



TROQ Electronic Co.,Ltd.
CRYSTAL UNIT SPECIFICATIONS

Customer	宁波均联智行科技股份有限公司
Production Name	Tuning Fork 3.2*1.5
TROQ P/N	ARNE32768023-2X
Revision	A
Print Date	2023/9/12

Drawn	Checked	Approved



Conforms to AEC-Q200



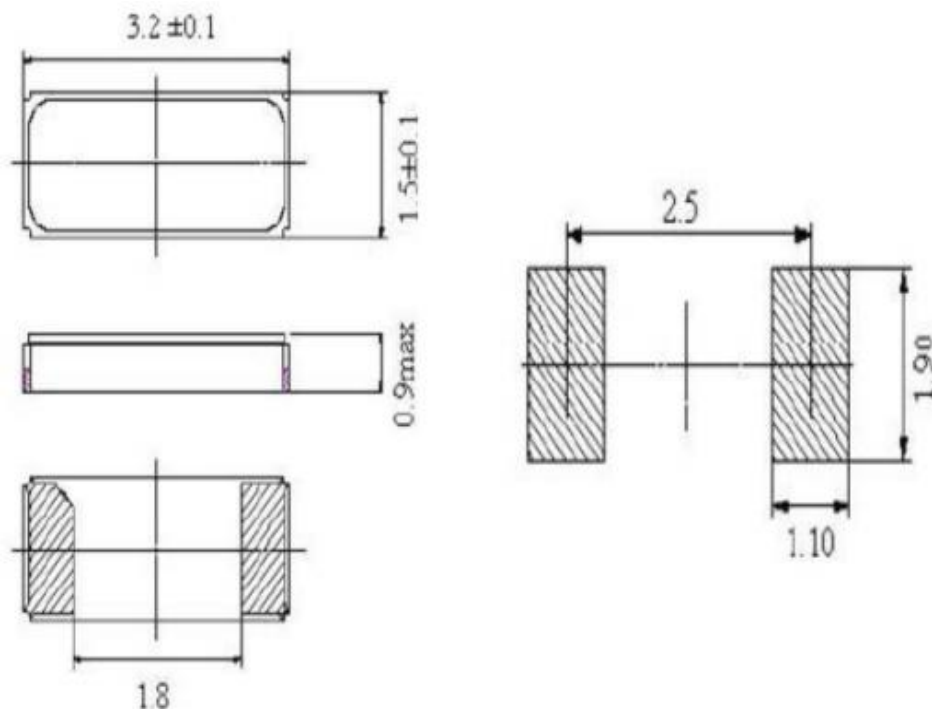
TROQ P/N: ARNE32768023-2X REV: A

● ELECTRICAL PARAMETERS

谐振器产品技术指标	Min	Max	Units
1.Holder Type(型号规格)	Tuning Fork 3.2*1.5		
2.Mode of Oscillation (振动模式)	Fundamental		
3.Frequency (标称频率)	32.768000		KHz
4.Load Capacitance (CL) (负载电容)	7		pF
5.Shunt Capacitance (Co) (静态电容)	0	2	pF
6.Equivalent Resistance (谐振电阻)		70	kΩ
7.Frequency Tolerance at 25℃ (调整频差)	-20	20	ppm
8.Temperature Coefficient (K) (温度系数)	-0.04		ppm/(△℃) ²
9.Insulation Resistance (at DC 100V) (绝缘电阻)	500		MΩ
10.Drive Level (激励功率)	1		uw
11.Operating Temperature Range (工作温度范围)	-40	105	℃
12.Storage Temperature Range (储存温度范围)	-55	125	℃
13.Aging (老化率) (1st year)	± 3		ppm/year

