GEYER
quartz technology

Your Solution for Frequency Control Products

Oscillators

VCXO TCXO VCTCXO LVDS PECL

QUALITY FOR MORE THAN 50 YEARS GEYER

Edition 11/2019

Mit mehr als 50 Jahren Erfahrung in der Quarz Branche ist **GEYER electronic** ein weltweit bekannter Hersteller von hochwertigen Schwingquarzen und Oszillatoren.

Der vorliegende Katalog bietet einen Überblick über das **GEYER Oszillatoren VCXO, VCTCXO TCXO LVDS und PECL** Bauteilesortiment. Weitere Bauformen und Sondertypen sind auf Anfrage lieferbar.

Für Neuentwicklungen und Freigabeprozesse stellt **GEYER electronic** kurzfristig geeignete Musterbauteile zur Verfügung. Darüber hinaus steht ein kompetentes Team von Design- und Entwicklungsingenieuren ganz im Dienste des Kunden und unterstützt bei der Auslegung von Schaltungen. Im **GEYER electronic** Design- und Testzentrum sind verschiedenste Messungen und Analysen, auch in der Klimasimulation, möglich.

With more than 50 years' experience in the frequency control marketplace, **GEYER electronic** is a world-renown manufacturer of quality quartz crystals and oscillators.

This catalog offers an overview of the **GEYER** component product range of **Oscillators VCXO, VCTCXO TCXO LVDS und PECL**. A variety of further packages and special types is available on request.

GEYER is pleased to provide suitable samples at short notice for new developments and approval processes. In addition, a competent team of design and development engineers committed to customers is available to provide support for the design of circuits. In the **GEYER electronic** Design and Test Center, a wide variety of measurements and analyses can be carried out, including in our climactic simulation test chamber.

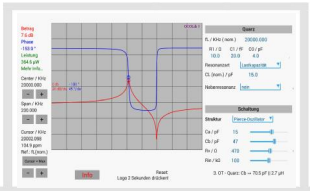
Be sure with Quartz Crystals from GEYER

This catalogue replaces all former catalogues. All specifications represent the latest technical information and are subject to change without notice. For current update please refer to www.geyer-electronic.com.

See page 36.

Contents

CONTENTS



GEYER quartz technology

Design und Testcenter

Auswahl von Bauteilen
Schaltungsbegutachtung
Messungen und Analysen von Baugruppen

Wir bieten einen weltweit außergewöhnlichen Service:
- Ausführliche Beratung
- Validierung Ihrer Schaltung
- Ausgemessene Muster für Vorserien und Prototypen
- Abgestimmte Spezifikationen und Baugrößen
- 3D Modelle unserer Bauteile zur Erleichterung des Design-in
- Kostenlose Simulation - App
- Test der fertigen Baugruppe auf verschiedenste Parameter

Die Vorteile für Sie:
- Vermeidung von Unsicherheiten bei der Bauteileauswahl oder Spezifikation
- Verkürzte Entwicklungsdauer
- Erhöhte Betriebssicherheit in der Serie
- Kostenoptimierte Bauteileauswahl
- Optimale Lebenserwartung in der Serie

Sie erhalten:
- Ausführliche Beratung zum Schaltungsdesign neuer Schaltungen

Unter den Gesichtspunkten von:
- Frequenzgenauigkeit von unterschiedlichen Versorgungsspannungen
- Frequenzgenauigkeit über den Arbeitstemperaturbereich
- Anschwingverhalten bei verschiedenen Temperaturen
- Anschwingsicherheit
- Stromverbrauch
- Layout Optimierung
- Auswahl kostengünstiger Bauteile

Design and Test Center

Part selection
Evaluation of Circuit Design
Measurements and Analysis of PCBs

We offer your Design Engineers an exceptional worldwide service:
- Comprehensive consulting
- Validation of your design
- Our own Design and Test center
- Selected samples for prototypes and pilot series
- Matched specifications and design sizes
- 3D models of our components for easy design-in
- Free Geyer App-Y-Quartz with analyzing tool
- Testing of boards on selected parameters

As a customer you can expect the following benefits:
- Prevention from incorrect decisions in component selection or specification
- Shorter development time
- Enhanced reliability of operation in production run
- Cost-optimized component selection
- Optimum design life in production run

You get:
- Comprehensive advice in design of new circuits

With regard to:
- Frequency deviation at different supply voltages
- Frequency deviation at different temperatures
- Start-up at different temperatures
- Start allowance
- Current consumption
- Layout optimizing
- Selection of economic components

Laboratoire de Design et de Tests

Choix de composants
Évaluation de circuits
Analyse et mesure des cartes

Pour vos développeurs/ingénieurs, nous offrons un service unique à travers le monde:
- Conseils et soutiens de nos ingénieurs
- Validation de votre circuit
- Échantillons pour pré-séries et prototypes
- Spécifications et tailles définies
- Modèles 3D de nos composants pour faciliter le design-in
- Simulations gratuites grâce à notre application
- Tests de différents paramètres de vos circuits finis

Votre bénéfice:
- Éviter des erreurs lors du choix du composant et de ses spécifications
- Réduction du temps de développement et de conception
- Amélioration de la sécurité de fonctionnement lors de la production en série
- Optimisation des coûts pour chaque composant
- Durée de vie optimale lors de la production en série

Nous vous offrons des conseils détaillés pour le design de nouveaux circuits, à travers:
- Exactitude de la fréquence pour la tension d'alimentation
- Exactitude de la fréquence par rapport à la plage de température
- Comportement de l'oscillation au démarrage pour différentes températures
- Sécurité du comportement d'oscillation au démarrage
- Consommation de courant
- Optimisation de Layout
- Choix de composants aux meilleurs prix

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

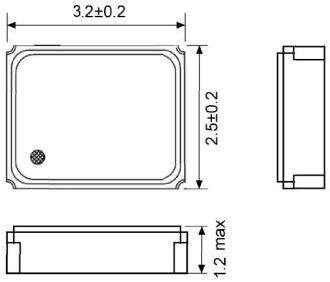
GEYER quartz technology

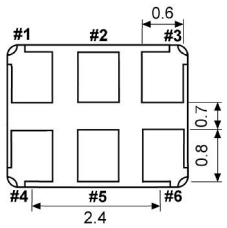
VCXO
Voltage Controlled Crystal Oscillator **SMD-version +3.3V**

model		KXO-70
frequency range		2.0 ~ 80.0 MHz
frequency stability	over all parameters	±50 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-40°C ~ +85°C
storage temperature range		-45°C ~ +90°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+3.3V DC ±5%
input current max.		15 mA
start-up time max.		10 ms
symmetry		45% / 55% at ½ V_{DD} level
rise and fall time max.		5 ns
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
frequency control voltage		1.65V ±1.35V
frequency adjustment (pullability) min.		±50 ppm
phase jitter max.		1.0 ps
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz
contents of reel		1000 pcs.

actual size

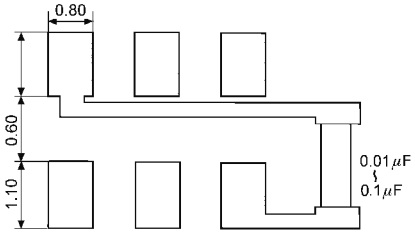
Dimensions (mm):



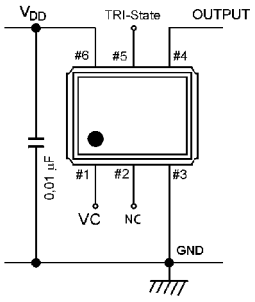


Pin	Connection
1	VC
2	NC
3	GND
4	OUTPUT
5	Tri-State
6	V_{DD}

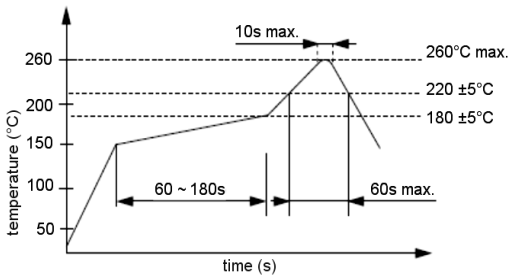
Suggested soldering pad:



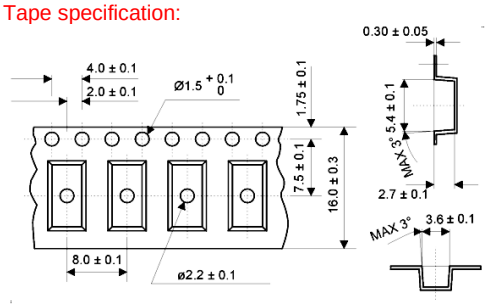
Test circuit:



Reflow soldering condition:



Tape specification:



reel diameter 178 mm

VCXO – KXO-70

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

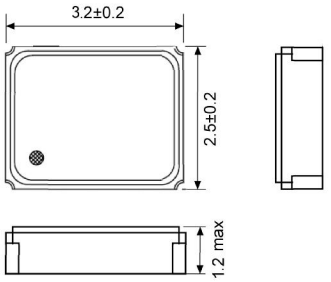
GEYER quartz technology

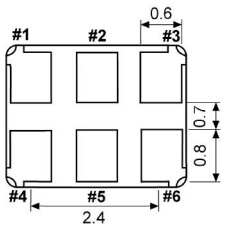
VCXO
Voltage Controlled Crystal Oscillator **SMD-version +3.3V**

model		KXO-70R
frequency range		2.0 ~ 80.0 MHz
frequency stability	over all parameters	±50 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-40°C ~ +85°C
storage temperature range		-45°C ~ +90°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+3.3V DC ±5%
input current max.		15 mA
start-up time max.		10 ms
symmetry		45% / 55% at ½ V_{DD} level
rise and fall time max.		5 ns
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
frequency control voltage		1.65V ±1.35V
frequency adjustment (pullability) min.		±50 ppm
phase jitter max.		1.0 ps
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz
contents of reel		1000 pcs.

actual size

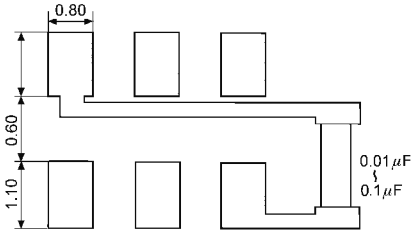
Dimensions (mm):



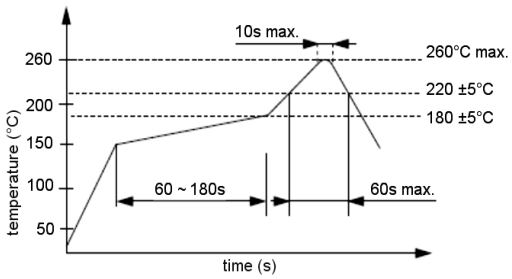


Pin	Connection
1	VC
2	Tri-State
3	GND
4	OUTPUT
5	NC
6	V_{DD}

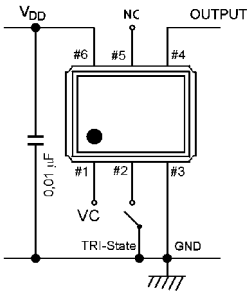
Suggested soldering pad:



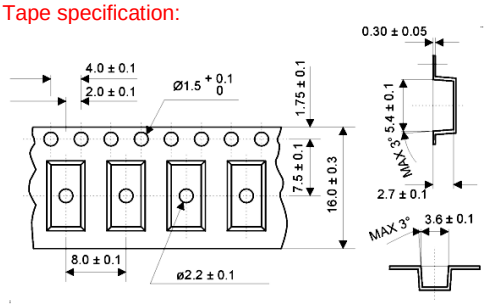
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

VCXO – KXO-70R

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

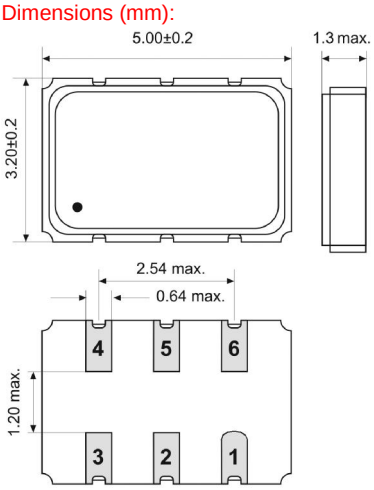
GEYER quartz technology

VCXO
Voltage Controlled Crystal Oscillator **SMD-version +2.5V +3.3V**

model		KXO-72
frequency range		1.0 ~ 80.0 MHz
frequency stability	over all parameters	±50 ppm over -20°C ~ +70°C (referred to +25°C) ±100 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-55°C ~ +125°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+2.5V DC ±5% or +3.3V DC ±5%
input current max.		10 mA at 1.0 MHz ~ 30 mA at 80.0 MHz (no load)
start-up time max.		10 ms
symmetry		40% / 60% at ½ V_{DD} level
rise and fall time max.		10 ns
frequency control voltage		1.65V ±1.35V at +3.3V 1.25V ±1.05V at +2.5V
frequency adjustment (pullability) min.		± 50 ppm ~ ±100 ppm
phase jitter max.		1.0 ps
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz
contents of reel		1000 pcs.

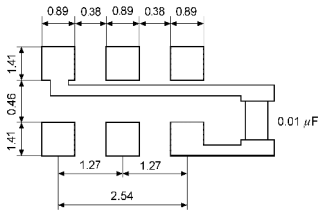
actual size

Dimensions (mm):

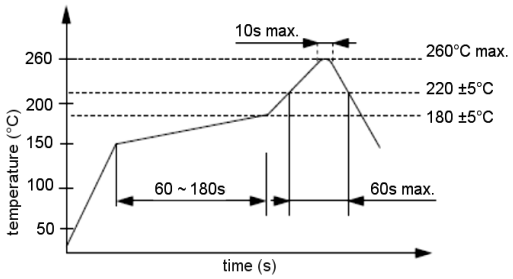


Pin	Connection
1	VC
2	NC
3	GND
4	OUTPUT
5	Tri-State
6	V_{DD}

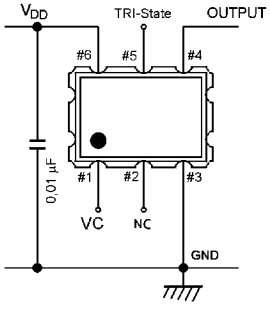
Suggested soldering pad:



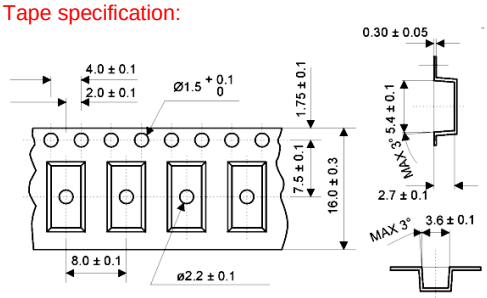
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

VCXO – KXO-72R

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

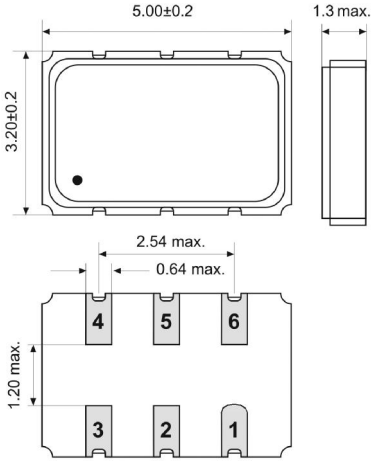
GEYER quartz technology

VCXO
Voltage Controlled Crystal Oscillator **SMD-version +2.5V +3.3V**

model		KXO-72R
frequency range		1.0 ~ 80.0 MHz
frequency stability	over all parameters	±50 ppm over -20°C ~ +70°C (referred to +25°C) ±100 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-55°C ~ +125°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+2.5V DC ±5% or +3.3V DC ±5%
input current max.		10 mA at 1.0 MHz ~ 30 mA at 80.0 MHz (no load)
start-up time max.		10 ms
symmetry		40% / 60% at ½ V_{DD} level
rise and fall time max.		10 ns
frequency control voltage		1.65V ±1.35V at +3.3V 1.25V ±1.05V at +2.5V
frequency adjustment (pullability) min.		± 50 ppm ~ ±100 ppm
phase jitter max.		1.0 ps
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz
contents of reel		1000 pcs.

