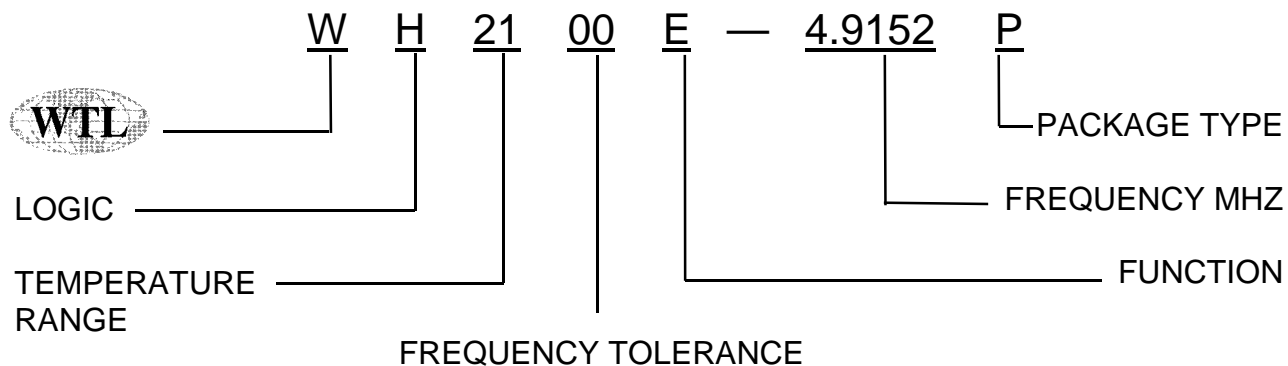


**2000 SMO SERIES PART NUMBERING GUIDE**

SURFACE MOUNT

**WH2000 ( ) - C**



**Part Numbering Definitions and Code**

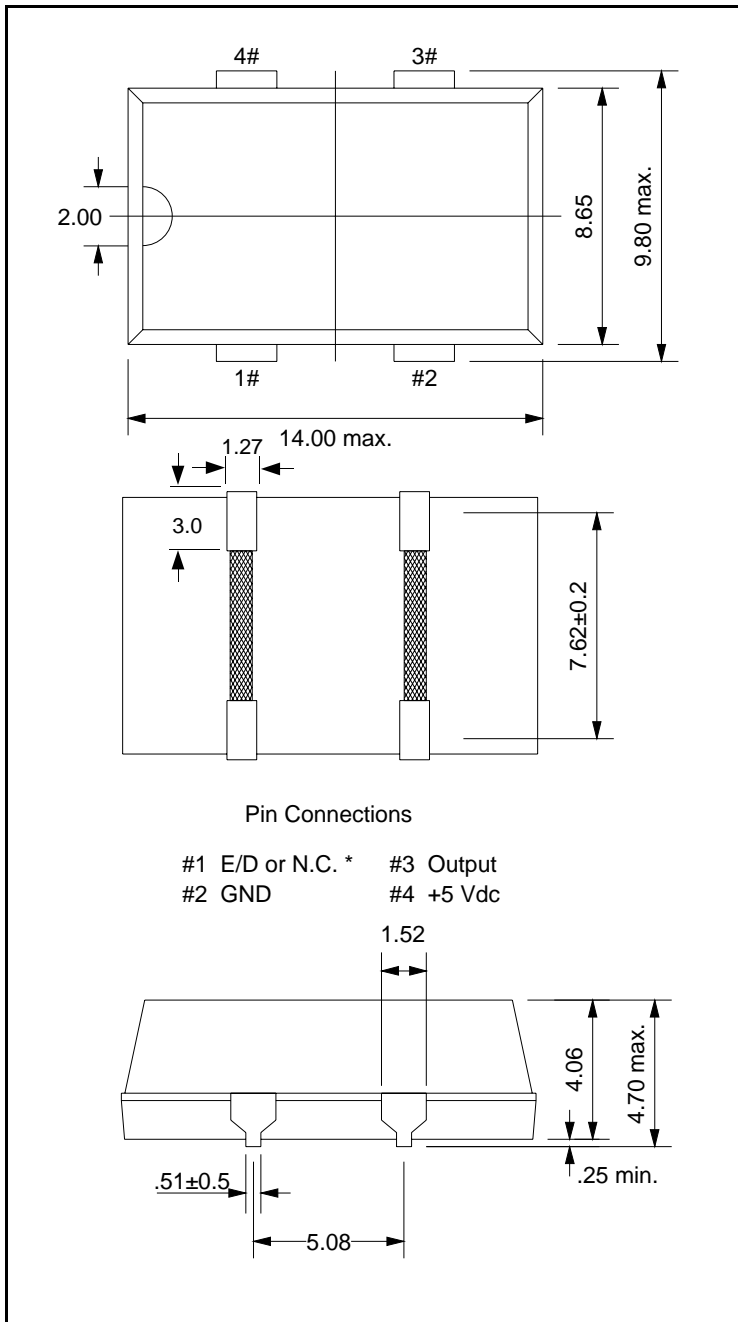
LOGIC	C = CMOS
	H = High Speed CMOS/TTL Compatible
TEMP RANGE:	21 = 0° to 70°C
	22 = -30° to 75°C
	23 = -40° to 85°C
FREQ. TOL.*	00 = 0.01% ± 100 ppm
	01 = 0.005% ± 50 ppm
FUNCTION:	E = Enable/Disable (TRI-STE, Pin One High)
PACKAGE TYPE:	C = CERAMIC BASE /METAL TOP SMD
SUPPLY VOLTAGE DESIGNATOR	5.0 ± 0.5v (No end designator number)
	3.3 ± 0.3v (Use 3 at end of P/N)
EXAMPLE	WH2202E-32C3

