



# Automotive 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



RoHS compliant



Pb free



REACH compliant



Conflict mineral free

actual size



### 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 <a href="#">document</a>
	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.

### PACKAGING NOTE / MARKING

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

### 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	○	○	○	○	3
-40°C ~ +105°C	T2	○	○	○	○	2
-40°C ~ +125°C	T3	○	○	○	○	1
-55°C ~ +125°C	T8	○	○	○	○	

○ 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

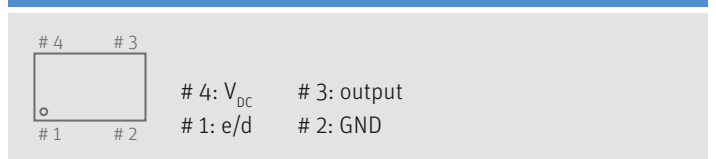
note: current at default edge control setting "D", also refer to table 4.

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

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

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

### PIN CONNECTION



B.C.E. S.r.l. - Via Regina Pacis, 54/c - Sassuolo (MO) - I 41049 - Italy  
 Tel.: 0536 811616 - Fax: 0536 811500 - Web: [www.bce.it](http://www.bce.it) - E-mail: [bce@bce.it](mailto:bce@bce.it)

Jauch MEMS – Uses SiTime's MEMS First™ technology

07092018

Jauch Quartz GmbH • e-mail: [info@jauch.com](mailto:info@jauch.com) • full data can be found under: [www.jauch.com](http://www.jauch.com)

All specifications are subject to change without notice



# Automotive MEMS Oscillator · JSO AC series · 2.8 V

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

C <sub>L</sub>	5 pF	15 pF	30 pF	5 pF	15 pF	30 pF
edge control	at 10% ~ 90% of V <sub>DC</sub> (ns)			at 20% ~ 80% of V <sub>DC</sub> (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<sub>DC</sub> = 2.8 V, please also refer to the supplementary information on our homepage for typical values and more details.

TABLE 5: NON-CONFIGURABLE FREQUENCIES

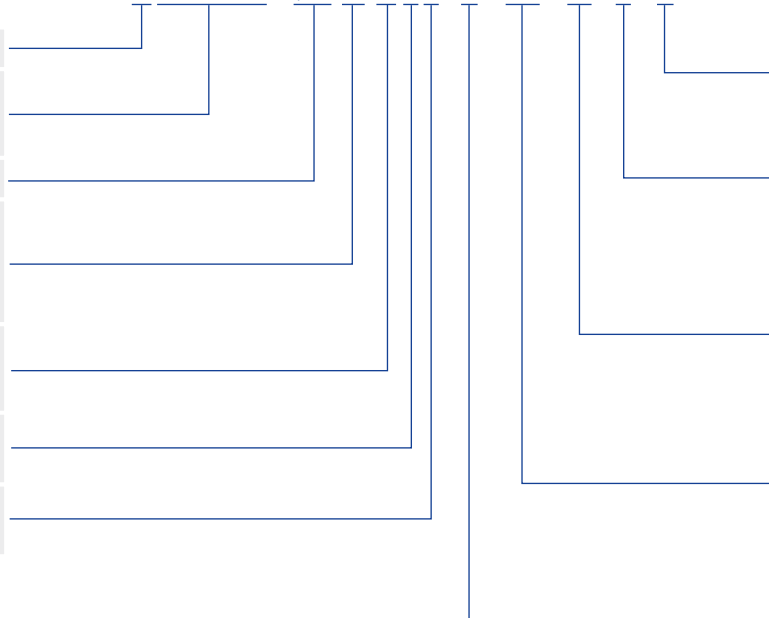
operating temperature option		operating temperature option	
T2 - (-40°C ~ +105°C)		T8 - (-55°C ~ +125°C)	
T3 - (-40°C ~ +125°C)			
from (MHz)	to (MHz)	from (MHz)	to (MHz)
61.223	61.674	61.223	61.974
69.796	70.485	69.240	70.827
79.063	79.162	78.715	79.561
81.428	82.232	80.160	80.174
91.834	92.155	80.780	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 = Oscillator
<b>frequency (8 digits), see also table 5</b> 1.0 ~ 110.0 MHz 115.0 ~ 137.0 MHz
JSO = Jauch Silicon Oscillator
<b>package</b> 75 = 7050      22 = 2520 53 = 5032      21 = 2016 32 = 3225
<b>frequency range</b> D1 = 1.0 ~ 110.0 MHz D2 = 115.0 ~ 137.0 MHz
<b>function/feature</b> A = automotive
<b>output I/F</b> C = (H)CMOS