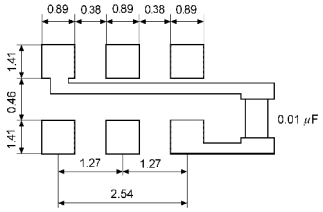
actual size

Dimensions (mm):

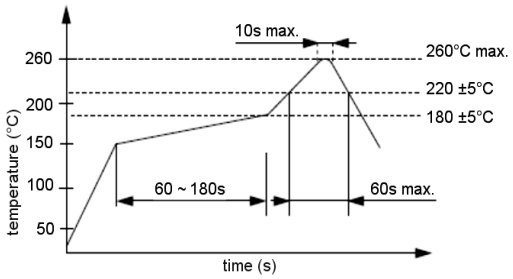


Pin	Connection
1	VC
2	Tri-State
3	GND
4	OUTPUT
5	NC
6	V_{DD}

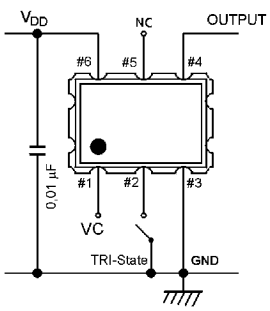
Suggested soldering pad:



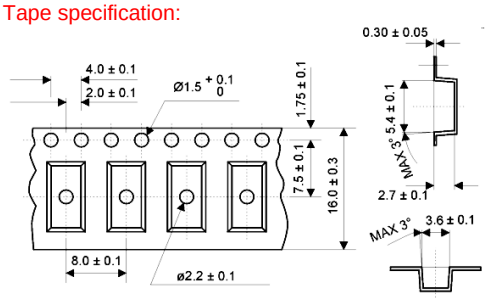
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

VCXO – KXO-72R

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

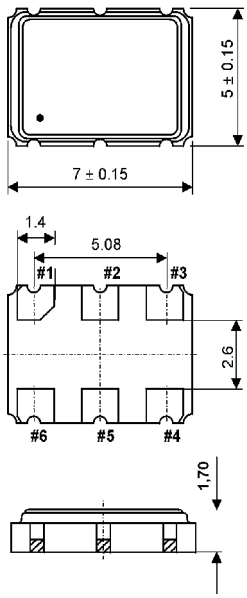
GEYER quartz technology

VCXO
Voltage Controlled Crystal Oscillator **SMD-version +3.3V**

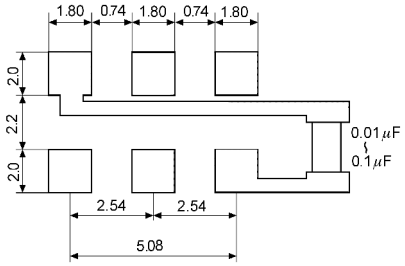
model		KXO-75
frequency range		1.544 ~ 77.760 MHz
frequency stability	over all parameters	±10 ppm ~ ±50 ppm over -10°C ~ +60°C (referred to +25°C) ±20 ppm ~ ±50 ppm over -20°C ~ +70°C (referred to +25°C) ±30 ppm ~ ±50 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-10°C ~ +60°C -20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+3.3V DC ±5%
input current max.		1.544 ~ 20.0 MHz 10 mA (no load) 20.1 ~ 40.0 MHz 15 mA (no load) 40.1 ~ 77.760 MHz 25 mA (no load)
start-up time max.		10 ms
symmetry		50% at ½ V_{DD} level
rise and fall time max.		5 ns
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
frequency control voltage		0V ~ +3.3V
frequency adjustment (pullability) min.		± 80 ppm ~ ±150 ppm
phase jitter absolut max.		100 ps
phase jitter one sigma max.		10 ps
contents of reel		1000 pcs.


actual size

Dimensions (mm):



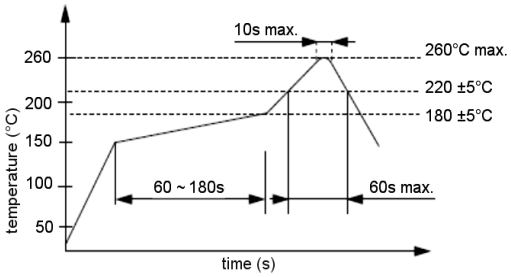
Suggested soldering pad:



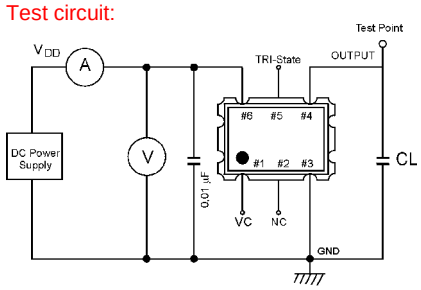
PIN	Connection	
1	VC	
2	NC	
3	GND	
4	Z	OUTPUT
5	"L" (0V)	"H"(+3,3V) or OPEN
6	V_{DD}	

Z= High Impedance

Reflow soldering condition:



Test circuit:



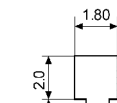
VCXO – KXO-75

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

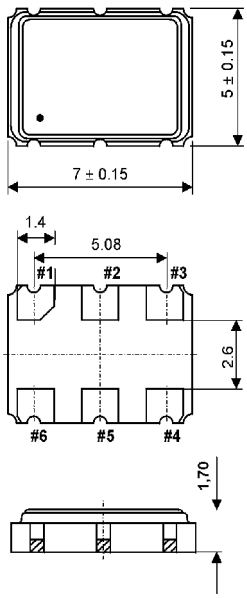
GEYER quartz technology

VCXO
Voltage Controlled Crystal Oscillator **SMD-version +3.3V**

model		KXO-75R
frequency range		1.544 ~ 77.760 MHz
frequency stability	over all parameters	±10 ppm ~ ±50 ppm over -10°C ~ +60°C (referred to +25°C) ±20 ppm ~ ±50 ppm over -20°C ~ +70°C (referred to +25°C) ±30 ppm ~ ±50 ppm over -40°C ~ +85°C (referred to +25°C)
output	load	15 pF
	waveform	HCMOS
operating temperature range		-10°C ~ +60°C -20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		+2.5 ~ +3.6V
input voltage V_{DD}		+3.3V DC ±5%
input current max.		1.544 ~ 20.0 MHz 10 mA (no load) 20.1 ~ 40.0 MHz 15 mA (no load) 40.1 ~ 77.760 MHz 25 mA (no load)
start-up time max.		10 ms
symmetry		50% at ½ V_{DD} level
rise and fall time max.		5 ns
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
frequency control voltage		0V ~ +3.3V
frequency adjustment (pullability) min.		± 80 ppm ~ ±150 ppm
phase jitter absolut max.		100 ps
phase jitter one sigma max.		10 ps
contents of reel		1000 pcs.


actual size

Dimensions (mm):

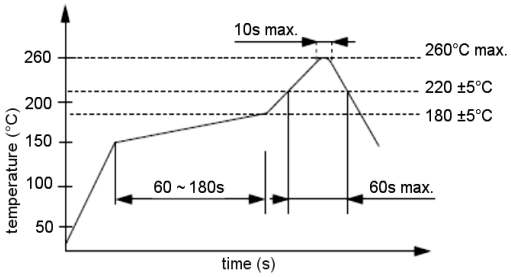


Suggested soldering pad:

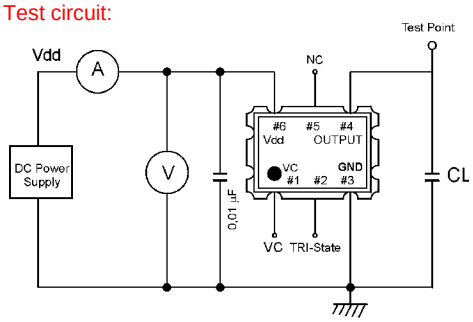
PIN	Connection	
1	VC	
2	"L" (OV)	"H"(+3,3V) or OPEN
3	GND	
4	Z	OUTPUT
5	NC	
6	V_{DD}	

Z= High Impedance

Reflow soldering condition:



Test circuit:



VCXO – KXO-75R

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

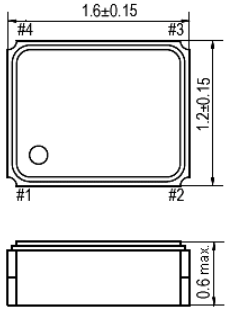
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +1.8V +3.3V**

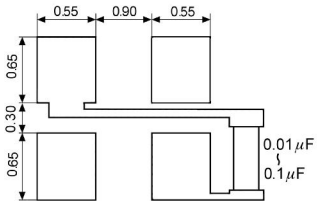
model		KXO-88
frequency range		26.0 MHz
initial frequency tolerance max.		±1.5 ppm
frequency stability	vs. temp.range	±0.5 ppm over -30°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.2 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF ±10%
	waveform	clipped sine wave
operating temperature range		-30°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		+1.7V ~ 3.45V
max. ratings		-0.6V to V_{DD} +0.6V (+4.6V max.)
input voltage V_{DD}		+1.8V DC ±5%, +3.3V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		2 ms
reflow frequency change		±1.0 ppm after reflow (at +25°C ±2°C)
phase noise max.		-115 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -150 dBc/Hz at 10 kHz -155 dBc/Hz at 100 kHz
contents of reel		2000 pcs.

actual size

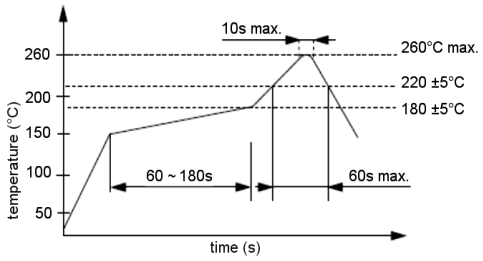
Dimensions (mm):



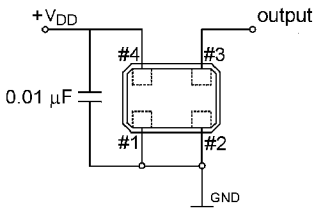
Suggested soldering pad:



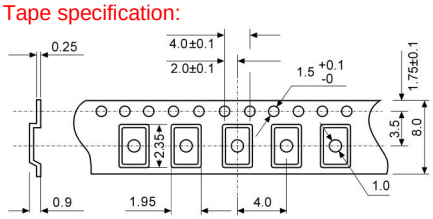
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

Pin	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

TCXO – KXO-88 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

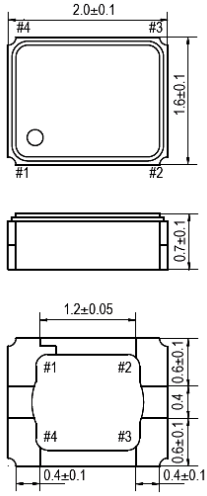
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +1.8V +2.5V +2.8V +3.0V +3.3V**

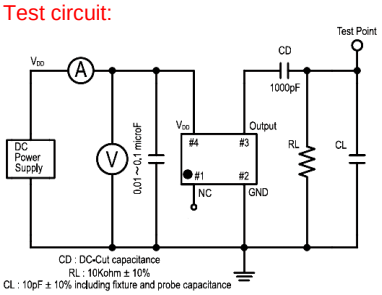
model		KXO-81
frequency range		13.0 ~ 52.0 MHz
initial frequency tolerance max.		±1.5 ppm
frequency stability	vs. temp.range	±2.0 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.1 ppm at V_{DD} ±5%
	vs. load max.	±0.1 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF ±10%
	waveform	clipped sine wave
operating temperature range		standard -30°C ~ +85°C, avail. -40°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		+1.6V ~ 3.6V
max. ratings		-0.6V to V_{DD} +0.6V (+4.6V max.)
input voltage V_{DD}		+1.8V DC ±5%, +2.5V DC ±5%, +2.8V DC ±5%, +3.0V DC ±5% or +3.3V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		2 ms
short-term frequency stability max.		±1 ppb (allan variance Tau = 0.1 sec.)
harmonics max.		-5.0 dBc
reflow frequency change		±1.0 ppm after reflow (at +25°C ±2°C)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

actual size

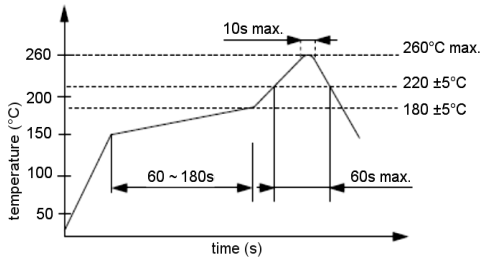
Dimensions (mm):



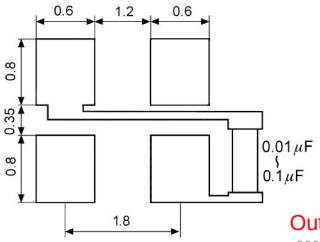
Test circuit:



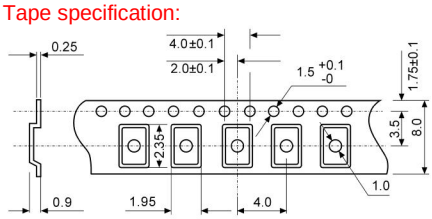
Reflow soldering condition:



Suggested soldering pad:



Tape specification:

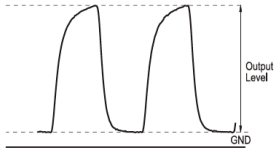


reel diameter 178 mm

Pin	Connection	
1	„L“	Open or „H“
2	GND	
3	z	OUTPUT
4	V_{DD}	

Z: high impedane

Output waveform:



TCXO – KXO-81 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

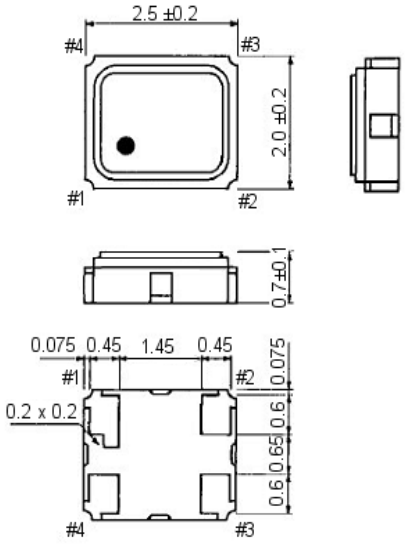
TCXO HCMOS
Temperature Compensated Crystal Oscillator **SMD-version +1.8V +2.5V +3.3V**

model		KXO-86
frequency range		13.0 ~ 54.0 MHz*
initial frequency tolerance max.		±0.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	15 pF
	waveform	HCMOS
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+1.8V DC ±5%, +2.5V DC ±5% or +3.3V DC ±5%
input current max.		6.0 mA (no load)
start-up time max.		2 ms
symmetry		45% / 55% at ½ V_{DD} level
rise and fall time max.		5 ns (10% V_{DD} ~ 90% V_{DD} level)
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
reflow frequency change		±1.0 ppm after reflow (at +25°C ± 2°C)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

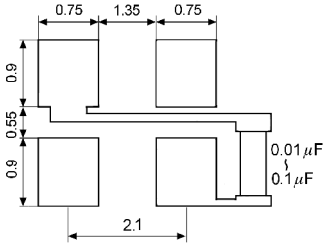
actual size

* Standard frequencies: 13.0 MHz 13.50 MHz 16.0 MHz 20.0 MHz 26.0 MHz 27.0 MHz 32.0 MHz 40.0 MHz 54.0 MHz

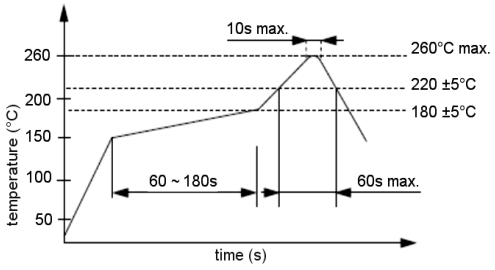
Dimensions (mm):



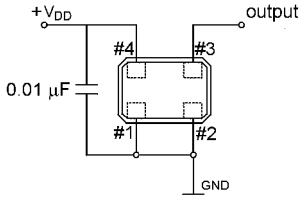
Suggested soldering pad:



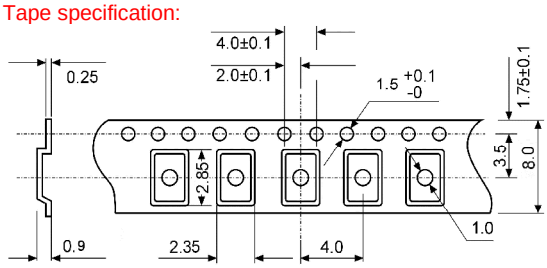
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

PIN	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

TCXO – KXO-86

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

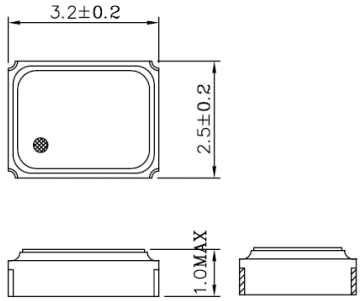
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +1.8V +2.8V +3.3V**

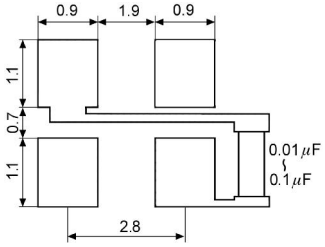
model		KXO-84
frequency range		10.0 ~ 40.0 MHz
initial frequency tolerance max.		±0.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+1.8V DC ±5%, +2.8V DC ±5% or +3.3V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		3 mS
harmonics max.		-5.0 dBc
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		1000 pcs.

actual size

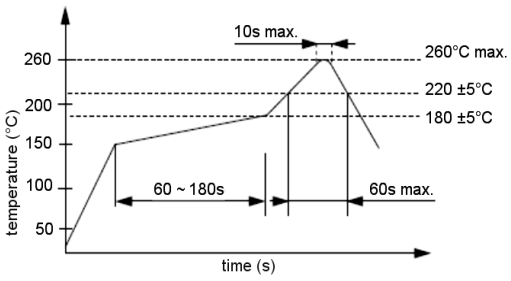
Dimensions (mm):

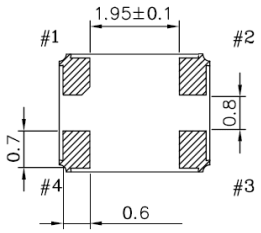


Suggested soldering pad:

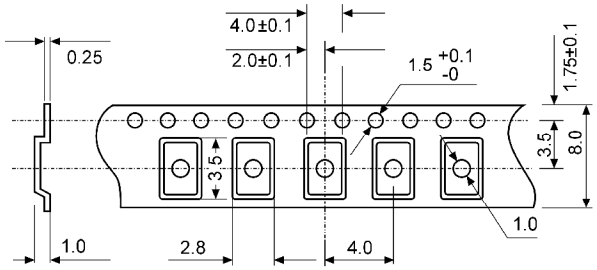


Reflow soldering condition:





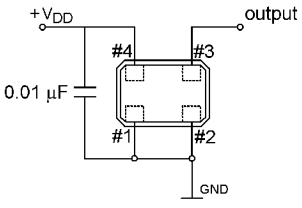
Tape specification:



reel diameter 178 mm

PIN	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

Test circuit:



TCXO – KXO-84 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

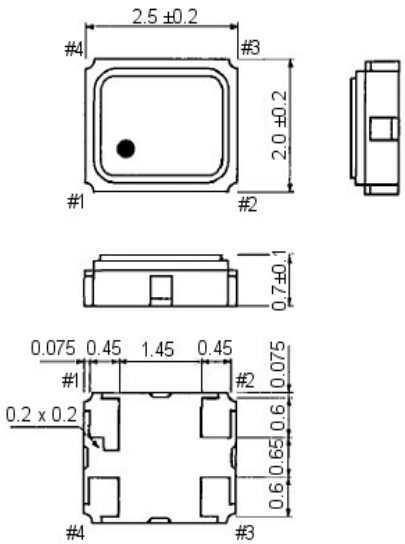
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +2.5V +2.8V +3.0V**

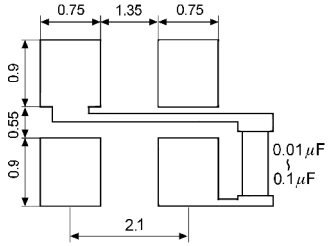
model		KXO-86
frequency range		13.0 ~ 40.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.2 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1.0 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+2.5V DC ±5%, +2.8V DC ±5% or +3.0V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		3 mS (Vout≧90%Vp-p) 4 mS (within ±2.5ppm)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

actual size

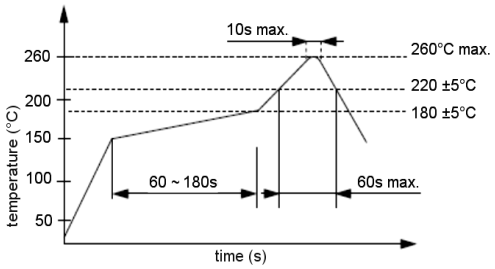
Dimensions (mm):



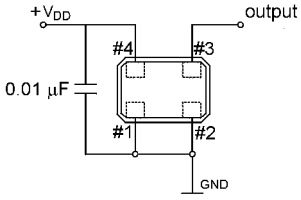
Suggested soldering pad:



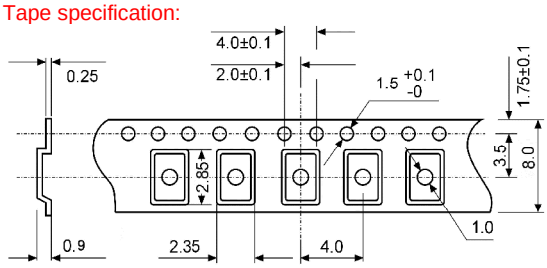
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

PIN	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

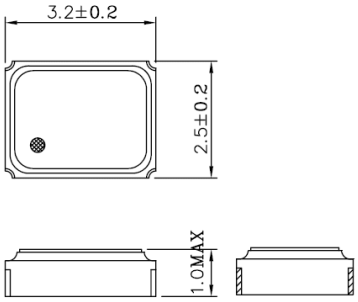
GEYER quartz technology

TCXO HCMOS
Temperature Compensated Crystal Oscillator **SMD-version +1.8V +2.5V +3.3V**

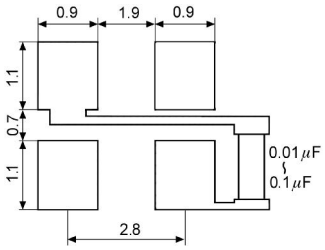
model		KXO-84
frequency range		10.0 ~ 40.0 MHz
initial frequency tolerance max.		±0.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	15 pF
	waveform	HCMOS
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+1.8V DC ±5%, +2.5V DC ±5% or +3.3V DC ±5%
input current max.		6.0 mA (no load)
start-up time max.		2 ms
symmetry		45% / 55% at ½ V_{DD} level
rise and fall time max.		5 ns (10% V_{DD} ~ 90% V_{DD} level)
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
reflow frequency change		±1.0 ppm after reflow (at +25°C ± 2°C)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		1000 pcs.

actual size

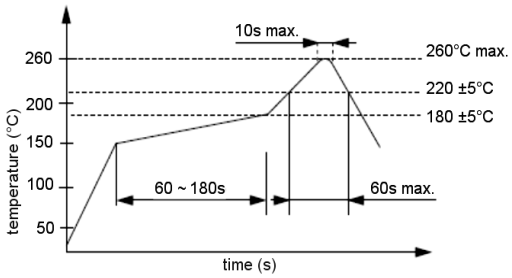
Dimensions (mm):

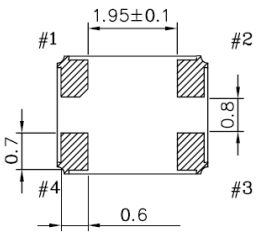


Suggested soldering pad:



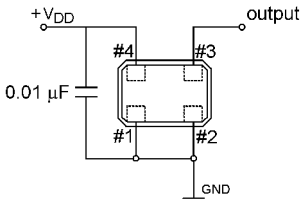
Reflow soldering condition:



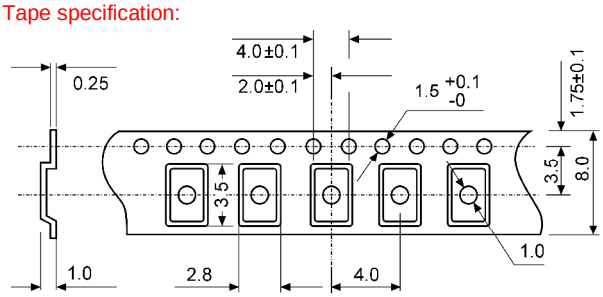


Pin	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

Test circuit:



Tape specification:



reel diameter 178 mm

TCXO – KXO-84 HCMOS

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

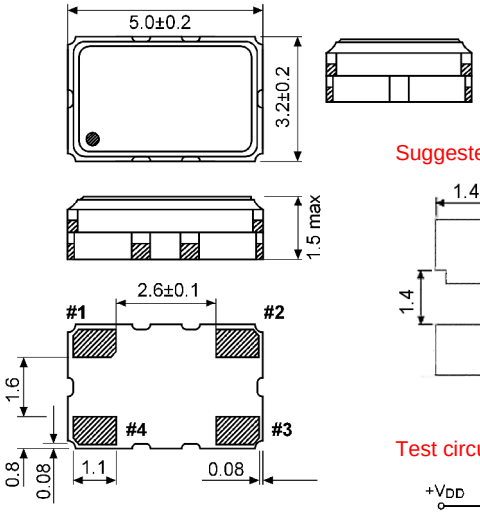
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +3.0V +3.3V**

model		KXO-83
frequency range		12.0 ~ 26.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±1.5 ~ ±5.0 ppm over -10°C ~ +60°C (referred to +25°C) ±2.0 ~ ±5.0 ppm over -20°C ~ +70°C (referred to +25°C) ±2.0 ~ ±5.0 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.3 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-10°C ~ +60°C -20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+3.0V DC ±5% or +3.3V DC ±5%
input current		1.2 mA typ., 2 mA max. (no load)
start-up time max.		3 mS
harmonics max.		-5.0 dBc
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		1000 pcs.

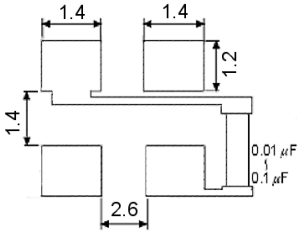
actual size

Dimensions (mm):

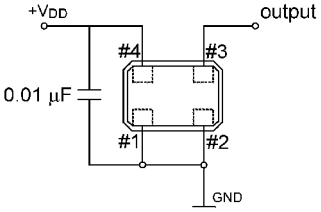


Pin	Connection
1	GND
2	GND
3	OUTPUT
4	V_{DD}

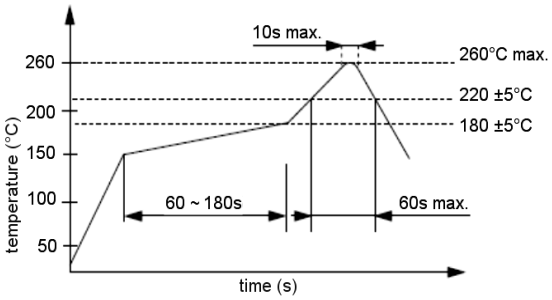
Suggested soldering pad:



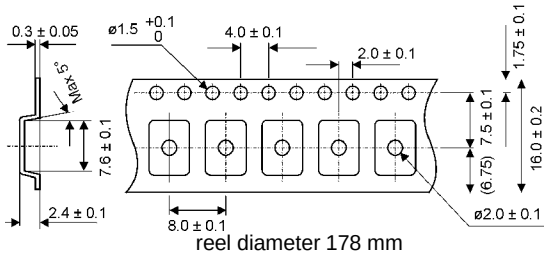
Test circuit:



Reflow soldering condition:



Tape specification:



reel diameter 178 mm

TCXO – KXO-83

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

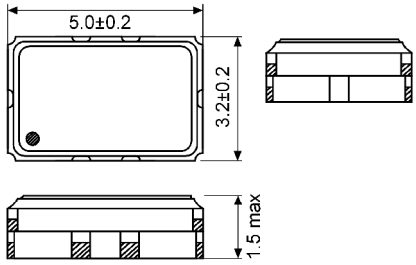
GEYER quartz technology

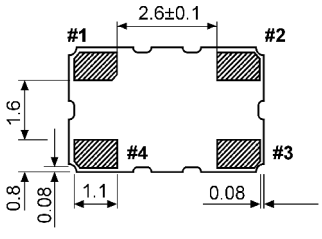
TCXO HCMOS
Temperature Compensated Crystal Oscillator **SMD-version +2.8V +3.3V**

model		KXO-83
frequency range		10.0 ~ 40.0 MHz
initial frequency tolerance max.		±1.0 ppm
frequency stability	vs. temp.range	±1.0 ppm ~ ±3 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.3 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	15 pF
	waveform	HCMOS
operating temperature range		standard -20°C ~ +70°C available -40°C ~ +85°C
storage temperature range		-55°C ~ +125°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+2.8V DC ±5% or +3.3V DC ±5%
input current max.		10.0 mA typ., 20 mA max.(no load)
start-up time max.		3 ms
symmetry		40% / 60% at ½ V_{DD} level
rise and fall time max.		5 ns (10% V_{DD} ~ 90% V_{DD} level)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz
contents of reel		1000 pcs.