\* NOTE: Call or fax WTL for Tighter Frequency Tolerance



WH2000 ( ) - P SMO DIMENSIONS

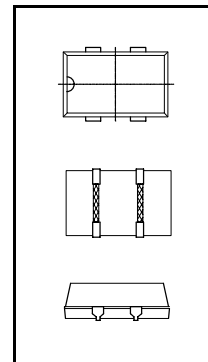
WH2000 ( ) - P SMO



Pin Connections

- #1 E/D or N.C. \*
- #2 GND
- #3 Output
- #4 +5 Vdc

Enlarged View



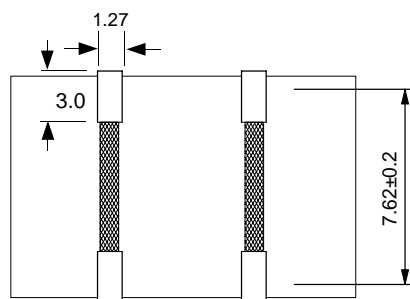
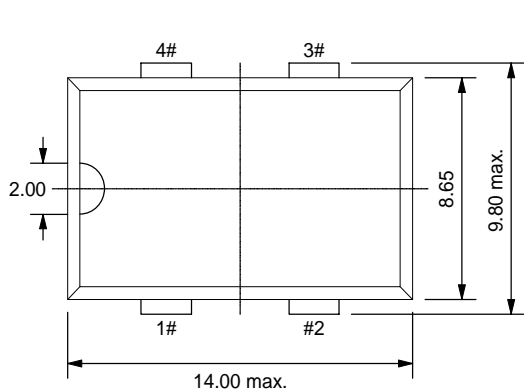
Actual Size Shown Above 1=1

**WH2000 ( ) -P SMO DIMENSIONS**

**WH2000 ( ) - P SMO**

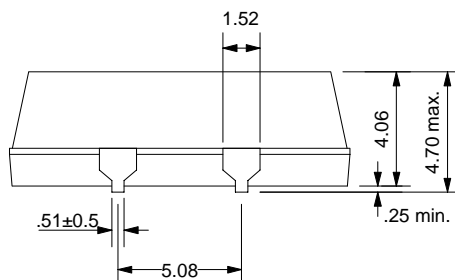
PARAMETERS	CONDITION	WH2000P	WH2000P1	WH2000P	WH2000P1	WH2000P	WH2000P1	UNITS
		MIN	MAX	MIN	MAX	MIN	MAX	
Frequency Range		1.025	26.000	26.000	36.000	26.000	66.667	MHz
Frequency Stability**	-10 ~ +70°C	-100	+100	-100	+100	-100	+100	PPM
	-40 ~ +85°C	-200	+200	-200	+200	-200	+200	
Input Current (I <sub>DD</sub> )	No Load		23		35		35	mA
	Output Disabled (I <sub>Z</sub> )		12		20		20	
Output Symmetry Typical 45/55%	2.5V	40	60	40	60	40	60	%
	1.4V	40	60	40	60	---	---	
Rise Time (T <sub>R</sub> )	0.5V ~ 4.5V		8		10		7	ns
	0.4V ~ 2.4V		8		10		7	
Fall Time (T <sub>F</sub> )	2.4V ~ 0.4V		8		8		7	
	4.5V ~ 0.5V		8		8		7	
Output Voltage (V <sub>OL</sub> ) (V <sub>OH</sub> )	I <sub>OL</sub> = MIN		0.4		0.4		0.4	V
	I <sub>OH</sub> = MAX	4.5		2.4		4.5		
Output Current (I <sub>OL</sub> ) (I <sub>OH</sub> )	'0' Logic Level	16		16		4		mA
	'1' Logic Level		-0.4		-0.4		-4.0	
Output Load	TTL		10		10		10LS	TTL
	HCMOS		50		30		50	
Start-up Time (T <sub>S</sub> )	0.0V ~ 4.5V		4		10		10	ms
Enable/Disable Time			100		100		100	ns
E/D Input Current	(Pin 1) V <sub>IL</sub> ≤ 0.8V	-100	-15	-100	-15	-100	-15	μA
	(Pin 1) V <sub>IH</sub> ≥ 2.2V		1.00		1.0		1.0	

\*\* Inclusive of 25°C tolerance, operating temperature range, input voltage change and load change.