*Note 1: $F(T) = K * (T-t_0) * (T-t_0)$; $t_0=25^{\circ}\text{C}$

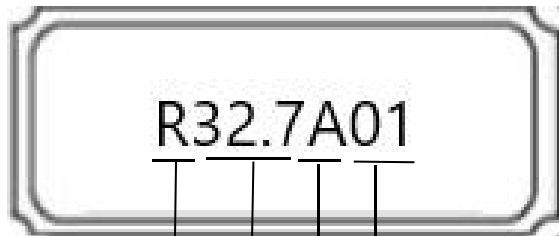
OUTLINE DIMENSIONS(UNIT:mm) 外形尺寸 (单位: mm)



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<http://www.troq.com>

● Marking (标记)



TROQ代码
标称频率

生产批号
负载电容

● 负载电容

负载电容 (CL)	6	7	9	12.5			
代码	A	B	C	D			



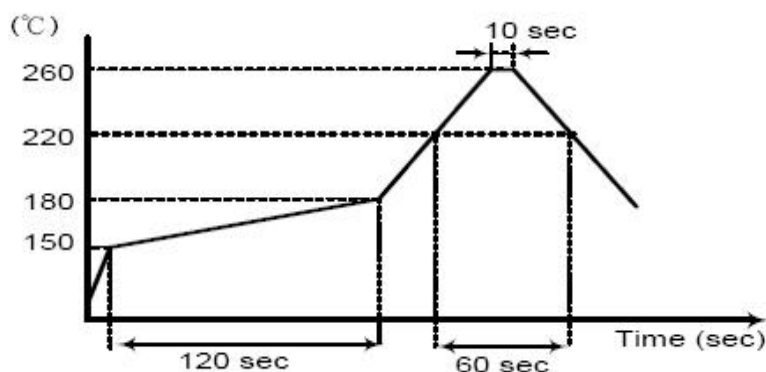
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● SUGGESTED REFLOW PROFILE (回流焊曲线图)

Total time:200sec.Max. (总时间: 200秒 最大)

Solder melting point:220℃ (熔点220℃)

Profiles Feature (特性)		Pb-Free Assembly
Average Ramp-up Rate(Ts max to Tp)	平均升温速度	3℃/second Max
Preheat	预热	
■ Temperature Min (Ts min)	最低温度	125℃
■ Temperature Max (Ts max)	最高温度	200℃
■ Time (ts min to ts max)	从最低到最高时间	(60~180) seconds
Time maintained above	维持上述时间	
■ Temperature(T1)	温度	217℃
■ Time(tp)	时间	(60~150) seconds
Peak/Classification Temperature(Tp)	最高点温度	260℃
Time within 5℃ of actual Peak Temperature(tp)	高温维持时间	(20~40) seconds
Ramp-down rate	降温速度	6℃/second max
Time 25℃ to Peak Temperature	从25℃到最高温度的时间	8 minutes max
Suggest reflow times	建议 reflow次数	3 Times max