actual size

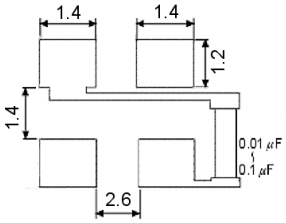
Dimensions (mm):



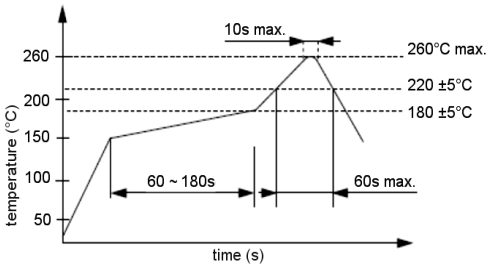


Pin	Connection
1	NC
2	GND
3	OUTPUT
4	V_{DD}

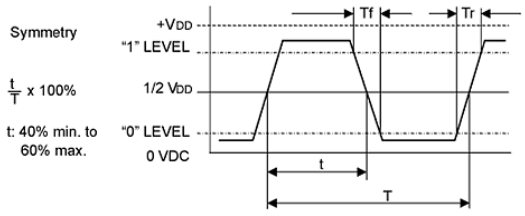
Suggested soldering pad:



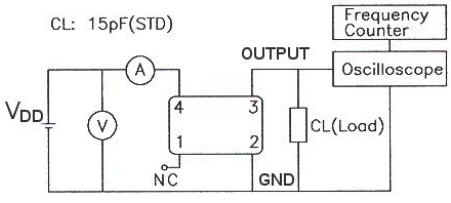
Reflow soldering condition:



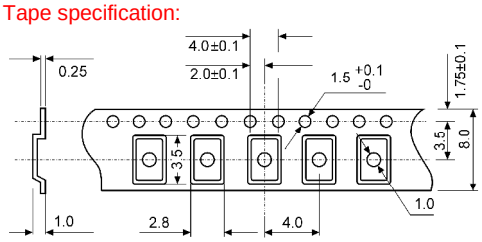
Output waveform:



Test circuit:



Tape specification:



reel diameter 178 mm

TCXO – KXO-83

RoHS 2015/863/EU compliant | REACH compliant | Conflict minerals free

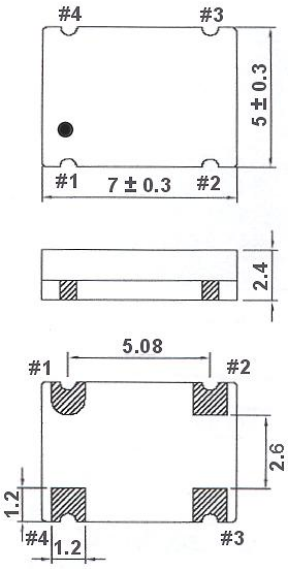
GEYER quartz technology

TCXO clipped sine wave
Temperature Compensated Crystal Oscillator **SMD-version +3.0V +3.3V**

model		KXO-82
frequency range		10.0 ~ 30.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.0 ppm over -30°C ~ +80°C (referred to +25°C)
	vs. input voltage max.	±0.2 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +80°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+3.0V DC ±5% or +3.3V DC ±5%
input current		1.2 mA typ., 20 mA max. (no load)
start-up time max.		3 mS
harmonics max.		-5.0 dBc
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

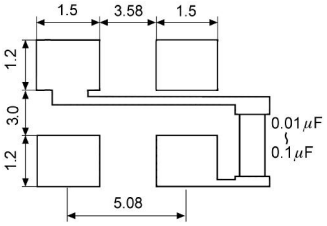
actual size

Dimensions (mm):

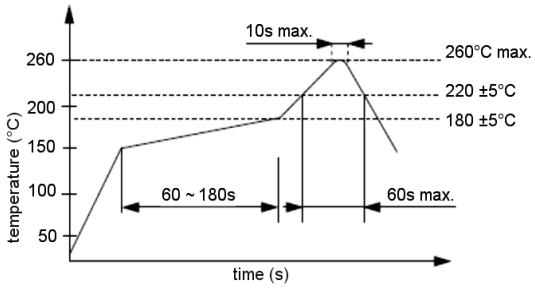


Pin	Connection
1	NC
2	GND
3	OUTPUT
4	V_{DD}

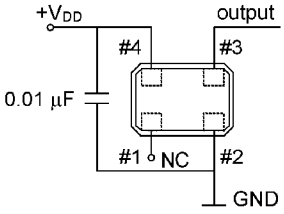
Suggested soldering pad:



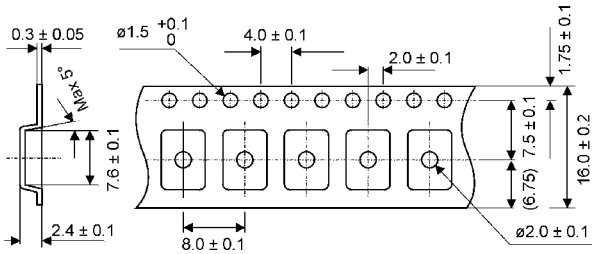
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

TCXO – KXO-82 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

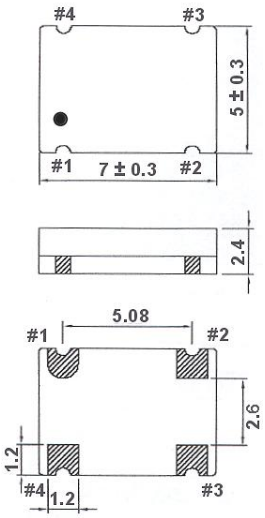
GEYER quartz technology

TCXO HCMOS
Temperature Compensated Crystal Oscillator **SMD-version +2.8V +3.3V**

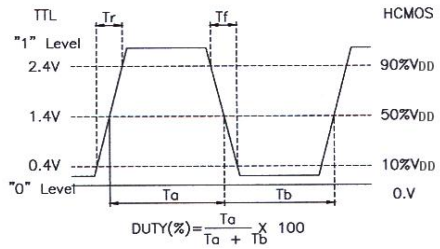
model		KXO-82
frequency range		10.0 ~ 30.0 MHz
initial frequency tolerance max.		±1.5 ppm
frequency stability	vs. temp.range	±1.0 ppm ~ ±3 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.3 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	15 pF
	waveform	HCMOS
operating temperature range		standard -20°C ~ +70°C available -40°C ~ +85°C
storage temperature range		-55°C ~ +125°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+2.8V DC ±5% or +3.3V DC ±5%
input current		10.0 mA typ., 20 mA max.(no load)
start-up time max.		2 ms
symmetry		40% / 60% at ½ V_{DD} level
rise and fall time max.		10 ns (10% V_{DD} ~ 90% V_{DD} level)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -135 dBc/Hz at 1 kHz -140 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz
contents of reel		1000 pcs.


actual size

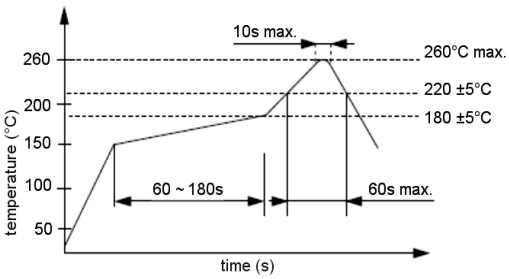
Dimensions (mm):



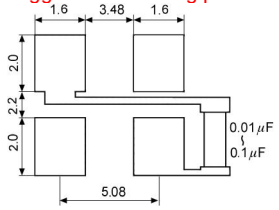
Output waveform:



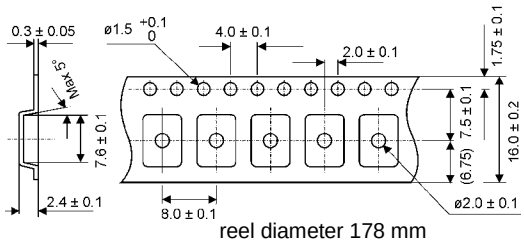
Reflow soldering condition:



Suggested soldering pad:



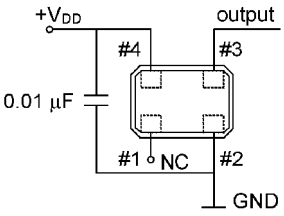
Tape specification:



reel diameter 178 mm

Pin	Connection
1	NC
2	GND
3	OUTPUT
4	V_{DD}

Test cicuit:



TCXO – KXO-82 HCMOS

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

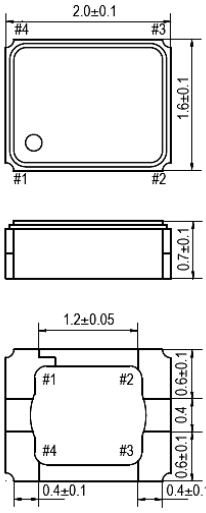
GEYER quartz technology

VCTCXO clipped sine wave
Voltage Controlled Temperature Compensated Crystal Oscillator **SMD-version +1.2V +1.8V +2.5V +3.3V**

model		KXO-81
frequency range		13.0 ~ 40.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+1.2V DC ±5%, +1.8V DC ±5%, +2.5V DC ±5% or +3.3V DC ±5%
input current		1.5 mA (no load)
start-up time max.		2 mS
harmonics max.		-5.0 dBc
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) min.		±9 ppm ~ ±15ppm
reflow frequency change		±1.0 ppm after reflow (at +25°C ± 2°C)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

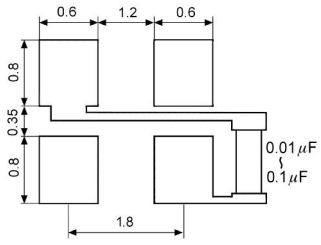
actual size

Dimensions (mm):

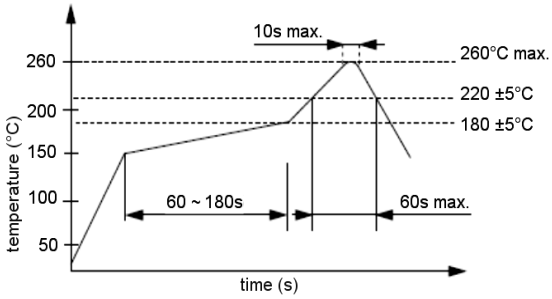


PIN	Connection
1	VC
2	GND
3	OUTPUT
4	V_{DD}

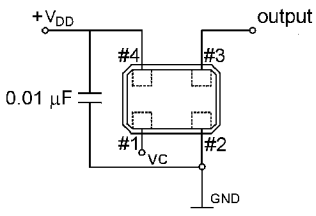
Suggested soldering pad:



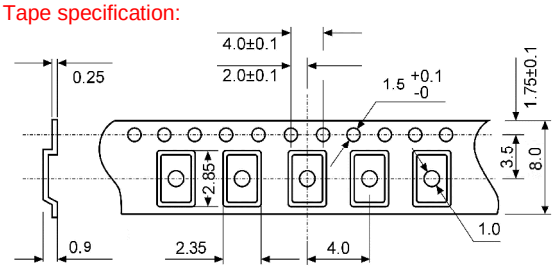
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 180 mm

VCTCXO – KXO-81 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

VCTCXO clipped sine wave
Voltage Controlled Temperature Compensated Crystal Oscillator

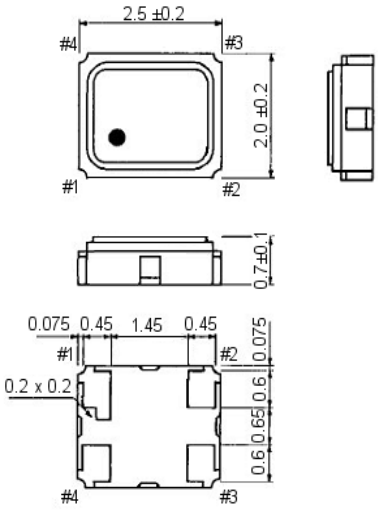
SMD-version +2.5V +3.3V

model		KXO-86
frequency range		13.0 ~ 40.0 MHz*
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+2.5V DC ±5% or +3.3V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		2 mS
harmonics max.		-5.0 dBc
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) min.		±9 ppm ~ ±15ppm
reflow frequency change		±1.0 ppm after reflow (at +25°C ± 2°C)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

actual size

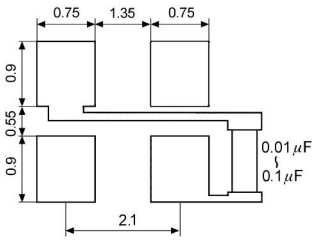
* Standard frequencies: 13.0 MHz 16.0 MHz 16.3690 MHz 19.20 MHz 26.0 MHz 38.40 MHz 40.0 MHz

Dimensions (mm):

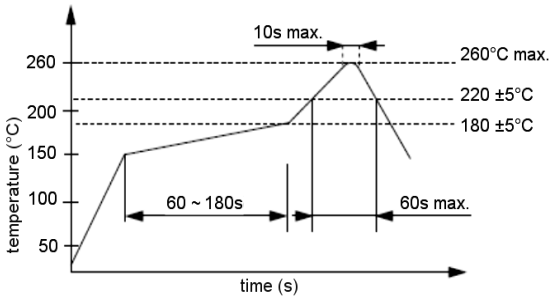


PIN	Connection
1	VC
2	GND
3	OUTPUT
4	V_{DD}

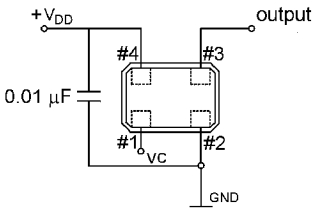
Suggested soldering pad:



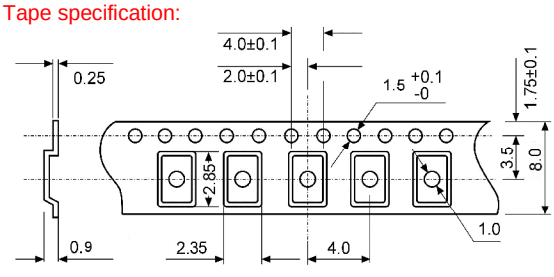
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 180 mm

VCTCXO – KXO-86 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

VCTCXO clipped sine wave

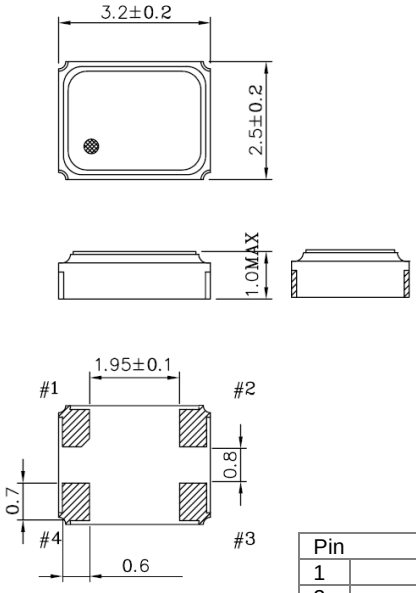
Voltage Controlled Temperature Compensated Crystal Oscillator **SMD-version +1.8V +2.8V +3.3V**

model		KXO-84
frequency range		10.0 ~ 40.0 MHz*
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.5 ppm over -30°C ~ +75°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +75°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+1.8V DC ±5%, +2.8V DC ±5% or +3.3V DC ±5%
input current max.		1.5 mA (no load)
start-up time max.		3 mS
harmonics max.		-5.0 dBc
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) max.		±12 ppm
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		1000 pcs.