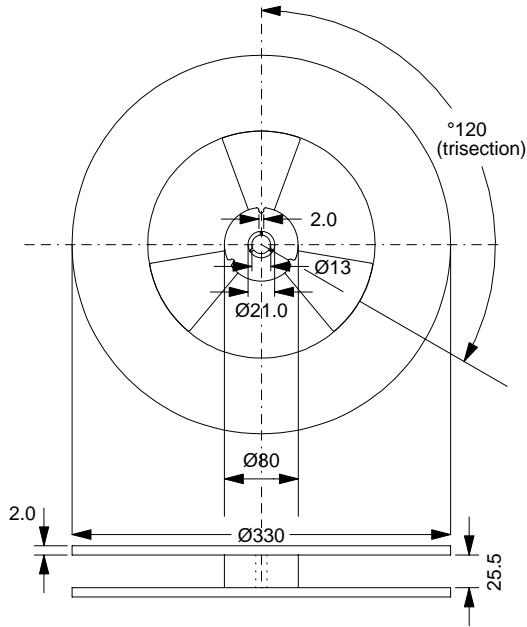
Pin Connections

- #1 E/D or N.C. \*
- #2 GND
- #3 Output
- #4 +5 Vdc





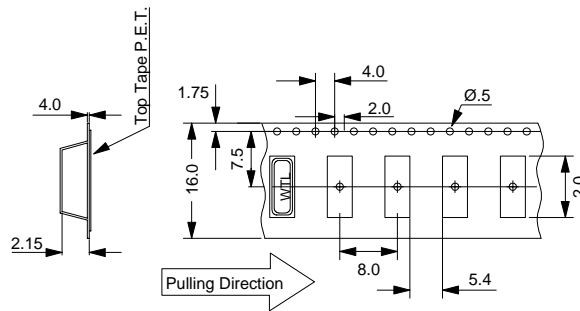
WH2000 ( ) - P SMO REEL



Material: Cardboard

Parts Quantity Per Reel: 1,000

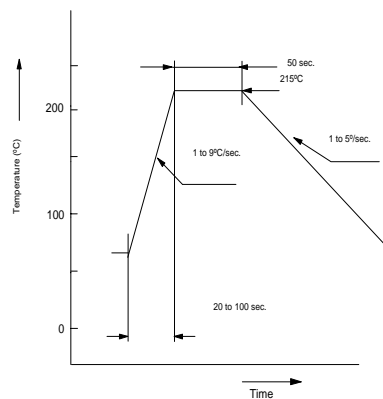
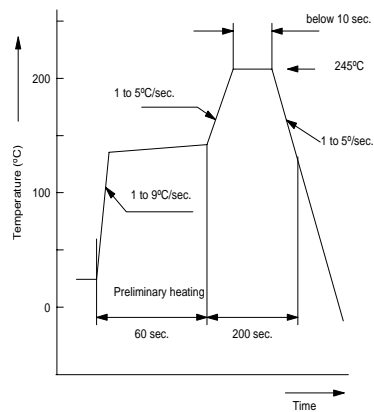
WH2000 ( ) - P SMO EMBOSSED CARRIER



