Jauch
THE PULSE OF PROGRESS

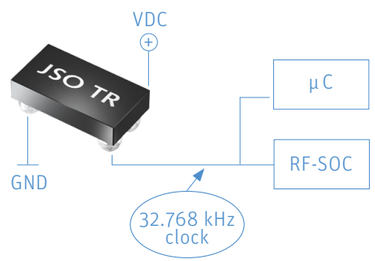
MEMS OSCILLATORS

› MEMS Oscillators

JSO15 TR

HIGHEST ACCURACY FOR RTC APPLICATIONS

32.768 kHz



PRODUCT FEATURES

- Temperature compensated MEMS oscillator (TCXO)
- Output frequency 32.768 kHz
- Best temperature stability ±5 ppm
- Temperature range -40°C ~ +85°C
- Variable supply voltage range 1.5 Volt ~ 3.63 Volt
- CSP 1.5 x 0.8 x 0.6 (chip scale package)
- High shock and vibration resistance
- Extremely high reliability

APPLICATIONS

- Highly accurate Real Time Clocks (RTC)
- Smart Meters / Automated Meter Reading (AMR)
- Wearables / Activity Trackers / Smart Watches
- Mobile Medical Instruments
- Health and Wellness Monitors
- Tablets / Mobile Phones

ADDITIONAL SERVICES

- Samples of JSO15 TR typically available from stock
- Free samples shipped within 48 hours
- Technical customer support by field application engineers

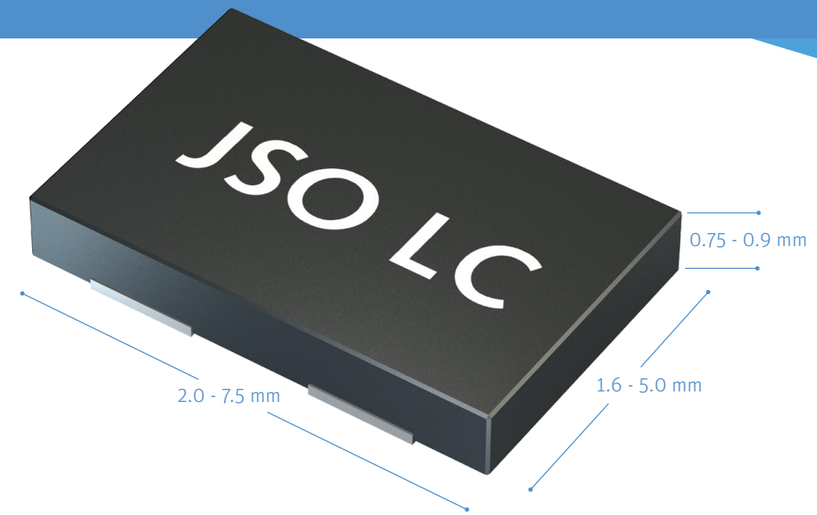
TEMPERATURE COMPENSATED MEMS OSCILLATORS

EASY TO USE: JUST CONNECT VDC, FEED MULTIPLE CLOCK RECEIVERS

JSO LC SERIES

LOW POWER FOR VERSATILE APPLICATIONS

1 MHz - 137 MHz



PRODUCT FEATURES

- Silicon MEMS resonator based oscillators
- Frequency range 1 MHz ~ 137 MHz
- Best temperature stability ±20 ppm
- Widest temperature range -55°C ~ +125°C
- Supply voltage range 1.8 Volt ~ 3.3 Volt
- Compatible to all standard oscillator packages and pad layouts
- 10,000 G shock and 70 G vibration resistance
- Extremely high reliability

DROP-IN REPLACEMENT FOR THE FOLLOWING PACKAGES

- 2016 (2.0 x 1.6 x 0.75 mm)
- 2520 (2.5 x 2.0 x 0.75 mm)
- 3225 (3.2 x 2.5 x 0.75 mm)
- 5032 (5.0 x 3.2 x 0.75 mm)
- 7050 (7.5 x 5.0 x 0.90 mm)

ADDITIONAL SERVICES

- Local configuration center in Germany
- Technical customer support by field application engineers
- Free samples shipped within 48 hours

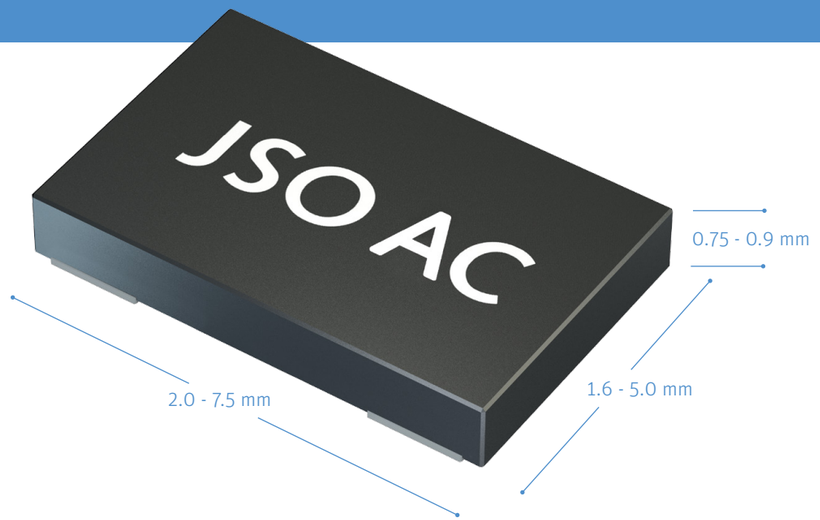
MEMS OSCILLATORS

EASY TO CONFIGURE: CHECK OUT OUR WEBSITE

JSO AC SERIES

AEC-Q100 QUALIFIED

1 MHz – 137 MHz



PRODUCT FEATURES

- Silicon MEMS resonator based oscillators
- AEC-Q100 qualified
- Frequency range 1 MHz ~ 137 MHz
- Best temperature stability ±20 ppm
- Widest temperature range -55°C ~ +125°C
- Supply voltage range 1.8 Volt ~ 3.3 Volt
- Compatible to all standard oscillator packages and pad layouts
- 10,000 G shock and 70 G vibration resistance
- Extremely high reliability

DROP-IN REPLACEMENT FOR THE FOLLOWING PACKAGES

- 2016 (2.0 x 1.6 x 0.75 mm)
- 2520 (2.5 x 2.0 x 0.75 mm)
- 3225 (3.2 x 2.5 x 0.75 mm)
- 5032 (5.0 x 3.2 x 0.75 mm)
- 7050 (7.5 x 5.0 x 0.90 mm)