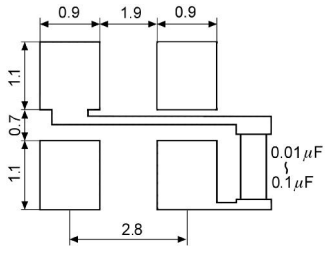
actual size

* Standard frequencies: 12.80 12.2880 16.3690 16.80 19.20 20.0 26.0 27.0 30.0 32.0 38.40 and 40.0 MHz

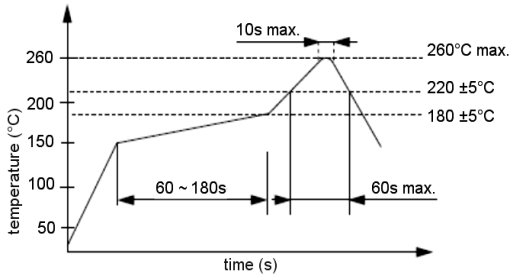
Dimensions (mm):



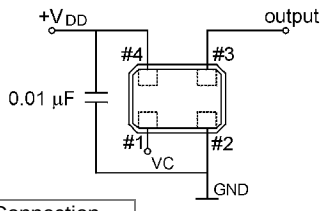
Suggested soldering pad:



Reflow soldering condition:

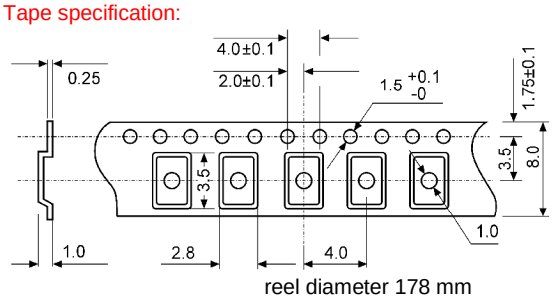


Test circuit:



Pin	Connection
1	VC
2	GND
3	OUTPUT
4	V_{DD}

Tape specification:



reel diameter 178 mm

VCTCXO – KXO-84 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

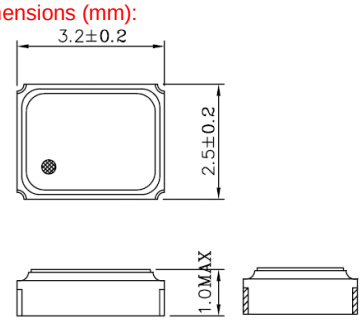
VCTCXO HCMOS

Voltage Controlled Temperature Compensated Crystal Oscillator **SMD-version** **+2.8V +3.3V**

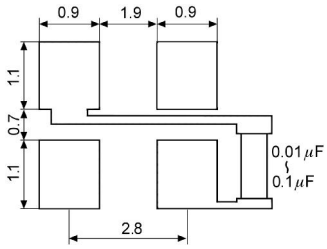
model		KXO-84
frequency range		8.0 ~ 40.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±1.0 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.3 ppm / 15pF ±5%
	vs. aging max.	±1 ppm / year at +25°C
output	load	15 pF
	waveform	HCMOS
operating temperature range		-40°C ~ +85°C
storage temperature range		-40°C ~ +90°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+2.8V DC ±5% or +3.3V DC ±5%
input current max.		7.0 mA (no load)
start-up time max.		3 mS
symmetry		40% / 60% at ½ V_{DD} level
rise and fall time max.		5 ns (10% V_{DD} ~ 90% V_{DD} level)
"0" level max.		V_{OL}: 10% V_{DD}
"1" level min.		V_{OH}: 90% V_{DD}
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) min.		±5 ppm ~ ±20 ppm
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

actual size

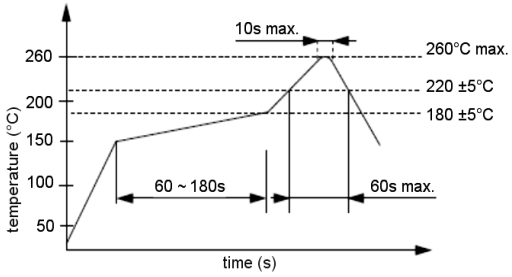
Dimensions (mm):

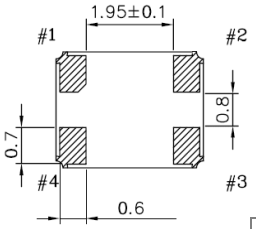


Suggested soldering pad:

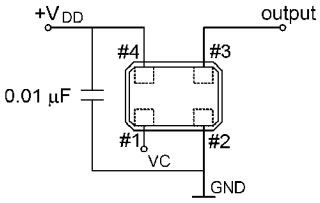


Reflow soldering condition:



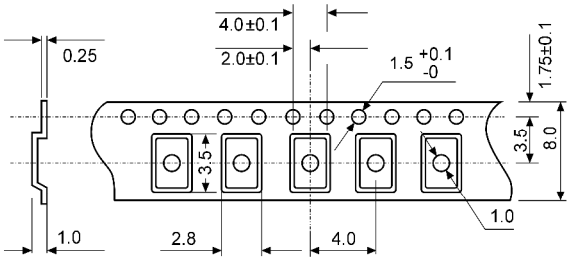


Test circuit:



Pin	Connection
1	VC
2	GND
3	OUTPUT
4	V_{DD}

Tape specification:



reel diameter 178 mm

VCTCXO – KXO-84 HCMOS

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

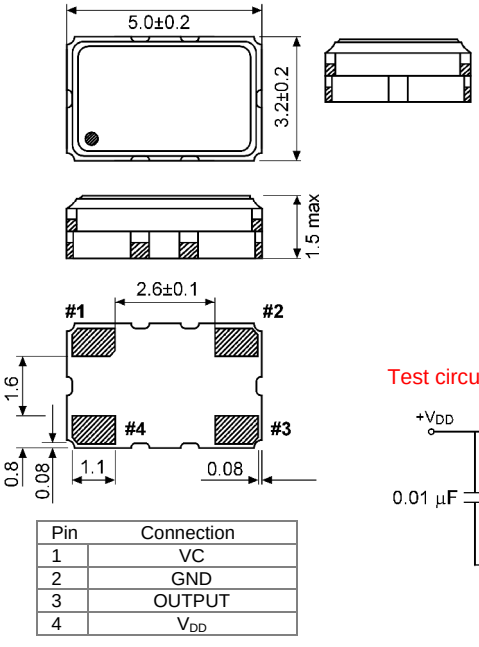
GEYER quartz technology

VCTCXO clipped sine wave
Voltage Controlled Temperature Compensated Crystal Oscillator **SMD-version +3.0V +3.3V**

model		KXO-83
frequency range		12.0 ~ 26.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±1.5 ~ ±5.0 ppm over -10°C ~ +60°C (referred to +25°C) ±2.0 ~ ±5.0 ppm over -20°C ~ +70°C (referred to +25°C) ±2.0 ~ ±5.0 ppm over -40°C ~ +85°C (referred to +25°C)
	vs. input voltage max.	±0.3 ppm at V_{DD} ±5%
	vs. load max.	±0.3 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-10°C ~ +60°C -20°C ~ +70°C -40°C ~ +85°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+3.0V DC ±5% or +3.3V DC ±5%
input current		1.2 mA typ., 2 mA max. (no load)
start-up time max.		3 mS
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) min.		±5 ppm (VC, positive slope)
harmonics max.		-5.0 dBc
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		1000 pcs.

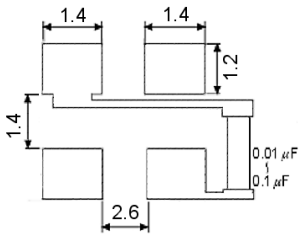
actual size

Dimensions (mm):

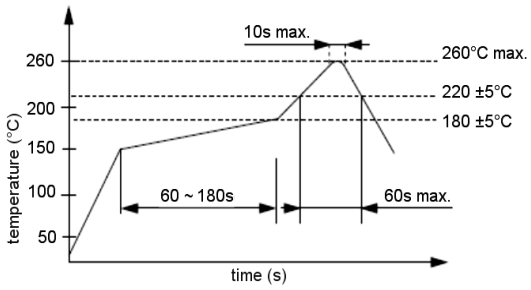


Pin	Connection
1	VC
2	GND
3	OUTPUT
4	V_{DD}

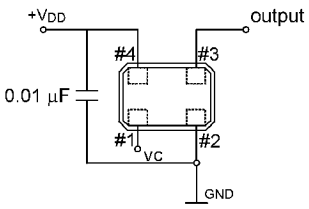
Suggested soldering pad:



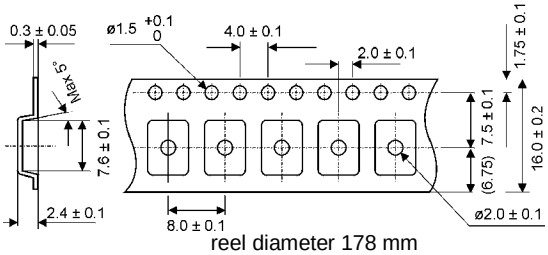
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

VCTCXO – KXO-83 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

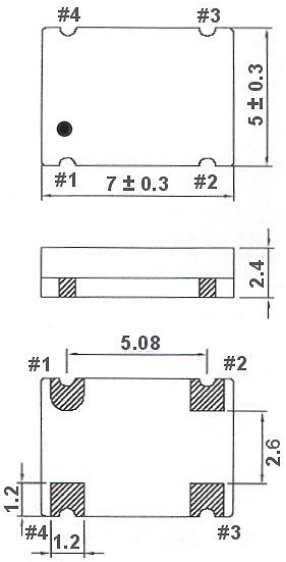
GEYER quartz technology

VCTCXO clipped sine wave
Voltage Controlled Temperature Compensated Crystal Oscillator **SMD-version +3.0V +3.3V**

model		KXO-82
frequency range		12.6 ~ 26.0 MHz
initial frequency tolerance max.		±1.5ppm
frequency stability	vs. temp.range	±2.0 over -30°C ~ +80°C (referred to +25°C)
	vs. input voltage max.	±0.2 ppm at V_{DD} ±5%
	vs. load max.	±0.2 ppm
	vs. aging max.	±1 ppm / year at +25°C
output	load	10k Ohm ±10% // 10pF ±10%
	voltage min.	0.8Vp-p at 10 k Ohm // 10 pF
	waveform	clipped sine wave
operating temperature range		-30°C ~ +80°C
storage temperature range		-40°C ~ +85°C
supply voltage range		1.6V ~ 3.6V
input voltage V_{DD}		+3.0V DC ±5% or +3.3V DC ±5%
input current		1.2 mA typ., 2 mA max. (no load)
start-up time max.		3 mS
harmonics max.		-5.0 dBc
frequency control voltage (VC)		½ V_{DD} ±1V DC
frequency adjustment (pullability) min.		±5 ppm (VC, positive slope)
phase noise max.		-80 dBc/Hz at 10 Hz -110 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -150 dBc/Hz at 100 kHz -150 dBc/Hz at 1 MHz
contents of reel		2000 pcs.

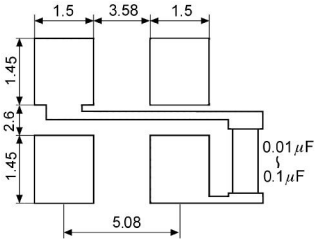

actual size

Dimensions (mm):

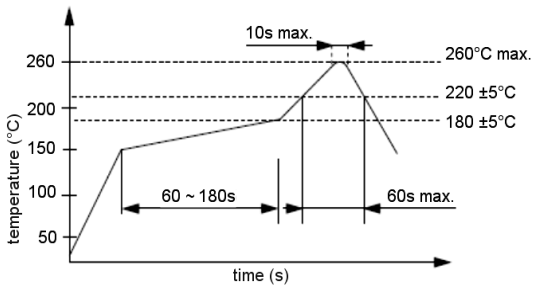


PIN	CONNECTION
1	VC
2	GND
3	OUTPUT
4	V_{DD}

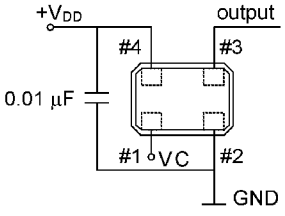
Suggested soldering pad:



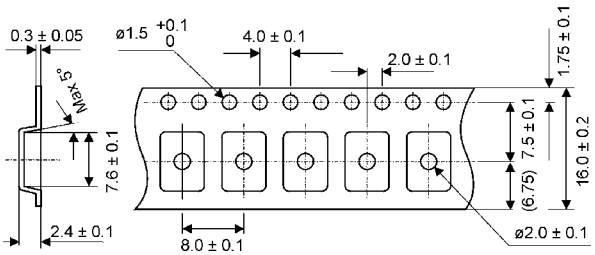
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 178 mm

VCTCXO – KXO-82 clipped sine wave

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

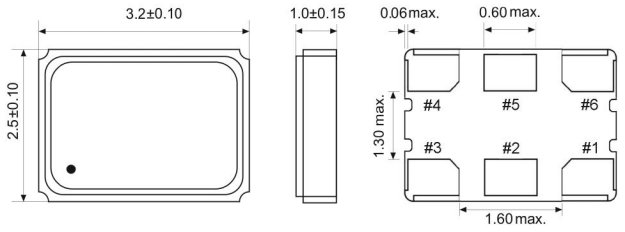
GEYER quartz technology

LVDS Clock Oscillator — SMD-version +2.5V +3.3V

model	KXO-V64
frequency range	10.0 ~ 1500.0 MHz
frequency stability incl. temperature stability, input voltage and load stability, aging.	±20 ppm ~ ±100 ppm over -20° ~ +70°C (refered to +25°C) ±20 ppm ~ ±100 ppm over -40° ~ +85°C (refered to +25°C)
output load	100 Ohm & 5 pF LVDS
operating temperature	standard -20° ~ +70°C available -40° ~ +85°C (=KXO-V64T)
storage temperature	-40° ~ +105°C
input voltage	+2.5V DC ± 5% or +3.3V DC ± 5%
input current	80 mA
start up time max.	10 ms
symmetry	45% / 55% at ½ V_{DD} level
rise & fall time (Tr) max.	1 ns (20% ~ 80% of waveform)
rise & fall time (Tf) max.	1 ns (80% ~ 20% of waveform)
disable delay time max.	200 ns
enable delay time max.	4 ms
enable/disable (Pin 1) input voltage	30% V_{DD} max.: output disable / 70% V_{DD} min.: output enable
"O" level max.	0.9V ~ 1.1V
"1" level min.	1.4V ~ 1.6V
LVDS offset output voltage	1.125V ~ 1.375V
tristate function	yes
phase jitter (12kHz ~ 20MHz) max.	RMS: 0.6ps
typical phase noise	-60 dBc/Hz at 10 Hz -90 dBc/Hz at 100 Hz -105 dBc/Hz at 1 kHz -115 dBc/Hz at 10 kHz -120 dBc/Hz at 100 kHz -130 dBc/Hz at 1 MHz
contents of reel	1000 pcs.