Conditional chart for soldering of SMD products

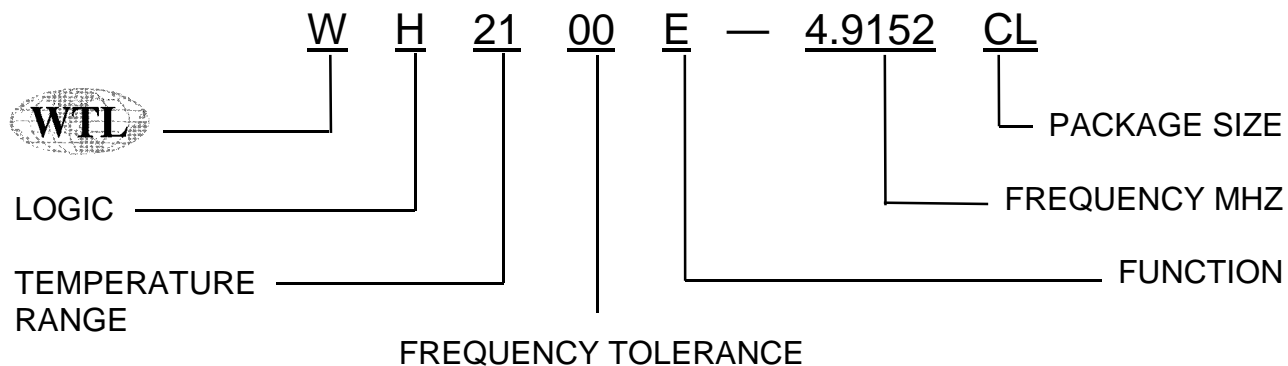
• Infrared - reflow

• Vapor Phase - reflow



**WH2000 ( ) - CL SMO SERIES PART NUMBERING GUIDE**

**WH2000 ( ) - CL**



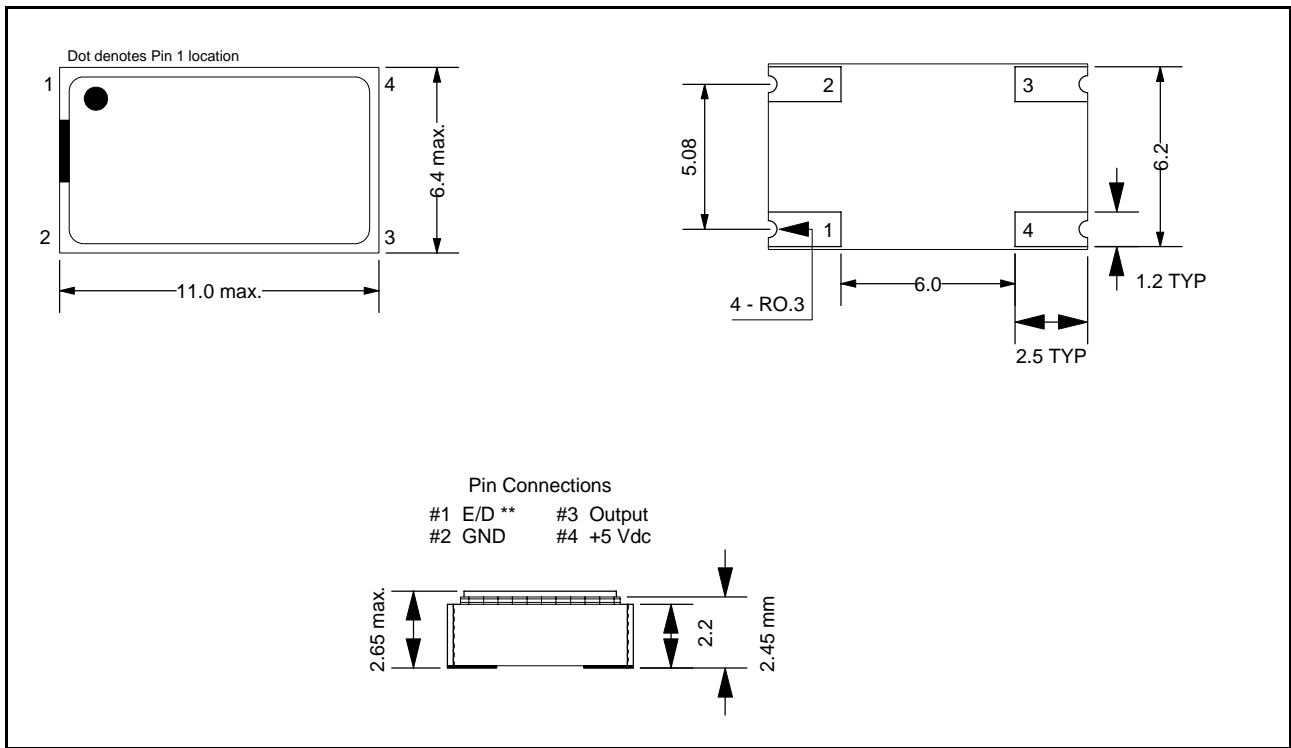
**Part Numbering Definitions and Code**

LOGIC	C = CMOS
	H = High Speed CMOS/TTL Compatible
TEMP RANGE:	21 = -10° to 70°C
	22 = -30° to 75°C
FREQ. TOL:	00 = 0.01% ± 100 ppm
	01 = 0.005% ± 50 ppm
	02 = 0.025% ± 25 ppm
FUNCTION:	E = Enable/Disable (TRI-STE, Pin One High)
PACKAGE TYPE:	CL = Ceramic Base/Metal Top (bmm long)
SUPPLY VOLTAGE:	5.0 ± 0.5v (No End Designator Number)
DESIGNATOR:	3.3 ± 0.3v (Use 3 at End of P/N)

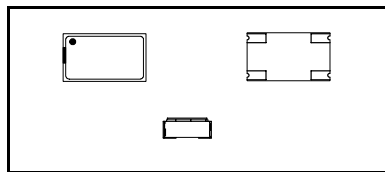


WH2000 ( ) - CL SMO SERIES PART NUMBERING GUIDE

WH2000 ( ) -CL SMO



Enlarged View



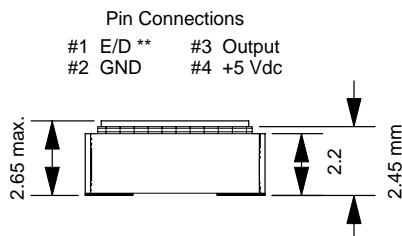
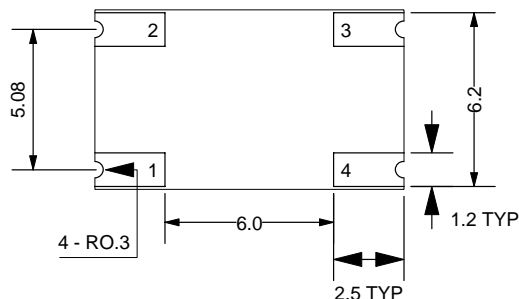
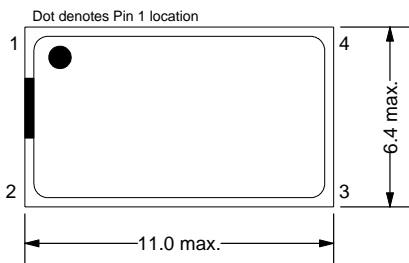
Actual Size Shown Above 1=1