ADDITIONAL SERVICES

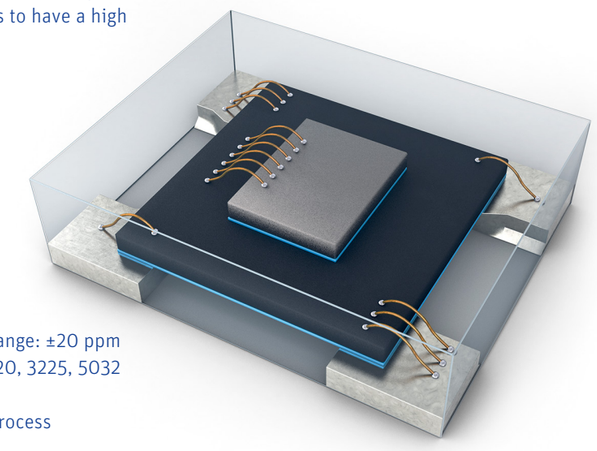
- Local configuration center in Germany
- Technical customer support by field application engineers
- Free samples shipped within 48 hours

MEMS OSCILLATORS FOR AUTOMOTIVE APPLICATIONS

EASY TO CONFIGURE: CHECK OUT OUR WEBSITE

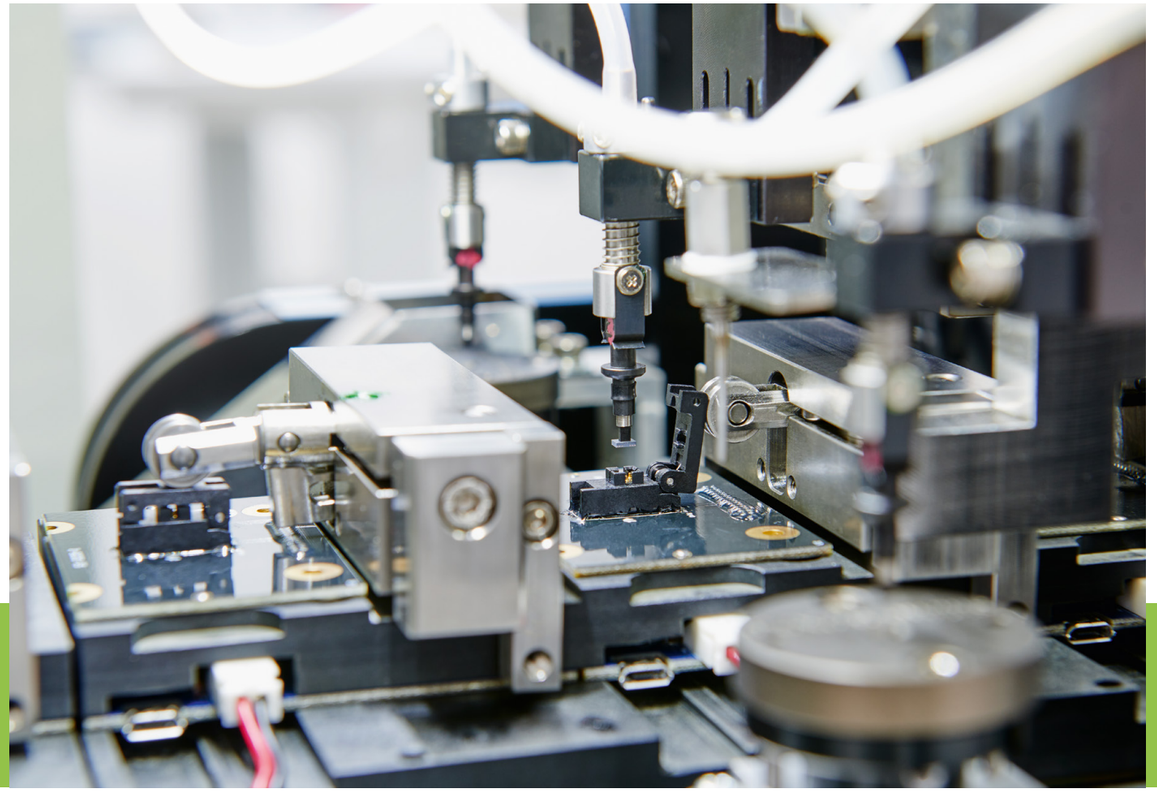
CUSTOMIZED AND CONFIGURABLE

MEMS oscillators use a silicon resonator, instead of a silicon dioxide resonator which is used in quartz crystal oscillators. MEMS oscillators are produced in semiconductor factories, as this ensures a constant high quality of the components. At our headquarters in Germany, the MEMS oscillators are configured to your specifications and can be shipped within 48 hours. Thanks to the rapid availability of products, it is possible to make last-minute changes to design-in. This enables developers to have a high degree of flexibility for their current project.



THE MEMS ADVANTAGE – CONFIGURED BY US TO YOUR SPECIFICATIONS – TYPE JSO AC AVAILABLE

- AEC-Q100
- Extremely high impact, shock and vibration resistance: 10,000 G of shock and 70 G of vibration
- Wide operating temperature range: -55°C to +125°C
- High frequency stability over the entire operating temperature range: ±20 ppm
- 100% drop-in replacement for standard QFN packages 2016, 2520, 3225, 5032 and 7050 (QFN = Quad Flatpack No-Lead)
- Extremely reliable thanks to the semiconductor manufacturing process



actual size

MEMS TCXO · JSO TR · 32.768kHz

- ultra-stable 32.768 kHz clock source
- ultra-small CSP package 1.5 x 0.8 mm
- very short start-up time
- can replace tuning fork crystals
- wide supply voltage range 1.5 V ~ 3.63 V
- very low current consumption

GENERAL DATA

TYPE		JSO15B1TR
supply voltage V_{DC}		1.5 V ~ 3.63 V
current consumption typ.		1.2 µA (rail-to-rail mode, no load, VDC = 1.8 V)
output frequency		32.768 kHz
frequency stability vs. temp.		±10 ppm ~ ±22 ppm (see table 1)
frequency stability vs. voltage		±0.75 ppm at 1.8 V ±0.18 V
		±1.5 ppm at 1.5 V ~ 3.63 V
aging	at +25°C	±1 ppm first year
temperature	operating	0°C ~ +70°C / -40°C ~ +85°C
	storage	-50°C ~ +125°C
output	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
	load max.	15 pF
	current max.	1.0 µA
	rise & fall time	200 ns max. (15 pF, 10 <-> 90 %)
		50 ns max. (5 pF, 10 <-> 90 %)
start-up time max.		400 ms
power supply ramp max.		100 ms
period jitter RMS typ.		35 ns

More information about the features of the JSO TR 32.768 kHz TCXO can be found on our homepage.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code including frequency tolerance* excluding frequency tolerance**		D ±22 ppm ±20 ppm	K ±13 ppm ±10 ppm	F ±10 ppm ±5 ppm
0°C ~ +70°C	T0	O	O	O
-40°C ~ +85°C	T1	O	O	O
O available				