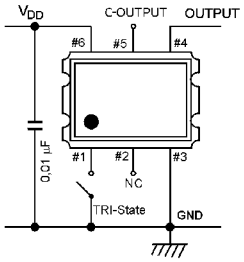
actual size

Dimensions (mm):

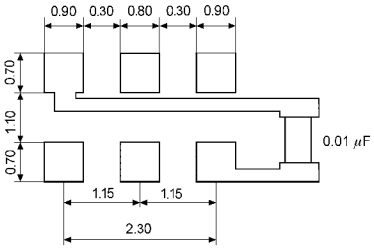


PIN	Connection
1	Tri-state
2	NC
3	GND
4	Output
5	C-Output
6	V_{DD}

Test circuit:

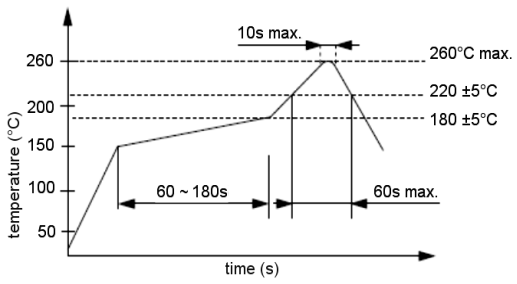


Suggested soldering pad:

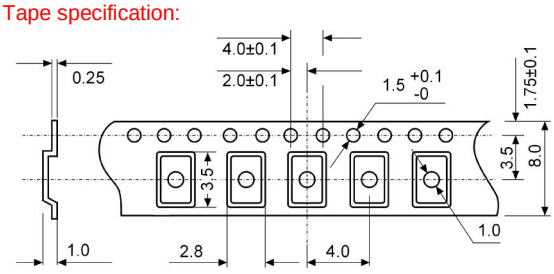


Note:
A capacitor of value 0,01µF and 10µF between V_{DD} and GND is recommended.

Reflow soldering condition:



Tape specification:



reel diameter 178 mm

LVDS Clock Oscillator – KXO-V64

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

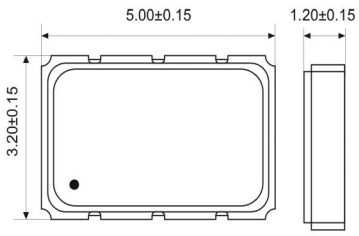
GEYER quartz technology

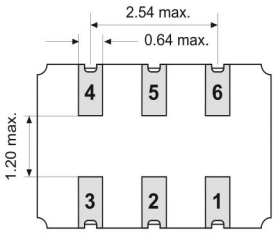
LVDS Clock Oscillator — SMD-version +2.5V +3.3V

model	KXO-V66
frequency range	40.0 ~ 600.0 MHz
frequency stability incl. temperature stability, input voltage and load stability, aging.	±25 ppm ~ ±100 ppm over -20° ~ +70°C (referred to +25°C) ±25 ppm ~ ±100 ppm over -40° ~ +85°C (referred to +25°C)
output load	100 Ohm
operating temperature	standard -20° ~ +70°C available -40° ~ +85°C (=KXO-V66T)
storage temperature	-55° ~ +125°C
input voltage	+2.5V DC ± 5% or +3.3V DC ± 5%
input current	80 mA
start up time max.	10 ms
symmetry	50% ± 5% at ½ Output level
rise & fall time (Tr)	300 ps typ. 600 ps max. (20% ~ 80% of waveform)
rise & fall time (Tf)	300 ps typ. 600 ps max. (80% ~ 20% of waveform)
"O" level max.	0.9V ~ 1.1V
"1" level min.	1.4V ~ 1.6V
LVDS offset output voltage	1.125V ~ 1.375V
disable delay time max.	200 ns
enable delay time max.	4 ms
tristate function	yes
phase jitter (12kHz ~ 20MHz) max.	RMS: 1ps
typical phase noise	-70 dBc/Hz at 10 Hz -105 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz -145 dBc/Hz at 1 MHz
contents of reel	1000 pcs.

actual size

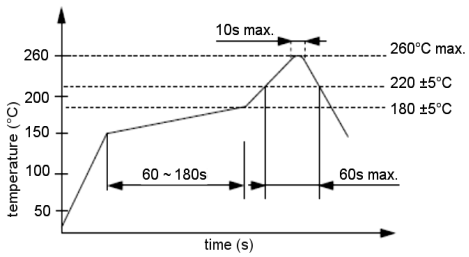
Dimensions (mm):



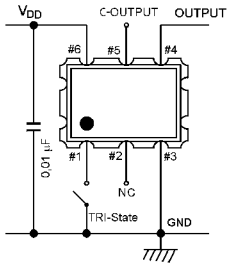


PIN	CONNECTION
1	Tri-state*
2	NC
3	GND
4	Output
5	C-Output
6	V_{DD}

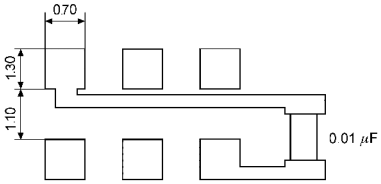
Reflow soldering condition:



Test circuit:

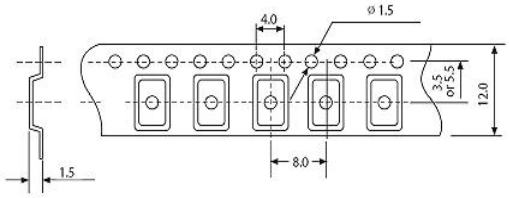


Suggested soldering pad:



note:
A capacitor of value 0,01µF and 10µF between V_{DD} and GND is recommended.

Tape specification:



reel diameter 180 mm

LVDS Clock Oscillator – KXO-V66

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

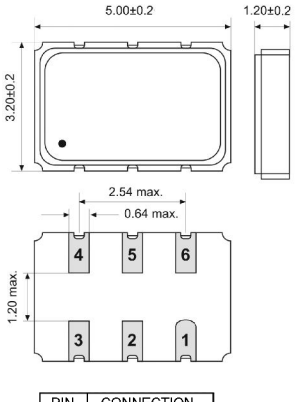
GEYER quartz technology

LVDS VCXO — SMD-version +2.5V +3.3V

model		KXO-V62
frequency range		20.0 ~ 700.0 MHz
frequency stability incl. temperature stability input voltage and load stability, aging		± 50ppm standard ±25ppm available
operating temperature		-20° ~ +70°C standard -40° ~ +85°C available
storage temperature		-40° ~ +125°C
symmetry		50% ±5%
rise & fall time max.		0.4 ns (20% ~ 80% of output level)
output high level max.		1.43V typ. ~ 1.60V
output low level		0.90V min. ~ 1.10V typ.
input voltage V_{DD}		+2.5V, + 3.3V ± 5%
input current max.		65 mA
output load		100 Ohm (OUT – OUTN)
start up time max.		5 ms
APR (absolute pulling range) min.		±50 ppm (Vcon = +1.65V ± 1.65V)
frequency linearity max.		10%
frequency slope		positive
Vcon input impedance min.		10M Ohm at DC characteristic
disable delay time max.		200 ns
enable delay time max.		4 ms
pin 1 control voltage		1.25V±1.05V (1.25V), 1.65V±1.35V (1.65V)
pin 2 function		enable input voltage
pin 2 function	enable input voltage	70% V_{DD} min. or NC
	disable input voltage	30% V_{DD} max.
output disable current (Pin #2 = VIL) max.		3.5 mA
phase jitter (12kHz ~ 20MHz) RMS max.		1.0 ps
typical phase noise		-125 dBc / 1 kHz -160 dBc / 10 MHz
contents of reel		1000 pcs.

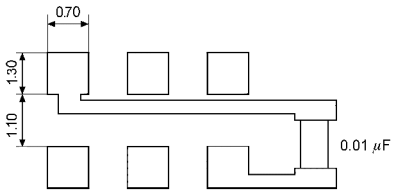
actual size

Dimensions (mm):

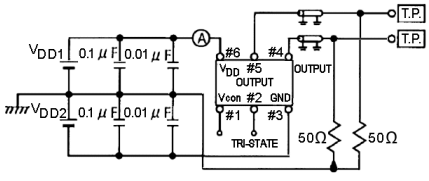


PIN	CONNECTION	
1	VC	
2	"L"	Open or "H"
3	GND	
4	Z	Output
5	Z	C-Output
6	V_{DD}	

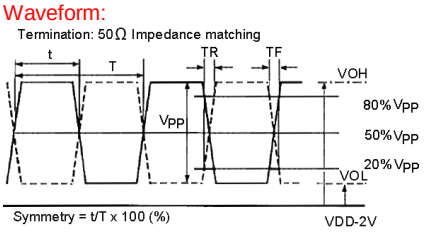
Suggested soldering pad:



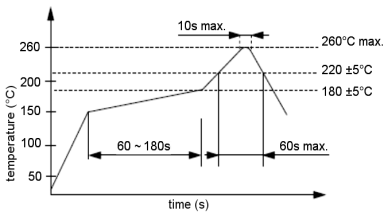
Test circuit:



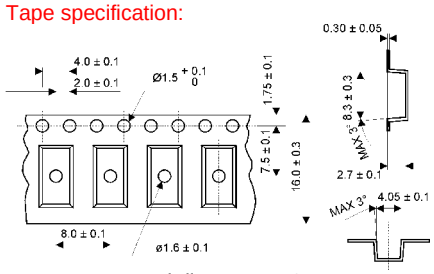
Waveform:



Reflow soldering condition:



Tape specification:



reel diameter 178 mm

LVDS VCXO – KXO-V62

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

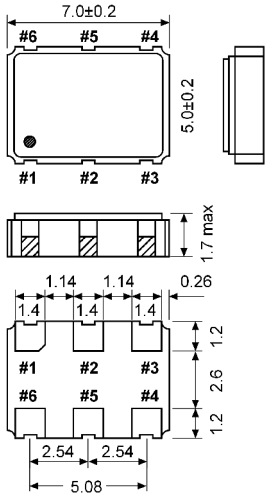
GEYER quartz technology

LVDS Clock Oscillator — SMD-version +2.5V +3.3V

model	KXO-V65
frequency range	19.440 ~ 700.0 MHz
frequency stability	±50ppm over -20° ~ +70°C (referred to +25°C) ±100ppm over -40° ~ +85°C (referred to +25°C)
output load	100 Ohm
operating temperature	standard -20° ~ +70°C available -40° ~ +85°C (= KXO-V65T)
storage temperature	-55° ~ +125°C
input voltage	+2.5V DC ±5% or +3.3V DC ±5%
input current max.	80 mA
start up time max.	10 ms
symmetry	50% ±5% at ½ V_{DD} level
rise and fall time (Tr)	300ps typ. 600ps max. (20% ~ 80% of waveform)
rise and fall time (Tf)	300ps typ. 600ps max. (80% ~ 20% of waveform)
disable delay time max.	200 ns
enable delay time max.	4 ms
"O" level max.	0.9V ~ 1,1V
"1" level min.	1.43V ~ 1,6V
LVDS offset output voltage	1.125V ~ 1,375V
tristate function	yes
phase jitter (12kHz ~ 20MHz)	RMS: 19.440 ~ 212,5 MHz 1ps max. < 700,0 MHz 4ps max.
typical phase noise	-70 dBc/Hz at 10 Hz -105 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz -145 dBc/Hz at 1 MHz
contents of reel	1000 pcs.

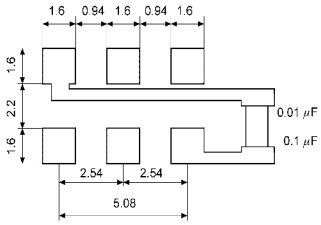

actual size

Dimensions (mm):

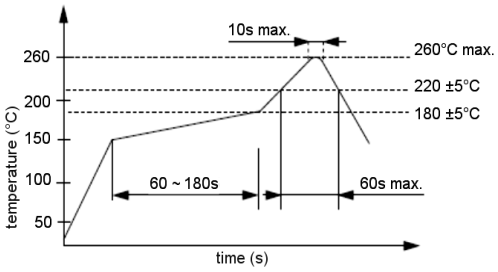


PIN	CONNECTION
1	Tri-state
2	NC
3	GND
4	Output
5	C-Output
6	V_{DD}

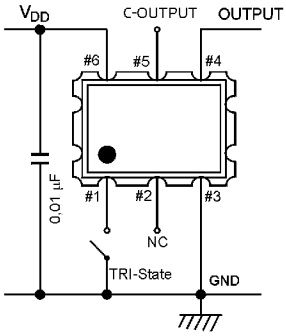
Suggested soldering pad:



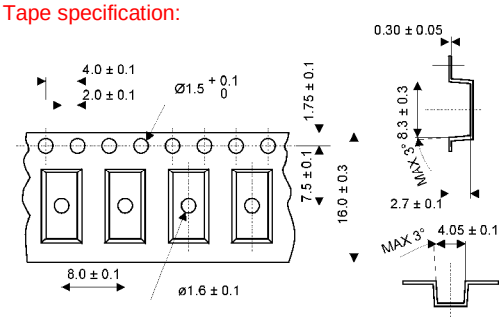
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 330 mm

LVDS Clock Oscillator – KXO-V65

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

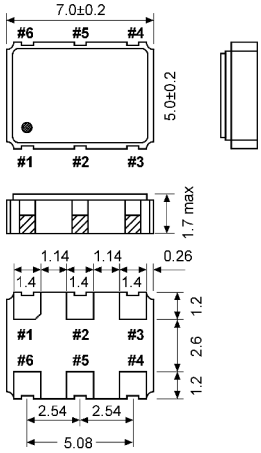
GEYER quartz technology

LVDS VCXO — SMD-version +2.5V +3.3V

model	KXO-V63
frequency range	20.0 ~ 700.0 MHz
frequency stability incl. temperature stability input voltage and load stability, aging.	±25ppm ~ ±100ppm over -20° ~ +70°C (referred at 25°C) ±25ppm ~ ±100ppm over -40° ~ +85°C (referred at 25°C)
output load	100 Ohm
operating temperature	standard -20° ~ +70°C available -40° ~ +85°C (=KXO-V63T)
storage temperature	-40° ~ +125°C
input voltage	+2.5V DC ±5% or + 3.3V DC ±5%
input current	45 mA typ., 60 mA max.
start up time max.	10 ms
symmetry	50% of waveform
rise & fall time (Tr)	400ps typ 850ps max. (20% ~ 80% of waveform)
rise & fall time (Tf)	400ps typ 850ps max. (80% ~ 20% of waveform)
disable delay time max.	200 ns
enable delay time max.	4 ms
"O" level max.	0.9V ~ 1.1V
"1" level min.	1.43V ~ 1.6V
LVDS offset output voltage	1.125V ~ 1.375V
frequency adjustment (pullability)	± 50ppm, ± 100ppm
tristate function	yes
phase jitter (12kHz ~ 20MHz)	RMS: 1ps typ, 3ps max.
typical phase noise	-70 dBc/Hz at 10 Hz -105 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz -145 dBc/Hz at 1 MHz
contents of reel	1000 pcs.

