

浙江匯隆晶片技術有限公司

ZHEJIANG HUILONG CRYSTALS TECHNOLOGY CO.,LTD

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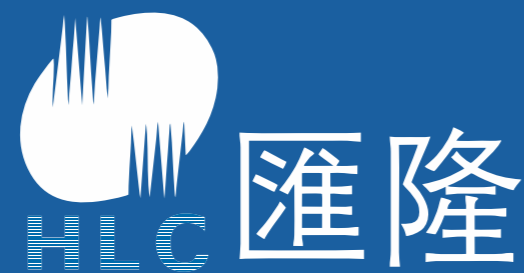
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PRODUCE MORE EXCELLENT CRYSTAL UNITS BRING MORE PROFIT TO YOU



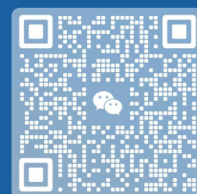
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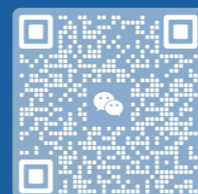


葉國萍 總經理 General Manager
Apple Ye 總工程師 Chief Engineer

應衛青 經營副總 VP of operations
May



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公司概況

COMPANY OVERVIEW



公司實現TQM全面質量管制。直接客戶群主要有：中興、同維（共進）、天邑、LG、三星、海興、福特汽車、TCL、華碩、飛利浦、智芯微、海爾、威克創， IQD，同時還是日本、臺灣等上市晶振製造商的戰略合作夥伴。

The company implements TQM comprehensive quality control.
The main direct customers are mainly includes ZTE,T&W, Tianyi ,LG,Samsung, Hisense ,IQD, and also a strategic partner of listed crystal oscillator manufacturers in Japan, Taiwan, etc.

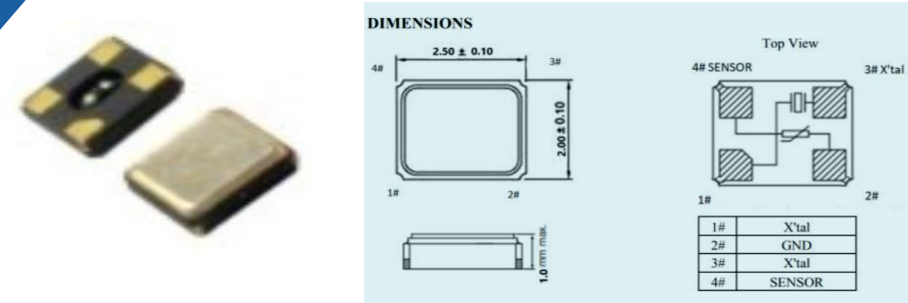
浙江匯隆晶片技術有限公司是專業生產石英諧振器、石英晶體振盪器、石英晶片的企業。公司為全球通信、資訊、網路、汽車電子和家用電器提供優質電子元器件的專業製造商，技術水準國內領先，主導產品SMD石英晶體諧振器的生產規模、產品檔次、設備自動化程度國內同行業領先，綜合排名在國內壓電晶體電子元器件企業名列前茅。

Zhejiang Huilong Crystals Technology Co., Ltd is an enterprise specializing in the production of quartz resonators and quartz crystal oscillators. HLC is a professional manufacturer of high-quality electronic components for global communications, information, networking, automotive electronics and household appliances, which has domestically leading technical level. The leading product SMD quartz crystal resonator production scale, product grade, and equipment automation level ranks It is among the best in the domestic industry, and the comprehensive ranking is among the best in the domestic piezoelectric crystal electronic component companies.

公司建廠於1998年11月。公司占地面积為24990m²，整體建築面積為50431m²，公司總人數為400多人。年產能達18.6億隻。

HLC was established in November 1998. The company covers an area of 24990 m², with an overall construction area of 50431 m² and a total population of over 400 people. The annual production capacity reaches 1.86 billion pieces.