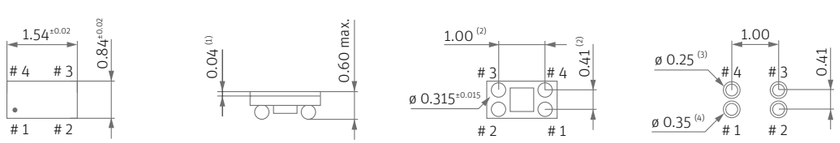
* includes tolerance at 25°C and frequency stability in operating temp. range.
** frequency stability in operating temp. range, frequency tolerance excluded.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 40%)

supply current at load	none	5 pF	10 pF	15 pF	unit
at startup (150 ms max.)	30.0				µA
during temp. compensation*	6.0				µA
V_{RR} = 1.80 V, compensation inactive	1.2	1.5	1.8	2.1	µA
V_{RR} = 2.50 V, compensation inactive	1.3	1.7	2.0	2.5	µA
V_{RR} = 3.30 V, compensation inactive	1.4	1.9	2.5	3.0	µA

* repetitive temp. compensation consuming 6 µA for 10 ms, repeating every 350 ms

DIMENSIONS



top view | side view | bottom view | pad layout | in mm

pin connection
#1: GND
#2: output
#3: V_{DC}
#4: GND

(1) polymer coating thickness
(2) basic spacing between centers
(3) non-solder mask defined pads
(4) soldermask opening diameter

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: identifier for pin 1

PIN CONNECTION

4: GND # 3: V_{DC}
1: GND # 2: output

RoHS compliant | Pb free | REACH compliant | Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS TCXO · JSO TR · 32.768kHz

ORDER INFORMATION

EXAMPLE O 0.032768 – JSO 15 B1 T R – F – 1V3 – T0 – R R – D

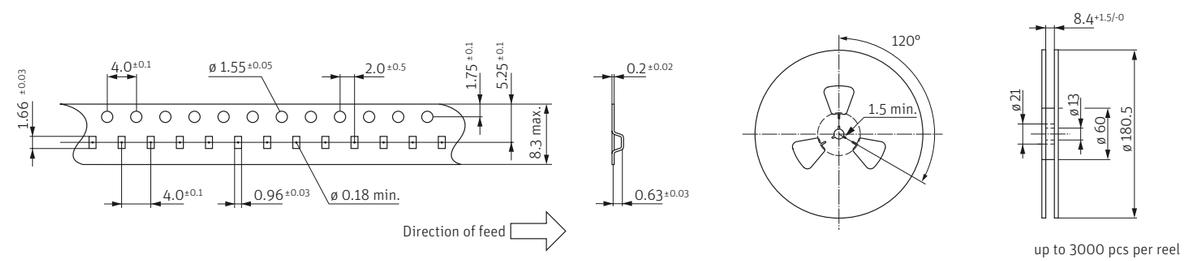
- O = Oscillator
- **frequency**
- JSO = Jauch Silicon Oscillator
- **package** 15 = 1.5 x 0.8 mm CSP
- version/revision
- **function/feature** T = TCXO
- **usage** R = for RTC (real time clock)
- **frequency stability** F = ±5 ppm, K = ±10 ppm, D = ±20 ppm, see table 1
- **supply voltage** 1V3 = variable supply voltage 1.5 V ~ 3.63 V
- **temperature range** T0 = 0°C ~ +70°C, T1 = -40°C ~ +85°C, see table 1
- **output:** R R = rail-to-rail
- **DC coupling:** D = DC

NOTE

Standard type O 0.032768-JSO15B1TR-F-1V3-T1-RR-D typically available from stock.

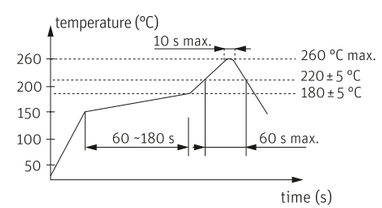
Frequency stability (table 1): F = ±5 ppm
Operating temperature range: T1 = -40°C ~ +85°C
Supply voltage: 1V3 = 1.5 V ~ 3.63 V variable

TAPING SPECIFICATION



up to 3000 pcs per reel

REFLOW SOLDERING PROFILE



note: parts are also suitable for soldering systems with lead (Pb) content.

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series · 1.8 V

- low power oscillator with HCMOS/LVCMOS output
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 1.8 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		1.8 V ± 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	4.2 ns max. at 15 pF / 6.8 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤74.0 MHz)
		15 pF max. recommended (>74.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	2 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		2 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x VDC		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.5	3.5	3.5	3.5	mA
1.0 ~ 19.9 MHz	3.6	3.9	4.4	5.5	mA
20.0 ~ 29.9 MHz	4.2	4.5	5.4	6.5	mA
30.0 ~ 49.9 MHz	4.5	5.1	6.5		mA
50.0 ~ 79.9 MHz	4.9	6.3			mA
80.0 ~ 110.0 MHz	5.7	7.6			mA
115.0 ~ 137.0 MHz	(8.0)	(13.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC · Pb · REACH compliant · Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO LC series · 1.8 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
D = 0*	1.8	4.2	6.8	1.2	2.8	4.8
1	2.2	5.0	7.6	1.4	3.4	5.2
2	2.4	5.6	8.8	1.6	3.8	6.0
3	2.8	6.0	10.0	1.8	4.2	6.8
4	4.8	9.8	17.0	3.4	6.6	11.6
5	6.6	12.6	21.0	4.4	8.6	15.0
6	10.0	18.0	32.0	6.6	12.0	22.0
7	18.0	34.0	62.0	12.4	24.0	44.0

* default edge control setting "D" at VDC = 1.8 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

0 26.123456 – JSO 75 C1 L C – B – 1.8 – T0 – S – D

- 0 = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T0 = -20°C ~ + 70°C
  T1 = -40°C ~ + 85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series · 2.5 V

- low power oscillator with HCMOS/LVCMOS output
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 2.5 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.5 V ± 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3.0 ns max. at 15 pF / 6.0 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤83.0 MHz)
		15 pF max. recommended (>83.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		3 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.7	3.7	3.7	3.7	mA
1.0 ~ 19.9 MHz	3.8	4.2	5.0	6.4	mA
20.0 ~ 29.9 MHz	4.3	5.0	6.4	9.0	mA
30.0 ~ 49.9 MHz	4.7	5.8	7.8	11.6	mA
50.0 ~ 79.9 MHz	5.6	7.6	10.7		mA
80.0 ~ 110.0 MHz	6.6	9.2			mA
115.0 ~ 137.0 MHz	(8.5)	(13.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