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

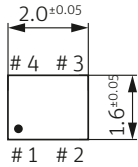


<b>edge control</b> D = default 0 - 7, see table 4
<b>standby function options</b> S = Stop T = TriState N = None
<b>temperature range</b> T1 = -40°C ~ +85°C T2 = -40°C ~ +105°C T3 = -40°C ~ +125°C T8 = -55°C ~ +125°C
<b>supply voltage</b> 3.3 = 3.3 V      2.5 = 2.5 V 3.0 = 3.0 V      1.8 = 1.8 V 2.8 = 2.8 V      2V3 = 2.5 V ~ 3.3 V
<b>frequency stability overall</b> B = ± 50 ppm G = ± 30 ppm C = ± 25 ppm D = ± 20 ppm

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## DIMENSIONS

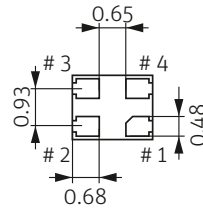
2.0 x 1.6 x 0.75  
JSO21 AC



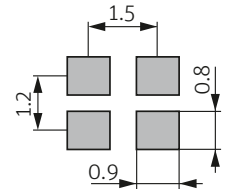
top view



side view

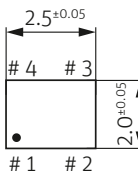


bottom view

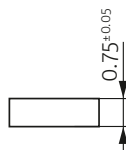


pad layout

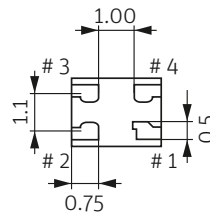
2.5 x 2.0 x 0.75  
JSO22 AC



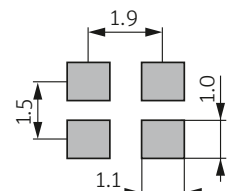
top view



side view

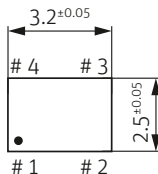


bottom view

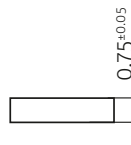


pad layout

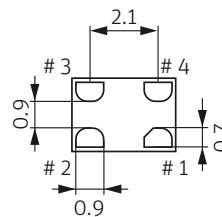
3.2 x 2.5 x 0.75  
JSO32 AC



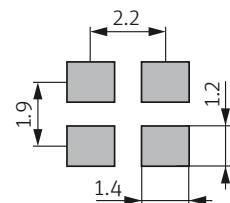
top view



side view

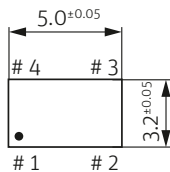


bottom view

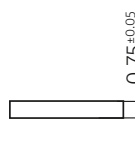


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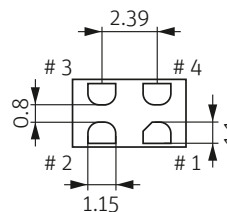
5.0 x 3.2 x 0.75  
JSO53 AC



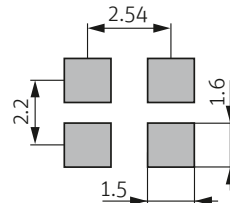
top view



side view

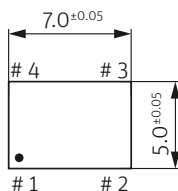


bottom view

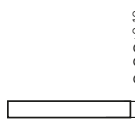


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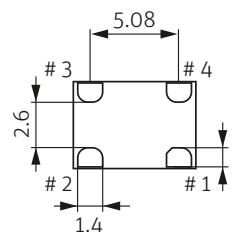
7.0 x 5.0 x 0.90  
JSO75 AC



