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VISHAY INTERTECHNOLOGY, INC.

INTERACTIVE
data book

FREQUENCY CONTROL PRODUCTS
VISHAY DALE

VSE-DB0020-0507

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FREQUENCY CONTROL PRODUCTS

Tuning Fork Crystals

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Thru-Hole Oscillators

Surface Mount Clock Oscillators

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- Standard, Fast and Ultra-fast Recovery (single, dual)
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- Bridge
- Superectifier®
- Sinterglass Avalanche Diodes

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- Bandswitching
- PIN

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- TVS (TransZorb®, Automotive, ESD, Arrays)

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- JFETs

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- Dual Gate MOSFETs
- MOSMICs®

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- LEDs and 7-Segment Displays
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- Power ICs
- Analog Switches
- DC/DC Converters
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- Foil Resistors
- Film Resistors
  - Thin Film Resistors
  - Thick Film Resistors
  - Metal Oxide Film Resistors
  - Carbon Film Resistors
- Wirewound Resistors
- Power Metal Strip® Resistors
- Variable Resistors
  - Cermet Variable Resistors
  - Wirewound Variable Resistors
  - Conductive Plastic Variable Resistors
- Networks/Arrays
- Non-linear Resistors
  - NTC Thermistors
  - PTC Thermistors
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Frequency Control Products

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www.vishay.com

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Crystals

QUARTZ

Quartz is formed from silicon and oxygen. It grows naturally or can be cultured in autoclaves under high pressure and heat. Most quartz used today by crystal manufacturers is cultured so that its purity and quality can be controlled. Quartz is used in Frequency Control Products because of its piezoelectric properties.

PIEZOELECTRIC EFFECT

When pressure is applied on a quartz crystal, a voltage is generated. The voltage produces a mechanical motion and vibration. The frequency of these vibrations is measured in hertz.

OPERATING MODES

A crystal can operate in a circuit in one of two modes, series or parallel.

- **SERIES RESONANCE:**
  When a crystal is operated at series resonance it appears resistive and no load capacitor is required.
- **PARALLEL MODE:**
  Crystals operated in this mode appear inductive in the circuit. A load capacitor must be specified for the crystal to operate at the proper frequency. Typical values of load capacitors at 18 pF, 20 pF, 30 pF or 32 pF.

FREQUENCY STABILITY

This is the allowable deviation from nominal frequency over a specified temperature range. It is expressed in ppm or % of nominal frequency.

FREQUENCY TOLERANCE

This is the maximum allowable deviation from the nominal frequency at 25 °C.

FUNDAMENTAL AND OVERTONE CRYSTALS

A crystal vibrates at many frequencies. The lowest frequency is called the fundamental mode and is usually supplied up to 30 MHz. Higher frequencies are achieved by operating the crystal at odd overtones (3rd, 5th, 7th and 9th) and tuning the circuit so the crystal operates at the designed overtone frequency.

PULLABILITY

The change in frequency (measured in ppm) for a given change in the parallel load capacitance is the pullability of the crystal. This will be specified for special applications such as VCXOs.

EQUIVALENT SERIES RESISTANCE

This is the resistance of the crystal measured at the series resonance frequency. The resistance measured at the parallel load resonant frequency is called the effective resistance.

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Crystals

SELECTOR GUIDE - CRYSTALS					
PRODUCT	FREQUENCY RANGE	FREQUENCY TOLERANCE (TYPICAL)	TEMPERATURE STABILITY (TYPICAL)	TEMPERATURE RANGE	KEY FEATURES
XT26T	32.768 KHz	20 ppm		-10 to + 60 °C	Tuning fork Low cost Sub-miniature package
XT38T	32.768 KHz	20 ppm		-10 to + 60 °C	Tuning fork Low cost Sub-miniature package
XT38P	32.768 KHz	20 ppm		-40 to + 85 °C	Tuning fork Low cost Surface mount package
XT32P	32.768 KHz	20 ppm		-40 to + 85 °C	Tuning fork Low cost Surface mount package
XT49U	1.8432 to 125 MHz	30 ppm	30 ppm	-20 to + 70 °C	Industry standard Low cost Hermetically sealed
XT49S	3.2 to 66 MHz	30 ppm	30 ppm	-20 to + 70 °C	Industry standard 3.5 mm profile Low cost Hermetically sealed
XT49SL	3.2 to 66 MHz	30 ppm	30 ppm	-20 to + 70 °C	Industry standard 2.5 mm profile Low cost Hermetically sealed
XT49M	3.2 to 66 MHz	30 ppm	30 ppm	-20 to + 70 °C	Industry standard 4.5 mm profile Low cost Hermetically sealed
XT49ML	3.2 to 66 MHz	30 ppm	30 ppm	-20 to + 70 °C	Industry standard 3.5 mm profile Low cost Hermetically sealed
XTUM	10 to 125 MHz	10 ppm	10 ppm	-40 to + 85 °C	Miniature package Wide frequency range
XT36C	10 to 80 MHz	50 ppm	50 ppm	-10 to + 70 °C	Surface mountable 1.6 mm profile
XT57C	9.8304 to 100 MHz	30 ppm	30 ppm	-10 to + 60 °C	Miniature package Low cost
XT46C	10 to 80 MHz	30 ppm	30 ppm	-10 to + 60 °C	Miniature package Low cost

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Global Part Numbering
Crystals

GLOBAL PART NUMBERING

X T 9 S	2 0	A	N A	4 0 M
MODEL NUMBER	**LOAD CAPACITANCE**	**PACKAGE CODE**	**OPTIONS**	**FREQUENCY**
XT9U = XT49U XT9S = XT49S XT9SL = XT49SL XT9M = XT49M XT9ML = XT49ML XTU1 = XTUM1 XT36 = XT36C XT57 = XT57C XT46 = XT46C	18 = 18 pF 20 = 20 pF NL = Series to be specified by customer	TAPE AND REEL G = RF5 (XT9U, XT9S,XT9SL) H = RF7 (XT9M, XT9ML, XT36, XT57, XT46) BULK 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
MODEL NUMBER	**OPERATING TEMPERATURE (OTR)**	**PACKAGE CODE**	**FREQUENCY**
XT26T = XT26T XT38T = XT38T	T = 0 °C to +70 °C R = -40 °C to +85	BULK A = B04 (all models)	32K768 = 32.768 KHz K is used as decimal place holder in frequency

Example: XT26T 32.768K

X T 3 8 P	A	A	3 2 K 7 6 8
MODEL NUMBER	**PAD LAYOUT**	**PACKAGE CODE**	**FREQUENCY**
XT32P = XT32P XT38P = XT38P	A = A B = B (see datasheet)	BULK A = B04 (all models)	32K768 = 32.768 KHz K is used as decimal place holder in frequency

Example: XT38PA 32.768K

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XT26T

Vishay Dale

Tuning Fork Crystal

The tuning fork type quartz crystal provides ultimate in size, performance and economic trade-offs. So it is used as a clock source in communication equipment, measuring instrument, microprocessor and other time management applications.

FEATURES

- Miniature package
- Low cost
- KHz frequency
- Tight tolerance
- 100 % Lead (Pb)-free and RoHS compliant

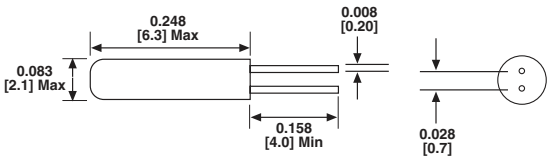
Pb-free

RoHS COMPLIANT

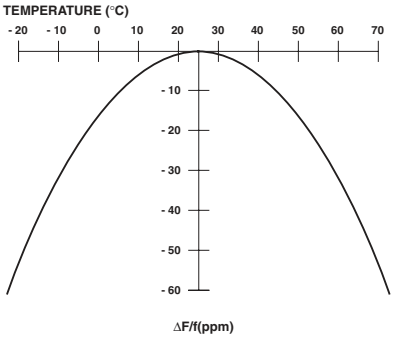
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		KHz		32.768	
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm		±20	
Frequency Coefficient	K	ref to 25 °C	ppm/(Δ°C)^2			-0.042
Operating Temperature Range	T_{OPR}		°C	-10		+60
Storing Temperature Range	T_{STG}		°C	-20		+70
Shunt Capacitance	C_O		pF		0.85	2
Motional Capacitance	C_1		fF	1	2	4
Load Capacitance	CL		pF		12.5	
Insulation Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW			1
Aging (first year)	Fa	at 25 °C ± 3° C	ppm	-5.0		+5.0
Equivalent Series Resistance(ESR)	Rs		KΩ			50

DIMENSIONS in inches [millimeters]



PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

1) Change in Temperature (°C) = 45 - 25 = 20 °C
2) Change in Frequency = - 0.042 ppm*(Δ°C)
= - 0.042 ppm*(20)^2
= - 16.8 ppm(max)

ORDERING INFORMATION

XT26T	32.768 KHz	e2
MODEL	FREQUENCY/KHz	JEDEC LEAD FREE STANDARD

GLOBAL PART NUMBER

X	T	2	6	T	T	A	3	2	K	7	6	8
MODEL					OPERATING TEMPERATURE	PACKAGE CODE	FREQUENCY					

For technical questions contact: frequency@vishay.com

Document Number: 35017
Revision: 14-Jun-05

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Tuning Fork Crystal

The tuning fork type quartz crystal provides ultimate in size, performance and economic trade-offs. So it is used as a clock source in communication equipment, measuring instrument, microprocessor and other time management applications.

FEATURES

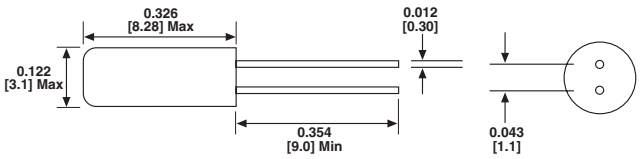
- Miniature package
- Low cost
- KHz frequency
- Tight tolerance
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free RoHS COMPLIANT

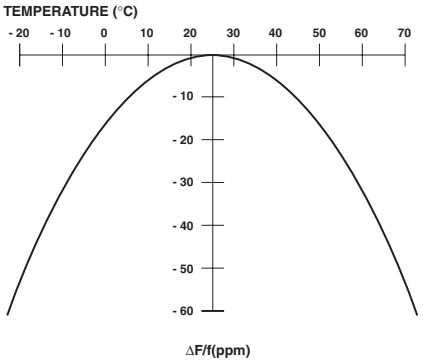
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		KHz		32.768	
Frequency Tolerance	$\Delta F/F_O$	at 25°C	ppm		± 20	
Frequency Coefficient	K	ref to 25°C	ppm/(Δ°C)^2			- 0.042
Operating Temperature Range	T_{OPR}		°C	- 10		+ 60
Storing Temperature Range	T_{STG}		°C	- 20		+ 70
Shunt Capacitance	C_O		pF		0.85	2
Motional Capacitance	C_1		fF	1	2	4
Load Capacitance	CL		pF		12.5	
Insulation Resistance	IR	$100V_{DC}$	MΩ	500		
Drive Level	DL		µW			1
Aging (first year)	Fa	at 25°C ± 3°C	ppm	- 5.0		+ 5.0
Equivalent Series Resistance(ESR)	Rs		KΩ			35

DIMENSIONS in inches [millimeters]



PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45°C?

1) Change in Temperature (°C) = 45 - 25 = 20°C
2) Change in Frequency = - 0.042ppm*(Δ°C)
= - 0.042ppm*(20)^2
= - 16.8ppm(max)

ORDERING INFORMATION

XT38T	32.768KHz	e2
MODEL	FREQUENCY/KHz	JEDEC LEAD FREE STANDARD

GLOBAL PART NUMBER

X	T	3	8	T	T	A	3	2	K	7	6	8
MODEL					OPERATING TEMPERATURE	PACKAGE CODE	FREQUENCY					

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XT38P

Vishay Dale

Miniature SMD Watch Crystal

The XT38P is a 2.5 mm height plastic molded 32.768 KHz SMD crystal unit. This thermoplastic molded rugged part is perfect for your SMD applications in limited circuit space using the watch frequency.

FEATURES

- 2.5 mm height
- Industry standard footprint
- Long term stability
- Tape and reel, 3000 pcs
- 100 % Lead (Pb)-free and RoHS compliant

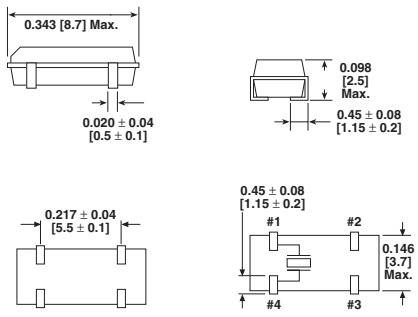
Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

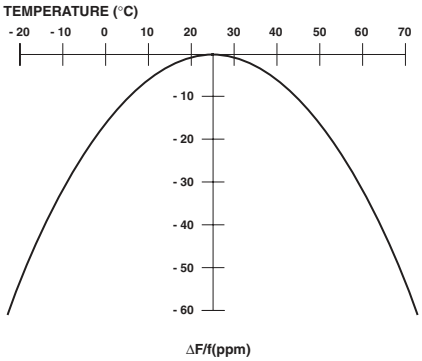
PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		KHz		32.768	
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	-20		+20
Frequency Coefficient	K	parabolic coefficient	ppm/°C^2	-0.027	-0.035	-0.043
Operating Temperature Range	T_{OPR}		°C	-40		+85
Storing Temperature Range	T_{STG}		°C	-55		+125
Shunt Capacitance	C_O		pF		1.0	
Motional Capacitance	C_1		fF		2.0	
Load Capacitance	CL		pF		12.5	
Insulation Resistance	IR		MΩ	500		
Drive Level	DL		µW			1.0
Aging (first year)	Fa	at 25 °C ± 3 °C	ppm		±3.0	
Equivalent Series Resistance(ESR)	Rs		KΩ			50

DIMENSIONS in inches [millimeters]

XT38PA



PARABOLIC TEMPERATURE CURVE



ORDERING INFORMATION

XT38P	A	32.768 KHz	e6
MODEL	PAD LAYOUT	FREQUENCY/KHz	JEDEC Lead (Pb)-Free STANDARD

To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

1) Change in Temperature (°C) = 45 - 25 = 20 °C

2) Change in Frequency = - 0.042 ppm*(Δ°C)

= - 0.042 ppm*(20)^2

= - 16.8 ppm(max)

GLOBAL PART NUMBER

X	T	3	8	P	A	A	3	2	K	7	6	8
MODEL					PAD LAYOUT	PACKAGE CODE	FREQUENCY					

For technical questions contact: frequency@vishay.com

Document Number: 35022
Revision: 17-Jun-05

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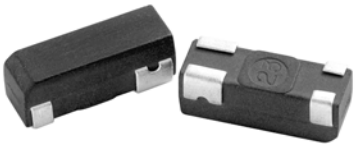
Surface Mount Watch Crystal



The XT32P is a cylinder type watch crystal molded in a thermoplastic housing capable of withstanding soldering re-flow processing. The XT32P is perfect for your SMD applications using the 32.768 KHz frequency. We offer two different footprints of the part to satisfy various pattern layout requirements.