RoHS 2011/65/EC — RoHS compliant
Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO LC series · 2.5 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.4	5.2	0.8	1.7	3.4
1	1.4	2.6	5.8	0.9	1.9	3.8
D=2*	1.6	3.0	6.0	1.1	2.1	4.0
3	1.8	4.0	6.6	1.2	2.6	4.6
4	3.2	6.4	11.0	2.2	4.4	7.8
5	4.4	8.4	14.6	2.9	5.8	10.4
6	6.6	12.4	23.0	4.4	8.6	15.2
7	12.8	25.0	46.0	8.6	16.6	30.0

* default edge control setting "D" at V_{DC} = 2.5 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 C1 L C – B – 2.5 – T0 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T0 = -20°C ~ +70°C
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series · 2.8 V

- low power oscillator with HCMOS/LVCMOS output
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 2.8 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.8 V ± 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	2.9 ns max. at 15 pF / 5.7 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤88.0 MHz)
		15 pF max. recommended (>88.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		4 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.8	3.8	3.8	3.8	mA
1.0 ~ 19.9 MHz	4.1	4.3	5.2	6.9	mA
20.0 ~ 29.9 MHz	4.4	5.2	6.7	9.8	mA
30.0 ~ 49.9 MHz	4.8	6.2	8.3	12.7	mA
50.0 ~ 79.9 MHz	6.1	8.1	11.7		mA
80.0 ~ 110.0 MHz	7.0	10.0			mA
115.0 ~ 137.0 MHz	(9.0)	(14.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

RoHS 2011/65/EC — RoHS compliant
Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO LC series · 2.8 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.2	4.6	0.8	1.6	3.0
1	1.3	2.4	5.2	0.9	1.8	3.5
D=2*	1.5	2.9	5.7	1.0	2.0	3.8
3	1.6	3.6	6.4	1.1	2.4	4.4
4	3.0	6.2	10.4	2.0	4.2	7.4
5	4.0	7.6	13.6	2.8	5.4	9.4
6	5.8	11.6	21.0	4.0	8.0	14.2
7	12.0	23.0	42.0	8.2	15.2	28.0

* default edge control setting "D" at V_{DC} = 2.8 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 C1 L C – B – 2.8 – T0 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **edge control**
  D = default
  0 – 7, see table 4
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **temperature range**
  T0 = -20°C ~ +70°C
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series · 3.0 V

- low power oscillator with HCMOS/LVCMOS output
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 3.0 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		3.0 V ± 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3.3 ns max. at 15 pF / 6.2 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤81.0 MHz)
		15 pF max. recommended (>81.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	4 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		5 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.9	3.9	3.9	3.9	mA
1.0 ~ 19.9 MHz	4.1	4.5	5.4	7.2	mA
20.0 ~ 29.9 MHz	4.5	5.4	6.9	10.1	mA
30.0 ~ 49.9 MHz	4.9	6.3	8.6	13.2	mA
50.0 ~ 79.9 MHz	6.1	8.4	12.2		mA
80.0 ~ 110.0 MHz	7.3	10.5	15.5		mA
115.0 ~ 137.0 MHz	(9.5)	(14.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

RoHS 2011/65/EC — RoHS compliant
Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO LC series · 3.0 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.1	2.0	4.2	0.7	1.4	2.8
1	1.2	2.2	4.8	0.8	1.6	3.3
2	1.3	2.8	5.4	0.9	1.9	3.6
D=3*	1.5	3.3	6.2	1.0	2.2	4.0
4	2.8	5.8	10.0	1.8	4.0	6.8
5	3.8	7.4	13.0	2.6	5.2	9.0
6	5.5	11.0	19.0	3.8	7.6	13.4
7	11.4	22.0	40.0	7.8	14.6	27.0

* default edge control setting "D" at V_{DC} = 3.0 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 C1 L C – B – 3.0 – T0 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **edge control**
  D = default
  0 – 7, see table 4
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **temperature range**
  T0 = -20°C ~ +70°C
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series · 3.3 V

- low power oscillator with HCMOS/LVCMOS output
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 3.3 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		3.3 V ± 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3 ns max. at 15 pF / 6 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤83.0 MHz)
		15 pF max. recommended (>83.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	4 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		5 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	4.0	4.0	4.0	4.0	mA
1.0 ~ 19.9 MHz	4.0	4.6	5.6	7.6	mA
20.0 ~ 29.9 MHz	4.6	5.7	7.4	10.9	mA
30.0 ~ 49.9 MHz	5.1	6.7	9.2	14.3	mA
50.0 ~ 79.9 MHz	6.4	9.0	13.2		mA
80.0 ~ 110.0 MHz	7.7	11.2	17.0		mA
115.0 ~ 137.0 MHz	(10.0)	(14.5)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

RoHS 2011/65/EC — RoHS compliant
Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO LC series · 3.3 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.0	1.7	3.6	0.7	1.2	2.6
1	1.1	1.8	4.4	0.7	1.3	3.0
2	1.2	2.6	5.0	0.8	1.8	3.3
D=3*	1.3	3.0	6.0	0.9	2.0	3.8
4	2.6	5.4	9.4	1.5	3.8	6.4
5	3.4	6.6	12.0	2.4	5.0	8.6
6	5.2	10.0	17.0	3.6	7.0	12.4
7	10.4	21.0	35.0	7.4	14.0	25.0

* default edge control setting "D" at V_{DC} = 3.3 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 C1 L C – B – 3.3 – T0 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **edge control**
  D = default
  0 – 7, see table 4
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **temperature range**
  T0 = -20°C ~ +70°C
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO LC series 2.5 V ~ 3.3 V

› low power oscillator with HCMOS/LVCMOS output
› compatible to industry standard packages 2016 – 7050
› extended shock & vibration resistance & temperature range
› configured to customer's specification
› very fast delivery service

GENERAL DATA

TYPE		JSOxxCxLC 2.5 V ~3.3 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.5 V – 10% ~ 3.3 V + 10%
temperature	operating	T0 = -20°C ~ +70°C
		T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	4.0 ns max. at 15 pF / 6.6 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤76.0 MHz)
		15 pF max. recommended (>76.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		5 ms (S) / 150 ns (T)
output disable time max.		150 ns
start-up time max.		5 ms
standby current max.		5 µA (for stop (S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm
-20°C ~ +70°C	T0	0	0	0	0
-40°C ~ +85°C	T1	0	0	0	0
-40°C ~ +105°C	T2	0	0	0	0
-40°C ~ +125°C	T3	0	0	0	0
-55°C ~ +125°C	T8	0	0	0	
0 available					

