

## Low Profile SMD Type Crystal Units



### FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- Surface mount
- Compliant to RoHS directive 2002/95/EC


**RoHS**  
COMPLIANT

This part is a miniature AT cut strip crystal unit packaged for surface mounting.

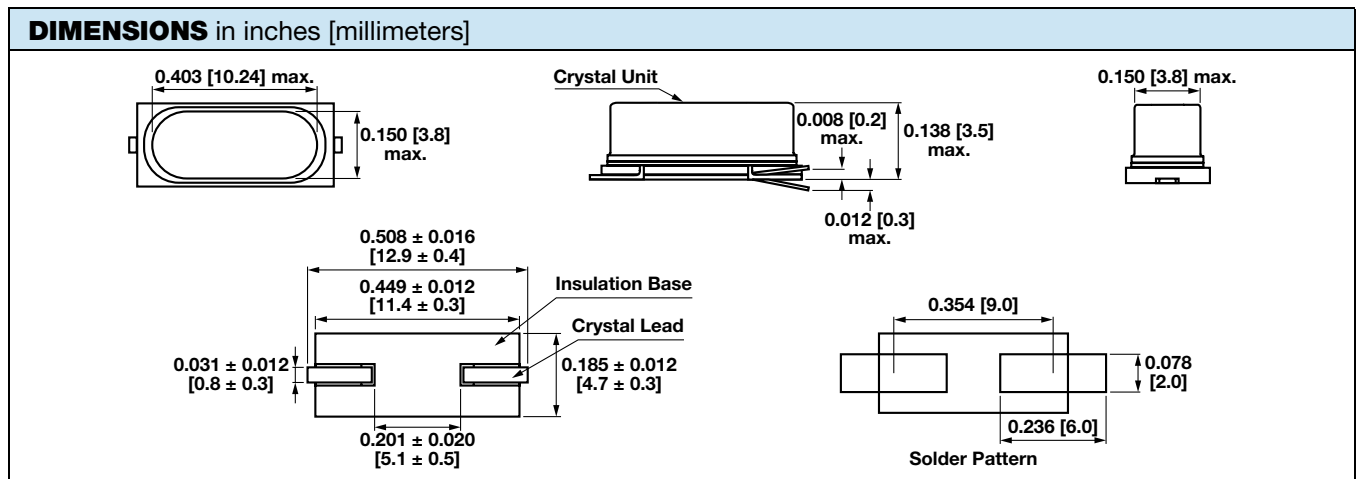
### STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Frequency range	$F_0$		MHz	3.200	-	66.000
Frequency tolerance	$\Delta F/F_0$	at 25 °C	ppm	$\pm 10$	$\pm 30$	$\pm 50$
Temperature stability	$T_C$	ref. to 25 °C	ppm	$\pm 10$	$\pm 30$	$\pm 50$
Operating temperature range	$T_{OPR}$		°C	- 20	-	+ 70
Storage temperature range	$T_{STG}$		°C	- 40	-	+ 85
Shunt capacitance	$C_0$		pF	-	-	7
Load capacitance	$C_L$	customer specified	pF	10	-	series
Insulation resistance	$I_R$	100 V <sub>DC</sub>	M $\Omega$	500	-	-
Drive level	$D_L$		$\mu$ W	-	100	500
Aging	$F_a$	at 25 °C, per year	ppm	- 5	-	+ 5

### EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE)

FREQUENCY RANGE (MHz)	MAX. ESR ( $\Omega$ )	MODE	FREQUENCY RANGE (MHz)	MAX. ESR ( $\Omega$ )	MODE
3.200 to 4.499	150	fundamental/AT	9.000 to 9.999	60	fundamental/AT
4.500 to 5.999	120	fundamental/AT	10.000 to 12.999	50	fundamental/AT
6.000 to 6.999	100	fundamental/AT	13.000 to 29.999	40	fundamental/AT
7.000 to 7.999	90	fundamental/AT	30.000 to 66.000	80	3 <sup>rd</sup> overtone
8.000 to 8.999	80	fundamental/AT			

### DIMENSIONS in inches [millimeters]





ORDERING INFORMATION				
<b>XT49ML</b>	<b>R</b>	<b>-20</b>	<b>20M</b>	<b>e2</b>
MODEL	OTR blank = standard R = - 40 °C to + 85 °C	LOAD blank = series -20 = 20 pF -30 = 30 pF -32 = 32 pF	FREQUENCY/MHz	JEDEC LEAD (Pb)-FREE STANDARD

GLOBAL PART NUMBER												
X	T	9	M	L	2	0	A	N	A	2	0	M
MODEL					LOAD		PACKAGE CODE	OPTION		FREQUENCY		

GLOBAL PART NUMBERING												
X	T	9	S	2	0	A	N	A	4	0	M	
<b>MODEL NUMBER</b>				<b>LOAD CAPACITANCE</b>		<b>PACKAGE CODE</b>		<b>OPTIONS</b>		<b>FREQUENCY</b>		
XT9U = XT49U XT9S = XT49S XT9SL = XT49SL XT9M = XT49M XT9ML = XT49ML XTU1 = XTUM1				18 = 18 pF 20 = 20 pF NL = series to be specified by customer		<b>Tape and reel</b> G = RF5 (XT9U, XT9S, XT9SL) H = RF7 (XT9M, XT9ML)  <b>Bulk</b> A = B04 (all models)		NA = no additional options RR = extended temperature of - 40 °C to + 85 °C Contact factory for all other options		4M = 4 MHz 40M = 40 MHz 100M = 100 MHz 12M288 = 12.288 MHz M is used as decimal place holder in frequency		
Example: XT49S-20 40M												
X	T	2	6	T	T	A	3	2	K	7	6	8
<b>MODEL NUMBER</b>				<b>OPERATING TEMPERATURE (OTR)</b>		<b>PACKAGE CODE</b>		<b>FREQUENCY</b>				
XT26T = XT26T XT38T = XT38T				T = - 10 °C to + 60 °C		<b>Bulk</b> A = B04 (all models)		32K768 = 32.768 kHz K is used as decimal place holder in frequency				
Example: XT26T 32.768K												
X	T	5	7	2	0	A	4	0	M			
<b>MODEL NUMBER</b>				<b>LOAD CAPACITANCE</b>		<b>PACKAGE CODE</b>		<b>FREQUENCY</b>				
XT57 = XT57C XT46 = XT46C XT36 = XT36C				18 = 18 pF 20 = 20 pF NL = series to be specified by customer		<b>Tape and reel</b> H = RF7  <b>Bulk</b> A = B04 (all models)		4M = 4 MHz 40M = 40 MHz 100M = 100 MHz 12M288 = 12.288 MHz M is used as decimal place holder in frequency				
Example: XT57C-20 40M												



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.