SMD Seam Temperature Sensing Crystal TSX2.0x1.6



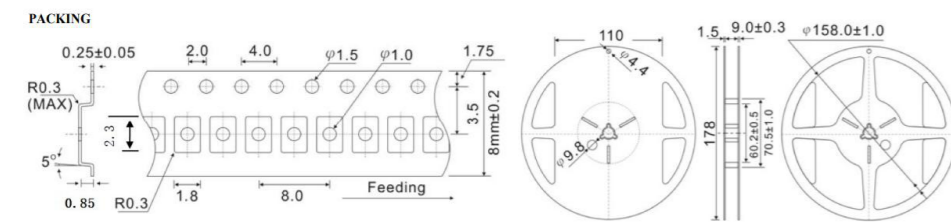
技術指標 / SPECIFICATIONS

Item	Series	2016
Frequency Range(F0)		19.2 ~ 96MHZ
Frequency Tolerance (at 25°C)		±3~±10ppm, or specify
Frequency Stability Over Operating Temperature Range		±10ppm, or specify
Operating Temperature Range		-30~ 85 °C, -40~ 125 °C or specify
Shunt Capacitance (C0)		3 pF Max.
Drive Level (DL)		1 ~ 200μW (100μW typical)
Load Capacitance (CL)		7 pF, 8 pF, 10 pF, or specify
Storage Temperature Range		-55 ~ +125 °C
Thermistor Resistance (25°C)		100 kΩ, or specify
Thermistor B-constant (25~50°C)		4250, or specify
Motional resistance (ESR)	19.2~30MHZ 30~54MHZ	80Ω max 50Ω max
Aging (at 25°C)		± 1 ppm / year; ± 3 ppm / year Max.
除表中所列參數外, 可根據客戶需要設計		

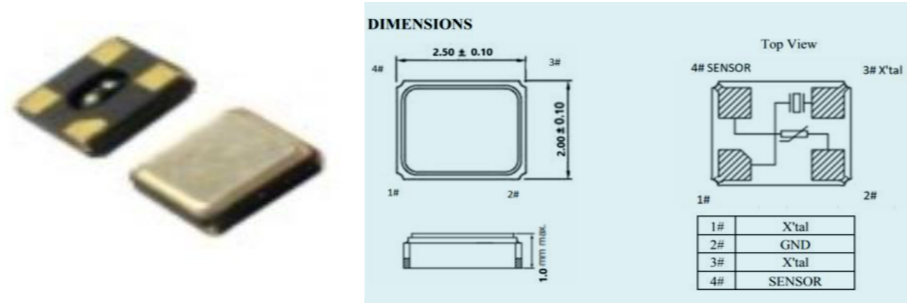
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .

Consult sales representative for other specifications.



SMD Seam Temperature Sensing Crystal TSX2.5x2.0



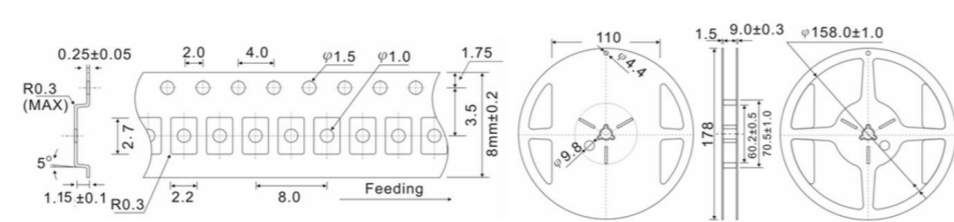
技術指標 / SPECIFICATIONS

Item	Series	2520
Frequency Range(F0)		12 ~ 54MHZ
Frequency Tolerance (at 25°C)		±3~±10ppm, or specify
Frequency Stability Over Operating Temperature Range		±10ppm, or specify
Operating Temperature Range		-30~ 85 °C, -40~ 125 °C or specify
Shunt Capacitance (C0)		3 pF Max.
Drive Level (DL)		1 ~ 200μW (100μW typical)
Load Capacitance (CL)		7 pF, 8 pF, 10 pF, or specify
Storage Temperature Range		-55 ~ +125 °C
Thermistor Resistance (25°C)		100 kΩ, or specify
Thermistor B-constant (25~50°C)		4250, or specify
Motional resistance (ESR)	12~13MHZ 14~30MHZ 30~54MHZ	120Ω max 80Ω max 50Ω max
Aging (at 25°C)		± 1 ppm / year; ± 3 ppm / year Max.
除表中所列參數外, 可根據客戶需要設計		

