



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 supply current

## General Data

type		JSO15B1TR
supply voltage $V_{DC}$		1.5 V ~ 3.63 V
current consumption typ.		1.2 $\mu$ A (rail-to-rail mode, no load, $V_{DC} = 1.8$ V)
output frequency		32.768 kHz
frequency stability vs. temp.		$\pm 10$ ppm ~ $\pm 22$ ppm (see table 1)
frequency stability vs. voltage		$\pm 0.75$ ppm at 1.8 V $\pm 0.18$ V $\pm 1.5$ ppm at 1.5 V ~ 3.63 V
aging	at +25°C	$\pm 1$ 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 $\mu$ A
	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

Table 1: Frequency Stability Code

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

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

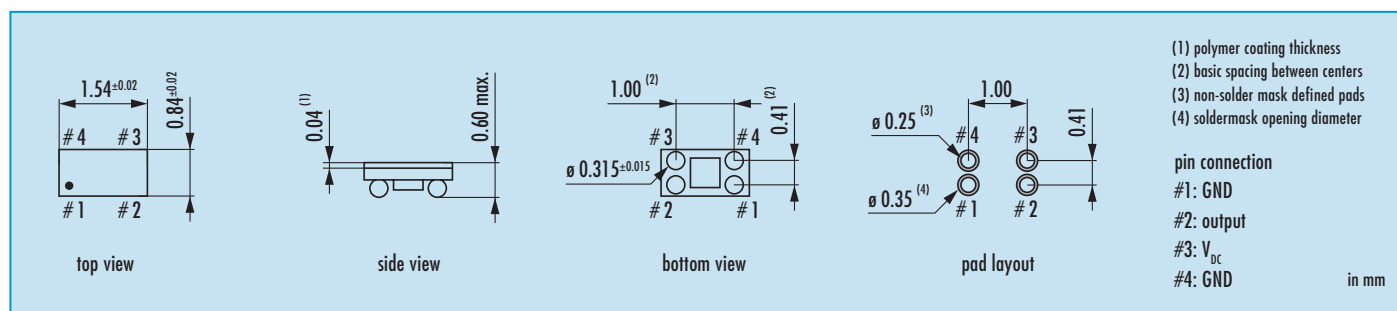
Table 2: Current Consumption typ. (for max. add 40%)

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

\* repetitive temp. compensation consuming 6  $\mu$ A for 10 ms, repeating every 350 ms

More information about the features of the JSO TR 32.768 kHz TCXO can be found [here](#).

## Dimensions



## Packing Note / Marking

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

## Pin Connection



RoHS compliant



Pb free



REACH compliant



Conflict mineral free

Jauch MEMS – Uses SiTime's MEMS First™ technology