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	4.0	4.0	4.0	4.0	mA
1.0 ~ 19.9 MHz	4.0	4.6	5.6	7.6	mA
20.0 ~ 29.9 MHz	4.6	5.7	7.4	10.9	mA
30.0 ~ 49.9 MHz	5.1	6.7	9.2	14.3	mA
50.0 ~ 79.9 MHz	6.4	9.0	13.2		mA
80.0 ~ 110.0 MHz	7.7	11.2	17.0		mA
115.0 ~ 137.0 MHz	(10.0)	(14.5)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

RoHS 2011/65/EC — RoHS compliant
Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.4	5.2	0.8	1.7	3.4
1	1.4	2.6	5.8	0.9	1.9	3.8
2	1.6	3.0	6.0	1.1	2.1	4.0
D=3*	1.8	4.0	6.6	1.2	2.6	4.6
4	3.2	6.4	11.0	2.2	4.4	7.8
5	4.4	8.4	14.6	2.9	5.8	10.4
6	6.6	12.4	23.0	4.4	8.6	15.2
7	12.8	25.0	46.0	8.6	16.6	30.0

* default edge control setting "D" at V_{DC} = 2.5 ~ 3.3 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 C1 L C – B – 2V3 – T0 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  C1 = 1.0 ~ 110.0 MHz
  C2 = 115.0 ~ 137.0 MHz
- **function/feature**
  L = lowpower
- **output I/F**
  C = (H)CMOS
- **edge control**
  D = default
  0 – 7, see table 4
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **temperature range**
  T0 = -20°C ~ +70°C
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series · 1.8 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxDxAC 1.8 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		1.8 V ± 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	4.2 ns max. at 15 pF / 6.8 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤74.0 MHz)
		15 pF max. recommended (>74.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	2 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		2 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	0	0	0	0	3
-40°C ~ +105°C	T2	0	0	0	0	2
-40°C ~ +125°C	T3	0	0	0	0	1
-55°C ~ +125°C	T8	0	0	0	0	
0 available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.5	3.5	3.5	3.5	mA
1.0 ~ 19.9 MHz	3.6	3.9	4.4	5.5	mA
20.0 ~ 29.9 MHz	4.2	4.5	5.4	6.5	mA
30.0 ~ 49.9 MHz	4.5	5.1	6.5		mA
50.0 ~ 79.9 MHz	4.9	6.3			mA
80.0 ~ 110.0 MHz	5.7	7.6			mA
115.0 ~ 137.0 MHz	(8.0)	(13.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC — RoHS compliant
Pb — Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO AC series · 1.8 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
D = 0*	1.8	4.2	6.8	1.2	2.8	4.8
1	2.2	5.0	7.6	1.4	3.4	5.2
2	2.4	5.6	8.8	1.6	3.8	6.0
3	2.8	6.0	10.0	1.8	4.2	6.8
4	4.8	9.8	17.0	3.4	6.6	11.6
5	6.6	12.6	21.0	4.4	8.6	15.0
6	10.0	18.0	32.0	6.6	12.0	22.0
7	18.0	34.0	62.0	12.4	24.0	44.0

* default edge control setting "D" at VDC = 1.8 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

0 26.123456 – JSO 75 D1 A C – B – 1.8 – T1 – S – D

- 0 = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T1 = -40°C ~ + 85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series · 2.5 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxDxAC 2.5 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.5 V ± 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3.0 ns max. at 15 pF / 6.0 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤83.0 MHz)
		15 pF max. recommended (>83.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		3 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	O	O	O	O	3
-40°C ~ +105°C	T2	O	O	O	O	2
-40°C ~ +125°C	T3	O	O	O	O	1
-55°C ~ +125°C	T8	O	O	O	O	
O available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.7	3.7	3.7	3.7	mA
1.0 ~ 19.9 MHz	3.8	4.2	5.0	6.4	mA
20.0 ~ 29.9 MHz	4.3	5.0	6.4	9.0	mA
30.0 ~ 49.9 MHz	4.7	5.8	7.8	11.6	mA
50.0 ~ 79.9 MHz	5.6	7.6	10.7		mA
80.0 ~ 110.0 MHz	6.6	9.2			mA
115.0 ~ 137.0 MHz	(8.5)	(13.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC — RoHS compliant
Pb — Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO AC series · 2.5 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.4	5.2	0.8	1.7	3.4
1	1.4	2.6	5.8	0.9	1.9	3.8
D=2*	1.6	3.0	6.0	1.1	2.1	4.0
3	1.8	4.0	6.6	1.2	2.6	4.6
4	3.2	6.4	11.0	2.2	4.4	7.8
5	4.4	8.4	14.6	2.9	5.8	10.4
6	6.6	12.4	23.0	4.4	8.6	15.2
7	12.8	25.0	46.0	8.6	16.6	30.0

* default edge control setting "D" at V_{DC} = 2.5 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 D1 A C – B – 2.5 – T1 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series · 2.8 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxDxAC 2.8 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.8 V ± 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	2.9 ns max. at 15 pF / 5.7 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤88.0 MHz)
		15 pF max. recommended (>88.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		4 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	0	0	0	0	3
-40°C ~ +105°C	T2	0	0	0	0	2
-40°C ~ +125°C	T3	0	0	0	0	1
-55°C ~ +125°C	T8	0	0	0	0	
0 available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.8	3.8	3.8	3.8	mA
1.0 ~ 19.9 MHz	4.1	4.3	5.2	6.9	mA
20.0 ~ 29.9 MHz	4.4	5.2	6.7	9.8	mA
30.0 ~ 49.9 MHz	4.8	6.2	8.3	12.7	mA
50.0 ~ 79.9 MHz	6.1	8.1	11.7		mA
80.0 ~ 110.0 MHz	7.0	10.0			mA
115.0 ~ 137.0 MHz	(9.0)	(14.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC · Pb · REACH · Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO AC series · 2.8 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.2	4.6	0.8	1.6	3.0
1	1.3	2.4	5.2	0.9	1.8	3.5
D=2*	1.5	2.9	5.7	1.0	2.0	3.8
3	1.6	3.6	6.4	1.1	2.4	4.4
4	3.0	6.2	10.4	2.0	4.2	7.4
5	4.0	7.6	13.6	2.8	5.4	9.4
6	5.8	11.6	21.0	4.0	8.0	14.2
7	12.0	23.0	42.0	8.2	15.2	28.0