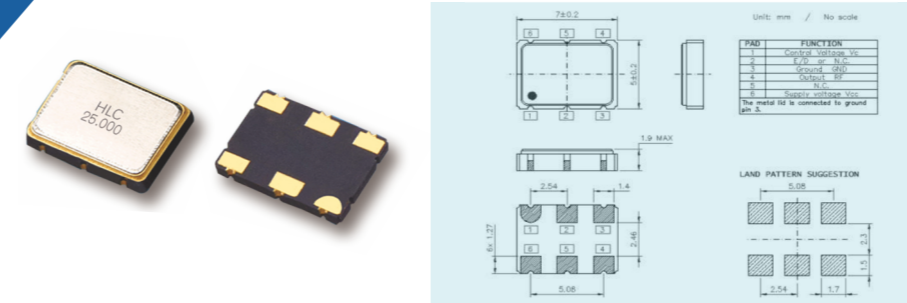
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .

Consult sales representative for other specifications.



SMD VCXO



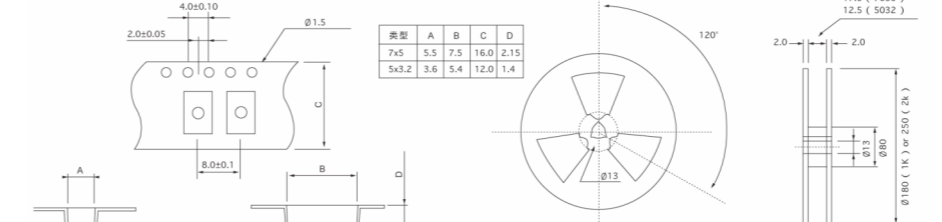
技術指標 / SPECIFICATIONS

電氣特性	Electrical Specifications	7050	5032	
頻率範圍	Frequency range	1MHz~200MHz	1MHz~60MHz	
供給電壓	Supply Voltage	2.5V	3.3V	5.0V
引腳1控制電壓	Pin 1 Control voltage	1.25V±1.05V (1.25V)	1.65V±1.35V (1.265V)	2.5V±2V (2.5V)
頻率偏差	Frequency Deviation	±50ppm min, ±100ppm min, ±150ppm min (option)		
消耗電流	Current consumption	40mA max	50mA max	35mA max
操作溫度範圍	Temperature Range	Operating	-40°C ~ +85°C, user spec	
		Storage	-55°C ~ +125°C	
溫度頻差	Frequency Stability	±50ppm, User spec		
輸出模式、負載	Output Load condition (COMS)	COMS 15pF		
占空比 (對稱性)	Symmetry (duty cycle)	45%~60%; 45%~55%		
上升/下降時間	Output rise and fall time (tr/ tf)	5ns max		
輸出低電壓	Low output voltage (COMS)	10%Vdd		
輸出高電壓	High output voltage (COMS)	90%Vdd		
起振時間	Oscillation start up time	5ms max		
老化率	Aging @25°C 1st year(Max)	±3ppm/year		
相位抖動	Phase Jitter (12KHZ~20MHZ)	100ps max		
周期抖動	period Jitter(PK-PK)	25ps max		
除表中所列參數外, 可根據客戶需要設計				

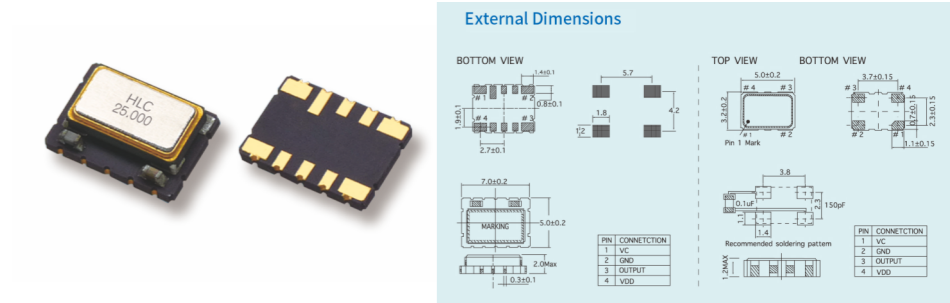
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編帶尺寸圖 / Taping Dimensions .