FEATURES

- Low profile
- Industry standard footprint
- Long term stability
- Tape and reel, 2000pcs
- 100 % Lead (Pb)-free and RoHS compliant

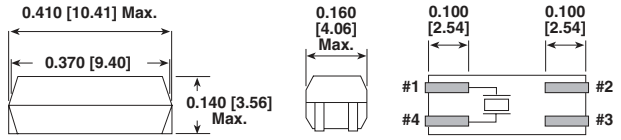
Pb-free RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

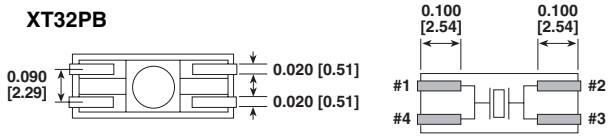
PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		KHz		32.768	
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	-20		+20
Frequency Coefficient	K	parabolic coefficient	ppm/°C^2	-0.027	-0.035	-0.043
Operating Temperature Range	T_{OPR}		°C	-40		+85
Storing Temperature Range	T_{STG}		°C	-55		+125
Shunt Capacitance	C_O		pF		1.0	
Motional Capacitance	C_1		fF		2.0	4
Load Capacitance	CL		pF		12.5	
Insulation Resistance	IR		MΩ	500		
Drive Level	DL		µW			1.0
Aging (first year)	Fa	at 25 °C ± 3 °C	ppm		±3.0	
Equivalent Series Resistance(ESR)	Rs		KΩ			50

DIMENSIONS in inches [millimeters]

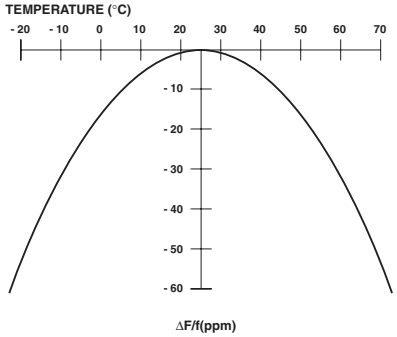
XT32PA



XT32PB



PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

1) Change in Temperature (°C) = 45 - 25 = 20 °C
2) Change in Frequency = - 0.042 ppm*(Δ°C)
= - 0.042 ppm*(20)^2
= - 16.8 ppm(max)

ORDERING INFORMATION

XT32P	A	32.768 KHz	e6
MODEL	PAD LAYOUT A or B	FREQUENCY /KHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	3	2	P	A	A	3	2	K	7	6	8
MODEL					PAD LAYOUT	PACKAGE CODE	FREQUENCY					

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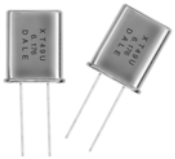
XT49U

Vishay Dale

Resistance Welded Holder Type Crystal Unit



The XT49U series is an industry standard AT cut crystal housed in a HC-49U package. It is our standard resistance weld type quartz crystal.

FEATURES

- Low cost
- Industry standard
- Excellent aging
- Wide frequency range
- 'AT' cut crystal
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free
RoHS COMPLIANT

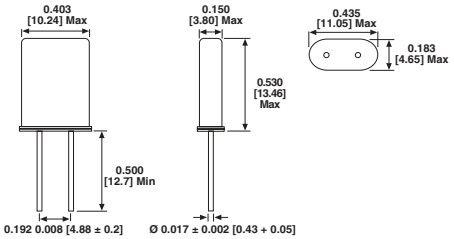
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	1.8432		125
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-20		+70
Storing Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE	FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE
1.8432 to 1.999	650	Fundamental	6.000 to 7.999	50	Fundamental
2.000 to 2.999	500	Fundamental	8.000 to 12.999	35	Fundamental
3.000 to 3.499	250	Fundamental	13.000 to 32.000	25	Fundamental
3.500 to 3.999	150	Fundamental	24.000 to 29.999	60	3rd Overtone
4.000 to 4.999	100	Fundamental	30.000 to 79.999	40	3rd Overtone
5.000 to 5.999	80	Fundamental	80.000 to 125.000	90	5th Overtone

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49U	R	-20	SP	M	e2
MODEL	OTR Blank = Standard R = -40 °C to +85 °C	LOAD Blank = Series -16 = 16 pF -20 = 20 pF -30 = 30 pF -32 = 32 pF	OPTIONS Blank = Standard SL = Sleeve SP = Spacer	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	9	U	2	0	A	N	A	4	M
MODEL				LOAD		PACKAGE CODE	OPTION		FREQUENCY	

For technical questions contact: frequency@vishay.com

Document Number: 35015
Revision: 17-Jun-05

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Low Profile Holder Type Crystal Units

This part is a miniature AT cut strip crystal unit with a low profile package. It is with resistance weld.

FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free
RoHS COMPLIANT

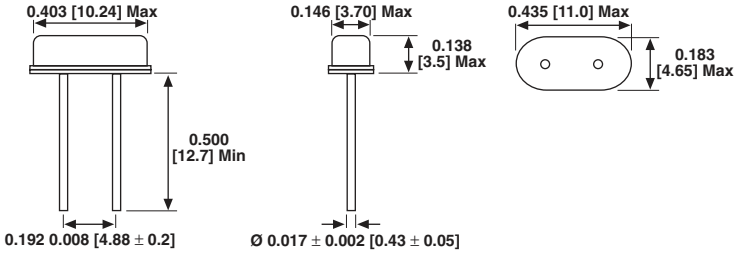
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	3.200		66.000
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-20		+70
Storing Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging (first year)	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE	FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	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 30.000	40	Fundamental/AT
7.000 to 7.999	90	Fundamental/AT	30.000 to 66.000	80	3rd Overtone
8.000 to 8.999	80	Fundamental/AT			

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49S	R	-20	SP	12 M	e2
MODEL	OTR	LOAD	OPTIONS	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	Blank = Standard R = -40 °C to +85 °C	Blank = Series -16 = 16 pF -20 = 20 pF Standard -30 = 30 pF -32 = 32 pF	Blank = Standard SP = Spacer SL = Sleeve		

GLOBAL PART NUMBER

X	T	9	S	2	0	A	N	A	1	2	M
MODEL				LOAD		PACKAGE CODE	OPTIONS		FREQUENCY		

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XT49SL

Vishay Dale

Low Profile Holder Type Crystal Units

This part is a miniature AT cut strip crystal unit with a low profile package. It is with resistance weld.

FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free RoHS COMPLIANT

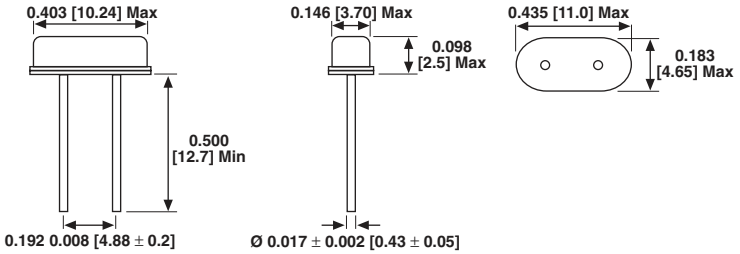
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	3.200		66.000
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-20		+70
Storing Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging (first year)	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE	FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	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 30.000	40	Fundamental/AT
7.000 to 7.999	90	Fundamental/AT	30.000 to 66.000	80	3rd Overtone
8.000 to 8.999	80	Fundamental/AT			

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49SL	R	-20	SP	12 M	e2
MODEL	OTR Blank = Standard R = -40 °C to +85 °C	LOAD Blank = Series -16 = 16 pF -20 = 20 pF Standard -30 = 30 pF -32 = 32 pF	OPTIONS Blank = Standard SP = Spacer SL = Sleeve	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	9	S	L	2	0	A	N	A	1	2	M
MODEL					LOAD		PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35042
Revision: 25-Aug-05

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Low Profile SMD Type Crystal Units

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

FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- Surface mount
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free
RoHS COMPLIANT

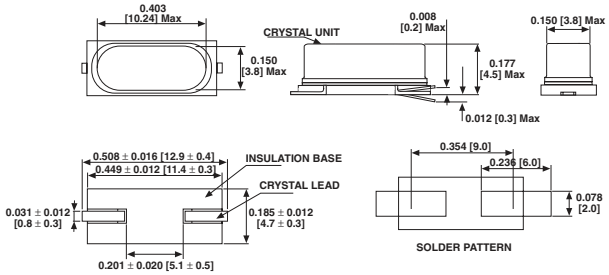
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_o		MHz	3.200		66.000
Frequency Tolerance	ΔF/Fo	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-20		+70
Storage Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_o		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE	FREQUENCY RANGE(MHZ)	MAX ESR (Ω)	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 30.000	40	Fundamental/AT
7.000 to 7.999	90	Fundamental/AT	30.000 to 66.000	80	3rd Overtone
8.000 to 8.999	80	Fundamental/AT			

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49 M	R	-20	20 M	e2
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	2	0	A	N	A	2	0	M
MODEL				LOAD		PACKAGE CODE	OPTIONS		FREQUENCY		

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XT49ML

Vishay Dale

Low Profile SMD Type Crystal Units

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

FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- Surface mount
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free RoHS COMPLIANT

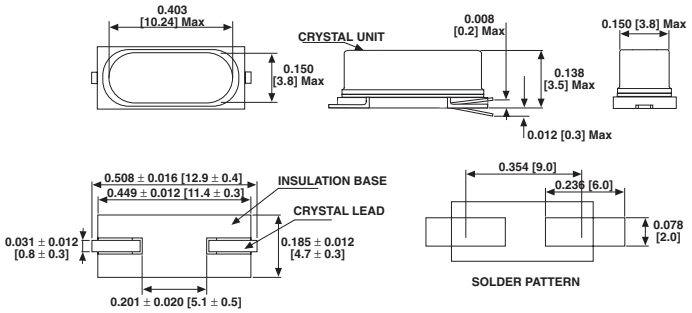
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_o		MHz	3.200		66.000
Frequency Tolerance	ΔF/Fo	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	30	±50
Operating Temperature Range	T_{OPR}		°C	-20		+70
Storage Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_o		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE(MHZ)	MAX ESR(Ω)	MODE	FREQUENCY RANGE(MHZ)	MAX ESR(Ω)	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 30.000	40	Fundamental/AT
7.000 to 7.999	90	Fundamental/AT	30.000 to 66.000	80	3rd Overtone
8.000 to 8.999	80	Fundamental/AT			

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49ML	R	-20	20	e2
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		CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35047
Revision: 25-Aug-05

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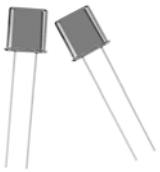
Resistance Welded Miniature Crystal Units



The XTUM-1 crystal unit is a miniature resistance welded package that provides excellent hermetic seal and frequency aging. The frequency range till 125 Mhz and miniature size is ideal for communication equipment.

FEATURES

- Low cost
- Industry standard
- Small compact size
- Wide frequency range
- High stability
- 'AT' cut crystal
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	10		125
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm		±10	±50
Temperature Stability	TC	see Frequency Stability vs Temperature Range	ppm		±10	±50
Operating Temperature Range	T_{OPR}		°C			
Storing Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	500
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

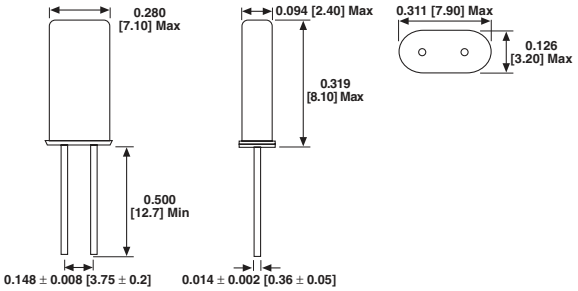
EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE)

FREQUENCY RANGE (Mhz)	MAX ESR (Ω)	MODE
10.000 to 12.999	60	Fundamental
13.000 to 19.999	40	Fundamental
20.000 to 29.999	30	Fundamental
30.000 to 39.999	60	Fundamental
40.000 to 59.999	50	Fundamental
60.000 to 79.999	50	3rd Overtone
80.000 to 125.000	100	5th Overtone

FREQUENCY STABILITY VS TEMPERATURE RANGE(25 °C ± 3 °C)

TEMPERATURE RANGE (°C)	FREQUENCY STABILITY(PPM)					
	±5	±10	±15	±20	±30	±50
0 to 50	x	x	x	x	x	x
-10 to 60	x	x	x	x	x	x
-20 to 70		x	x	x	x	x
-40 to 85				x	x	x

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XTUM1	-18	20 M	e2
MODEL	LOAD	FREQUENCY/MHz	JEDEC
	Blank = Series -32 = 32 pF -18 = 18 pF Standard		Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	U	1	1	8	A	N	A	2	0	M
MODEL				LOAD		PACKAGE CODE	OPTIONS		FREQUENCY		

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XT36C

Vishay Dale

Surface Mount Crystal

FEATURES

- Miniature size
- Wide frequency range
- Glass sealing
- Emboss taping
- Lead (Pb)-free terminations and RoHS compliant

RoHS COMPLIANT

This XT36C part is a miniature SMD crystal with 8.0 x 4.5 ceramic package and a height of 1.6 mm max. It is widely applied in notebook computer, PCMCIA and communication equipment.

