40.00 MHz–99.99 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, 40.00 MHz–99.99 MHz	I _{OL}	4	—	—		
Output Logic Level High, 100.00 MHz–133.000 MHz	V _{OH}	V _{DD} – 0.4	—	—	V	Note 2
Output Logic Level Low, 100.00 MHz–133.000 MHz	V _{OL}	—	—	0.4		
Output Logic High Drive, 100.00 MHz–133.000 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, 100.00 MHz–133.000 MHz	I _{OL}	4	—	—		
Load	I _{OUT}	—	—	15	pF	—
Output Rise/Fall Time (Note 2)	t _R /t _F	—	—	4	ns	—
Duty Cycle	—	45	50	55	%	Note 2, Note 5

Note 1: The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 uF and 0.01 uF.

2: Parameters are tested with the test circuit shown in Figure 1-1.

3: See Standard Frequencies and Ordering Information tables for more specific information.

4: Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.

5: Duty Cycle is measured as On Time/Period, see Figure 1-2.

6: Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.

7: The output is enabled if the Enable/Disable is left open.

8: Only ±50 ppm and ±100 ppm stability options are available for -40/+105 °C, -40/+125 °C, -55/+105 °C, and -55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 3.3V OPTION (CONTINUED)

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Period Jitter, RMS	Φ_J	—	2.4	—	ps	Note 6
Period Jitter, Peak-to-Peak		—	20.2	—		Note 6
Random Jitter		—	2.4	—		—
Deterministic Jitter		—	0	—		—
RMS Jitter, 12 kHz–20 MHz, 125 MHz		—	0.06	0.3		—
Enable/Disable						
Output Enable	V_{IH}	$0.7 \times V_{DD}$	—	—	V	Note 7
Output Disable	V_{IL}	—	—	$0.3 \times V_{DD}$	V	Note 7
Disable Time	t_D	—	—	150	ns	—
Start-Up Time	t_{SU}	—	—	5	ms	—
Operating Temperature	T_{OP}	–10	—	+70	°C	Ordering Option
		–40	—	+85		
		–40	—	+105		
		–40	—	+125		
		–55	—	+105		
		–55	—	+125		

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 μ F and 0.01 μ F.
- 2:** Parameters are tested with the test circuit shown in [Figure 1-1](#).
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see [Figure 1-2](#).
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ± 50 ppm and ± 100 ppm stability options are available for –40/+105 °C, –40/+125 °C, –55/+105 °C, and –55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 2.5V OPTION

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply						
Voltage	V _{DD}	2.375	2.5	2.625	V	Note 1
Max. Supply Voltage	—	−0.5	—	5.0	V	—
Current (Note 2)	I _{DD}	—	—	4.5	mA	≤20.000 MHz
		—	—	5.5		20.000 MHz to 39.999 MHz
		—	—	7.0		40.000 MHz to 79.999 MHz
		—	—	7.5		80.000 MHz to 99.999 MHz
				30.0		100.000 MHz to 125.000 MHz
Current, Output Disabled	—	—	—	5	μA	—
Frequency						
Nominal Frequency	f _{NOM}	0.032768	—	125.000	MHz	Note 3
Stability (Note 4, Note 8)	—	—	—	±20	ppm	Ordering Option
		—	—	±25		
		—	—	±50		
		—	—	±100		
Outputs						
Output Logic Level High, < 40 MHz	V _{OH}	0.9 × V _{DD}	—	—	V	Note 2, Note 3
Output Logic Level Low, < 40 MHz	V _{OL}	—	—	0.1 × V _{DD}		
Output Logic High Drive, < 40 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, < 40 MHz	I _{OL}	4	—	—		

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 uF and 0.01 uF.
- 2:** Parameters are tested with the test circuit shown in Figure 3-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 4-1.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ±50 ppm and ±100 ppm stability options are available for -40/+105 °C, -40/+125 °C, -55/+105 °C, and -55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 2.5V OPTION (CONTINUED)