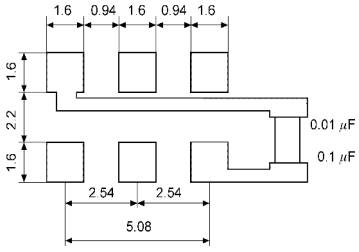

actual size

Dimensions (mm):

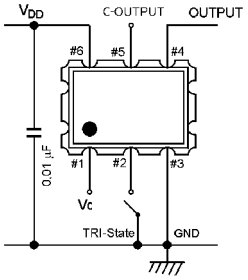


PIN	CONNECTION
1	VC
2	Tri-state
3	GND
4	Output
5	C-Output
6	VDD

Suggested soldering pad:

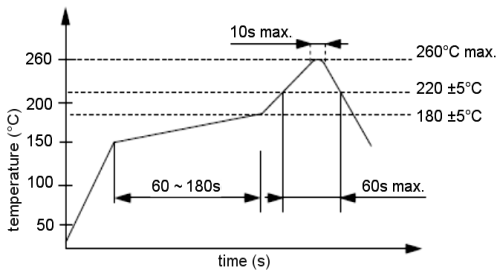


Test circuit:

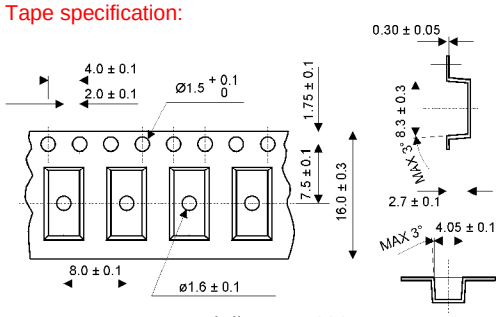


pin #2	pin #4 / pin #5
"L" (0 V)	HIGH IMPEDANCE (Z)
"H" (+3.3 V) or OPEN	OUTPUT

Reflow soldering condition:



Tape specification:



reel diameter 330 mm

LVDS VCXO – KXO-V63

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

PECL

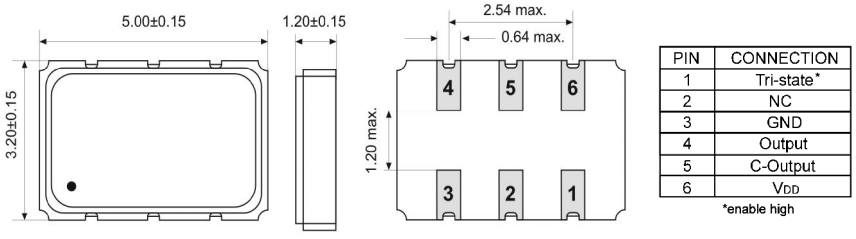
Positive Emitter Coupled Oscillator **SMD-version +2.5V +3.3V**

model	KXO-68
frequency range	25.0 ~ 180.0 MHz
frequency stability incl. all conditions	±100 ppm = KXO-68A ± 50 ppm = KXO-68B ± 25 ppm = KXO-68D
operating temperature range	standard -20°C ~ +70°C available -40°C ~ +85°C
storage temperature	-55°C ~ +125°C
supply voltage	-0.5V to +7.0V
input voltage	+2.5V DC ±5% or +3.3V DC ±5%
input current (Pin#1=Open or VIH) max.	90 mA
start up time (max.)	10 ms
symmetry	40% ~ 60% (at crossing point)
rise and fall time max.	1.0 ns (20% ~ 80% of amplitude)
disable delay time max.	100 ns
enable delay time max.	10 ms
″O″ level max.	V_{DD} to +1.62V DC
″1″ level min.	V_{DD} to +1.025V DC
output load	50 Ohm (V_{DD} to +2.0V)
stand-by control voltage	VIH: +0.7V_{DD} min. VIL: +0.3V_{DD} max.*
stand-by current (Pin#1=VIL) max.	100 µA
phase jitter (12 kHz to 20 MHz band) max.	1 ps RMS
typical phase noise	-70 dBc/Hz at 10 Hz -105 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz -145 dBc/Hz at 1 MHz
contents of reel	1000 pcs.

actual size

* Internal crystal oscillation to be halted (Pin#1=VIL).

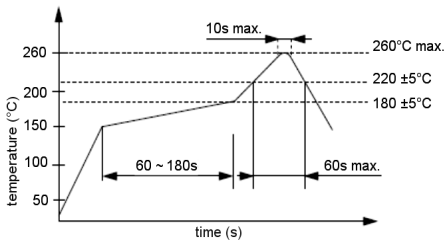
Dimensions (mm):



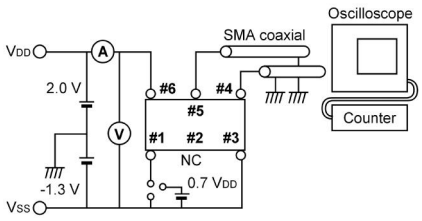
PIN	CONNECTION
1	Tri-state*
2	NC
3	GND
4	Output
5	C-Output
6	V_{DD}

*enable high

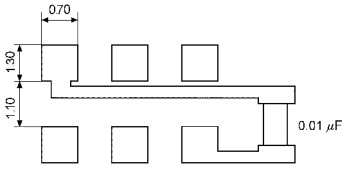
Reflow soldering condition:



Test circuit:

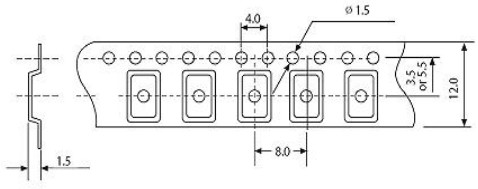


Suggested soldering pad:



Note:
A capacitor of value 0.01µF and 10µF between V_{DD} and GND is recommended.

Tape specification:



reel diameter 180 mm

PECL – KXO-68

RoHS 2015/863/EU | REACH compliant | Conflict minerals free

GEYER quartz technology

PECL

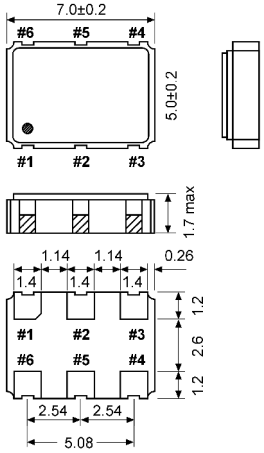
Positive Emitter Coupled Oscillator **SMD-version +2.5V +3.3V**

model	KXO-67
frequency range	50.0 ~ 212.50 MHz
frequency stability over all conditions	±100ppm = KXO-67A ± 50ppm = KXO-67B ± 25ppm = KXO-67D
operating temp.range	standard -20°C ~ +70°C available -40°C ~ +85°C
storage temp.range	-50°C ~ +125°C
supply voltage	-0.5V to +7.0V
input voltage	+2.5V DC ±5% or+3.3V DC ±5%
input current (Pin#1=Open or VIH) max.	90 mA max.
start up time max.	10 ms
symmetry	40% ~ 60% (at crossing point)
rise and fall time max.	0.8 ns (20% ~ 80% of amplitude)
disable delay time max.	100 ns
enable delay time max.	10 ms
″O″ level max.	V_{DD} to +1.63V
″1″ level min.	V_{DD} to +1.02V
output load	50 Ohm (V_{DD} to +2.0V)
stand-by control voltage	VIH: +0.7V_{DD} min. VIL: +0.3V_{DD} max.*
stand-by current (Pin#1=VIL) max.	100 µA
phase jitter (12 kHz to 20 MHz band) max.	RMS: 1 ps
typical phase noise	-70 dBc/Hz at 10 Hz -105 dBc/Hz at 100 Hz -130 dBc/Hz at 1 kHz -145 dBc/Hz at 10 kHz -145 dBc/Hz at 100 kHz -145 dBc/Hz at 1 MHz
contents of reel	1000 pcs.


actual size

* Internal crystal oscillation to be halted (Pin#1=VIL).

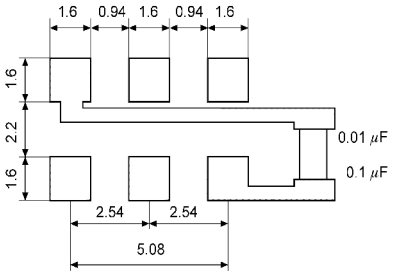
Dimensions (mm):



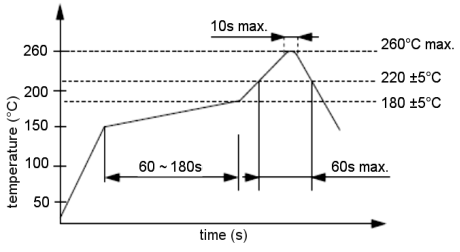
PIN	CONNECTION
1	Tri-state*
2	NC
3	GND
4	Output
5	C-Output
6	V_{DD}

*enable high

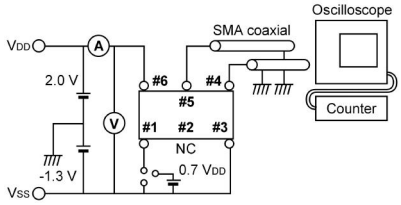
Suggested soldering pad:



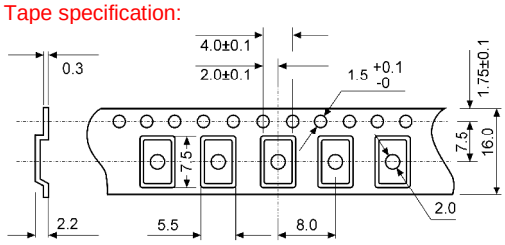
Reflow soldering condition:



Test circuit:



Tape specification:



reel diameter 245 mm

Technical explanation of crystal oscillators

XO	Crystal oscillator	Typical supply voltages: 1.8/2.5/3.0/3.3 or 5 Volt. Typical output levels: clipped sine/TTL/HCMOS. The same temperature characteristics as a corresponding crystal.
VCXO	Voltage controlled oscillator	Typical supply voltages and output levels as above. Can be pulled up or down over a specified frequency range by applying a control voltage to a control pin. **Note:** This pin must be connected to a specified voltage. Grounding, pulling to V_{DD} or leave open (NC) will seriously degrade the properties of the oscillator. If the pullability is not needed, better choose a XO.
TCXO	Temperature compensated oscillator	Typical supply voltages and output levels as above. About one order of magnitude better accuracy over temperature than XOs.
VCTCXO	Voltage controlled temperature compensated oscillator	A combination of the oscillator types mentioned afore. The same note also applies here.
SSO	Spread spectrum oscillator	The output frequency varies continuously around the desired frequency to avoid discrete signal peaks in the output noise spectrum. Typical center sweeps are +/-0.5% to +/-2.0%, typical down sweeps are -0.5% to -4%. Typical supply voltage is 3.3V. Typical output signal level is HCMOS.
LVDS	Low-voltage differential signal oscillator	High speed oscillator with differential output (ANSI/TIA/EIA-644A). Output swing +/-350mV. Typical supply voltage 2.5V/3.3V. Low power consumption.
(LV)PECL	Low-Voltage Positive-Emitter-Coupled Logic	High speed oscillator with differential output. Output swing +/-800mV. Typical supply voltage 2.5V/3.3V. Medium to high power consumption-

GEYER worldwide

www.geyer-electronic.com

GEYER ELECTRONIC . HQ GERMANY
Lochhamer Schlag 5 D-82166 Gräfelfing / München
Tel: +49 89 546868-0 Fax: +49 89 546868-91 e-mail: info@geyer-electronic.de

GEYER ELECTRONIC UK office
sales@geyer-electronic.co.uk

GEYER ELECTRONIC France Office
sales@geyer-france.fr

GEYER ELETRONIC Netherlands Office
sales@geyer-benelux.com

GEYER ELECTRONIC Denmark Office
sales@geyer-nordic.com

GEYER ELECTRONIC Hungary Office
sales@geyer-electronic.hu

GEYER ELECTRONIC USA Office
sales@geyer-usa.com

GEYER ELECTRONIC India Office
sales@geyer-india.com

GEYER ELECTRONIC Singapore Office
sales@geyer-electronic.net

GEYER ELECTRONIC Taiwan Office
sales6@geyer-electronic.net

Allgemeine Lieferbedingungen der GEYER ELECTRONIC e. K. (Fassung 06/2018)

I. Geltungsbereich

1. Alle unsere Angebote, Lieferungen und Leistungen an unsere Kunden erfolgen ausschließlich aufgrund dieser Bedingungen. Diese gelten auch für alle zukünftigen Lieferungen, Leistungen und Angebote, selbst wenn sie nicht nochmals gesondert vereinbart werden.
2. Anders lautende Bedingungen des Kunden finden keine Anwendung, auch wenn wir ihrer Geltung im Einzelfall nicht gesondert widersprechen. Unsere Bedingungen gelten auch dann, wenn wir in Kenntnis entgegenstehender oder von unseren Bedingungen abweichender Bedingungen des Kunden die Lieferung vorbehaltlos ausführen.
3. Unsere Bedingungen gelten nur gegenüber Unternehmen im Sinne von § 310 Abs.1 BGB.

II. Angebot und Vertragsabschluss

1. Unsere Angebote sind freibleibend, soweit sie nicht ausdrücklich als verbindlich bezeichnet sind.
2.Die zu unserem Angebot gehörenden oder in Prospekten, Katalogen oder ähnlichen Unterlagen enthaltenen produktbeschreibenden Angaben wie Abbildungen, Zeichnungen, Beschreibungen, Gewichts-, Maß-, Leistungs-, Funktions- und Verbrauchsdaten, Belastbarkeiten, Toleranzen, sowie Angaben in Bezug auf die Verwendung oder Geeignetheit für bestimmte Einsatzzwecke sind nur annähernd maßgeblich und unverbindlich, soweit sie nicht ausdrücklich als verbindlich bezeichnet sind. Alle solche Angaben beziehen sich auf unter mitteleuropäischen Betriebsbedingungen getestete Serienmodelle und beschreiben deren Standardfunktionen. Sie sind keine garantierten Beschaffenheitsmerkmale, sondern Beschreibungen oder Kennzeichnungen der Ware oder Leistung.
3. Handelsübliche Abweichungen und solche, die aufgrund rechtlicher Vorschriften erfolgen oder technische Verbesserungen darstellen, sowie die Ersetzung von Bauteilen durch gleichwertige Teile sind zulässig, soweit sie die Verwendbarkeit zum vertraglich vorgesehenen Zweck nicht beeinträchtigen.
4. Wir behalten uns an sämtlichen Unterlagen des Angebots Eigentums- und Urheberrechte vor, sie dürfen ohne unsere Zustimmung Dritten nicht zugänglich gemacht werden.
5. Bestellungen des Kunden sind schriftlich abzufassen (Brief, Fax, E-Mail).
6. Bestellungen oder Aufträge des Kunden können wir innerhalb von 4 Wochen nach Zugang durch Zusendung einer Auftragsbestätigung annehmen.