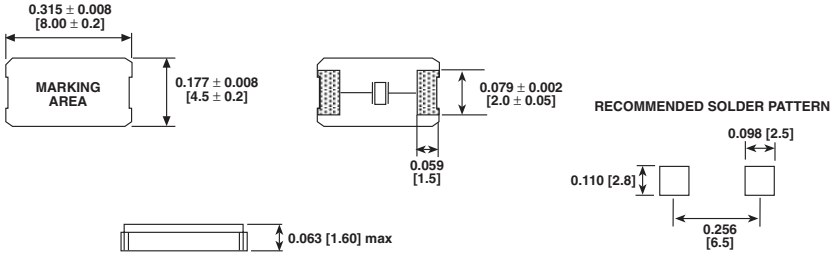
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	10.000		80.000
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±30	±50	±100
Temperature Stability	TC	ref to 25 °C	ppm	±30	±50	±100
Operating Temperature Range	T_{OPR}		°C	-10		+70
Storage Temperature Range	T_{STG}		°C	-40		85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	300
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHz)	MAX ESR (Ω)	MODE
10.000 to 11.999	80	Fundamental
12.000 to 39.999	50	Fundamental
40.000 to 80.000	70	3rd Overtone

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT36C	-20	24 M	e4
MODEL	LOAD Blank = Series 12 = 12 pF 16 = 16 pF 20 = 20 pF 32 = 32 pF	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	3	6	2	0	A	2	4	M
MODEL				LOAD		PACKAGE CODE	FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35010
Revision: 17-Jun-05

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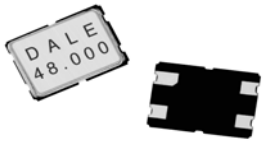
Quartz Crystals



The XT57C is a miniature SMD crystal with 7.0 x 5.0 ceramic package and a height of 1.1 mm max. 9.8304 MHz to 100 MHz frequency makes It widely applied in notebook computer, PCMCIA and communication equipment.

FEATURES

- Miniature size
- 1.1 mm height
- Wide frequency range
- Seam sealing
- Emboss taping
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free
RoHS COMPLIANT

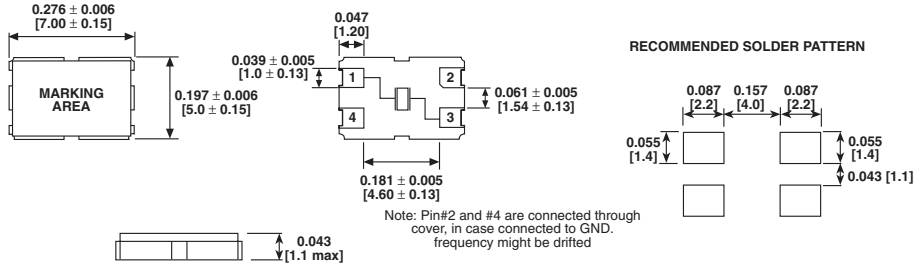
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	9.8304		100.000
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-10		+60
Storage Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	300
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHz)	MAX ESR (Ω)	MODE
9.8304 to 15.999	60	Fundamental
16.000 to 39.999	40	Fundamental
40.000 to 83.999	60	3rd Overtone
84.000 to 100.000	80	3rd Overtone

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT57C	-20	2 M	e4
MODEL	LOAD Blank = Series 20 = 20 pF 32 = 32 pF 16 = 16 pF	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	T	5	7	2	0	A	2	5	M
MODEL				LOAD		PACKAGE CODE	FREQUENCY		

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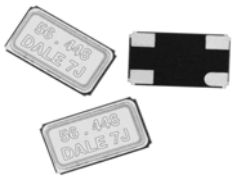
XT46C

Vishay Dale

Surface Mount Crystal



This part is an ultra miniature package with size of 6.0 x 3.5 x 1.0 mm. With its ceramic base and metal cover it provides the durability and reliability necessary for strenuous process like infrared and vapor phase reflow.

FEATURES

- Ultra-miniature size
- Wide frequency range
- Seam sealing
- Ceramic package
- Emboss taping
- Reflow soldering
- 100 % Lead (Pb)-free and RoHS complian

Pb-free

RoHS COMPLIANT

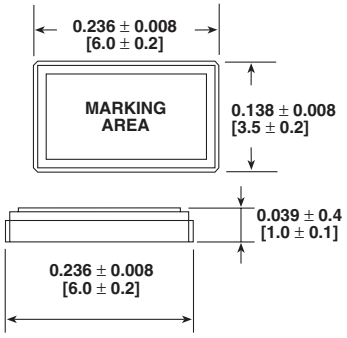
STANDARD ELECTRICAL SPECIFICATIONS

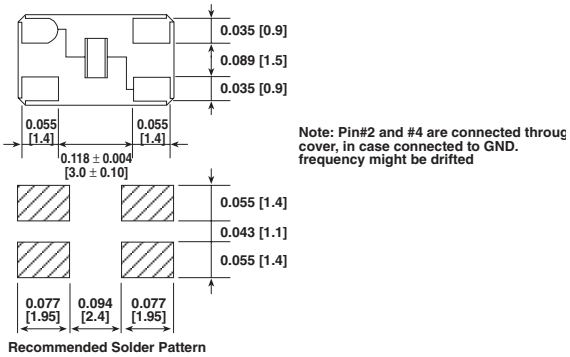
PARAMETER	SYMBOL	CONDITION	UNIT	MIN	TYPICAL	MAX
Frequency Range	F_O		MHz	10.000		80.000
Frequency Tolerance	$\Delta F/F_O$	at 25 °C	ppm	±10	±30	±50
Temperature Stability	TC	ref to 25 °C	ppm	±10	±30	±50
Operating Temperature Range	T_{OPR}		°C	-10		+60
Storing Temperature Range	T_{STG}		°C	-40		+85
Shunt Capacitance	C_O		pF			7
Load Capacitance	CL	Customer Specified	pF	10		Series
Insulator Resistance	IR	100 V_{DC}	MΩ	500		
Drive Level	DL		µW		100	300
Aging	Fa	at 25 °C, per year	ppm	-5.0		+5.0

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

FREQUENCY RANGE (MHZ)	MAX ESR (Ω)	MODE
10.000 to 15.999	60	Fundamental
16.000 to 39.999	40	Fundamental
40.000 to 80.000	70	3rd Overtone

DIMENSIONS in inches [millimeters]





ORDERING INFORMATION

XT46C	-20	25 M	e4
MODEL	LOAD	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	Blank = Series -20 = 20 pF Standard -32 = 32 pF		

GLOBAL PART NUMBER

X	T	4	6	2	0	A	2	5	M
MODEL				LOAD		PACKAGE CODE	FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35021
Revision: 25-Aug-05

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Oscillators

OSCILLATOR

An oscillator is a circuit that generates an output signal though feedback and amplification.

CLOCK OSCILLATOR

A clock oscillator is a device that establishes a reference frequency for timing purposes such as sequencing events in a computer.

LOGIC

This is the terminology used for families of active devices used in the manufacturing of clock oscillator. The most popular are TTL, HCMOS, CMOS, and ECL.

LOAD/FAN-OUT

The maximum load, specified in number of gates or in maximum load capacity, that a family of oscillators can drive is defined as the output load of driving capability.

RISE TIME

The rise time is defined as the transition time of the output waveform from low state to high state.

FALL TIME

The fall time is defined as the transition time of the output waveform from high state to low state.

SYMMERTY

Symmetry is the time the waveform is above the threshold vs. below the threshold. 50/50 is perfect symmetry.

TRI-STATE

The tri-state option allows the oscillator to be isolated from the circuit upon application of a command signal. When this feature is activated, the output goes to a high impedance state.

SUPPLY VOLTAGE

The DC input voltage necessary for oscillator operation.

INPUT CURRENT

The amount of current consumed by an oscillator from the power supply.

FREQUENCY STABILITY (Variation of Frequency from nominal.)

This is inclusive of calibration tolerance at 25 °C, temperature change, input voltage change, load change, aging, shock, and vibration.

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Oscillators

SELECTOR GUIDE - OSCILLATORS				
PRODUCT	**FREQUENCY RANGE**	**FREQUENCY STABILITY**	**TEMPERATURE RANGE**	**KEY FEATURES**
XO-53	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	TTL Compatible 14 Pin Dip
XO-54	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85°C)	14 Pin Dip HCMOS/TTL Compatible Tristate Output Available
XO-543	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	3.3 V Operation HCMOS/TTL Compatible Tristate Output Available
XO-52	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85°C)	8 Pin Dip HCMOS/TTL Compatible Tristate Output Available
XO-523	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85°C)	3.3 V Operation HCMOS/TTL Compatible Tristate Output Available
XO-56	1 to 999.9 KHz	100/50/25 ppm	0 to +70 °C (-40 to +85°C)	Low Frequency HCMOS/TTL Compatible 14 Pin Dip
XOVC-23	1 to 40 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Voltage Control HCMOS/TTL Compatible
XOSM-52	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount HCMOS/TTL Compatible Tristate Output Available
XOSM-55	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 5 V Operation HCMOS/TTL Tristate Output
XOSM-553	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output

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SELECTOR GUIDE - OSCILLATORS				
PRODUCT	**FREQUENCY RANGE**	**FREQUENCY STABILITY**	**TEMPERATURE RANGE**	**KEY FEATURES**
XOSM-57	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount HCMOS/TTL Compatible Tristate Output
XOSM-573	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output
XOSM-572	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 2.5 V Operation HCMOS/TTL Tristate Output
XOSM-571	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 1.8 V Operation HCMOS/TTL Tristate Output
XOSM-533	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output
XOSM-532	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to + 85°C)	Surface Mount 2.5 V Operation HCMOS/TTL Tristate Output
XOSM-531	1 to 100 MHz	100/50/25 ppm	0 to +70 °C (-40 to +85 °C)	Surface Mount 1.8 V Operation HCMOS/TTL Tristate Output

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Global Part Numbering
Oscillators

GLOBAL PART NUMBERING

X	O	5	2	C	T	E	L	N	A	4	0	M

MODEL NUMBER	FREQUENCY STABILITY	OPERATING TEMPERATURE (OTR)	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS	FREQUENCY
XO53 = XO-53 XO54 = XO-54 XO34 = XO-543 XO52 = XO-52 XO32 = XO-523 XO56 = XO-56 XOVC = XOVC-23 XO5M = XOSM-52 XO63 = XOSM-533 XO62 = XOSM-532 XO61 = XOSM-531 XO57 = XOSM-57 XO37 = XOSM-573 XO27 = XOSM-572 XO17= XOSM-571 XO55 = XOSM-55 XO35 = XOSM-553	C = 0.01% (100 ppm) D = 0.005% (50 ppm) E = 0.0025% (25 ppm)	T = 0 °C to +70 °C R = -40 °C to +85 °C	F = Pin 1 Open E = Disable to Tristate	TAPE AND REEL H = RF7 BULK A = B04 (XO63, XO62,XO61) C = D06 (XO57, XO37, XO27, XO17) D = D07 (XO53, XO54, XO34, XO56, XOVC, XO55, XO35) L = D08 (XO52, XO32, XO5M	NA = No Additional Options 60 = 45/55 Symmetry 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: XO52CTELNA40M

For technical questions contact: frequency@vishay.com

Document Number: 35002
Revision: 14-Jun-05

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Full Size Clock Oscillators TTL Compatible

The XO-53 series oscillator is TTL compatible and features fast rise/fall times with high reliability at low cost. The metal package with pin#7 case ground acts as shielding to minimize EMI radiation.