WH2000 ( ) - CL SMO SERIES PART NUMBERING GUIDE

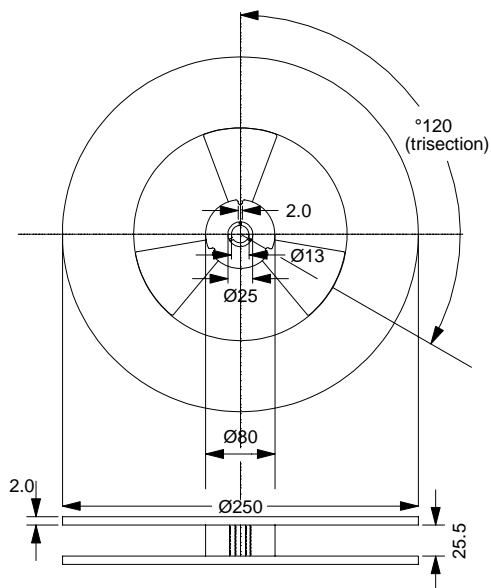
WH2000 ( ) -CL SMO

PARAMETERS	FREQUENCY RANGES (MHz)	CONDITION	WH2000 CL			WH2000 CL-1			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Frequency Stability	* NOTE: Below	All Conditions* TA = 25°C TA = -10 to +70°C	-100	± 20 ± 40	100	-100	± 20 ± 40	100	PPM
Input Current (I <sub>DD</sub> )	1.8432 ~ 25.000 25.000+ ~ 50.000 50.000+ ~ 70.000 70.000+ ~ 100.000	Maximum Load		17 33 45 67	25 45 70 80		13 25 --- ---	20 35 --- ---	mA
Output Symmetry		50% V <sub>DD</sub> Level	40	50 ±5	60	45	50 ±3	55	%
Rise Time (TR)	1.8432 ~ 70.000 70.000+ ~ 100.000	0.5V to 4.5 V		4 2	7 3		5 ---	10 ---	ns
Fall Time (TF)	1.8432 ~ 70.000 70.000+ ~ 100.000	4.5V to 0.5V		4 2	7 3		5 ---	10 ---	ns
Output Voltage (V <sub>OL</sub> ) (V <sub>OH</sub> )		'0' Logic Level '1' Logic Level			0.5	4.5		0.5	V
Output Current (I <sub>OL</sub> ) (I <sub>OH</sub> )		'0' Logic Level '1' Logic Level	16		-16	4		-4	mA
Output Load	1.8432 ~ 70.000 70.000+ ~ 100.000	TTL HCMOS			10 50			10LS 15	TTL pF
Start-up Time (TS)		0.0V to 5.0V		3	10		3	10	ms
Enable/Disable Time					100			100	ns
INH Input Current (I <sub>IL</sub> ) (I <sub>IH</sub> )		(Pin 1) V <sub>IL</sub> ≤ 0.8V (Pin 1) V <sub>IL</sub> ≥ 2.2V	400	50 30	-400	400		-400	μA