Consult sales representative for other specifications.



SERIES SMD TCXO



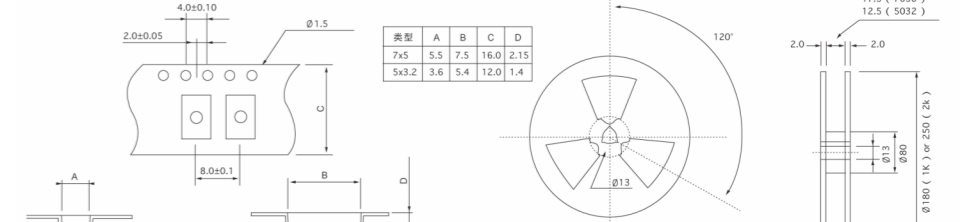
技術指標 / SPECIFICATIONS

電氣特性	Electrical Specifications	7050	5032	
頻率範圍	Frequency range	10MHz~236MHz		
操作溫度範圍	Operating Temperature Range	-40°C ~ +85°C		
溫度頻差	Frequency Stability	±0.5ppm	-10°C ~ +60°C	
		±1.0ppm	-40°C ~ +85°C	
電源電壓	Supply Voltage	3.3Vdc±5%, 5.0Vdc±5%		
		1.5mA	10M~15M	
電源電流	Supply Current	2.0mA	15M~40M	
		Frequency Stability	Supply Voltage Variation	±0.2PPM
頻率穩定性	Aging	Output Load Variation	±0.2PPM	Per Standard Load ±10%
		±0.1ppm/year		
輸出電平	Output Level(Clipped Sine)	0.8 Min		
負載	Load	10KΩ//10PF		
		Vc input impedance	1.0	
輸入阻抗	Vc	100Hz	-115 Dbc/Hz	
		1KHz	-135 Dbc/Hz	
		input@13.0MHz	10KHz	-148 Dbc/Hz
起振時間	start time	2 mSec Max		
儲存溫度	Storage Time.Range	-55°C ~ +125°C		
除表中所列參數外, 可根據客戶需要設計				
In addition to the parameters listed in the table, it can be designed according to customer needs				
Remark:				
All specifications subject to change without notice.				
20MHz~40MHz only for VDD=2.8V~3.3V				

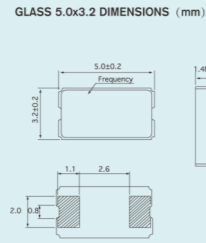
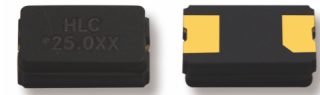
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .

Consult sales representative for other specifications.