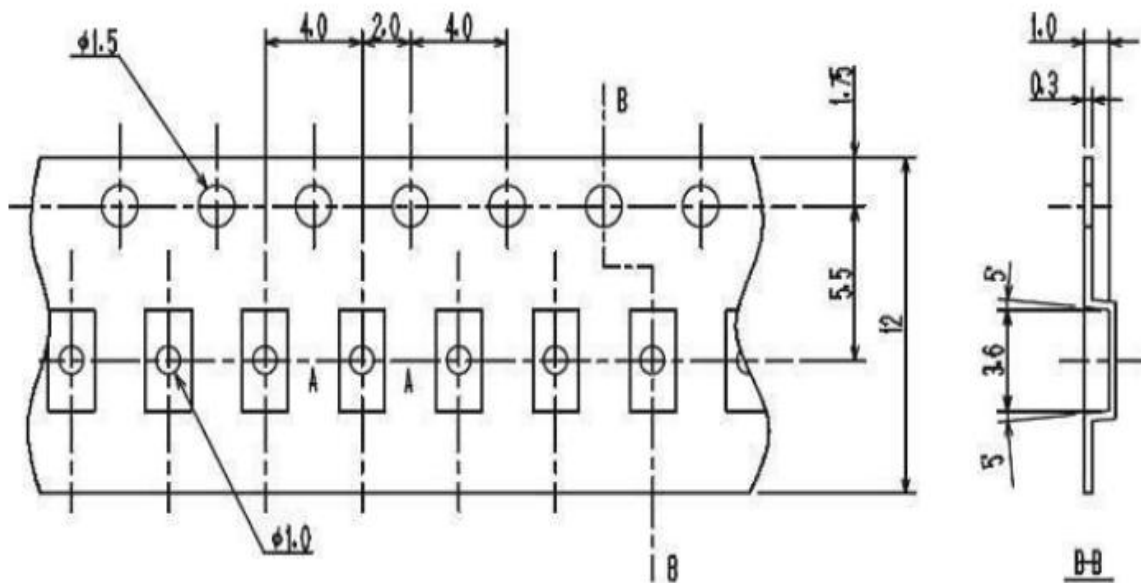


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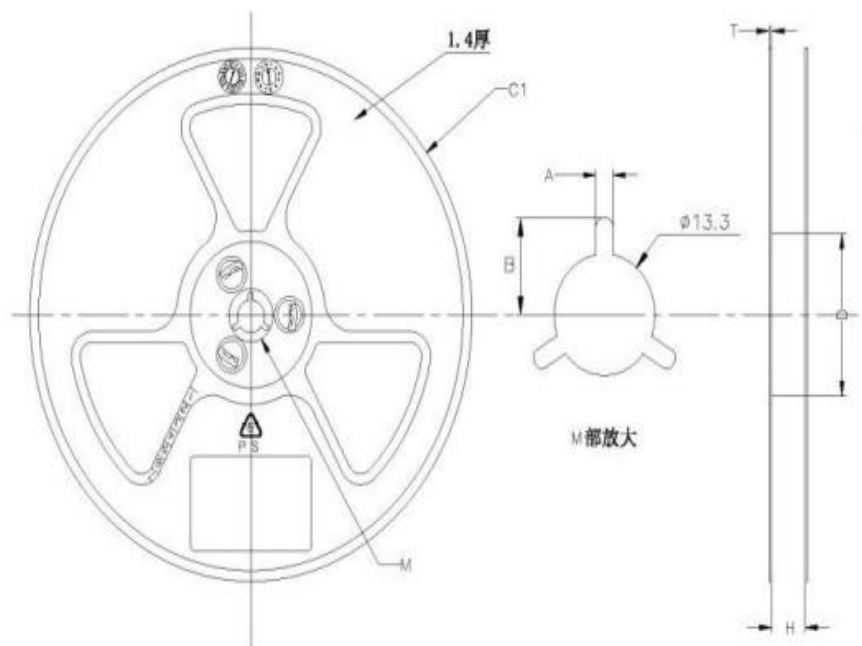
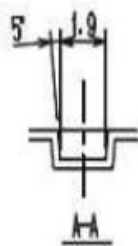
- PACKING (包装) 3Kpcs/REEL