\* NOTE: Call or Fax WTL for Extended Frequencies & Stabilities

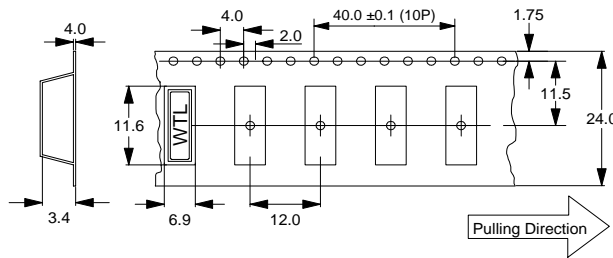
WH2000 ( ) -CL SMO REEL



Material: Conductive Polystyrene

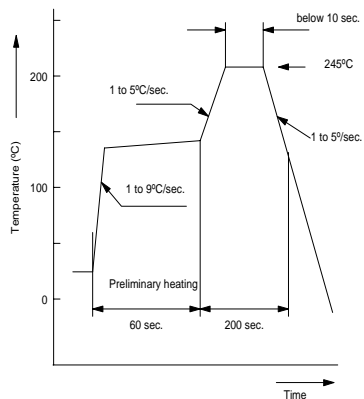
Parts Quantity Per Reel: 1,000

WH2000 ( ) -CL SMO EMBOSSED CARRIER

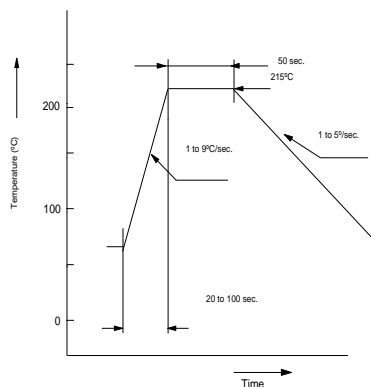


Conditional chart for soldering of SMD products

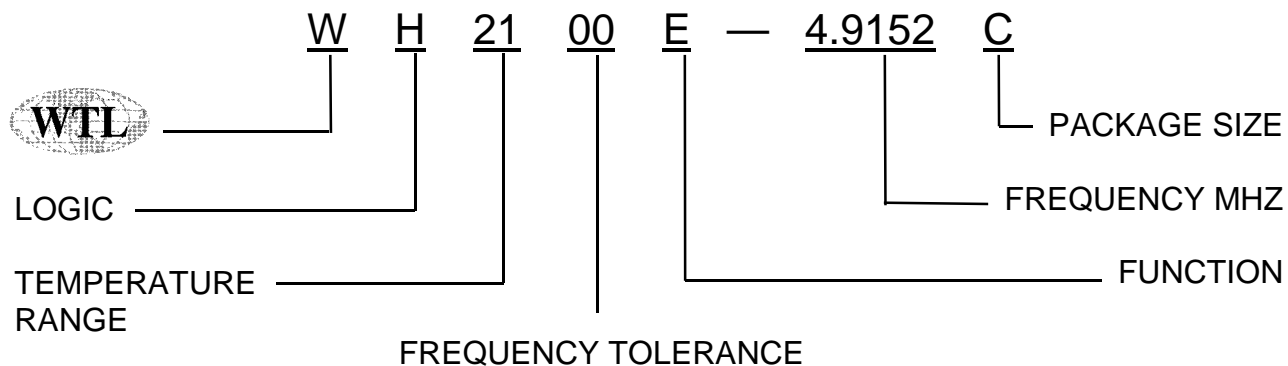
• Infrared - reflow



• Vapor Phase - reflow



**WH2102 ( ) -C SMO**



**Part Numbering Definitions and Code**

LOGIC	<b>C</b> = CMOS	
	<b>H</b> =	<b>High Speed CMOS/TTL Compatible</b>
TEMP RANGE:	<b>21</b> =	<b>-0° to 70°C</b>
	<b>23</b> =	<b>-40 to 85 C</b>
FREQ. TOL:	<b>00</b> =	<i>0.01% ± 100 ppm</i>
	<b>01</b> =	<i>0.005% ± 50 ppm</i>
	<b>02</b> =	<b>0.025% ,± 25 ppm</b>
FUNCTION:	<b>E</b> =	<b>Enable/Disable (TRI-STE, Pin One High)</b>
PACKAGE TYPE:	<b>C</b> =	<b>Ceramic Base/Metal Top</b>

WH2000 ( ) - C SMO

WTL P/N: WH2102E-2.048C

- ◆ ENABLE - DISABLE
- Ultra Miniature Configuration (SMD)
- High Stability & High Reliability
- Light & Thin (Typ. 1.80 mm)
- Ceramic + Metal High Hermeticity Package
- Low power consumption, Heavy load durable

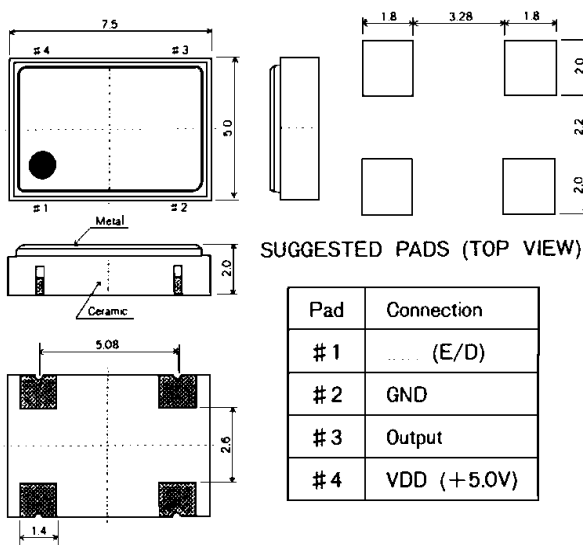
◆ SPECIFICATION

Type 2000 - C		2000 - C	2000 - C1
Frequency Range		1.0 - 50MHz	1.0MHz - 70MHz
Frequency Tolerance		±50, ±100ppm	
Operable Temperature		-40°C to +85°C	
Supply Current (V <sub>oo</sub> = 5V)	≤25MHz	20mA (10mA Typ.)	25mA (17mA Typ.)
	>25MHz	35mA (21mA Typ.)	45mA (33mA Typ.)
	>50MHz		60mA (45mA Typ.)
Output	Driving Ability	15pF	50pF
	TTL	10LS-TTL	10N-TTL
	Symmetry	50/45% (53/47% Typ.)	60/40% (55/45% Typ.)
	Rise/Fall	10ns Max. (5ns Typ.)	7ns Max. (4ns Typ.)