FEATURES

- 10TTL output load
- 14 pin fill size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- Lead (Pb)-free terminations and RoHS compliant

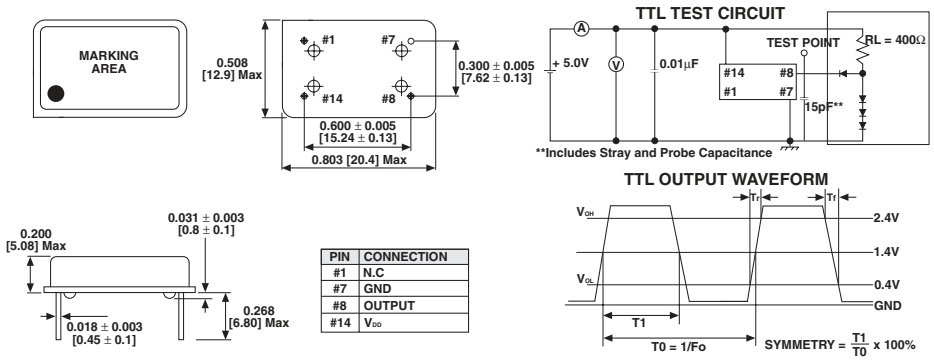
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-53
Frequency Range	F_O		1.0 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		5.0 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1.0 MHz to 23.999 MHz	15 mA Max
		24.000 MHz to 69.999 MHz	30 mA Max
		70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry	Sym	At 1.4 V	40/60 %(45/55 % Option)
Rise Time	T_r	0.4 V ~ 2.4 V	5 nS Max
Fall Time	T_f	2.4 V ~ 0.4 V	5 nS Max
Output Voltage	V_{OH}		2.4 V Min
	V_{OL}		0.4 V Max
Output Load	TTL Load		1 ~ 10 TTL
Start-up Time		Ts	10 mS Max

* Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XO-53	B	R	40 M	e2
MODEL	FREQUENCY STABILITY	OTR	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = 0 °C to +70 °C R = -40 °C to +85 °C		

GLOBAL PART NUMBER

X	O	5	3	C	T	D	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	PACKAGE CODE	OPTIONS		FREQUENCY		

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XO-54

Vishay Dale

Full Size Clock Oscillators TTL/HCMOS Compatible

The XO-54 series oscillator is Full Size Tri-state Enable/Disable control. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

FEATURES

- 14 pin full size
- Industry standard
- Wide frequency range
- Low cost
- Tri-State enable/disable
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant

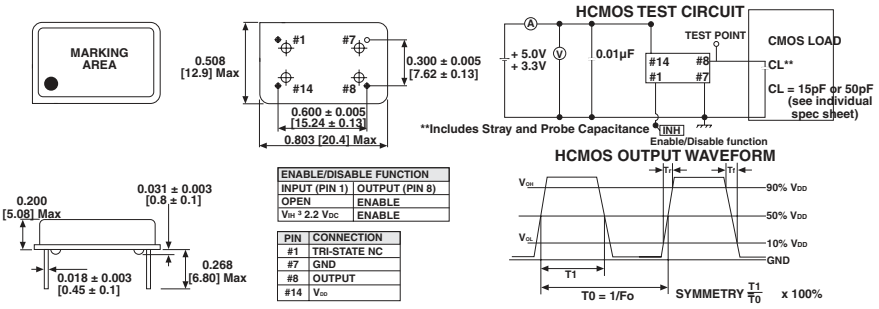
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-54
Frequency Range	F_O		1 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		5.0 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1 MHz to 23.999 MHz	20 mA Max
		24.000 MHz to 49.999 MHz	30 mA Max
		50.000 MHz to 69.999 MHz	40 mA Max
		70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry	Sym	1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	10 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	10 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 10 TTL
	HCMOS Load		~50 M : 50 pF
			~70 M : 30 pF
			~100 M : 15 pF
Start-up Time		Ts	10 mS Max
Pin 1, Tri-State Function			Pin 1 = H or open.... Output active at pin 8 Pin 1 = L.... High Impedance at pin 8

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



ORDERING INFORMATION

XO-54	B	R	E	40 M	e2
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = 0 °C to +70 °C R = -40 °C to +85 °C	Blank = Pin 1 open E = Disable or Tristate		

GLOBAL PART NUMBER

X	O	5	4	C	T	E	D	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35024
Revision: 20-Jul-05

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Full Size Clock Oscillators TTL/HCMOS Compatible

The XO-543 series is with 3.3 V power supply. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

FEATURES

- 14 pin full size
- Industry standard
- Wide frequency range
- Low cost
- Tri-State enable/disable
- Resistance weld package
- 3.3 V
- Lead (Pb)-free terminations and RoHS compliant

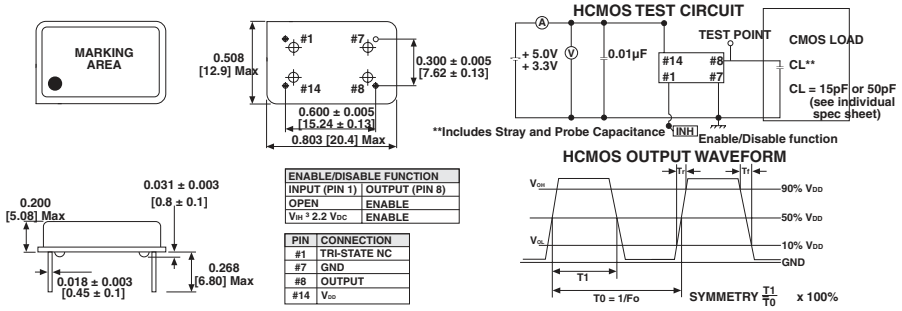
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-543
Frequency Range	F_O		1 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		3.3 V ± 10 %
Aging (first year)		25 °C ± 3 °C	±5ppm
Supply Current	I_{DD}	1 MHz TO 23.999 MHz	15 mA Max
		24.000 MHz TO 49.999 MHz	20 mA Max
		50.000 MHz TO 69.999 MHz	30 mA Max
		70.000 MHz TO 100.000 MHz	45 mA Max
Output Symmetry	Sym	1/2 V_{DD}	40/60 %(45/55 % option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	8 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	8 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 5 TTL
	HCMOS load		~ 50 M : 30 pF
			~ 125 M : 15 pF
Start-up Time		Ts	10 mS Max
Pin 1, Tri-State Function			Pin 1 = H or open.... Output active at pin 8 Pin 1 = L.... High Impedance at pin 8

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



ENABLE/DISABLE FUNCTION	
INPUT (PIN 1)	OUTPUT (PIN 8)
OPEN	ENABLE
V_{IH} ≥ 2.2 V_{DC}	ENABLE

PIN	CONNECTION
#1	TRI-STATE NC
#7	GND
#8	OUTPUT
#14	V_{DD}

ORDERING INFORMATION

XO-543	B	R	E	40 M	e2
MODEL	FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm)	OTR Blank = 0 °C to +70 °C R = -40 °C to +85 °C	ENABLE/DISABLE Blank = Pin 1 open E = Disable or Tristate	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	O	3	4	C	T	E	D	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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XO-52

Vishay Dale

Half Size Clock Oscillators Enable/Disable

The XO-52 series oscillator is half size, has Tri-state enable/disable controlled function. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

FEATURES

- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant

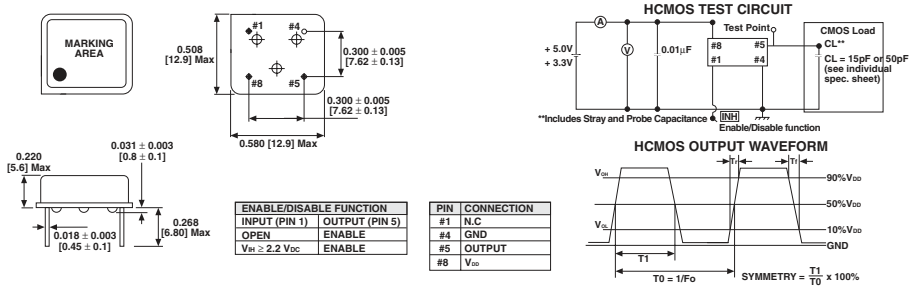
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-52
Frequency Range	F_O		1 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		5.0 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1 MHz to 23.999 MHz	20 mA Max
		24.000 MHz to 49.999 MHz	30 mA Max
		50.000 MHz to 69.999 MHz	40 mA Max
		70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry	Sym	At 1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	20 % V_{DD} ~ 80 % V_{DD}	10 nS Max
Fall Time	T_f	80 % V_{DD} ~ 20 % V_{DD}	10 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 10 TTL
	HCMOS Load		~50 M : 50 pF
			~70 M : 30 pF
			~100 M : 15 pF
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



ENABLE/DISABLE FUNCTION	
INPUT (PIN 1)	OUTPUT (PIN 5)
OPEN	ENABLE
$V_{IH} \geq 2.2$ Vdc	ENABLE

PIN	CONNECTION
#1	N.C
#4	GND
#5	OUTPUT
#8	V_{DD}

ORDERING INFORMATION

XO-52	B	R	E	40 M	e2
MODEL	FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	OTR Blank = 0 °C to +70 °C R = -40 °C to +85 °C	ENABLE/DISABLE Blank = Pin 1 open E = - Disable to Tristate	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	O	5	2	C	T	E	L	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35025
Revision: 20-Jul-05

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Half Size Clock Oscillators Enable/Disable

The XO-523 series oscillator is half size, has Tri-state enable/disable controlled function, and is with a 3.3 V power supply voltage. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

FEATURES

- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 3.3 V
- Lead (Pb)-free terminations and RoHS compliant

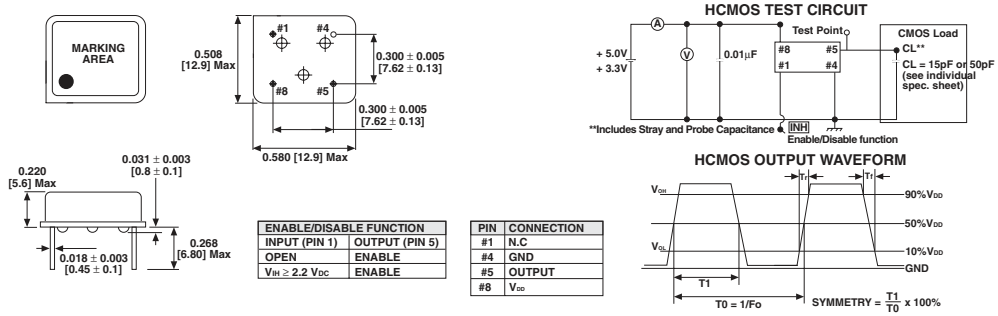
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-523
Frequency Range	F_O		1 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ + 125 °C
Power Supply Voltage	V_{DD}		3.3 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1 MHz to 23.999 MHz	15 mA Max
		24.000 MHz to 49.999 MHz	20 mA Max
		50.000 MHz to 69.999 MHz	30 mA Max
		70.000 MHz to 100.000 MHz	45 mA Max
Output Symmetry	Sym	At 1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	20 % V_{DD} ~ 80 % V_{DD}	8 nS Max
Fall Time	T_f	80 % V_{DD} ~ 20 % V_{DD}	8 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 5 TTL
	HCMOS Load		~50 M : 30 pF
			~125 M : 1 5pF
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



ENABLE/DISABLE FUNCTION	
INPUT (PIN 1)	OUTPUT (PIN 5)
OPEN	ENABLE
$V_{IH} \geq 2.2\ V_{DC}$	ENABLE

PIN	CONNECTION
#1	N.C
#4	GND
#5	OUTPUT
#8	V_{DD}

ORDERING INFORMATION

XO-523	B	R	E	40 M	e2
MODEL	FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm)	OTR Blank = 0 °C to +70 °C R = -40°C to +85 °C	ENABLE/DISABLE Blank = Pin 1 open E = - Disable to Tristate	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	O	3	2	C	T	E	L	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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XO-56

Vishay Dale

Full Size Clock Oscillators TTL/HCMOS Compatible

The XO-56 series oscillator is Full Size for low frequency. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

FEATURES

- 14 pin full size
- Industry standard
- Low frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant

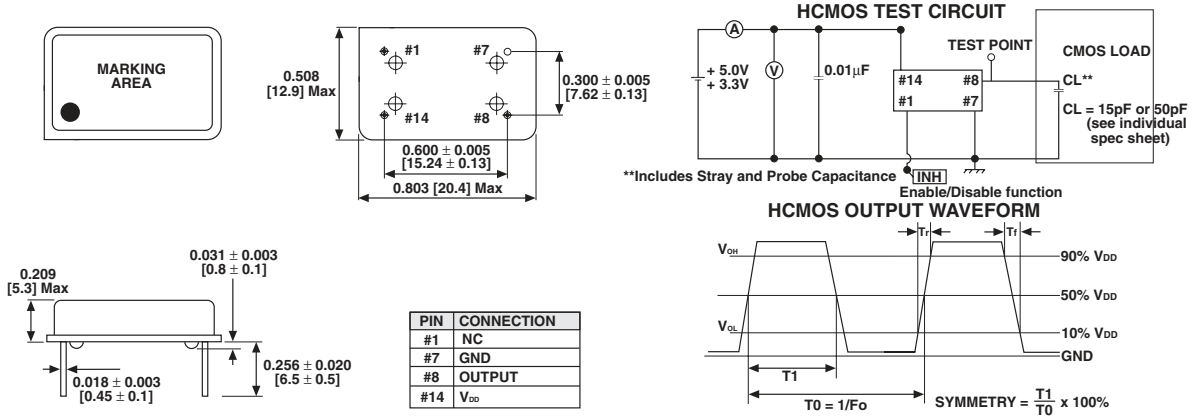
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XO-56
Frequency Range	F_O		1.0 kHz ~ 999.9 kHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		5.0 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	± 5 ppm
Supply Current	I_{DD}	1.0 kHz to 999.9 kHz	10 mA Max
Output Symmetry	Sym	1/2 V_{DD}	40/6 0%(45/55 % Option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	10 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	10 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 10 TTL
	HCMOS Load		15 pF
Start-up Time		Ts	10 mS Max

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



ORDERING INFORMATION

XO-56	B	R	256 K	e2
MODEL	FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	OTR Blank = 0 °C to +70 °C R = -40 °C to +85 °C	FREQUENCY/kHz	JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	O	5	6	C	T	D	N	A	2	5	6	K
MODEL				FREQUENCY STABILITY	OTR	PACKAGE CODE	OPTIONS		FREQUENCY			

For technical questions contact: frequency@vishay.com

Document Number: 35049
Revision: 20-Jul-05

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Full Size Voltage Controlled Crystal Oscillators

The XOVC-23 is a full size voltage controlled crystal oscillator designed primarily for use in phase locked loops, phase shift keying and other tele-communication applications such as ADSL and cable modem.