REEL SPECIFICATION



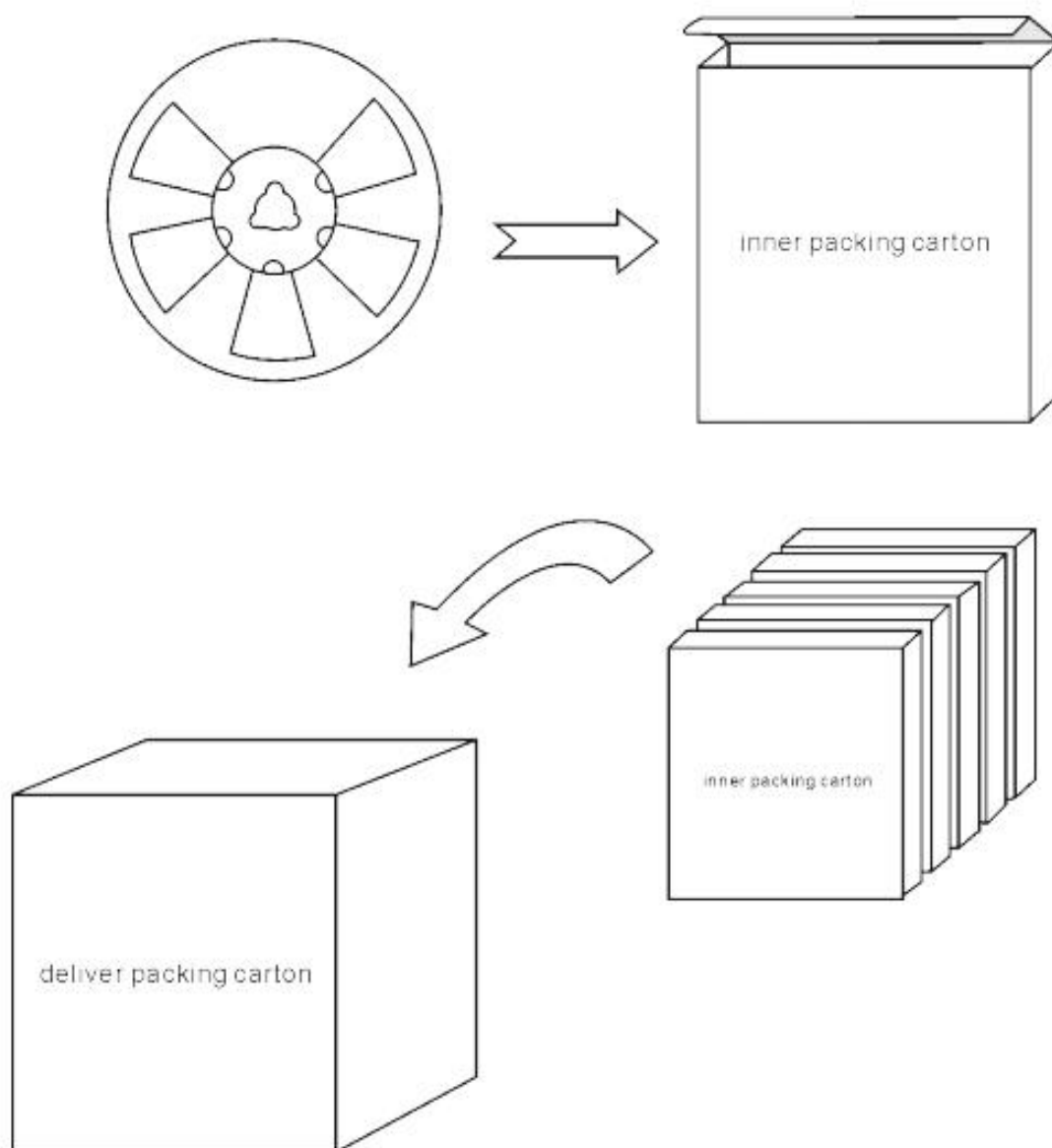
备注:

符合: EIA-481
公差: $\pm 0.2\text{mm}$
单位: mm



名称	规格	单位
材料	PS	
卷边厚T	1.8 ± 0.05	mm
卷内宽H	12 ± 0.5	mm

PACKING SPECIFICATION



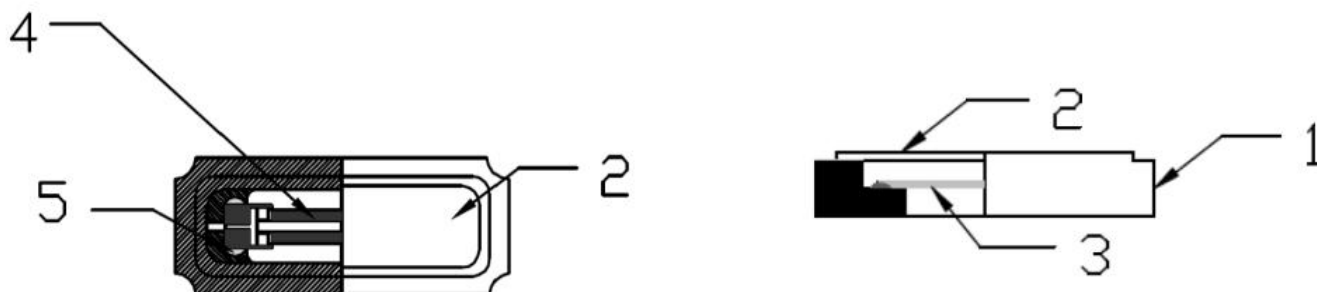
备注：每盘3000pcs

每箱10盘（30000pcs）

产品外箱包装以实际为准。

● BOM List (材质清单)

INSIDE STRUCTURE



No.	组件 COMPONENTS	材料成份 MATERIALS
1	基座 Package	陶瓷 Ceramic (Al ₂ O ₃)
2	外壳 LID	KV 合金 KV (Fe/Co/Ni)
3	水晶片 Crystal blank	二氧化硅 SiO ₂
4	电极 Electrode	Ag 银
5	接着剂 Adhesive	树脂、银粉 Resin、Ag

● RELIABILITY SPECIFICATIONS (信赖度试验)

No	Test Item (测试项目)	Test Conditions (测试条件)	Reference (参考)
1	High Temperature High Humidity Storage (高温、高湿、储存)	Temperature: 85°C±3°C 温度: 85°C±3°C Relative Humidity: 80~85%RH 相对湿度: 80~85%RH Time: 1000 Hours 时间: 1000小时	JIS C5023
2	High Temperature Storage (高温储存)	Temperature: 125°C±2°C 温度: 125°C±2°C Time: 1000 Hours 时间: 1000小时	MIL-STD-883 Method 1005.8
3	Low Temperature Storage (低温储存)	Temperature: -40°C±2°C 温度: -40°C±2°C Time: 1000Hours 时间: 1000小时	MIL-STD-883 Method 1013
4	Thermal Shock (温度冲击)	Temperature1: -55°C±5°C 温度1: -55°C±5°C Temperature2: 125°C±5°C 温度2: 125°C±5°C Temperature change between T1 and T2 5 min T1和T2温度在5分钟内改变 300cycles maintain T1 and T2 for 30 minutes each mone cycle 每次循环30分钟共300次	MIL-STD-202 Method 107 Condition A
5	RESISTANCE TO SOLDER HEAT (耐焊接热)	Solder Temperature: 230°C±5°C 焊槽温度: 230°C±5°C Time: 10±1 Seconds 时间: 10±1秒	MIL-STD-202 Method 210
6	Solderability(可焊性)	The solder pot temperature is 235±5°C , dwell time 10~30sec 235±5°C焊锡槽浸润10~30秒	J-STD-002
7	Drop Test (落下试验)	10 Times Free Fall from 120cm height table to 3cm thickness hard wood board 从120cm高度10次跌落到3cm厚硬质木板上	JIS C6701
8	MECHANICAL SHOCK (机械冲击)	Half sine wave, 1000 G 半正弦波, 加速度1000G 6 Times for all 6 directions 六个相互垂直方向各六次	MIL-STD-202 Method 213
9	Vibration (机械振动)	Frequency Range: 10Hz~2000Hz 频率范围: 10Hz~2000Hz Amplitude: 1.52mm 振幅: 1.52mm Sweep time: 20 minutes Test time: 4 hours × 3 X、Y、Z 三个相互垂直方向各振动4小时共12小时	MIL-STD-202 Method 204
10	Leakage Test (气密性)	Take measurements with a helium Leakage detector 氦质检漏 Leakage Rate ≤ 1×10 ⁻³ Pa cm ³ /s 漏率 ≤ 1×10 ⁻³ Pa cm ³ /s	MIL-STD-883