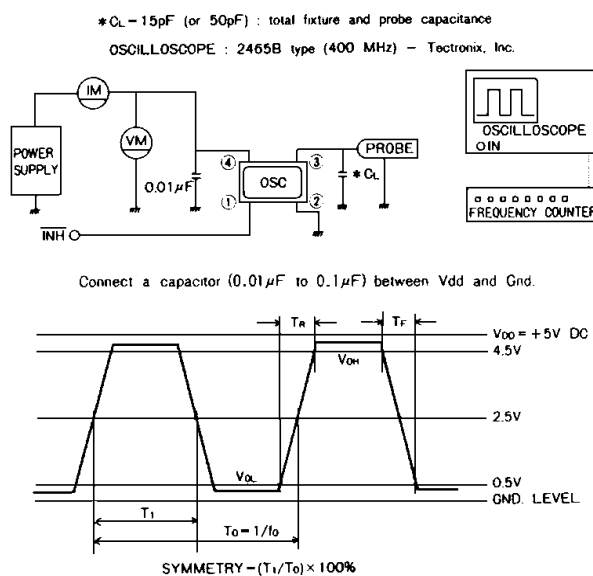
● ENABLE - DISABLE FUNCTION

Pad #1	Open	≥2.2V	≤0.8V
Pad #3	Active	Active	High Z

◆ OUTLINE DRAWING (mm)