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Output Logic Level High, 40.00 MHz–99.99 MHz	V _{OH}	V _{DD} – 0.4	—	—	V	Note 2
Output Logic Level Low, 40.00 MHz–99.99 MHz	V _{OL}	—	—	0.4		
Output Logic High Drive, 40.00 MHz–99.99 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, 40.00 MHz–99.99 MHz	I _{OL}	4	—	—		
Output Logic Level High, 100.00 MHz–133.000 MHz	V _{OH}	1.65	—	—	V	Note 2
Output Logic Level Low, 100.00 MHz–133.000 MHz	V _{OL}	—	—	0.4		
Output Logic High Drive, 100.00 MHz–133.000 MHz	I _{OH}	8	—	—	mA	
Output Logic Low Driver, 100.00 MHz–133.000 MHz	I _{OL}	8	—	—		
Load	I _{OUT}	—	—	15	pF	—
Output Rise/Fall Time	t _R /t _F	—	—	4	ns	Note 2
Duty Cycle	—	45	50	55	%	—
Period Jitter, RMS	Φ _J	—	2.4	—	ps	Note 6
Period Jitter, Peak-to-Peak		—	20.2	—		Note 6
Random Jitter		—	2.4	—		—
Deterministic Jitter		—	0	—		—
RMS Jitter, 12 kHz–20 MHz, 125 MHz		—	0.061	0.3		—
Enable/Disable						
Output Enable	V _{IH}	0.7 × V _{DD}	—	—	V	Note 7
Output Disable	V _{IL}	—	—	0.3 × V _{DD}	V	Note 7
Disable Time	t _D	—	—	150	ns	—
Start-Up Time	t _{SU}	—	—	5	ms	—

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 μ F and 0.01 μ F.
- 2:** Parameters are tested with the test circuit shown in Figure 3-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 4-1.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ± 50 ppm and ± 100 ppm stability options are available for $-40/+105$ °C, $-40/+125$ °C, $-55/+105$ °C, and $-55/+125$ °C temperature range.

ELECTRICAL CHARACTERISTICS, 2.5V OPTION (CONTINUED)

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Operating Temperature	T _{OP}	-10	—	+70	°C	Ordering Option
		-40	—	+85		
		-40	—	+105		
		-40	—	+125		
		-55		+105		
		-55	—	+125		

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 uF and 0.01 uF.
- 2:** Parameters are tested with the test circuit shown in Figure 3-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 4-1.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ± 50 ppm and ± 100 ppm stability options are available for -40/+105 °C, -40/+125 °C, -55/+105 °C, and -55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 1.8V OPTION

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply						
Voltage	V _{DD}	1.71	1.8	1.89	V	Note 1
Max. Supply Voltage	—	−0.5	—	3.6	V	—
Current (Note 2)	I _{DD}	—	—	2.5	mA	≤40.000 MHz
		—	—	3.5		40.000 MHz to 49.999 MHz
		—	—	6.5		50.000 MHz to 79.999 MHz
		—	—	7		80.000 MHz to 99.999 MHz
				20		100.000 MHz to 125.000 MHz
Current, Output Disabled	—	—	—	5	μA	—
Frequency						
Nominal Frequency	f _{NOM}	0.032768	—	125.000	MHz	Note 3
Stability (Note 4, Note 8)	—	—	—	±20	ppm	Ordering Option
		—	—	±25		
		—	—	±50		
		—	—	±100		
Outputs						
Output Logic Level High, < 40 MHz	V _{OH}	0.9 × V _{DD}	—	—	V	Note 2
Output Logic Level Low, < 40 MHz	V _{OL}	—	—	0.1 × V _{DD}		
Output Logic High Drive, < 40 MHz	I _{OH}	2.8	—	—	mA	
Output Logic Low Driver, < 40 MHz	I _{OL}	2.8	—	—		

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 uF and 0.01 uF.
- 2:** Parameters are tested with the test circuit shown in Figure 3-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 4-1.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ±50 ppm and ±100 ppm stability options are available for -40/+105 °C, -40/+125 °C, -55/+105 °C, and -55/+125 °C temperature range.