FEATURES

- 14 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- Lead (Pb)-free terminations and RoHS compliant

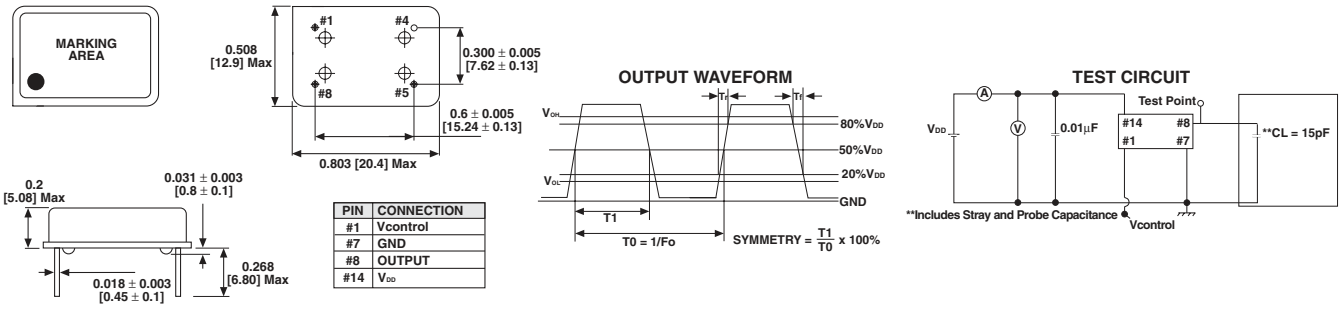
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XOVC-23
Frequency Range*	F_O		1 MHz ~ 40.00 MHz
Frequency Calibration		At 25 °C	±15 ppm
Temperature Stability		Over T_{OPR}	±15 ppm, ±25 ppm, ±50 ppm
Stability vs. power change		V_{DD} ± 5 %	±5 ppm
Stability vs. load change		15 pF ± 10 %	±3 ppm
Pullability		Over Control Voltage Range	±50 ppm, ±100 ppm, ± 200 ppm
Control Voltage Range			0.5 ~ 4.5 V
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		5.0 V ± 5 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1.000 MHz to 23.999 MHz	15 mA Max
		24.000 MHz to 40.000 MHz	25 mA Max
Output Symmetry	Sym	At 1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	20 % V_{DD} ~ 80 % V_{DD}	10 nS Max
Fall Time	T_f	80 % V_{DD} ~ 20 % V_{DD}	10 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load			15 pF Max
Start-up Time		Ts	10 mS Max

*Frequency over 40.000 MHz, please consult factory

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XOVC-23	B	-1	27 M	e2
MODEL	FREQUENCY STABILITY	PULLABILITY	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm)	-1 = ±100 ppm -2 = ±200 ppm -3 = ±50 ppm		

Note: Contact factory for other models, frequencies, stabilities and temperature ranges.

GLOBAL PART NUMBER

X	O	V	C	1	C	D	N	A	2	7	M
MODEL				PULLABILITY	FREQUENCY STABILITY	PACKAGE CODE	OPTIONS		FREQUENCY		

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XOSM-52

Vishay Dale

Half Size Clock Oscillator Enable/Disable

The XOSM-52 series oscillator is half size, has Tri-state enable/disable controlled function. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

FEATURES

- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free and RoHS compliant

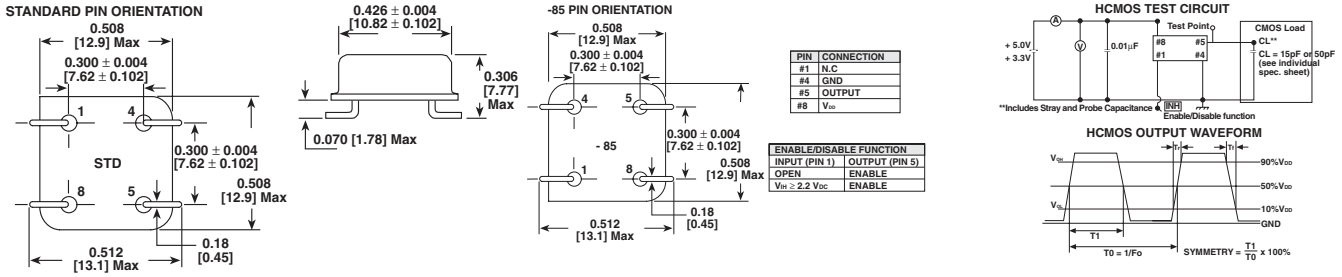
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XOSM-52
Frequency Range	F_O		1 MHz ~ 100.00 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125° C
Power Supply Voltage	V_{DD}		5.0 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1 MHz to 23.999 MHz	20 mA Max
		24.000 MHz to 49.999 MHz	30 mA Max
		50.000 MHz to 69.999 MHz	40 mA Max
		70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry	Sym	At 1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	20 % V_{DD} ~ 80 % V_{DD}	10 nS Max
Fall Time	T_f	80 % V_{DD} ~ 20 % V_{DD}	10 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load	TTL Load		1 ~ 10 TTL
	HCMOS Load		~ 50 M : 50 pF
			~ 70 M : 30 pF
			~ 100 M : 15 pF
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XOSM-52	B	R	E	40 M	e2
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = 0 °C to 70 °C R = -40 °C to +85 °C	Blank = Pin 1 open E = - Disable to Tristate		

GLOBAL PART NUMBER

X	O	5	M	C	T	E	L	N	A	4	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35026
Revision: 21-Jul-05

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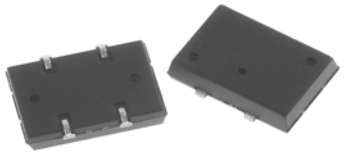
J - Lead Plastic Clock Oscillators



The XOSM-55 series oscillator is a J-Lead plastic tri-state enable/disable controled clock oscillator with a 5.0 V power supply voltage. The J-Lead configuration and high resistance soldering temperature make it ideal for surface mount production.

FEATURES

- J-Lead plastic surface mount
- SG-615 compatible
- Wide frequency range
- Low cost
- Tri-state enable/disable
- 5.0 V power supply
- Lead (Pb)-free terminations and RoHS compliant

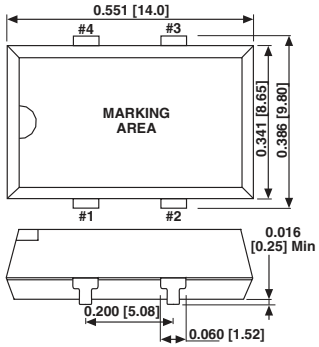
RoHS COMPLIANT

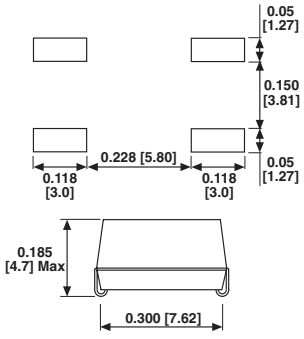
STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-55
Frequency Range		F_O		1 MHz ~ 66.667 MHz
Frequency Stability*				±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		5.0 V ± 1 0%
Aging (First Year)			25 °C ± 3 °C	±5 ppm
Supply Current		I_{DD}	1.000 MHz to 23.999 MHz	20 mA Max
			24.000 MHz to 49.999 MHz	30 mA Max
			50.000 MHz to 66.667 MHz	40 mA Max
Output Symmetry		Sym	At 0.5 V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	8 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	7 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	TTL Load			1 ~ 10 LSTTL
	HCMOS Load			30 pF Max
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]





PIN	CONNECTION
#1	TRI-STATE/NC
#2	GND
#3	OUTPUT
#4	V_{DD}

ENABLE/DISABLE FUNCTION	
INPUT(PIN1)	OUTPUT(PIN3)
OPEN	ENABLE
$V_{IH} \geq 2.2V_{DC}$	ENABLE
$V_{IL} \leq 0.8V_{DC}$	DISABLE

***note: A 0.01uF bypass capacitor should be placed between V_{DD}(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-55	B	R	E	50 M	e2
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	5	5	C	T	E	D	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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XOSM-553

Vishay Dale

Surface Mount Oscillator

The XOSM-553 series oscillator is a J-Lead plastic tri-state enable/disable controled clock oscillator with a 3.3 V power supply voltage. The J-Lead configuration and high resistance soldering temperature make it ideal for surface mount production.

FEATURES

- J-Lead plastic surface mount
- SG-615 compatible
- Wide frequency range
- Low cost
- Tri-state enable/disable
- 3.3 V power supply
- Lead (Pb)-free terminations and RoHS compliant

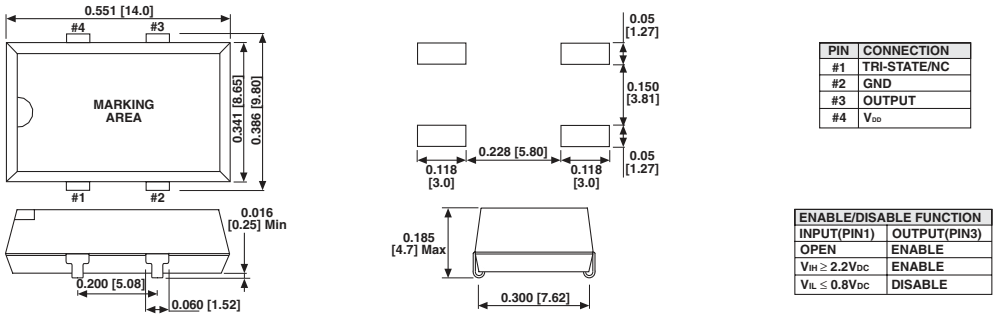
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-553
Frequency Range		F_O		1 MHz ~ 66.667 MHz
Frequency Stability*				±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		3.3 V ± 10 %
Aging (First Year)			25 °C ± 3 °C	±5 ppm
Supply Current		I_{DD}	1.000 MHz to 23.999 MHz	15 mA Max
			24.000 MHz to 49.999 MHz	20 mA Max
			50.000 MHz to 66.667 MHz	30 mA Max
Output Symmetry		Sym	At 1/2 V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	5 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	5 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	TTL Load			1 ~ 10 LSTTL
	HCMOS Load			15 pF Max
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



PIN	CONNECTION
#1	TRI-STATE/NC
#2	GND
#3	OUTPUT
#4	V_{DD}

ENABLE/DISABLE FUNCTION	
INPUT(PIN1)	OUTPUT(PIN3)
OPEN	ENABLE
$V_{IH} \geq 2.2V_{DC}$	ENABLE
$V_{IL} \leq 0.8V_{DC}$	DISABLE

***note:A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-53	B	R	E	50 M	e2
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	3	5	C	T	E	D	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35050
Revision: 17-Jun-05

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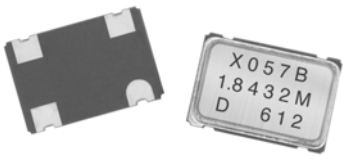
Surface Mount Oscillator



FEATURES

- Miniature Package
- Tri-state enable/disable
- TTL/HCMOS compatible
- Tape and Reel
- IR Re-flow
- 5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free

RoHS COMPLIANT

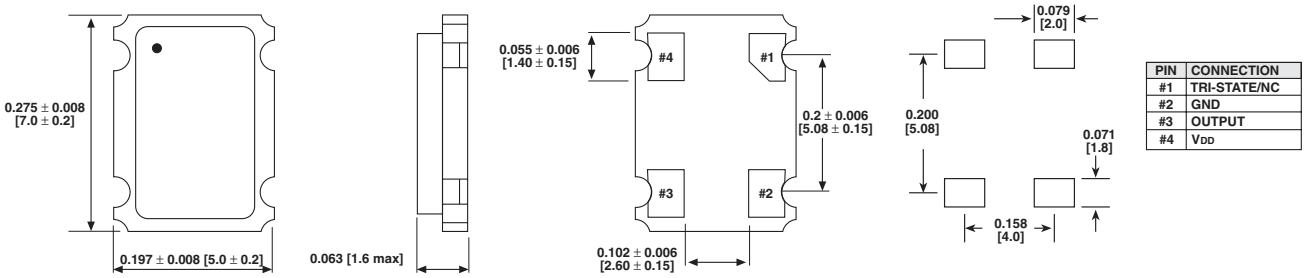
The XOSM-57 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.6 mm. It is mainly used in portable PC and telecommunication devices and equipment.