* default edge control setting "D" at V_{DC} = 2.8 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE O 26.123456 – JSO 75 D1 A C – B – 2.8 – T1 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series · 3.0 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxDxAC 3.0 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		3.0 V ± 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3.3 ns max. at 15 pF / 6.2 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤81.0 MHz)
		15 pF max. recommended (>81.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	4 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		5 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	0	0	0	0	3
-40°C ~ +105°C	T2	0	0	0	0	2
-40°C ~ +125°C	T3	0	0	0	0	1
-55°C ~ +125°C	T8	0	0	0	0	
0 available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	3.9	3.9	3.9	3.9	mA
1.0 ~ 19.9 MHz	4.1	4.5	5.4	7.2	mA
20.0 ~ 29.9 MHz	4.5	5.4	6.9	10.1	mA
30.0 ~ 49.9 MHz	4.9	6.3	8.6	13.2	mA
50.0 ~ 79.9 MHz	6.1	8.4	12.2		mA
80.0 ~ 110.0 MHz	7.3	10.5	15.5		mA
115.0 ~ 137.0 MHz	(9.5)	(14.0)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC — RoHS compliant
Pb — Pb free
REACH compliant
Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO AC series · 3.0 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.1	2.0	4.2	0.7	1.4	2.8
1	1.2	2.2	4.8	0.8	1.6	3.3
2	1.3	2.8	5.4	0.9	1.9	3.6
D=3*	1.5	3.3	6.2	1.0	2.2	4.0
4	2.8	5.8	10.0	1.8	4.0	6.8
5	3.8	7.4	13.0	2.6	5.2	9.0
6	5.5	11.0	19.0	3.8	7.6	13.4
7	11.4	22.0	40.0	7.8	14.6	27.0

* default edge control setting "D" at V_{DC} = 3.0 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 D1 A C – B – 3.0 – T1 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

09|2018

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series · 3.3 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

GENERAL DATA

TYPE		JSOxxDxAC 3.3 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		3.3 V ± 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	3 ns max. at 15 pF / 6 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤83.0 MHz)
		15 pF max. recommended (>83.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	4 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		5 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	0	0	0	0	3
-40°C ~ +105°C	T2	0	0	0	0	2
-40°C ~ +125°C	T3	0	0	0	0	1
-55°C ~ +125°C	T8	0	0	0	0	
0 available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	4.0	4.0	4.0	4.0	mA
1.0 ~ 19.9 MHz	4.0	4.6	5.6	7.6	mA
20.0 ~ 29.9 MHz	4.6	5.7	7.4	10.9	mA
30.0 ~ 49.9 MHz	5.1	6.7	9.2	14.3	mA
50.0 ~ 79.9 MHz	6.4	9.0	13.2		mA
80.0 ~ 110.0 MHz	7.7	11.2	17.0		mA
115.0 ~ 137.0 MHz	(10.0)	(14.5)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

RoHS 2011/65/EC · Pb · REACH · Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

MEMS Oscillator · JSO AC series · 3.3 V

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.0	1.7	3.6	0.7	1.2	2.6
1	1.1	1.8	4.4	0.7	1.3	3.0
2	1.2	2.6	5.0	0.8	1.8	3.3
D=3*	1.3	3.0	6.0	0.9	2.0	3.8
4	2.6	5.4	9.4	1.5	3.8	6.4
5	3.4	6.6	12.0	2.4	5.0	8.6
6	5.2	10.0	17.0	3.6	7.0	12.4
7	10.4	21.0	35.0	7.4	14.0	25.0

* default edge control setting "D" at V_{DC} = 3.3 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE O 26.123456 – JSO 75 D1 A C – B – 3.3 – T1 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **edge control**
  D = default
  0 – 7, see table 4
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **temperature range**
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm

actual size 2016 2520 3225 5032 7050

MEMS Oscillator · JSO AC series 2.5 V ~ 3.3 V

- low power oscillator with HCMOS/LVCMOS output
- qualified according to AEC-Q100
- compatible to industry standard packages 2016 – 7050
- extended shock & vibration resistance & temperature range
- configured to customer's specification
- very fast delivery service

MEMS Oscillator · JSO AC series · 2.5 V ~3.3 V

GENERAL DATA

TYPE		JSOxxDxAC 2.5 V ~3.3 V
frequency range		1.0 ~ 110.0 MHz
		115.0 ~ 137.0 MHz
frequency stability over all		±20 ppm ~ ±50 ppm (see table 1)
current consumption		see table 2
supply voltage V_{DC}		2.5 V – 10% ~ 3.3 V + 10%
temperature	operating	T1 = -40°C ~ +85°C
		T2 = -40°C ~ +105°C
		T3 = -40°C ~ +125°C
		T8 = -55°C ~ +125°C
	storage	-55°C ~ +150°C
output	logic	HCMOS/LVCMOS
	rise & fall time	4.0 ns max. at 15 pF / 6.6 ns max. at 30 pF (see table 4)
	load max.	30 pF max. recommended (≤76.0 MHz)
		15 pF max. recommended (>76.0 MHz)
		other load capacitances possible, see supplementary document
	current max.	3 mA
	low level max.	0.1 x V_{DC}
	high level min.	0.9 x V_{DC}
standby function (e/d)		stop (S), tristate-only (T) or none (N), see table 3
output enable time max.		150 ns (T) / 10 ms (S)
output disable time max.		150 ns
start-up time max.		10 ms
standby current max.		5 µA, (for stop(S), see table 3)
phase jitter 12 kHz ~ 20 MHz		< 3.0 ps RMS
symmetry at 0.5 x V_{DC}		45% ~ 55% (standard)

note: some frequencies can't be configured, see table 5.

TABLE 1: FREQUENCY STABILITY CODE

stability code / temp. code*		B ±50 ppm	G ±30 ppm	C ±25 ppm	D ±20 ppm	AEC-Q100 Grade
-40°C ~ +85°C	T1	0	0	0	0	3
-40°C ~ +105°C	T2	0	0	0	0	2
-40°C ~ +125°C	T3	0	0	0	0	1
-55°C ~ +125°C	T8	0	0	0	0	
0 available						

* includes stability at 25°C, operating temp. range, supply voltage change, shock and vibration, aging 1st year.

TABLE 2: CURRENT CONSUMPTION TYP. (FOR MAX. ADD 30%)

current at load	5 pF	15 pF	30 pF	60 pF	unit
output disabled	4.0	4.0	4.0	4.0	mA
1.0 ~ 19.9 MHz	4.0	4.6	5.6	7.6	mA
20.0 ~ 29.9 MHz	4.6	5.7	7.4	10.9	mA
30.0 ~ 49.9 MHz	5.1	6.7	9.2	14.3	mA
50.0 ~ 79.9 MHz	6.4	9.0	13.2		mA
80.0 ~ 110.0 MHz	7.7	11.2	17.0		mA
115.0 ~ 137.0 MHz	(10.0)	(14.5)			mA

note: current at default edge control setting "D", also refer to table 4.

