



actual size

# Oscillator JOE21 · LVPECL

- SMD Low Voltage LVPECL Oscillator, 2.0 x 1.6 mm
- superior phase jitter (60fs RMS max. at 156.250 MHz)
- drives fast LVPECL logic
- complementary output, low EMI
- compact & flat ceramic / metal package



RoHS compliant



Pb free



REACH compliant



Conflict mineral free

GENERAL DATA		JOE21 2.5 V / 3.3 V LVPECL
TYPE		JOE21 2.5 V / 3.3 V LVPECL
frequency range		100.0 ~ 160.0 MHz
frequency stability over all*		±50 ppm ~ ±100 ppm (see table 1)
current consumption		60 mA max.
supply voltage V <sub>DC</sub>		2.5 V ±5 % / 3.3 V ±5 %
temperature	operating	-20 °C ~ +70 °C (T0)
		-40 °C ~ +85 °C (T1)
		-40 °C ~ +105 °C (T2 Δ)
		-40 °C ~ +125 °C (T3 Δ)
	storage	-55 °C ~ +125 °C
output	rise & fall time	0.6 ns (V <sub>DC</sub> = 2.5 V / 20 % ~ 80 % of V <sub>pp</sub> )
		0.5 ns (V <sub>DC</sub> = 3.3 V / 20 % ~ 80 % of V <sub>pp</sub> )
	load nom.	50 Ω at V <sub>REF</sub> = 0.5V (V <sub>DC</sub> = 2.5 V)
		50 Ω at V <sub>REF</sub> = 1.3 V (V <sub>DC</sub> = 3.3 V)
	low level max.	0.91 V (V <sub>DC</sub> = 2.5 V) / 1.71 V (V <sub>DC</sub> = 3.3 V)
high level min.	1.40 V (V <sub>DC</sub> = 2.5 V) / 2.20 V (V <sub>DC</sub> = 3.3 V)	
output enable time max.		10 ms
output disable time max.		200 ns
start-up time max.		10 ms
phase jitter 12 kHz ~ 20.0 MHz		see table 2
symmetry at 50% of V <sub>pp</sub>		45 % ~ 55 % max.

Δ ask for availability of higher temperature ranges and frequency stabilities

TABLE 1: FREQUENCY STABILITY CODE				
stability code	A	B	G	C
temp. code*	±100 ppm	±50 ppm	±30 ppm	±25 ppm
-20 °C ~ +70 °C	T0	○	○	Δ
-40 °C ~ +85 °C	T1	○	○	Δ
-40 °C ~ +105 °C	T2 Δ	Δ	Δ	
-40 °C ~ +125 °C	T3 Δ	Δ		

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

ENABLE / DISABLE FUNCTION	
pin #1 (e/d control)	pin #4 / #5 (outputs)
V <sub>ED</sub> ≥ 0.7 V <sub>DC</sub> (use external pull-up resistor)	active
gnd or V <sub>ED</sub> ≤ 0.3 V <sub>DC</sub>	high impedance, low stby. current
standby function	stop
standby current max.	10 μA

TABLE 2: PHASE JITTER INFORMATION		
at V <sub>DC</sub> = 3.3 V	RMS phase jitter (offset 12 kHz ~ 20.0 MHz)	
typical frequencies	typical	maximum
156.250 MHz	40 fs RMS	< 60 fs RMS*
125.0 MHz	60 fs RMS	< 80 fs RMS*
100.0 MHz	65 fs RMS	< 100 fs RMS*

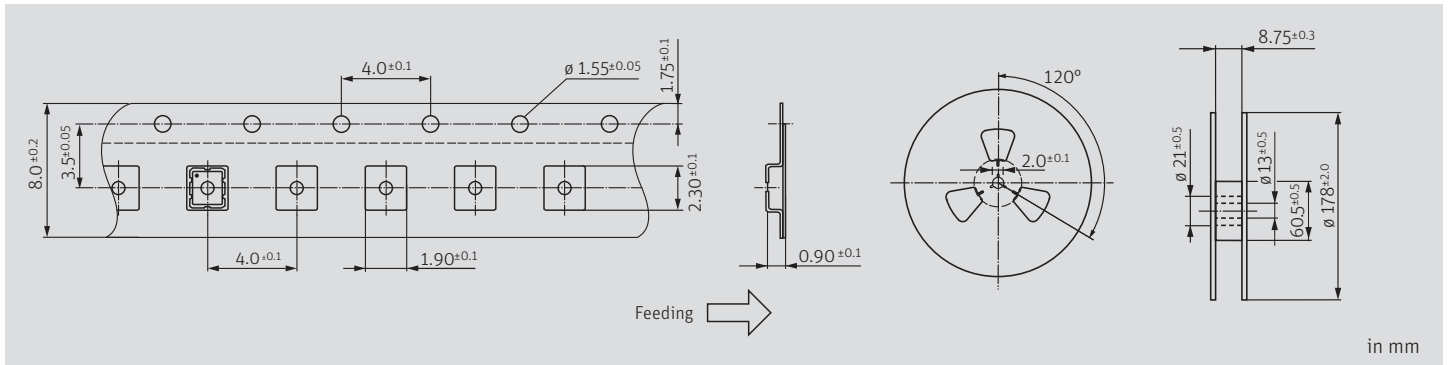
\* the suffix -SP is always added to the description of these very low noise oscillators (see order information)

DIMENSIONS			
top view	side view	bottom view	pad layout
			<p>XO JOE21 #1: e/d #2: not connected #3: GND #4: output 1 #5: output 2 #6: V<sub>DC</sub></p> <p>pin connection</p>
			in mm

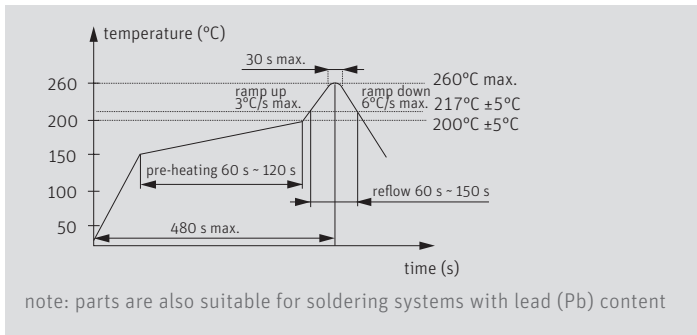
ORDER INFORMATION						
0	frequency	type	frequency stability code	supply voltage code	option	superior phase noise
Oscillator	100.0 ~ 160.0 MHz	JOE21	see table 1	2.5 = 2.5 V 3.3 = 3.3 V	T0 = -20 °C ~ +70 °C T1 = -40 °C ~ +85 °C T2 = -40 °C ~ +105 °C please ask T3 = -40 °C ~ +125 °C please ask	SP = superior phase noise
<b>Example: 0 156.250-JOE21-B-3.3-T1-SP- LF</b> (Suffix LF = RoHS compliant / Pb free)						

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## TAPING SPECIFICATION



## REFLOW SOLDERING PROFILE



## MARKING

### frequency

□ F B S & date code

date code: A ~ M: Jan. - Dec.

5: 2025   6: 2026   7: 2027   8: 2028   9: 2029   0: 2030

Jan.	Febr.	Mar.	Apr.	May	June
A	B	C	D	E	F
July	Aug.	Sept.	Oct.	Nov.	Dec.
G	H	J	K	L	M

## PACKAGING NOTE

- standard packing unit is 3000 pieces per reel
- non-multiple packing units are only supplied taped / bulk