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-57
Frequency Range		F_O		1 MHz ~ 100.000 MHz
Frequency Stability*			All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		5.0 V ± 10 %
Aging (First Year)			25 °C ± 3 °C	±5ppm
Supply Current		I_{DD}	1.000 MHz to 23.999 MHz	20 mA Max
			24.000 MHz to 49.999 MHz	30 mA Max
			50.000 MHz to 69.999 MHz	40 mA Max
			70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry		Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	5 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	5 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	TTL Load			1 ~ 10 TTL
	HCMOS Load			30 pF Max
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-57	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	5	7	C	T	E	C	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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XOSM-573

Vishay Dale

Surface Mount Oscillator

The XOSM-573 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.6 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- TTL/HCMOS compatible
- Tape and Reel
- IR Re-flow
- 3.3 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

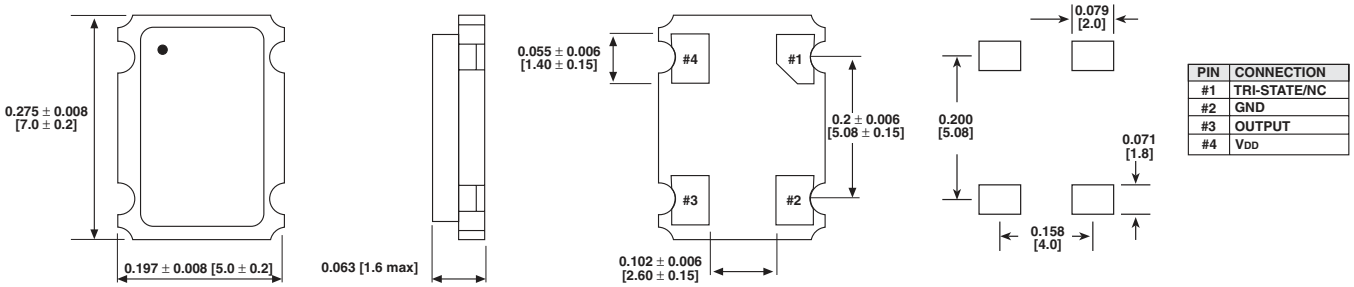
Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XOSM-573
Frequency Range	F_O		1 MHz ~ 100.000 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature Range	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		3.3 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1.000 MHz to 23.999 MHz	20 mA Max
		24.000 MHz to 49.999 MHz	30 mA Max
		50.000 MHz to 69.999 MHz	40 mA Max
		70.000 MHz to 100.000 MHz	60 mA Max
Output Symmetry	Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	5 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	5 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load HCMOS Load			30 pF Max
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating tempe2ure range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



PIN	CONNECTION
#1	TRI-STATE/NC
#2	GND
#3	OUTPUT
#4	V_{DD}

***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-573	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	3	7	C	T	E	C	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35051
Revision: 20-Jul-05

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Surface Mount Oscillator

The XOSM-572 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.5 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 2.5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free

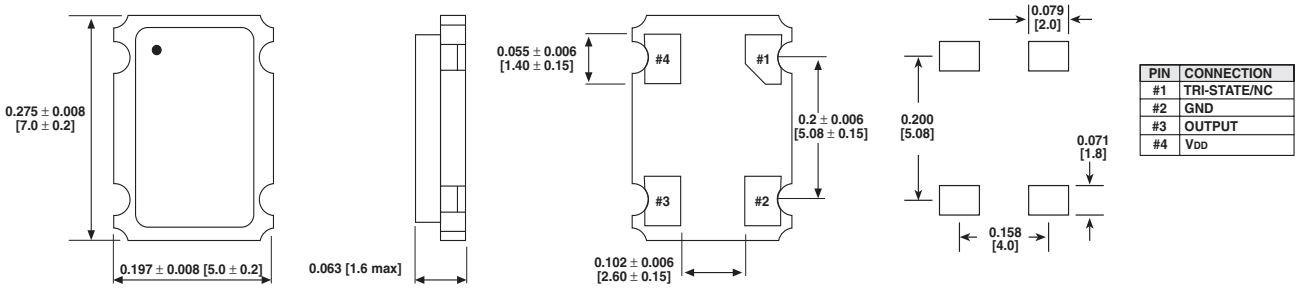
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-572
Frequency Range		F_O		1 MHz ~ 100.000 MHz
Frequency Stability*			All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		2.5 V ± 10 %
Aging (First Year)			25 °C ± 3 °C	±5 ppm
Supply Current		I_{DD}	1.000 MHz to 23.999 MHz	12 mA Max
			24.000 MHz to 49.999 MHz	15 mA Max
			50.000 MHz to 69.999 MHz	20 mA Max
			70.000 MHz to 100.000 MHz	30 mA Max
Output Symmetry		Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	7 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	7 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	HCMOS Load			30 pF Max
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



PIN	CONNECTION
#1	TRI-STATE/NC
#2	GND
#3	OUTPUT
#4	VDD

***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-572	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	2	7	C	T	E	C	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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XOSM-571

Vishay Dale

Surface Mount Oscillator

The XOSM-571 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.5 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 1.8 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

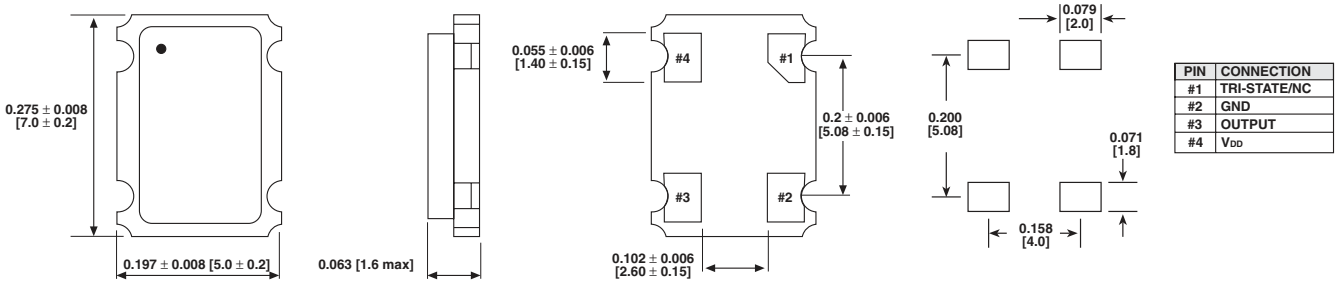
Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XOSM-571
Frequency Range	F_O		1 MHz ~ 100.000 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		1.8 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1.000 MHz to 23.999 MHz	10 mA Max
		24.000 MHz to 49.999 MHz	12 mA Max
		50.000 MHz to 69.999 MHz	15 mA Max
		70.000 MHz to 100.000 MHz	25 mA Max
Output Symmetry	Sym	At $^1/_2$ V_{DD}	40/60 %(45/5 5% Option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	6 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	6 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load | HCMOS Load			30 pF Max
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note:A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-571	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	1	7	C	T	E	C	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35061
Revision: 20-Jul-05

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Surface Mount Oscillator

The XOSM-533 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 3.3 V input voltage
- Lead (Pb)-free terminations and RoHS compliant

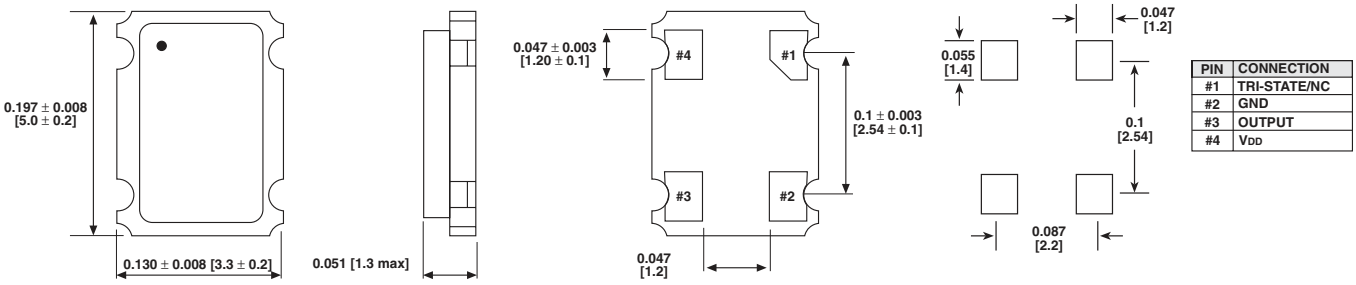
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-533
Frequency Range		F_O		1.544 MHz ~ 100.000 MHz
Frequency Stability*			All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		3.3 V ± 10 %
Aging (First Year)			25 °C ± 3 °C	±5 ppm
Supply Current		I_{DD}	1.544 MHz to 9.999 MHz	8 mA Max
			10.000 MHz to 34.999 MHz	10 mA Max
			35.000 MHz to 49.999 MHz	25 mA Max
			50.000 MHz to 100.000 MHz	35 mA Max
Output Symmetry		Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	7 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	7 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	HCMOS Load			30 pF Max (15 pF typ.)
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01µF bypass capacitor should be placed between V_{DD}(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-533	B	R	E	50 M	e2
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		JEDEC Lead (Pb)-Free STANDARD

GLOBAL PART NUMBER

X	O	6	3	C	T	E	A	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODES	OPTIONS		FREQUENCY		

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XOSM-532

Vishay Dale

Surface Mount Oscillator

The XOSM-532 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 2.5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

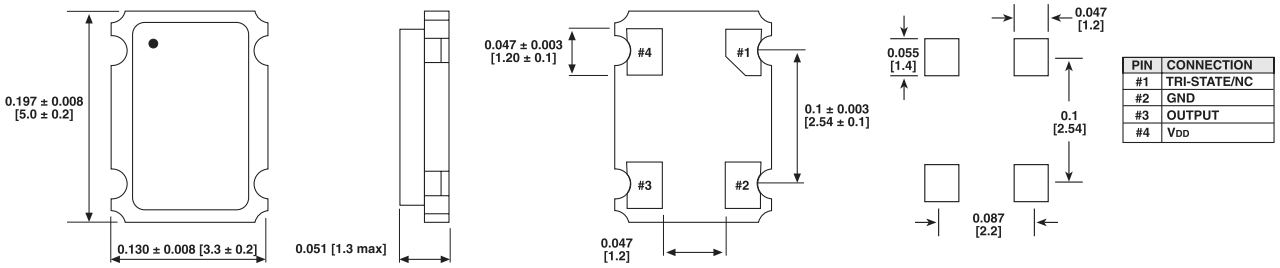
Pb-free
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER		SYMBOL	CONDITION	XOSM-532
Frequency Range		F_O		1.544 MHz ~ 100.000 MHz
Frequency Stability*			All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature		T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range		T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage		V_{DD}		2.5 V ± 10 %
Aging (First Year)			25 °C ± 3 °C	±5 ppm
Supply Current		I_{DD}	1.544 MHz to 9.999 MHz	7 mA Max
			10.000 MHz to 34.999 MHz	8 mA Max
			35.000 MHz to 49.999 MHz	20 mA Max
			50.000 MHz to 100.000 MHz	30 mA Max
Output Symmetry		Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time		T_r	10 % V_{DD} ~ 90 % V_{DD}	6 nS Max
Fall Time		T_f	90 % V_{DD} ~ 10 % V_{DD}	6 nS Max
Output Voltage		V_{OH}		90 % V_{DD} Min
		V_{OL}		10 % V_{DD} Max
Output Load	HCMOS Load			30 pF Max (15 pF typ.)
Start-up Time			Ts	10 mS Max
Pin 1, tri-state function				Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-532	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	6	2	C	T	E	A	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

For technical questions contact: frequency@vishay.com

Document Number: 35058
Revision: 20-Jul-05

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Surface Mount Oscillators

The XOSM-531 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 1.8 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

Pb-free

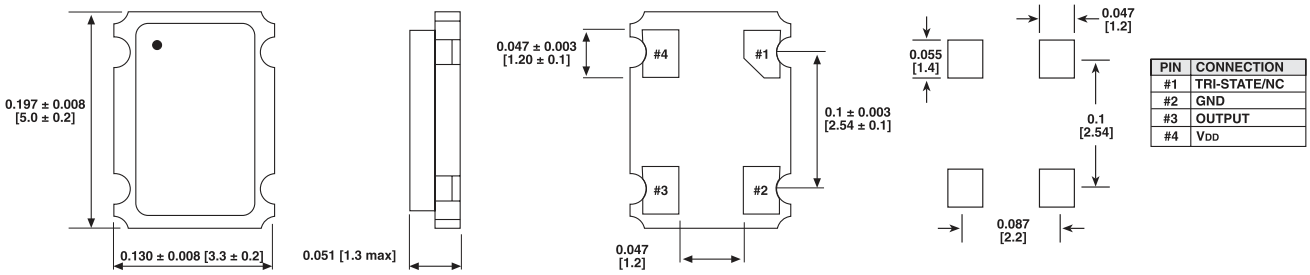
RoHS COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	XOSM-531
Frequency Range	F_O		1.544 MHz ~ 100.000 MHz
Frequency Stability*		All Condition*	±25 ppm, ±50 ppm, ±100 ppm
Operating Temperature	T_{OPR}		0 °C ~ 70 °C (-40 °C ~ +85 °C option)
Storage Temperature Range	T_{STG}		-55 °C ~ +125 °C
Power Supply Voltage	V_{DD}		1.8 V ± 10 %
Aging (First Year)		25 °C ± 3 °C	±5 ppm
Supply Current	I_{DD}	1.544 MHz to 9.999 MHz	6 mA Max
		10.000 MHz to 34.999 MHz	7 mA Max
		35.000 MHz to 49.999 MHz	15 mA Max
		50.000 MHz to 100.000 MHz	25 mA Max
Output Symmetry	Sym	At $^1/_2$ V_{DD}	40/60 %(45/55 % Option)
Rise Time	T_r	10 % V_{DD} ~ 90 % V_{DD}	5 nS Max
Fall Time	T_f	90 % V_{DD} ~ 10 % V_{DD}	5 nS Max
Output Voltage	V_{OH}		90 % V_{DD} Min
	V_{OL}		10 % V_{DD} Max
Output Load HCMOS Load			30 pF Max (15 pF typ.)
Start-up Time		Ts	10 mS Max
Pin 1, tri-state function			Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

XOSM-531	B	R	E	50 M	e4
MODEL	FREQUENCY STABILITY	OTR	ENABLE/DISABLE	FREQUENCY/MHz	JEDEC Lead (Pb)-Free STANDARD
	AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard	Blank = Standard R = -40 °C to +85 °C	E = Disable to Tristate		

GLOBAL PART NUMBER

X	O	6	1	C	T	E	A	N	A	5	0	M
MODEL				FREQUENCY STABILITY	OTR	ENABLE/ DISABLE	PACKAGE CODE	OPTIONS		FREQUENCY		

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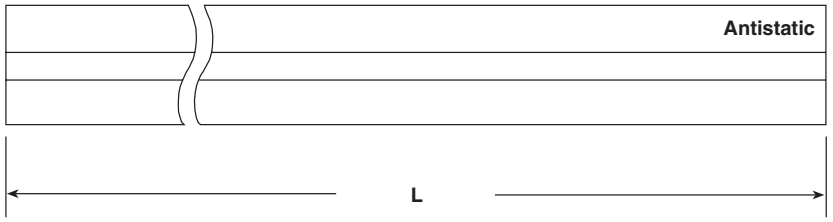
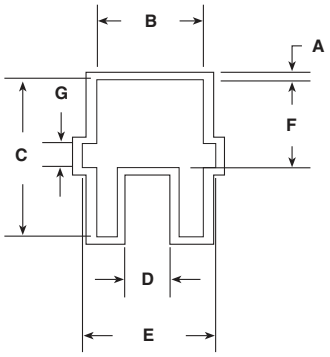
Tubes