III. Preise und Zahlungsbedingungen

1. Die von uns genannten Preise verstehen sich in EURO für Lieferungen ab Werk innerhalb und außerhalb Deutschlands (EXW gemäß Incoterms 2000) nach Maßgabe der Regelung in Abschnitt IV.1, jeweils zuzüglich der zum Zeitpunkt der Rechnungsstellung gültigen Mehrwertsteuer.
2. Sofern nicht etwas anderes vereinbart ist, ist der Kaufpreis innerhalb von 30 Tagen netto (ohne Abzug) zu bezahlen.
3. Leistet der Kunde bei Fälligkeit nicht, so sind die ausstehenden Beträge ab dem Tag der Fälligkeit mit 9 % p.a. über dem jeweiligen Basiszins der Deutschen Bundesbank zu verzinsen. Der Gläubiger einer Entgeltforderung hat bei Verzug des Schuldners außerdem einen Anspruch auf Zahlung einer Pauschale in Höhe von 40 Euro. Die Geltendmachung eines höheren Verzugsschadens bleibt unberührt.
4. Die Aufrechnung mit Gegenansprüchen des Kunden oder die Zurückbehaltung von Zahlungen wegen solcher Ansprüche ist nur zulässig, soweit die Gegenansprüche unbestritten oder rechtskräftig festgestellt sind

IV. Lieferung

1. Lieferungen erfolgen innerhalb Deutschlands und außerhalb Deutschlands ab Werk (EXW gemäß Incoterms 2000**).** Die Versandart ins In- und Ausland erfolgt nach unserer freien Wahl. Wir liefern in handelsüblicher Verpackung. Versand- und Verpackungskosten werden dem Kunden in tatsächlicher Höhe in Rechnung gestellt, soweit nichts anderes mit dem Kunden vereinbart ist. Auf Wunsch des Kunden werden wir die Lieferung durch eine Transportversicherung auf seine Kosten eindecken.
2. Wir sind zu Teillieferungen berechtigt.
3. Kosten, die uns durch Annahmeverweigerung oder falsche Angaben des Kunden entstehen, werden dem Kunden in Rechnung gestellt.
4. Der Mindestauftragswert für Lieferungen auf dem Versandweg beträgt EURO 25,- ohne Mehrwertsteuer.

V. Gefahrübergang

1. Die Gefahr des zufälligen Untergangs und der zufälligen Verschlechterung der Ware geht auf den Kunden über mit dem Tag der Versandbereitschaft.
2. Verzögert sich der Versand infolge von Umständen, die der Kunde zu vertreten hat, so geht die Gefahr vom Tage der Versandbereitschaft ab auf ihn über.

VI. Transportschäden

Transportschäden hat der Kunde dem Frachtführer oder dem sonst zur Ausführung der Versendung bestimmten Dritten wie auch uns unverzüglich, spätestens aber innerhalb der nachfolgenden Fristen schriftlich (Fax, E-Mail, Brief) wie folgt zu melden: Bei beschädigter Verpackung:
a) Post: Schaden ist bei Übergabe bestätigen zu lassen und beim Postamt innerhalb von 24 h (!) zu melden. Schaden ist innerhalb 48 h an uns melden.
b) Paketdienst: In Gegenwart des Fahrers ist auszupacken und Schaden bestätigen zu lassen. Schaden ist innerhalb 48 h an uns zu melden.
c) Spedition: In Gegenwart des Fahrers ist auszupacken und Schaden auf Frachtbrief bescheinigen zu lassen. Schaden ist innerhalb 48 h an uns zu melden. Bei unbeschädigter Verpackung:
a) Post: Sofort (innerhalb 24 h !) ist das zuständige Postamt zu verständigen und Besichtigung und Tatbestandsaufnahme zu beantragen. Schaden ist innerhalb 48 h an uns zu melden.
b) Paketdienst: Schaden ist innerhalb 48 h an uns melden.
c) Spedition: In Gegenwart des Fahrers ist auszupacken, Schaden ist auf Frachtbrief bescheinigen zu lassen und zu vermerken, dass die Verpackung vor der Schadensfeststellung unbeschädigt war. Schaden ist innerhalb 48 h an uns zu melden.

VII. Lieferzeit

1. Die Einhaltung vereinbarter Lieferzeiten setzt die rechtzeitige und ordnungsgemäße Erfüllung aller Verpflichtungen des Kunden voraus.
2. Eine vereinbarte Lieferzeit ist eingehalten, wenn bis zu ihrem Ablauf die Übergabe an den Kunden, Frachtführer oder sonst mit dem Versand beauftragten Dritten erfolgte oder Versandbereitschaft besteht und dies dem Kunden mitgeteilt wurde.
3. Ist die Nichteinhaltung einer vereinbarten Lieferzeit auf höhere Gewalt oder sonstige von uns nicht zu vertretende Umstände zurückzuführen, wird der Liefertermin um die Dauer dieser Ereignisse verlängert.
4. Geraten wir mit einer Lieferung in Verzug oder wird uns eine Lieferung unmöglich, so ist unsere Haftung auf Schadensersatz nach Maßgabe des Abschnitts X dieser Bedingungen beschränkt.

VIII. Eigentumsvorbehalt

1. Wir behalten uns das Eigentum an der Ware bis zur Begleichung aller Forderungen aus der laufenden Geschäftsbeziehung mit dem Kunden vor. Bei vertragswidrigem Verhalten des Kunden, insbesondere bei Zahlungsverzug oder Vollstreckungsmaßnahmen durch Dritte, sind wir berechtigt, die Ware zurückzunehmen. In der Zurücknahme oder Pfändung der Ware durch uns liegt kein Rücktritt vom Vertrag, es sei denn, wir hätten dies ausdrücklich erklärt. Wir sind nach Rücknahme der Ware zu deren Verwertung befugt.
2. Der Kunde darf die Ware weder verpfänden noch zur Sicherheit übereignen. Bei Pfändungen oder sonstigen Eingriffen Dritter hat uns der Kunde unverzüglich davon zu benachrichtigen.
3. Der Kunde ist berechtigt, die Ware im ordentlichen Geschäftsgang weiter zu veräußern. Er tritt uns bereits jetzt alle Forderungen in Höhe des Rechnungs-betrages ab, die ihm durch die Weiterveräußerung gegen einen Dritten erwachsen, und zwar unabhängig davon, ob die Ware ohne oder nach Verarbeitung oder Vermischung weiterverkauft worden ist. Wir nehmen die Abtretung an. Nach der Abtretung ist der Kunde zur Einziehung der Forderung ermächtigt. Wir behalten uns vor, die Forderung selbst einzuziehen, sobald der Kunde seinen Zahlungsverpflichtungen nicht ordnungsgemäß nachkommt.
4. Die Be- u.Verarbeitung der Ware durch den Kunden erfolgt stets im Namen und im Auftrag für uns. Erfolgt eine Verarbeitung mit uns nicht gehörenden Gegenständen,so erwerben wir an der neuen Sache das Miteigentum im Verhältnis zum Wert der von uns gelieferten Ware zu den sonstigen verarbeiteten Gegenständen. Dasselbe gilt wenn die Ware mit anderen uns nicht gehörenden Gegenständen vermischt wird.
5. Wir verpflichten uns, die uns zustehenden Sicherheiten auf Verlangen des Kunden insoweit freizugeben, als ihr Wert die zu sichernden Forderungen, soweit diese noch nicht beglichen sind, um mehr als 20 % übersteigen.

IX. Mängelhaftung

1. Mängelansprüche des Kunden setzen voraus, dass dieser seinen nach Gesetz geschuldeten Untersuchungs- und Rügepflichten ordnungsgemäß nachgekommen ist. Danach hat der Kunde gelieferte Ware unverzüglich nach der Ablieferung zu untersuchen und uns Mängel unverzüglich anzuzeigen. Unterlässt der Kunde die Anzeige, so gilt die Ware als genehmigt, es sei denn, es handelt sich um einen Mangel, der bei der Untersuchung nicht erkennbar war.
2. Soweit ein Mangel der Ware vorliegt, leisten wir Gewähr nach unserer Wahl zur Nacherfüllung in Form der Nachbesserung oder der Ersatzlieferung. Im Falle der Nachbesserung sind wir verpflichtet, alle zum Zweck der Nachbesserung erforderlichen Aufwendungen zu tragen, soweit sich diese nicht dadurch erhöhen, dass die Ware nach einem anderen Ort als dem Erfüllungsort verbracht wurde.
3. Schlägt die Nacherfüllung fehl, ist der Kunde nach seiner Wahl berechtigt, entsprechende Minderung des Kaufpreises oder Rücktritt vom Kaufvertrag zu verlangen.
4. Mängelansprüche bestehen nicht bei nur unerheblicher Abweichung von der vereinbarten Beschaffenheit oder unerheblicher Beeinträchtigung der Brauchbarkeit, bei natürlicher Abnutzung oder bei Schäden aufgrund unsachgemäßen Gebrauchs, bei Verwendung ungeeigneter Betriebsmittel oder aufgrund äußerer Einflüsse, die nach dem Vertrag nicht vereinbart oder vorausgesetzt sind, sowie bei nicht reproduzierbaren Softwarefehlern.
5. Die Gewährleistung entfällt auch, wenn der Kunde ohne unsere Zustimmung die Ware ändert oder durch Dritte ändern lässt und die Mängelbeseitigung hierdurch unmöglich oder erschwert wird. In jedem Falle hat der Kunde die durch die Änderung entstehenden Mehrkosten der Mängelbeseitigung zu tragen.
6. Bei Mängeln von Fremderzeugnissen sind wir berechtigt nach unserer Wahl unsere Mängelansprüche gegen die Hersteller oder Lieferanten für Rechnung des Kunden geltend zu machen oder an den Kunden abzutreten. Mängelansprüche gegen uns bestehen bei derartigen Mängeln nach Maßgabe dieser Bedingungen nur, wenn die gerichtliche Durchsetzung solcher Ansprüche gegen den Hersteller oder Lieferanten erfolglos war oder, z.B. aufgrund einer Insolvenz, aussichtslos ist.
7. Für die Geltendmachung von Mängelansprüchen sind uns immer die beanstandeten Waren zur Verfügung zu stellen.
8. Die Verjährungsfrist für Mängelansprüche beträgt 12 Monate, gerechnet ab Gefahrübergang. 9. Gebrauchtwaren verkaufen wir unter Ausschluss jeglicher Mängelhaftung. 10. Garantien im Rechtssinne erhält der Kunde durch uns nicht, es sei denn, wir erteilen im Einzelfalle eine ausdrückliche Garantie. 11. Für Schadensersatzansprüche haften wir nach den Regelungen unter Abschnitt X. Darüber hinaus ist die Mängelhaftung ausgeschlossen.

X. Haftung auf Schadensersatz

1.Unsere Haftung auf Schadensersatz, gleich aus welchem Rechtsgrund, insbesondere aus Unmöglichkeit, Verzug, mangelhafter oder falscher Lieferung, Vertragsverletzung, fehlerhafter oder unterbliebener Beratung oder Auskunft, Verletzung von Pflichten bei Vertragsverhandlungen und unerlaubter Handlung, soweit es dabei auf ein Verschulden ankommt, ist nach Maßgabe dieses Abschnitts X eingeschränkt.
2. Wir haften nicht im Falle einfacher Fahrlässigkeit unserer Organe, gesetzlichen Vertreter, Angestellten oder sonstigen Erfüllungsgehilfen.
3. Wir haften aber nach den gesetzlichen Bestimmungen, sofern wir schuldhaft eine wesentliche Vertragspflicht verletzen; in diesem Falle ist die Schadensersatzhaftung auf den vorhersehbaren, typischerweise eintretenden Schaden begrenzt. Unter wesentlichen Vertragspflichten werden die Pflichten verstanden, deren Erfüllung die ordnungsgemäße Durchführung des Vertrages überhaupt erst ermöglicht und auf deren Einhaltung der Kunde regelmäßig vertrauen darf.
4. Die vorstehenden Haftungsausschlüsse und –beschränkungen gelten nicht für garantierte Beschaffenheitsmerkmale und nicht wegen schuldhafter Verletzung des Lebens, des Körpers oder der Gesundheit und auch nicht für die Haftung nach dem Produkthaftungsgesetz.

XI. Entsorgung nach dem Elektro- und Elektronikgeräte-Gesetz

1. Unterliegt die Ware dem Elektro- und Elektronikgeräte-Gesetz, bieten wir dem Kunden auf dessen bei Kaufvertragsabschluss zu äußernden schriftlichen Wunsch an, die Entsorgung gegen Erstattung der tatsächlich entstandenen Kosten nach den gesetzlichen Vorschriften zu übernehmen. Andernfalls übernimmt der Kunde die Pflicht, die gelieferte Ware nach Nutzungsbeendigung auf eigene Kosten nach den gesetzlichen Vorschriften ordnungsgemäß zu entsorgen.
2. Der Kunde stellt uns und unsere Lieferanten dann von den Verpflichtungen nach § 10 Abs. II Elektro- und Elektronikgeräte-Gesetz (Rücknahmepflicht der Hersteller) und damit in Zusammenhang stehenden Ansprüchen Dritter frei.
3.Der Kunde hat gewerbliche Dritte, an die er die gelieferte Ware weitergibt, vertraglich dazu zu verpflichten, die gelieferte Ware nach Nutzungsbeendigung auf deren Kosten nach den gesetzlichen Vorschriften ordnungsgemäß zu entsorgen und für den Fall der erneuten Weitergabe eine entsprechende Weiterverpflichtung aufzuerlegen. Unterlässt der Kunde diese Verpflichtungen, so ist er verpflichtet, die gelieferte Ware nach Nutzungsbeendigung auf seine Kosten zurückzunehmen und nach den gesetzlichen Vorschriften ordnungsgemäß zu entsorgen.
4. Unser Anspruch auf Übernahme/Freistellung durch den Kunden verjährt nicht vor Ablauf von zwei Jahren nach der endgültigen Beendigung der Nutzung des Gerätes. Diese Frist beginnt frühestens mit Zugang einer schriftlichen Mitteilung des Kunden und/oder dessen Abnehmers bei uns über die Nutzungsbeendigung.

XII. Datenschutz

1. Soweit zur Geschäftsabwicklung erforderlich, werden im Zuge der Geschäftsbeziehung auftragsbezogene Kundendaten erhoben und verarbeitet.
2. Der Kunde ist damit einverstanden, dass seine Daten auch für Zwecke der Versendung von Informationen über unsere Produkte und Dienstleistungen an ihn genutzt werden. Der Kunde kann hierfür jederzeit sein Einverständnis widerrufen.
3. Erhebung und Verarbeitung der Kundendaten erfolgen stets unter Beachtung der geltenden datenschutzrechtlichen Bestimmungen, insbesondere der Datenschutz-Grundverordnung (DS-GVO).
4. Nähere Einzelheiten unserer Datenschutzbestimmungen ergeben sich aus der im Internet abrufbaren Datenschutzerklärung, *www.geyer-electronic.de*.

XIII. Schlussbestimmungen

1. Bei allen sich aus der Geschäftsbeziehung ergebenden Streitigkeiten gilt im Geschäftsverkehr mit Kaufleuten nach unserer Wahl München oder der Firmensitz des Kunden als Gerichtsstand vereinbart.
2. Sofern nichts anderes vereinbart ist, ist München Erfüllungsort. 3. Es gilt das Recht der Bundesrepublik Deutschland. Die Bestimmungen des UN-Kaufrechts finden keine Anwendung. GEYER ELECTRONIC e. K