TABLE 3: CONFIGURABLE STANDBY FUNCTION OPTIONS (E/D)

pin #1 (e/d control)	option	functionality
low "0" (V_{IL} ≤ 0.2 V_{DC})	S = Stop	output weakly pulled down, oscillator in sleep mode
	T = TriState	output high impedance, oscillator operates
	N = None	oscillator output active
high "1" (V_{IH} ≥ 0.8 V_{DC})	all	oscillator output active
open*	all	oscillator output active

* a pull up resistor is recommended in EMI stressed circuit environments.

TABLE 4: MAX. RISE & FALL TIME VS. LOAD CAPACITANCE

C_L	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V_{DC} (ns)			at 20% ~ 80% of V_{DC} (ns)		
0	1.2	2.4	5.2	0.8	1.7	3.4
1	1.4	2.6	5.8	0.9	1.9	3.8
2	1.6	3.0	6.0	1.1	2.1	4.0
D=3*	1.8	4.0	6.6	1.2	2.6	4.6
4	3.2	6.4	11.0	2.2	4.4	7.8
5	4.4	8.4	14.6	2.9	5.8	10.4
6	6.6	12.4	23.0	4.4	8.6	15.2
7	12.8	25.0	46.0	8.6	16.6	30.0

* default edge control setting "D" at V_{DC} = 2.5 ~ 3.3 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

operating temperature option		operating temperature option	
T2 – (-40°C ~ +105°C) T3 – (-40°C ~ +125°C)		T8 – (-55°C ~ +125°C)	
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	82.632
94.249	94.430	91.834	95.474
94.875	94.994	96.192	96.209
97.714	98.679	96.936	99.158
110.0	115.194	110.0	119.342
117.811	118.038	–	–
118.594	118.743	120.239	120.262
122.142	122.705	121.170	121.243
123.022	123.348	121.601	123.948

ORDER INFORMATION

EXAMPLE

O 26.123456 – JSO 75 D1 A C – B – 2V3 – T1 – S – D

- O = Oscillator
- **frequency (8 digits), see also table 5**
  1.0 ~ 110.0 MHz
  115.0 ~ 137.0 MHz
- JSO = Jauch Silicon Oscillator
- **package**
  75 = 7050 22 = 2520
  53 = 5032 21 = 2016
  32 = 3225
- **frequency range**
  D1 = 1.0 ~ 110.0 MHz
  D2 = 115.0 ~ 137.0 MHz
- **function/feature**
  A = automotive
- **output I/F**
  C = (H)CMOS
- **frequency stability overall**
  B = ± 50 ppm
  G = ± 30 ppm
  C = ± 25 ppm
  D = ± 20 ppm
- **supply voltage**
  3.3 = 3.3 V 2.5 = 2.5 V
  3.0 = 3.0 V 1.8 = 1.8 V
  2.8 = 2.8 V 2V3 = 2.5 V ~ 3.3 V
- **temperature range**
  T1 = -40°C ~ +85°C
  T2 = -40°C ~ +105°C
  T3 = -40°C ~ +125°C
  T8 = -55°C ~ +125°C
- **standby function options**
  S = Stop
  T = TriState
  N = None
- **edge control**
  D = default
  0 – 7, see table 4

PACKING NOTE / MARKING

QTY < 250 pcs. → cut tape
QTY 250/500/1K/3K pcs. → tape and reel
Marking: lot code only

PIN CONNECTION

4: V_{DC} # 3: output
1: e/d # 2: GND

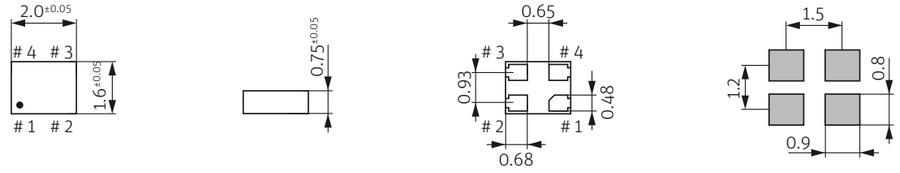
RoHS compliant | Pb free | REACH compliant | Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology

09|2018

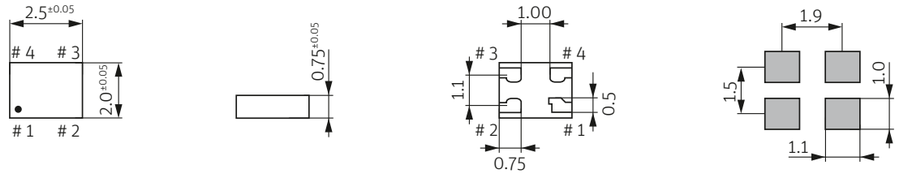
DIMENSIONS

2.0 x 1.6 x 0.75
JSO21 LC / JSO21 AC



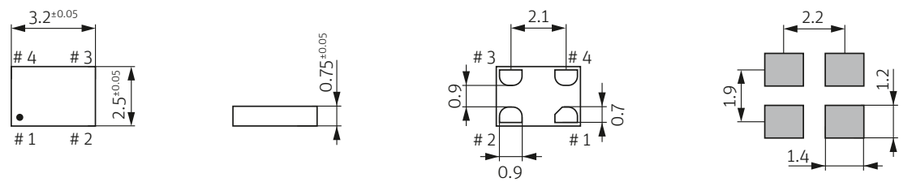
top view side view bottom view pad layout

2.5 x 2.0 x 0.75
JSO22 LC / JSO22 AC



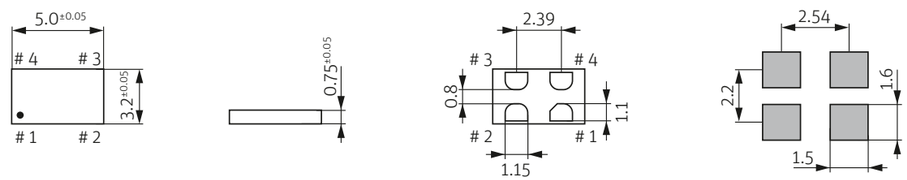
top view side view bottom view pad layout

3.2 x 2.5 x 0.75
JSO32 LC / JSO32 AC



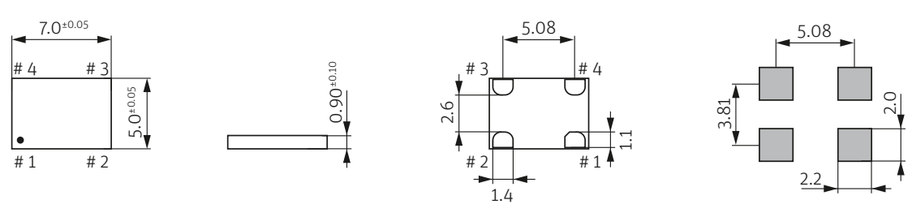
top view side view bottom view pad layout