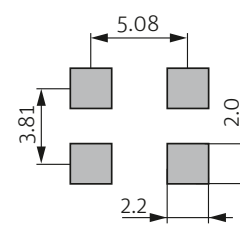
top view



side view



bottom view



pad layout

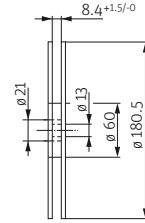
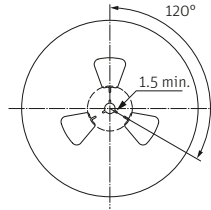
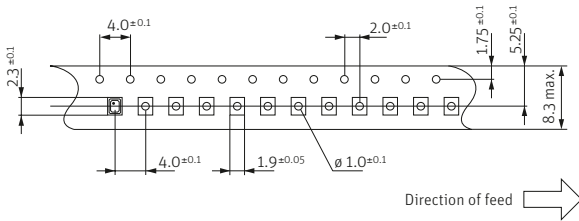
in mm

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

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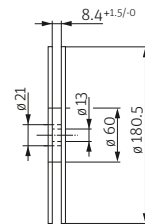
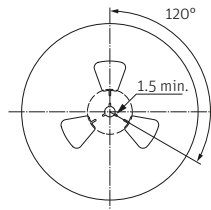
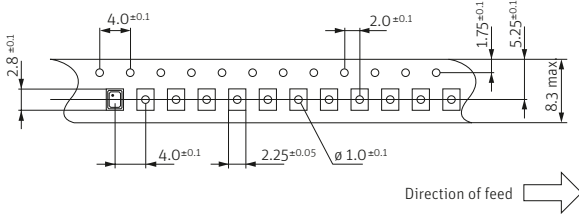
## TAPING SPECIFICATION

2.0 x 1.6 x 0.75  
JSO21 AC



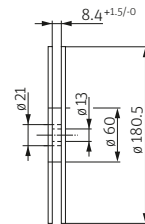
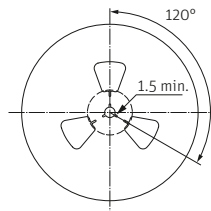
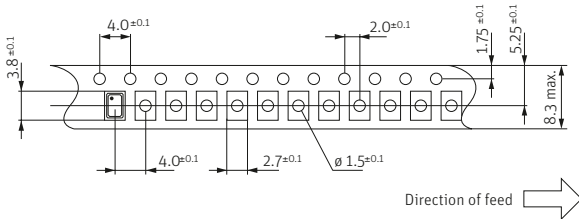
up to 3000 pcs per reel

2.5 x 2.0 x 0.75  
JSO22 AC



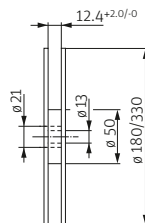
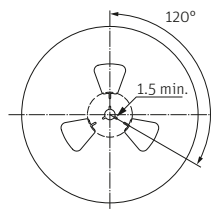
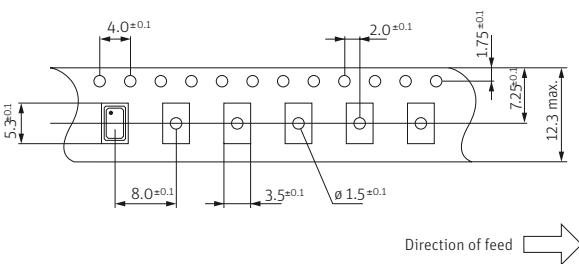
up to 3000 pcs per reel

3.2 x 2.5 x 0.75  
JSO32 AC



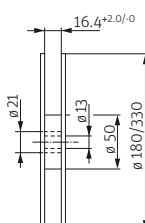
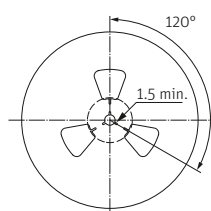
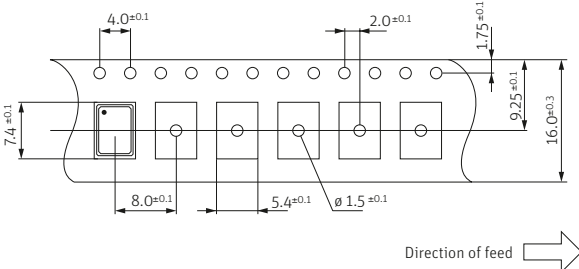
up to 3000 pcs per reel

5.0 x 3.2 x 0.75  
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 AC



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