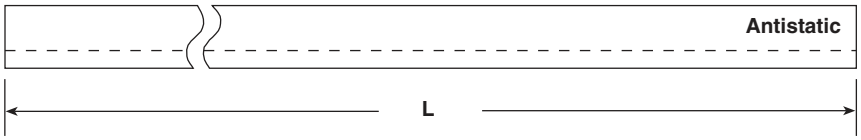
PACKAGING SPECIFICATIONS in inches (millimeters)

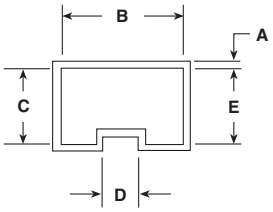
Style A





Style B





P/N	STYLE	A	B	C	D	E	F	G	L	QTY/TUBE
XO-53	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	25
XO-54	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	25
XO-543	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	25
XO-52	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	40
XO-523	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	40
XO-56	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	25
XOVC-23	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	25
XOSM-52	A	0.031 [0.8]	0.433 [11.0]	0.622 [15.8]	0.177 [4.5]	0.531 [13.5]	0.339 [8.6]	0.087 [2.2]	20.08 [510.0]	40
XOSM-57	B	0.024 [0.6]	0.26 [6.6]	0.094 [2.4]	0.098 [2.5]	0.079 [2.0]	_	_	15.16 [385.0]	50
XOSM-573	B	0.024 [0.6]	0.26 [6.6]	0.094 [2.4]	0.098 [2.5]	0.079 [2.0]	_	_	15.16 [385.0]	50

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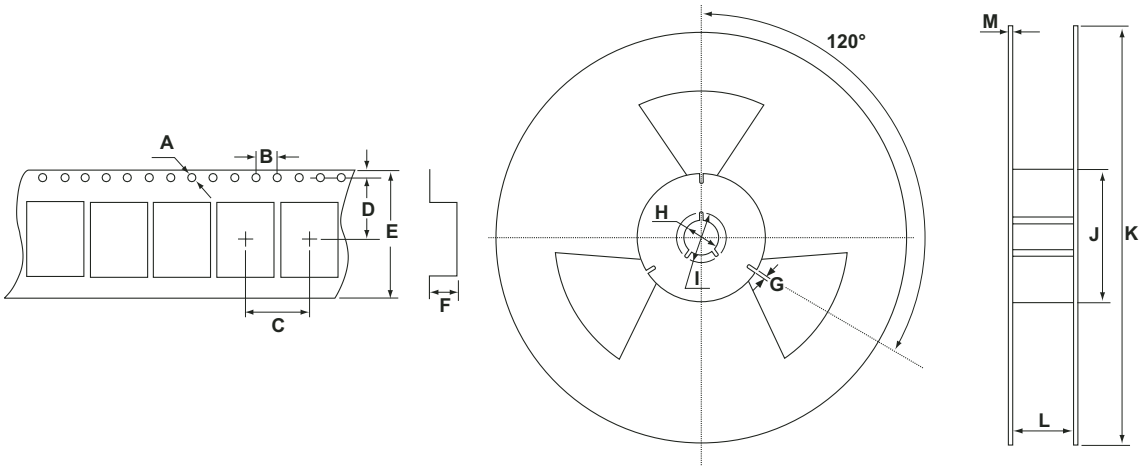
Surface Mount Tape and Reel

TAPE AND REEL SPECIFICATIONS in inches (millimeters)



TAPE SPECIFICATIONS

MODEL	A	B	C	D	E	F	QTY/REEL
XT32P	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.154 (3.9)	1000
XT38P	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.106 (2.7)	1000
XT49M	Ø 0.059 (1.50)	0.157 (4.0)	0.472 (12.0)	0.453 (11.5)	0.945 (24.0)	0.171 (4.35)	1000
XT49ML	Ø 0.059 (1.50)	0.157 (4.0)	0.472 (12.0)	0.453 (11.5)	0.945 (24.0)	0.138 (3.5)	1000
XT46C	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.059 (1.5)	1000
XT57C	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.079 (2.0)	1000
XT36C	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.079 (2.0)	1000
XOSM-57/573/572/571	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.295 (7.5)	0.630 (16.0)	0.079 (2.0)	1000
XOSM-533/532/531	Ø 0.059 (1.50)	0.157 (4.0)	0.315 (8.0)	0.217 (5.5)	0.472 (12.0)	0.059 (1.5)	1000

REEL SPECIFICATIONS

MODEL	G	H	I	J	K	L	M
XT32P	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	3.917 (99.5)	12.99 (330)	0.630 (16.0)	0.091 (2.3)
XT38P	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	3.917 (99.5)	12.99 (330)	0.630 (16.0)	0.091 (2.3)
XT49M	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	3.917 (99.5)	12.99 (330)	0.945 (24.0)	0.091 (2.3)
XT49ML	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	3.917 (99.5)	12.99 (330)	0.945 (24.0)	0.091 (2.3)
XT46C	0.091 (2.3)	Ø 0.531 (13.5)	0.850 (21.6)	2.362 (60.0)	7.008 (178)	0.630 (16.0)	0.056 (1.4)
XT57C	0.091 (2.3)	Ø 0.531 (13.5)	0.850 (21.6)	2.362 (60.0)	7.008 (178)	0.630 (16.0)	0.056 (1.4)
XT36C	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	2.362 (60.0)	7.008 (178)	0.689 (17.5)	0.056 (1.4)
XOSM-57/573/572/571	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	2.362 (60.0)	7.008 (178)	0.689 (17.5)	0.056 (1.4)
XOSM-533/532/531	0.098 (2.5)	Ø 0.531 (13.5)	0.850 (21.6)	2.362 (60.0)	7.008 (178)	0.531 (13.5)	0.056 (1.4)

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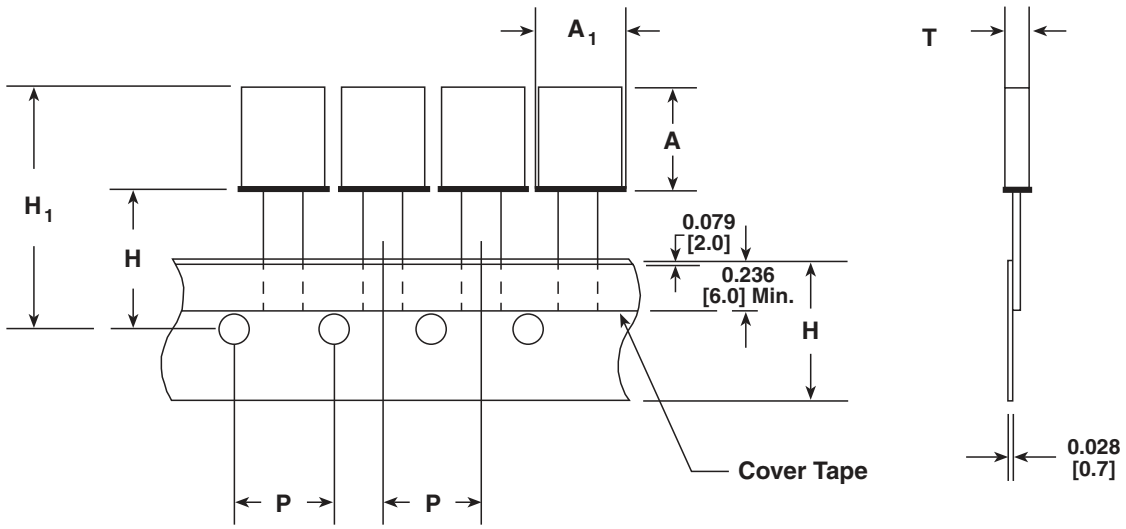
PACKAGING SPECIFICATIONS in inches (millimeters)



P/N	A	A_1	H	H_1	P	T
XT49S	0.146 [3.7]	0.453 [11.5]	0.709 [18.0]	0.945 [24.0] Max.	0.500 [12.7]	0.197 [5.0] Max.
XT49U	0.524 [13.3]	0.441 [11.2]	0.709 [18.0]	1.32 [33.6] Max.	0.500 [12.7]	0.197 [5.0] Max.
XTUM1	0.323 [8.2]	0.354 [9.0]	0.709 [18.0]	1.12 [28.5] Max.	0.500 [12.7]	0.197 [5.0] Max.

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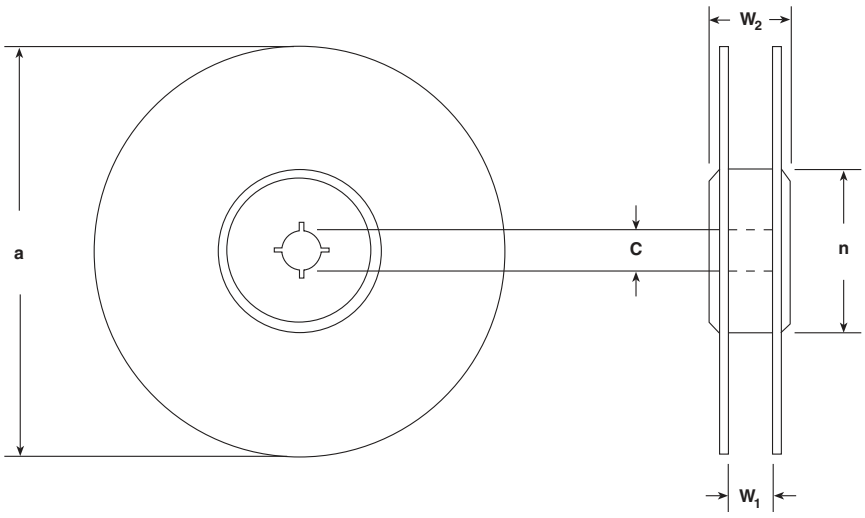
PACKAGING SPECIFICATIONS in inches (millimeters)



P/N	a	C	n	W_1	W_2	QTY/REEL
XT49S	14.57 [370.0] Max.	1.50 [38.0] Max.	3.15 [80.0] Max.	1.36 [34.5] Max.	2.20 [56.0] Max.	1000
XT49U	14.57 [370.0] Max.	1.50 [38.0] Max.	3.15 [80.0] Max.	1.73 [44.0] Max.	2.20 [56.0] Max.	1000
XTUM1	14.57 [370.0] Max.	1.50 [38.0] Max.	3.15 [80.0] Max.	1.54 [39.0] Max.	2.20 [56.0] Max.	1000

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Crystals and Oscillators Packaging Methods

TAPE AND REEL in inches [millimeters]											
MODEL	PACKAGE CODE	SAP CODE	REEL SIZE	CARRIER TAPE WIDTH	COMPONENT PITCH	MINIMUM ORDER QUANTITY	ORDER MULTIPLE	PACKAGE CODE	SAP CODE	MINIMUM ORDER QUANTITY	ORDER MULTIPLE
XT26T	-	-	-	-	-	-	-	B04	A	1000	100
XT38T	-	-	-	-	-	-	-	B04	A	1000	100
XT38P	RC6	F	13	0.630 [16.0]	0.315 [8.0]	3000	3000	B04	A	200	100
XT32P	RF6	M	13	0.630 [16.0]	0.315 [8.0]	2000	2000	B04	A	200	100
XT49U	RF5	G	14.57	0.709 [18.0]	0.500 [12.7]	1000	1000	B04	A	500	100
XT49S	RF5	G	14.57	0.709 [18.0]	0.500 [12.7]	1000	1000	B04	A	500	100
XT49SL	RF5	G	14.57	0.709 [18.0]	0.500 [12.7]	1000	1000	B04	A	500	100
XT49M	RF7	H	13	0.087 [2.2]	0.531 [13.5]	1000	1000	B04	A	500	100
XT49ML	RF7	H	7	0.087 [2.2]	0.531 [13.5]	1000	1000	B04	A	500	100
XT36C	RF7	H	7	0.630 [16.0]	0.315 [8.0]	1000	1000	B04	A	100	100
XT57C	RF7	H	7	0.087 [2.2]	0.531 [13.5]	1000	1000	B04	A	100	100
XT46C	RF7	H	7	0.087 [2.2]	0.531 [13.5]	1000	1000	B04	A	100	100
XO-53	-	-	-	-	-	-	-	D07	D	100	25
XO-54	-	-	-	-	-	-	-	D07	D	100	25
XO-543	-	-	-	-	-	-	-	D07	D	100	25
XO-52	-	-	-	-	-	-	-	D08	L	120	40
XO-523	-	-	-	-	-	-	-	D08	L	120	40
XO-56	-	-	-	-	-	-	-	D07	D	1000	25
XOVC-23	-	-	-	-	-	-	-	D07	D	100	25
XOSM-52	-	-	-	-	-	-	-	D08	L	120	40
XOSM-55	RF7	H	13	0.945 [24.0]	0.472 [12.0]	1000	1000	D07	D	100	25
XOSM-553	RF7	H	13	0.945 [24.0]	0.472 [12.0]	1000	1000	D07	D	100	25
XOSM-57	RF7	H	7	0.630 [16.0]	0.315 [8.0]	1000	1000	D06	C	100	50
XOSM-573	RF7	H	7	0.630 [16.0]	0.315 [8.0]	1000	1000	D06	C	100	50
XOSM-572	RF7	H	7	0.630 [16.0]	0.315 [8.0]	1000	1000	D06	C	100	50
XOSM-571	RF7	H	7	0.630 [16.0]	0.315 [8.0]	1000	1000	D06	C	100	50
XOSM-533	RF7	H	7	0.472 [12.0]	0.315 [8.0]	1000	1000	B04	A	100	100
XOSM-532	RF7	H	7	0.472 [12.0]	0.315 [8.0]	1000	1000	B04	A	100	100
XOSM-531	RF7	H	7	0.472 [12.0]	0.315 [8.0]	1000	1000	B04	A	100	100