5.0 x 3.2 x 0.75
JSO53 LC / JSO53 AC



top view side view bottom view pad layout

7.0 x 5.0 x 0.90
JSO75 LC / JSO75 AC



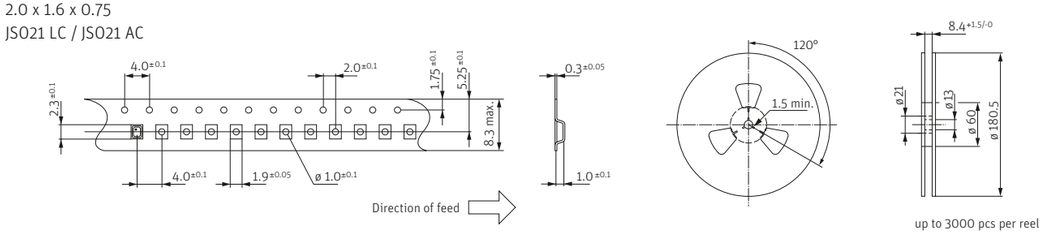
in mm top view side view bottom view pad layout

Pin connection # 1: e/d # 2: GND # 3: output # 4: V_{DC} note: a capacitor of 0.1 µF between V_{DC} and GND is recommended

MEMS Oscillator · JSO LC series & JSO AC series

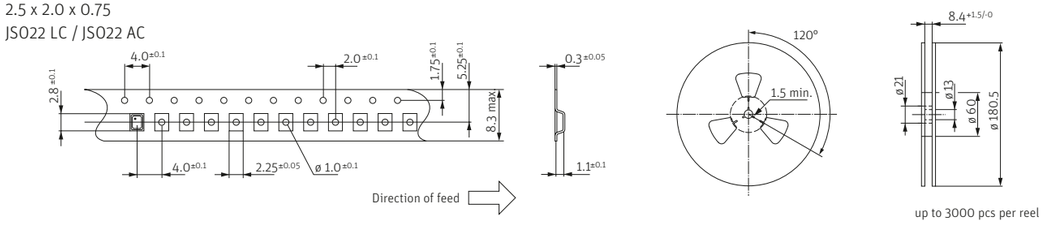
TAPING SPECIFICATION

2.0 x 1.6 x 0.75
JSO21 LC / JSO21 AC



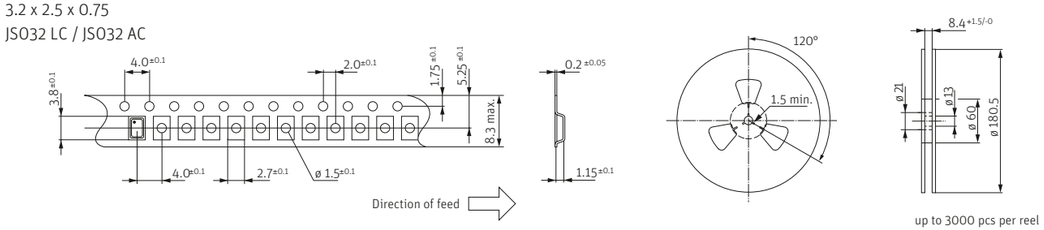
up to 3000 pcs per reel

2.5 x 2.0 x 0.75
JSO22 LC / JSO22 AC



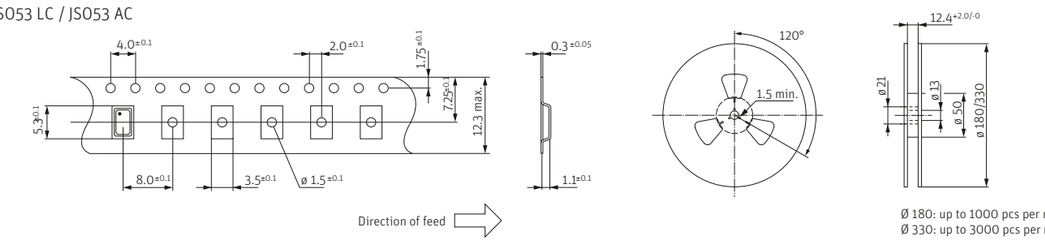
up to 3000 pcs per reel

3.2 x 2.5 x 0.75
JSO32 LC / JSO32 AC



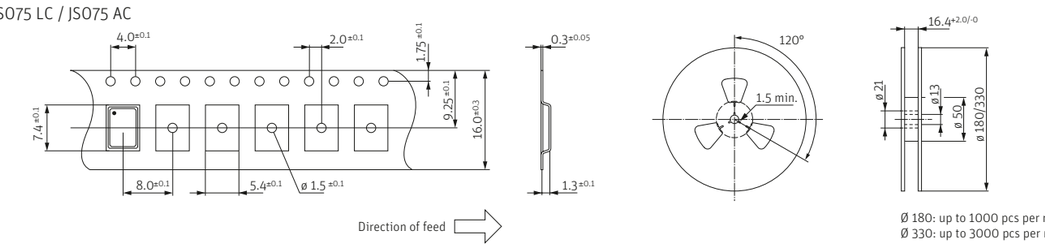
up to 3000 pcs per reel

5.0 x 3.2 x 0.75
JSO53 LC / JSO53 AC



Ø 180: up to 1000 pcs per reel
Ø 330: up to 3000 pcs per reel

7.0 x 5.0 x 0.90
JSO75 LC / JSO75 AC



Ø 180: up to 1000 pcs per reel
Ø 330: up to 3000 pcs per reel

in mm

RELIABLE AND SAFE: FREQUENCY PRODUCTS AND BATTERY SOLUTIONS FROM JAUCH

ABOUT JAUCH

The Jauch Group is one of the leading specialists for quartz crystals, crystal oscillators, MEMS oscillators and battery technology. Established in 1954, we are a leading company in the frequency control products industry, and have recently added MEMS timing oscillators to our range. We are also a recognized expert for lithium ion and lithium polymer battery solutions.

With our in-depth technical consulting, certification expertise and advanced test environments, we are able to underline our claim to leadership.

Along with our subsidiaries in France, Great Britain and the USA, we are able to develop and provide pioneering technology solutions.

Frequency Control and Battery Technology

Jauch®
THE PULSE OF PROGRESS

GM50 | 09.2018

Jauch Quartz GmbH
In der Lache 24
78056 Villingen-Schwenningen
Germany

Jauch Quartz France
116 rue de Silly
92100 Boulogne-Billancourt
France

Jauch Quartz America, Inc.
506 Second Avenue, Suite 1400
Seattle, WA 98104
USA

Jauch Quartz UK, Ltd.
Unit 4.7, Frimley 4 Business Park
Frimley, Surrey, GU16 7SG
United Kingdom

info@jauch.com · www.jauch.com