ELECTRICAL CHARACTERISTICS, 1.8V OPTION (CONTINUED)

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Output Logic Level High, 40.00 MHz–125.00 MHz	V _{OH}	V _{DD} – 0.4	—	—	V	Note 2
Output Logic Level Low, 40.00 MHz–125.00 MHz	V _{OL}	—	—	0.4		
Output Logic High Drive, 40.00 MHz–125.00 MHz	I _{OH}	4	—	—	mA	
Output Logic Low Driver, 40.00 MHz–125.00 MHz	I _{OL}	4	—	—		
Load	I _{OUT}	—	—	15	pF	—
Output Rise/Fall Time	t _R /t _F	—	—	5	ns	Note 2
Duty Cycle	—	45	50	55	%	Note 2, Note 5
Period Jitter, RMS	Φ _J	—	2.4	—	ps	Note 6
Period Jitter, Peak-to-Peak		—	20.2	—		Note 6
Random Jitter		—	2.4	—		—
Deterministic Jitter		—	0	—		—
RMS Jitter, 12 kHz–20 MHz, 125 MHz		—	0.4	0.9		—
Enable/Disable						
Output Enable	V _{IH}	0.7 × V _{DD}	—	—	V	Note 7
Output Disable	V _{IL}	—	—	0.3 × V _{DD}	V	Note 7
Disable Time	t _D	—	—	150	ns	—
Start-Up Time	t _{SU}	—	—	5	ms	—
Operating Temperature	T _{OP}	–10	—	+70	°C	Ordering Option
		–40	—	+85		
		–40	—	+105		
		–40	—	+125		
		–55		+105		
		–55	—	+125		

- Note 1:** The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 μ F and 0.01 μ F.
- 2:** Parameters are tested with the test circuit shown in Figure 3-1.
- 3:** See Standard Frequencies and Ordering Information tables for more specific information.
- 4:** Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging.
- 5:** Duty Cycle is measured as On Time/Period, see Figure 4-1.
- 6:** Broadband Period Jitter measured using Wavecrest SIA3300C, 90K samples.
- 7:** The output is enabled if the Enable/Disable is left open.
- 8:** Only ± 50 ppm and ± 100 ppm stability options are available for –40/+105 °C, –40/+125 °C, –55/+105 °C, and –55/+125 °C temperature range.

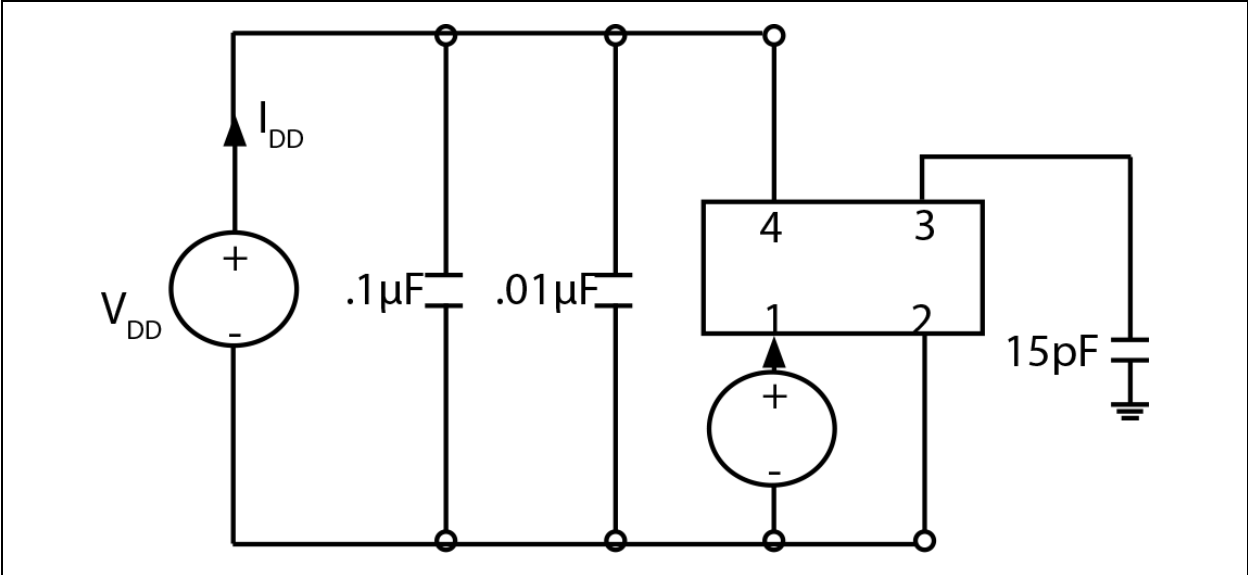


FIGURE 1-1: TEST CIRCUIT.