QUARTZ CRYSTAL UNIT GLASS5.0x3.2



技術指標 / SPECIFICATIONS

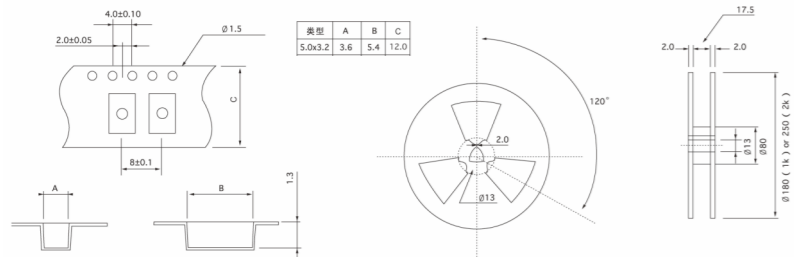
電氣特性	TYPE	GLASS 5.0X3.2
頻率範圍	Frequency range	8MHz~60MHz
切型、振動模式	Crystal cut and Mode	AT/FUND
調整頻差	Frequency Tolerance (at25C)	±5ppm ~ ±30ppm, or specify
溫度頻差	Frequency Temperature Characteristics	* ±10ppm (-20°C - 70°C); ±30ppm (-40°C - 85°C)*
工作溫度範圍	Operating Temperature Range	-40°C ~ +125°C
儲存溫度	Storage Time.Range	-55°C ~ +125°C
諧振電阻	Equivalent Series Resistance (ESR)	See Table
負載電容	Load Capacitance (CL)	6pf ~ ∞
靜態電容	Shunt Capacitance (Co)	<5pf
絕緣電阻	Insulation Resistance	> 500MΩ At DC 200V
激勵功率	Drive Level	10μw ~ 300μw
老化率	Aging (Year)	±3ppm (Year)

FREQUENCIES VS EQUIVALENT SERIES RESISTANCE

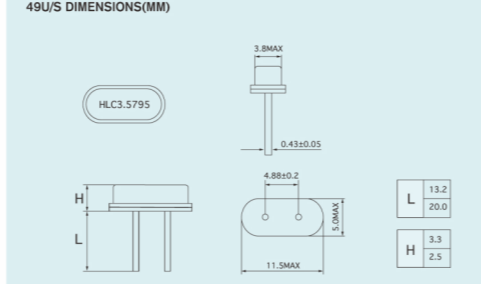
Frequency (MHz)	Mode	ESR (Ω)GLASS 5.0X3.2
6.000 < f < 20.000	AT/FUND	≤ 200
20.000 ≤ f < 40.000	AT/FUND	≤ 150
40.000 ≤ f < 80.000	3rd Overtone	≤ 60

除表中所列參數外，可根據客戶需要設計
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .



QUARTZ CRYSTAL UNIT HC-49U/S



技術指標 / SPECIFICATIONS

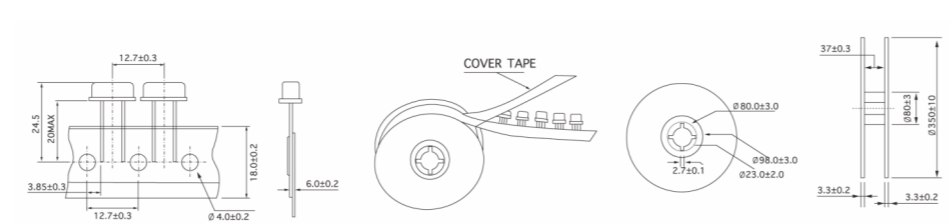
電氣特性	TYPE	HC-49U/S
頻率範圍	Frequency range	3.5MHz~125MHz
切型	Crystal cut	AT;BT
調整頻差	Frequency Tolerance (at25C)	±5ppm ~ ±30ppm
溫度頻差	Frequency Temperature Characteristics	*AT: ±2.5ppm (0°C - 50°C); ±5ppm (-10°C - 60°C) ±10ppm (-20°C - 70°C); ±30ppm (-40°C - 85°C)* BT: ±100ppm (-20°C - 70°C);
儲存溫度	Storage Time.Range	-40°C ~ +85°C
諧振電阻	Equivalent Series Resistance (ESR)	See Table
負載電容	Load Capacitance (CL)	4pf ~ ∞
靜態電容	Shunt Capacitance (Co)	<5pf
絕緣電阻	Insulation Resistance	> 500MΩ At DC 100V
激勵功率	Drive Level	1μw ~ 100μw
老化率	Aging (Year)	±3ppm (Year)