◆ TEST CIRCUIT

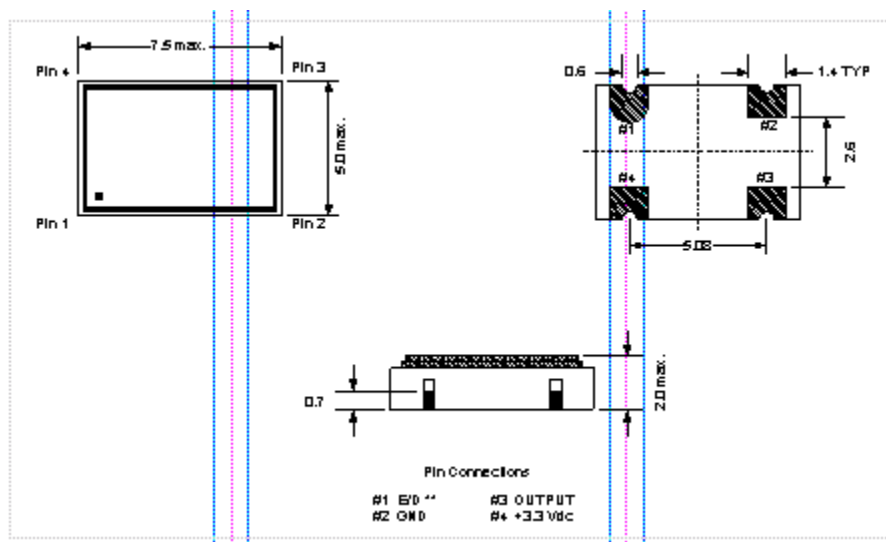




WH2000 ( ) - C SMO

WH2000 ( ) - C SMO

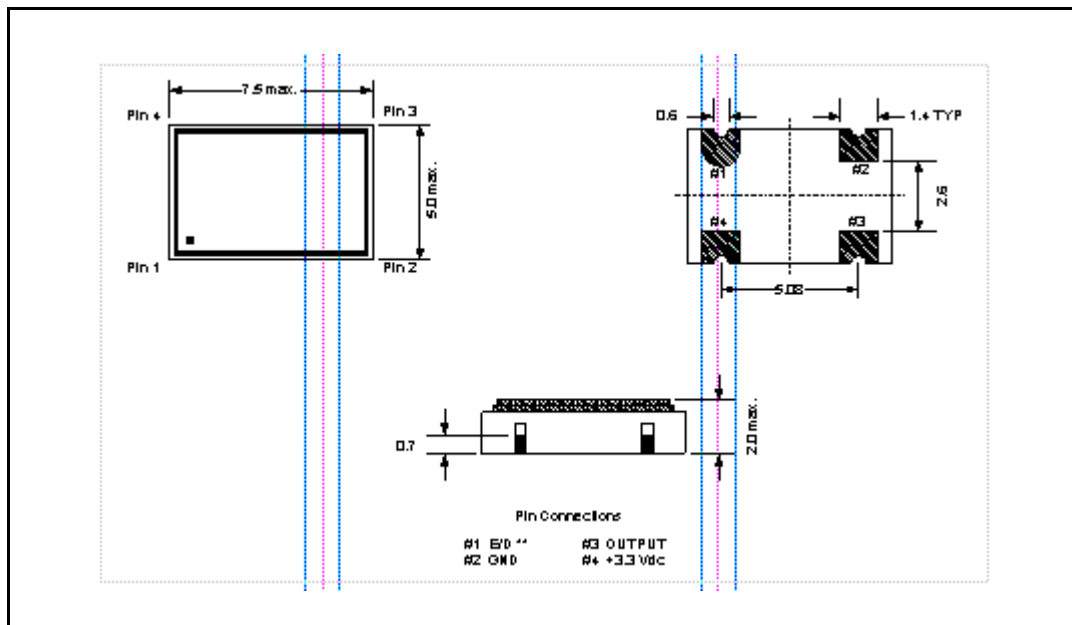
WH2000 ( ) - C SMO MECHANICAL DRAWING



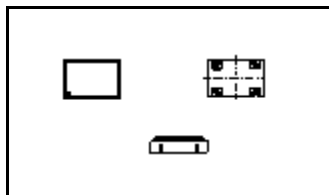


WH2000 ( ) - C SMO SERIES PART NUMBERING GUIDE

WH2000 ( ) -C SMO

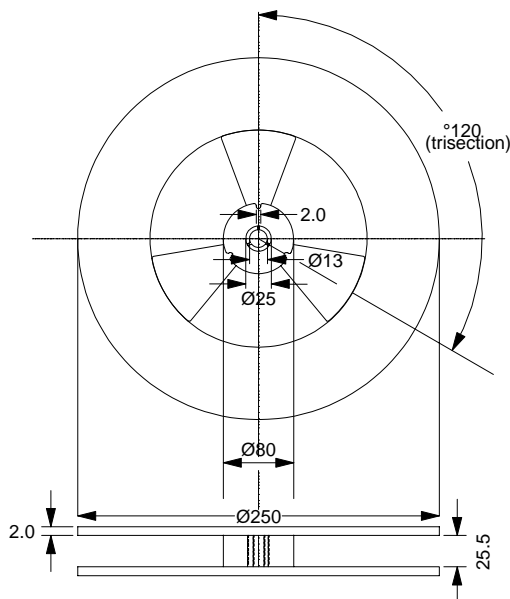


Enlarged View



Actual Size Shown Above 1=1

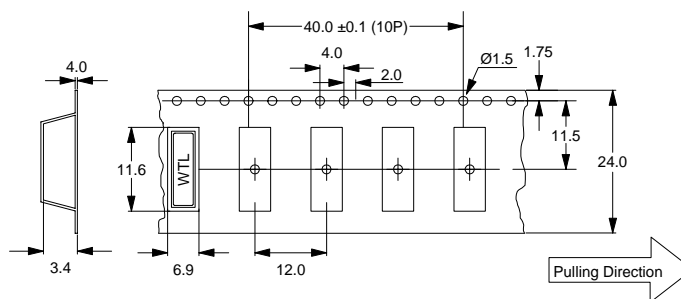
WH2000 ( ) -C SMO REEL



Material: Conductive Polystyrene

Parts Quantity Per Reel: 1,000

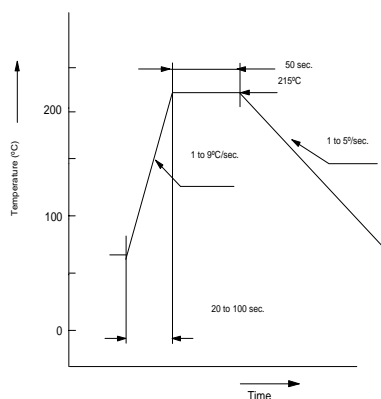
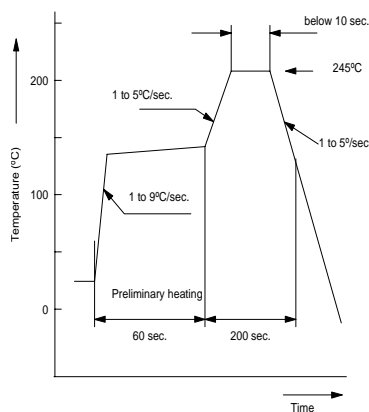
WH2000 ( ) -C SMO EMBOSSED CARRIER



Conditional chart for soldering of SMD products

• Infrared - reflow

• Vapor Phase - reflow





PRECISION QUARTZ CRYSTAL CLOCK OSCILLATOR SURFACE MOUNT SPECIFICATION RFQ FORM

Supply the Specifications and Fax WTL with your Information

NAME: \_\_\_\_\_ TITLE: \_\_\_\_\_ COMPANY: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_ FAX NO: \_\_\_\_\_  
 CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_ EMAIL: \_\_\_\_\_  
 MAIL STOP: \_\_\_\_\_

Quantity Needed

IMMEDIATE: \_\_\_\_\_ DELIVERY REQUIRED: \_\_\_\_\_  
 FUTURE NEEDS: \_\_\_\_\_ APPROX. DELIVERY DATE: \_\_\_\_\_  
 CUSTOMER SPEC. DRAWING NO: \_\_\_\_\_ TARGET PRICE: \_\_\_\_\_ PER \_\_\_\_\_  
 DEVICE TYPE & APPLICATION: \_\_\_\_\_  
 PROJECT DESCRIPTION OR NO.: \_\_\_\_\_

How to Order Custom-Designed WTL Crystal Clock Oscillators/SMD

Please provide the following information concerning your crystal clock oscillator requirements

- 1. Output Frequency \_\_\_\_\_ MHz or  
KHz
- 2. Package Type \_\_\_\_\_
- 3. Frequency Stability \_\_\_\_\_ ppm
- 4. Operating Temperature Range \_\_\_\_\_ °C to \_\_\_\_\_ °C
- 5. Input Current \_\_\_\_\_ mA max.
- 6. Output Logic \_\_\_\_\_
- 7. Symmetry \_\_\_\_\_
- 8. Rise and Fall Times \_\_\_\_\_ ns max.
- 9. Load \_\_\_\_\_
- 10. Additional specifications, if any: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_