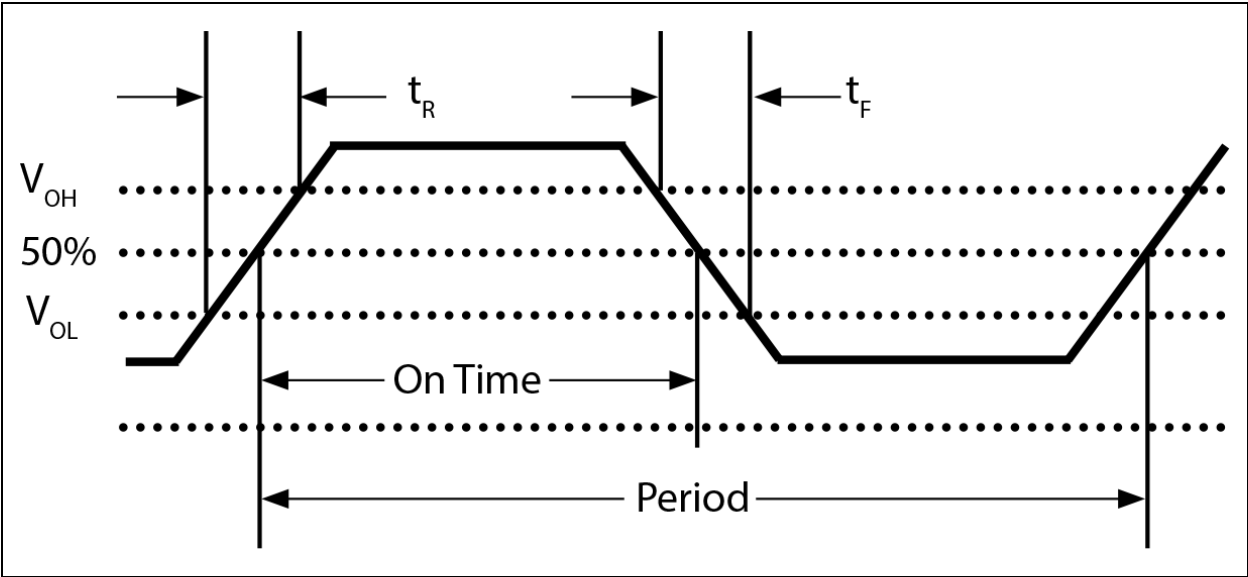


FIGURE 1-2: WAVEFORM.

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 2-1](#).

TABLE 2-1: PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1	E/D	Enable/Disable
2	GND	Case and Electrical Ground
3	Output	Output
4	V _{DD}	Power Supply Voltage

TABLE 2-2: ENABLE/DISABLE FUNCTION

E/D Pin	Output
High	Clock Output
Open	Clock Output
Low	High Impedance

3.0 RELIABILITY

Microchip qualification includes aging at various extreme temperatures, shock and vibration, temperature cycling, and IR reflow simulation. The VC-820 family is capable of meeting the following qualification tests.

TABLE 3-1: ENVIRONMENTAL COMPLIANCE

Parameter	Conditions
Mechanical Shock	MIL-STD-883, Method 2002
Mechanical Vibration	MIL-STD-883, Method 2007
Solderability	MIL-STD-883, Method 2003
Gross and Fine Leak	MIL-STD-883, Method 1014
Resistance to Solvents	MIL-STD-883, Method 2015
Moisture Sensitivity Level	MSL 1
Contact Pads	Gold (0.3 μm min. to 1.0 μm max.) over Nickel
Weight	27 mg

4.0 IR REFLOW

The VC-820 is qualified to meet the JEDEC standard for Pb-Free assembly. The temperatures and time intervals listed are based on the Pb-Free small body requirements. The VC-820 device is hermetically sealed, so an aqueous wash is not an issue.