FREQUENCIES VS EQUIVALENT SERIES RESISTANCE

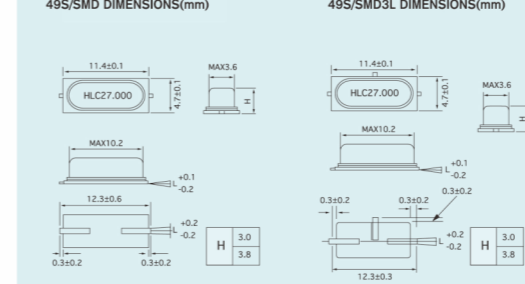
Frequency (MHz)	Mode	ESR (Ω)
3.500 ≤ f < 4.000	AT/FUND	150~100
4.000 ≤ f < 6.000	AT/FUND	100~60
6.000 ≤ f < 10.000	AT/FUND	60~50
10.000 ≤ f < 15.000	AT/FUND	50~30
15.000 ≤ f < 35.000	AT/FUND	≤ 25
21.000 ≤ f < 40.000	BT/FUND	≤ 40
25.000 ≤ f < 100.000	3rd Overtone	80~60

除表中所列參數外，可根據客戶需要設計
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .



QUARTZ CRYSTAL UNIT HC-49S/SMD



技術指標 / SPECIFICATIONS

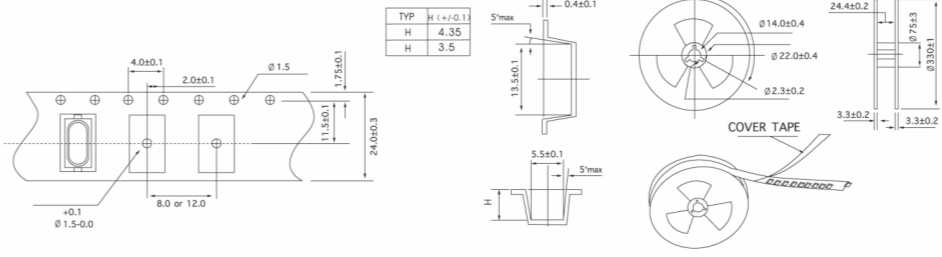
電氣特性	TYPE	HC-49S/SMD
頻率範圍	Frequency range	3.5MHz~125MHz
切型	Crystal cut	AT;BT
調整頻差	Frequency Tolerance (at25C)	±5ppm ~ ±30ppm
溫度頻差	Frequency Temperature Characteristics	*AT: ±2.5ppm (0°C - 50°C); ±5ppm (-10°C - 60°C) ±10ppm (-20°C - 70°C); ±30ppm (-40°C - 85°C)* BT: ±100ppm (-20°C - 70°C);
儲存溫度	Storage Time.Range	-40°C ~ +85°C
諧振電阻	Equivalent Series Resistance (ESR)	See Table
負載電容	Load Capacitance (CL)	4pf ~ ∞
靜態電容	Shunt Capacitance (Co)	<5pf
絕緣電阻	Insulation Resistance	> 500MΩ At DC 100V
激勵功率	Drive Level	1μw ~ 100μw
老化率	Aging (Year)	±3ppm (Year)

FREQUENCIES VS EQUIVALENT SERIES RESISTANCE

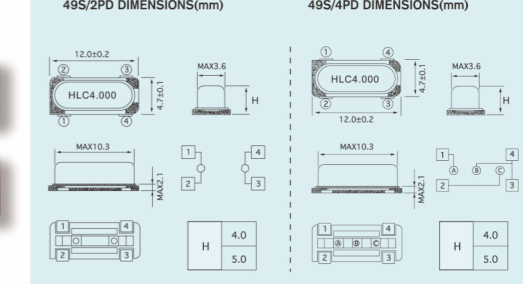
Frequency (MHz)	Mode	ESR (Ω)
3.500 ≤ f < 4.000	AT/FUND	150~100
4.000 ≤ f < 6.000	AT/FUND	100~60
6.000 ≤ f < 10.000	AT/FUND	60~50
10.000 ≤ f < 15.000	AT/FUND	50~30
15.000 ≤ f < 35.000	AT/FUND	≤ 25
21.000 ≤ f < 40.000	BT/FUND	≤ 40
25.000 ≤ f < 100.000	3rd Overtone	80~60

除表中所列參數外，可根據客戶需要設計
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .