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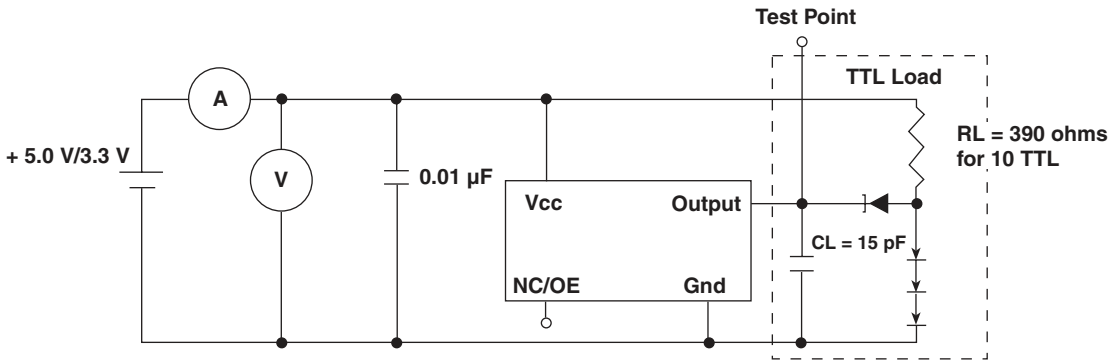
Environmental and Mechanical Specifications

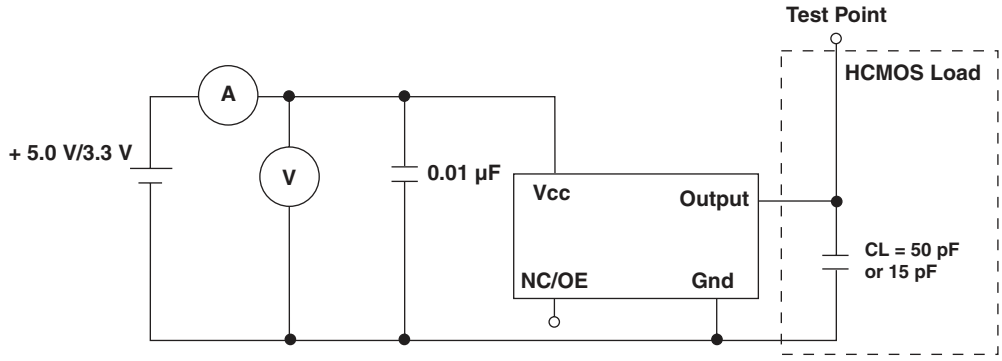
ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS		
DESCRIPTION	**LIMITS/CONDITIONS**	**TEST PROCEDURES**
Thermal Cycle	- 55° C, + 85° C, 5 cycles	MIL-STD-202, Method 107, Condition A
Gross Leak test	All units 100 % leak tested	MIL-STD-202, Method 112, Condition D
Fine Leak	Mass spectrometer leak rate less than 2 x 10^{-8} Atm. cc/sec of helium	MIL-STD-202, Method, Condition C
Moisture Resistance	95 % RH, + 25° to + 65° C, 10 cycles	MIL-STD-202, Method 106
Shock	1000g, 0.35 mS	MIL-STD-202, Method 213, Condition I
Vibration	10 - 55Hz, 0.06" D.A., 55 - 2000Hz, 20g	MIL-STD-202, Method 204, Condition D
Solderability	Minimum 95 % coverage	MIL-STD-202, Method 208
Resistance to Solvents	Isopropyl alcohol, terpene and monethanolamine solutions	MIL-STD-202, Method 215

TEST CIRCUITS

TTL



HCMOS



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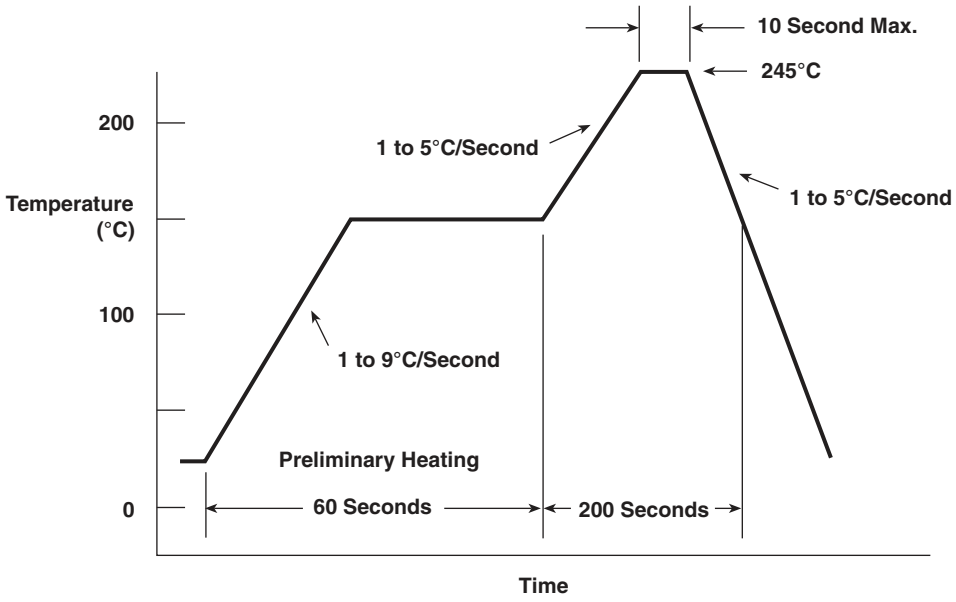
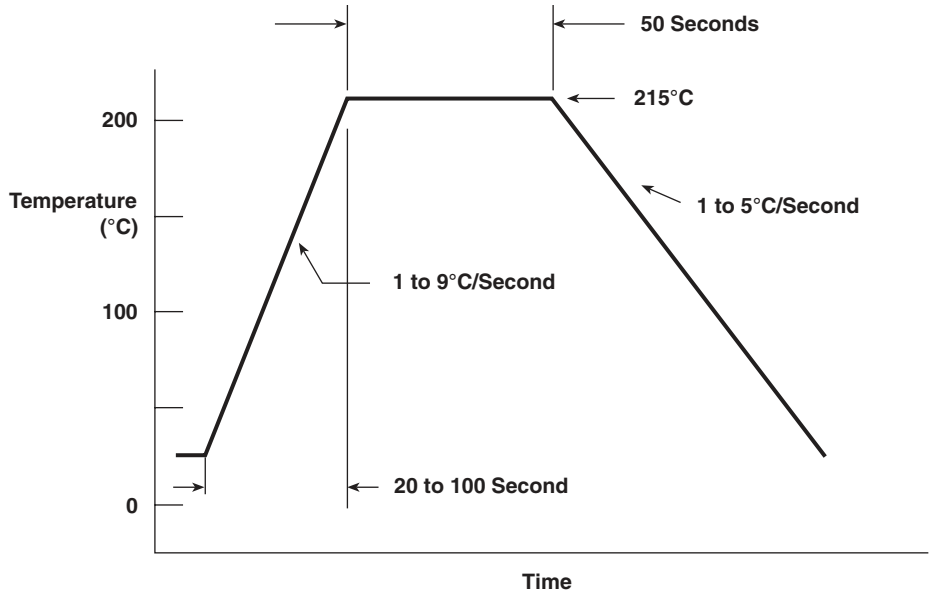
Soldering Profiles

RECOMMENDED PROFILES FOR SOLDER REFLOW

Infrared Reflow



Vapor Phase Reflow



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CROSS REFERENCE - CRYSTALS AND OSCILLATORS

VISHAY P/N	ABRACON	AVX KYOCERA	CTS	ECS	ECLIPTEK	EPSON	FOX	M-TRON	PLETRONICS	RALTRON	RXD	SARONIX	VALPEY
XT26T	AB26T	KF-26G-12P0200	—	ECS-2X6	EC26T	C-002RX 12.5	NC26	MMCC-2	WX26	R26	WC-26E	NTF 3226	NC26
XT38T	AB38T	KF-38G-12P0200	—	ECS-3X8	EC38T	C-001R 12.5	NC38	MMCC-1	WX	R38	WC-38E	NTF 3238	NC38
XT49S	ABL	—	ATS	—	EC2	—	HC49S	ATS-49	LP49	AS	MP35	49S	VM6S
XT49U	AB	—	MP	—	EC OR 8EC	—	HC49U	MP-1/SRMP-1	MP49	A	MP49	NMP / NYP	VM6
XTUM1	ABU	—	—	—	ECUM	—	UM1	UM-1	UM1	—	—	UM1	UM1
XT32PA	—	—	—	—	ECPSM310T	MC-406	—	—	—	—	—	32S12A	VFSMC-2
XT32PB	—	—	—	—	—	MC-405	FSM327	—	—	—	—	32S12B	VFSMC-1
XT38PA	—	—	—	—	ECPSM 29 T	MC306	FSR327	SX1555	SM20S	—	—	32S12C	—
XT46C	ECCM5	KSX-36	—	ECX-64	—	FA368	FM	PP	SM12H	—	—	NKS6	—
XT49M	ABLS	—	ATS-SM	—	EC2SM	—	HC49SD	ATSM-49	SM42	AS-SMD	MP35L	49SMLB	VM6SSM-2
XT36C	ABM5	—	—	—	—	—	—	PX	—	H180A	—	—	—
XT57C	ABMM	—	SMLP	—	—	—	FD	—	—	H13K	—	NKS 7	VFSXG-2
XO-52B	ACH	KHO-HC1CS	MXO45HS	ECS-2100	EC1100HS	—	—	MH13FAD	SQ2200	CO12100	HHSC2 OR HTHSC2	NCH 039/069/089 C	VF70
XO-52BE	ACHA	KHO-HC1CSE	MXO45HST	ECS-2200	EC100HSTS	*SG531	H5C-2 OR F3020	MH13EAD	SQ3300	CO19100	NNSCR2 OR HRC2	NTH 039/069/089 C	VF70T
XO-523B	—	—	—	—	EC1300HS	—	—	—	SQ2200V	—	—	—	—
XO-523BE	—	—	—	—	EC1300HST	—	—	—	SQ3300V	—	—	—	—
XO-53B	—	KXO-01-1	MXO45	ECS 100A	—	—	F1100E	MTO13FAD	—	CO1100	T2	NCT 040/050/070 C	VF150
XO-53BE	—	—	MXO45T	—	—	*SG51	F100HT	MTO13EAD	—	—	—	NTT 040/050/070 C	VF150T
XO-54B	ACO	KXO-HC 1CS	—	ECS 400A	EC1100	—	F5C	MHO+13FAD	P1100-HC	CO6100	HSC2 OR THSC2	NCH 030/060/080 C	VF140
XO-54BE	ACOA	KHO-HC 1CSE	—	ECS 1000E	EC1100TS	—	F5C-2 OR F3000	MHO+13EAD	P1100-3SV	CO15100	HSCR2 OR RC2	NTH 030/060/080 C	VF140T
XO-543B	—	—	—	—	EC1300	—	—	—	P1100-HCV	—	—	—	—
XO-543BE	—	—	—	—	EC1300TS	—	—	—	P1100-3SV	—	—	—	—
XOVC-23	—	—	—	—	EC3100	—	VCXO-B	MV1	VC-1	VC 7025	—	—	—
XOSM-55	ASMA	—	—	ECS-8F	EC1400SJTS	SG615P	FSO-2	MHR13TAJ	SM1100C	CO66610	—	NTH 03/06/08 HC	
XOSM-553		—	—		EC1500SST					CO63100	—	NTH 03/06/08 HC3	
XOSM-57BE	ASLA	K50-HC 1 CS E	CB3-2C	ECS-3951C	EC2500TS	—	F3345 OR F3355	M113TAN	SM7700H	CO4910	—	S1700C OR 1750C	VF1 / VF5
XOSM-573BE	ASVA	K50-3C1E	CB3LV-2C	ECS-3953C	EC2600TS	—	F4100	M213TAN	—	CO4310	—	S1703C	VF3
XOSM-572	—	K53-2C	CB2V5	ECS-5725	EC2700TS	—	F4400	M2250	—	—	—	S1614	—
XOSM-571	—	K53-1C	CB1V8	ECS-5718	EC2900TS	—	F4500	M2180	—	CO418	—	S1612	—
XOSM-533	ASFLP	FXO-61F2	636L	ECS-3963	EC3600TS	—	F530L	M2034	—	COM23	—	S1633	G3
XOSM-532	ASFL2	—	636N	ECS-3525	EC3700TS	—	F540L	—	—	—	—	S1634	—
XOSM-5531	ASFL3	—	636M	ECS-3518	EC3900TS	—	F510L	—	—	—	—	—	—

*The Vishay product is pin compatible in a metal can. The SG-51 and SG531 are in a molded package.

NOTE: The above cross reference is the suggested substitute for key competitors part numbers. Vishay does not accept any responsibility for any errors that result from this cross reference. Please contact factory for other crosses.

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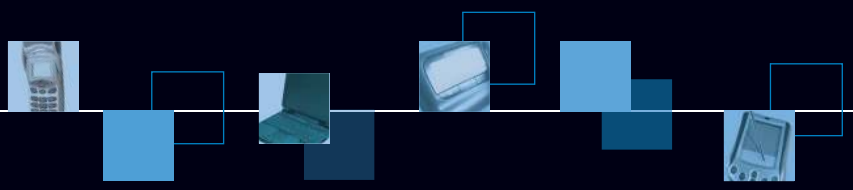

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