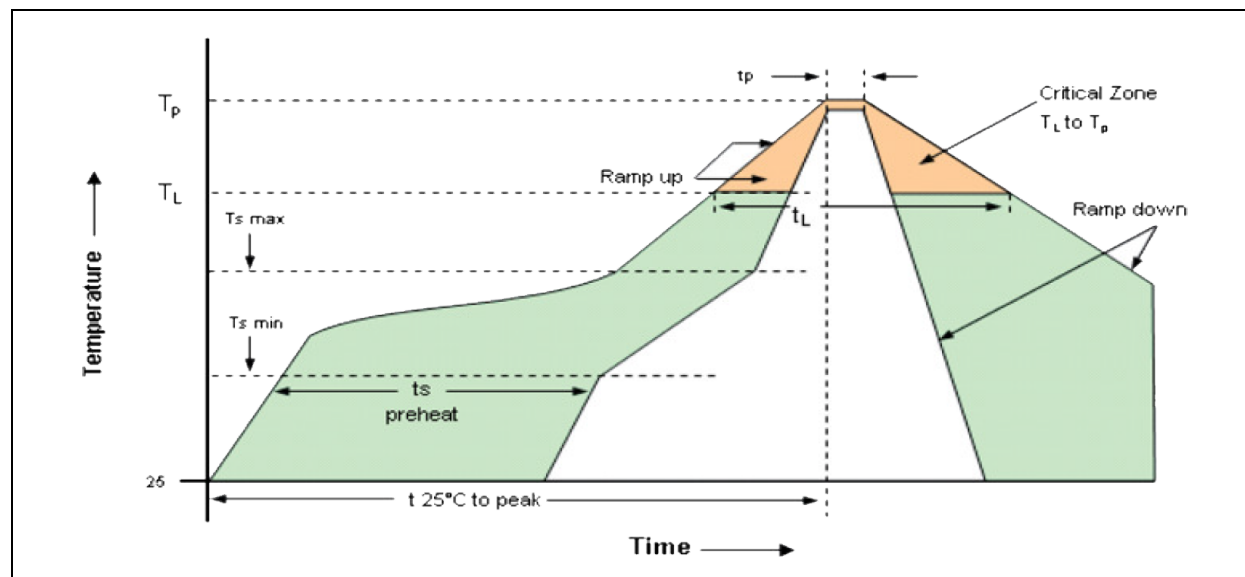


FIGURE 4-1: Solder Profile.

TABLE 4-1: REFLOW PROFILE

Symbol	Minimum	Maximum	Conditions
T_S	150°C	200°C	Pb-Free
t_S	60 seconds	260 seconds	
R_{UP}	—	3°C per second	
t_L	60 seconds	150 seconds	
T_{AMB-P}	—	480 seconds	
t_P	—	30 seconds	
R_{DN}	—	6°C per second	

5.0 TAPE AND REEL

TABLE 5-1: TAPE AND REEL DIMENSIONS

Tape Dimensions (mm)						Reel Dimensions (mm)							
Dimension	W	F	Do	Po	P1	A	B	C	D	N	W1	W2	# per Reel
Tolerance	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Min.	Typ.	Min.	Min.	Typ.	Max.	
VC-820	8	3.5	1.5	4	4	175	2	13	21	60	10	14	3000