QUARTZ CRYSTAL UNIT HC-49S/2PD, HC-49S/4PD



技術指標 / SPECIFICATIONS

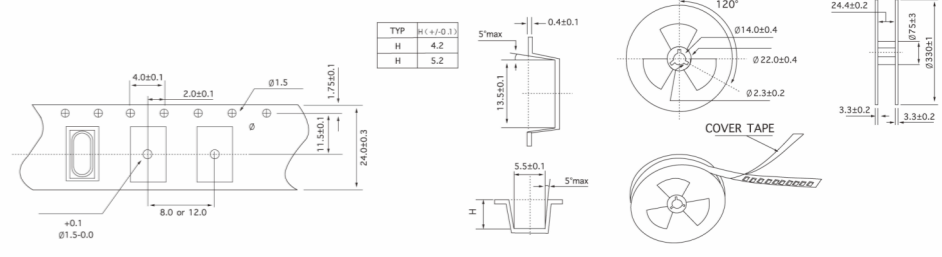
電氣特性	TYPE	HC-49S/2PD, HC-49S/4PD
頻率範圍	Frequency range	3.5MHz~125MHz
切型	Crystal cut	AT;BT
調整頻差	Frequency Tolerance (at25C)	±5ppm ~ ±30ppm
溫度頻差	Frequency Temperature Characteristics	*AT: ±2.5ppm (0°C - 50°C); ±5ppm (-10°C - 60°C) ±10ppm (-20°C - 70°C); ±30ppm (-40°C - 85°C)* BT: ±100ppm (-20°C - 70°C);
儲存溫度	Storage Time.Range	-40°C ~ +85°C
諧振電阻	Equivalent Series Resistance (ESR)	See Table
負載電容	Load Capacitance (CL)	4pf ~ ∞
靜態電容	Shunt Capacitance (Co)	<5pf
絕緣電阻	Insulation Resistance	> 500MΩ At DC 100V
激勵功率	Drive Level	1μw ~ 100μw
老化率	Aging (Year)	±3ppm (Year)

FREQUENCIES VS EQUIVALENT SERIES RESISTANCE

Frequency (MHz)	Mode	ESR (Ω)
3.500 ≤ f < 4.000	AT/FUND	150~100
4.000 ≤ f < 6.000	AT/FUND	100~60
6.000 ≤ f < 10.000	AT/FUND	60~50
10.000 ≤ f < 15.000	AT/FUND	50~30
15.000 ≤ f < 35.000	AT/FUND	≤ 25
21.000 ≤ f < 40.000	BT/FUND	≤ 40
25.000 ≤ f < 100.000	3rd Overtone	80~60

除表中所列參數外，可根據客戶需要設計
In addition to the parameters listed in the table, it can be designed according to customer needs

編帶尺寸圖 / Taping Dimensions .



QUARTZ CRYSTAL BLANKS 49S. SMD

SMD 晶體頻率片

技術指標/SPECIFICATIONS-SMD CUT STRIP BLANKS

類型	TYPE								
Zz'角度	ZZ 'angle	35°±0.5°, ±15°, ±30°, ±1'							
型號	Model	SMD1612	SMD2016	SMD2520	SMD3225	SMD5032	SMD6035	SMD7050	
外形尺寸 (mm)	Overall dimensions (mm)	0.900-11.99	1.200-1.499	1.500-1.899	1.900-2.299	3.900-4.599	2.900-3.899	4.600-5.100	
頻率 (MHz)	Frequency (MHz)	24-80	16-80	12-80	8-80	6-80	7.372-80	6-80	
工作溫度	Working Temperature	-40°C ~ 125°C							
溫頻範圍	Temperature frequency range	±5ppm ~ ±50ppm							
石英材料	Quartz material	Q≥2.8x106, 純工晶棒, 腐蝕隧道<50條/cm2							

AT或BT 49U/S 晶體頻率片

技術指標/SPECIFICATIONS-AT CUT OR BT 4PU/S CUT ROUND BLANKS

類型	TYPE		AT CUT		BT CUT
Zz'角度	ZZ 'angle	35°±0.5°, ±30°, ±1', ±2'			
外形尺寸 (mm)	Overall dimensions (mm)	8X2	6.5X2	8X2	
頻率 (MHz)	Frequency (MHz)	3.5MHz ~ 80MHz	12MHz ~ 40MHz	20MHz ~ 450MHz	
石英材料	Quartz material	Q≥2.2x106, 純工晶棒, 腐蝕隧道<200條/cm2			