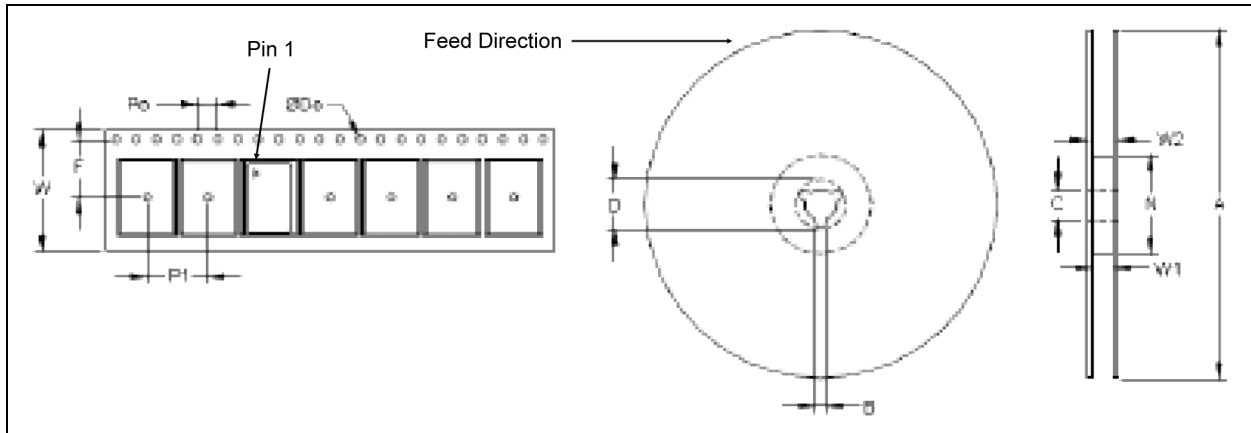


FIGURE 5-1: Tape and Reel.

Note: Pin 1 and feed direction are standard per EIA-481

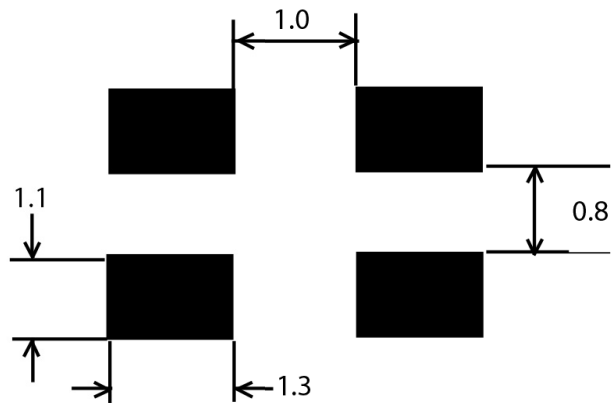
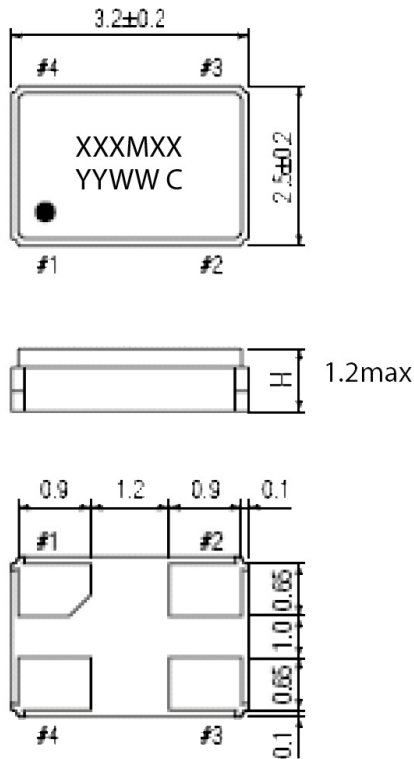
5.1 Standard Output Frequencies in MHz

- 0.032768
- 0.625000
- 2.000
- 4.000
- 8.000
- 10.000
- 10.700
- 14.31818
- 16.000
- 16.384
- 16.875
- 18.432
- 20.000
- 24.000
- 24.576
- 25.000
- 25.0125
- 26.000
- 27.000
- 28.63630
- 29.4912
- 30.000
- 31.250
- 31.700
- 32.000
- 33.000
- 33.333000
- 35.328
- 40.000
- 43.675771
- 48.000
- 50.000
- 62.500
- 64.000
- 66.666000
- 75.000
- 80.000
- 93.750
- 100.000
- 106.250
- 108.000
- 114.285
- 125.000
- 133.000

6.0 PACKAGING INFORMATION

4-Lead 3.2 mm × 2.5 mm × 1.2 mm VDFN [FEC] 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>



Dimensions in mm

APPENDIX A: REVISION HISTORY

Revision A (April 2024)

- Converted Vectron document VC-820 to Microchip data sheet template DS20006895A.
- Minor grammatical text changes throughout.