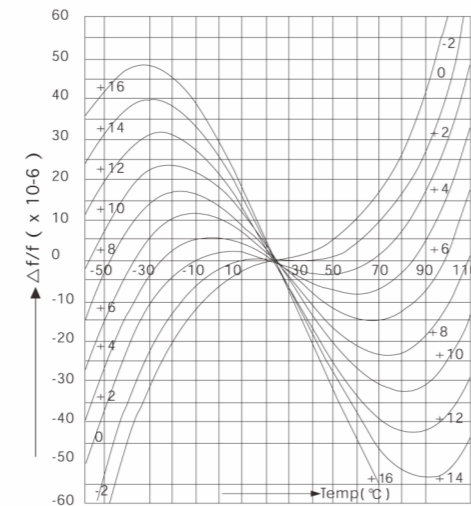
AT或BT切是白片及小方片

技術指標/SPECIFICATIONS-AT CUT OR BT CUT ROUND BLANKS

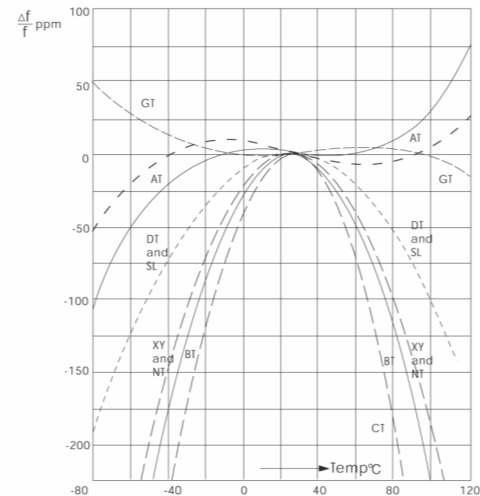
類型	TYPE		AT CUT		BT CUT
Zz'角度	ZZ 'angle	35°±0.5°, ±30°, ±1', ±2'		-49°30'±3'5'	
外形尺寸 (mm)	Overall dimensions (mm)	29.5x25.5、24.5x9、11x9、11x5.4		31x9、24.5x9	
厚度 (mm)	Thickness (mm)	0.13、0.15、0.17、0.20、0.25、0.30等規格		0.13、0.15等	

GLOSSARY OF TERMS

頻率溫度特性/AT-Cut Angles



常用切型的頻率溫度特性曲線 Temperature characteristics



AT-Cut Temperature efficient

f_s = Motional (Series) Resonance Frequency

$$f_s = \frac{1}{2\pi \sqrt{L_1 C_1}}$$

Equation 1

R_1 = Series Resistance

$$R_1 = \frac{2\pi f_s L_1}{Q}$$

Equation 2

f_L = Parallel load Resonant Frequency

$$f_L = f_s \sqrt{1 + \frac{C_1}{C_0 + C_1}}$$

Equation 3

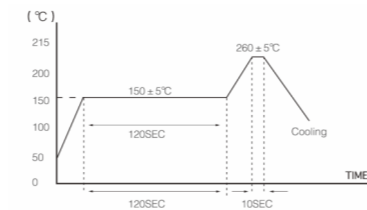
R_L = Load "EFFECTIVE" Resistance also name as crystal

Impedance (C_1)

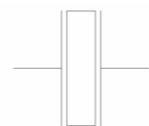
$$R_L = R_1 \left(1 + \frac{C_0}{C_1} \right)$$

Equation 4

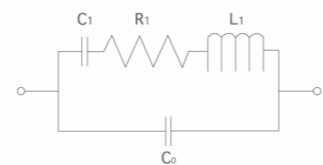
回流焊曲線圖 REFLOW CURVE CHART



等效電路 AT-Cut & BT-Cut Angles



Schematic Symbol



Equivalent Circuit