VC-820

NOTES:

PRODUCT IDENTIFICATION SYSTEM

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

<u>XX-XXX</u>	<u>-X</u>	<u>X</u>	<u>X</u>	<u>-X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>-xxXxxxxxxx</u>	<u>XX</u>
Device	Power Supply	Output	Temperature Range	Stability	Enable/Disable	Load	Custom Options	Frequency	Packaging
Device:	VC-820	=	Crystal Oscillator as 3.2 mm × 2.5 mm × 1.2 mm ceramic VDFN						
Power Supply:	E	=	3.3VDC						
	H	=	2.5VDC						
	J	=	1.8VDC						
Output:	A	=	CMOS						
Temp. Range:	W	=	-10°C to +70°C						
	E	=	-40°C to +85°C						
	F	=	-40°C to +105°C (±50 ppm and ±100 ppm only)						
	7	=	-40°C to +125°C (±50 ppm and ±100 ppm only)						
	B	=	-55°C to +105°C (±50 ppm and ±100 ppm only)						
Stability:	C	=	-55°C to +125°C (±50 ppm and ±100 ppm only)						
	E	=	±20 ppm						
	F	=	±25 ppm						
	K	=	±50 ppm						
Enable/Disable:	S	=	±100 ppm						
	A	=	Enable High						
Load:	A	=	15 pF						
Custom Options:	N	=	Standard Option						
Frequency:	xxMxxxxxxx	=	Frequency in MHz						
	xxKxxxxxxx	=	Frequency in kHz						
Packaging:	TR	=	3,000/Reel (standard Tape & Reel)						
	<blank>	=	100/Reel (non-standard Tape & Reel)						

Examples:

- VC-820-EA7-KAAN-1M00000000TR
3.3VDC Power Supply, CMOS, -40°C to +125°C (±50 ppm and ±100 ppm only), ±50 ppm, Enable High, 15 pF Load, Standard Option, 1.0000 MHz Frequency, 3,000/Reel
- VC-820-EAB-KAAN-10M00000000
3.3VDC Power Supply, CMOS, -55°C to +105°C (±50 ppm and ±100 ppm only), ±50 ppm, Enable High, 15 pF Load, Standard Option, 10.0000 MHz Frequency, 100/Reel
- VC-820-EAW-SAAN-44M2368000
3.3VDC Power Supply, CMOS, -10°C to +70°C, ±100 ppm, Enable High, 15 pF Load, Standard Option, 44.2368 MHz Frequency, 100/Reel
- VC-820-HAC-KAAN-125M00000000
2.5VDC Power Supply, CMOS, -55°C to +125°C (±50 ppm and ±100 ppm only), ±50 ppm, Enable High, 15 pF Load, Standard Option, 125.0000 MHz Frequency, 100/Reel
- VC-820-JAE-FAAN-66M6660000TR
1.8VDC Power Supply, CMOS, -40°C to +85°C, ±25 ppm, Enable High, 15 pF Load, Standard Option, 66.6660 MHz Frequency, 3,000/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 2:** The frequency is 10 digits long including M, for MHz, or K, for kHz, and the prefix can be 1, 2 or 3 digits long.

NOTES:

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

- 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, within operating specifications, and under normal conditions.
 - Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.
 - 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. Microchip is committed to continuously improving the code protection features of our products.
-

This publication and the information herein may be used only with Microchip products, including to design, test, and integrate Microchip products with your application. Use of this information in any other manner violates these terms. Information regarding device applications is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. Contact your local Microchip sales office for additional support or, obtain additional support at <https://www.microchip.com/en-us/support/design-help/client-support-services>.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL, OR CONSEQUENTIAL LOSS, DAMAGE, COST, OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION.

Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, CryptoMemory, CryptoRF, dsPIC, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Klear, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricon, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, ClockWorks, The Embedded Control Solutions Company, EtherSynch, Flashtec, Hyper Speed Control, HyperLight Load, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, TimeCesium, TimeHub, TimePictra, TimeProvider, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, Clockstudio, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, EyeOpen, GridTime, IdealBridge, iGAT, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, IntelliMOS, Inter-Chip Connectivity, JitterBlocker, Knob-on-Display, MarginLink, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mSiC, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, Power MOS IV, Power MOS 7, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SmartHLS, SMART-I.S., storClad, SQL, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, Trusted Time, TSHARC, Turing, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2024, Microchip Technology Incorporated and its subsidiaries.

All Rights Reserved.

ISBN: 978-1-6683-4470-5

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

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