SPECIFICATION FOR APPROVAL

CUSTOMER	
PRODUCT TYPE	HC-49/S SMD
NOMINAL FREQ.	12.0288000 MHz
STAR P/N	9C12288005
CUSTOMER P/N	
ISSUE DATE	12/03/2012

CUSTOMER'S APPROVAL
(Please return one copy with approval)

APPROVED	QA
	

STAR **STAR CORPORATION**

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Star PN: 9C12288005		VER A
FMT NO:		PAGE 1/6
PREPARED	APPROVED	QA
SHU-CHEN KO	SIMON	TON KSIEH

SMD QUARTZ CRYSTAL UNIT

(9C SERIES) HC-49/S SMD PACKAGE

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- DIMENSIONS 3
- SUGGESTED REFLOW PROFILE 3
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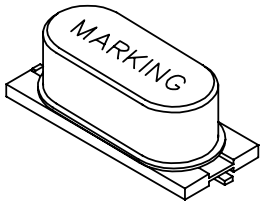
ATTACHMENT(S) (optional)

TESTING DATA

- ELECTRICAL CHARACTERISTICS TEST A ☐ YES ☑ NO
- TEMPERATURE CHARACTERISTICS TEST B ☐ YES ☑ NO

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*The detail marking spec.
please refer to marking code page

ELECTRICAL SPECIFICATIONS

1.	Nominal Frequency	12.288000 MHz
2.	Oscillation Mode	Fundamental
3.	Load Capacitance	15.0 pF
4.	Frequency Tolerance (25 ^{o}C)	+/- 30 ppm
5.	Effective Series Resistance	40 Ohms Max.
6.	Shunt Capacitance (C0)	6.0 pF Max.
7.	Motional Capacitance (C1)	N/A
8.	Drive Level	500 uW
9.	Operation Temperature Range	20 ^{o}C ~ +70 ^{o}C
10.	Stability Over Temperature Range	+/- 30 ppm (related to 25 ^{o}C)
11.	Insulation Resistance	500 MOhms Min. at DC 100V
12.	Attenuation of Spurious Frequency Amplitude	N/A
13.	Ratio of Holder to Motional (C0/1)	N/A
14.	Storage Temperature	-40 ^{o}C ~ +85 ^{o}C
15.	Aging	+/- 5.0 ppm/year

* Measured by SAUNDERS 250A/250B CRYSTAL IMPEDANCE METER.

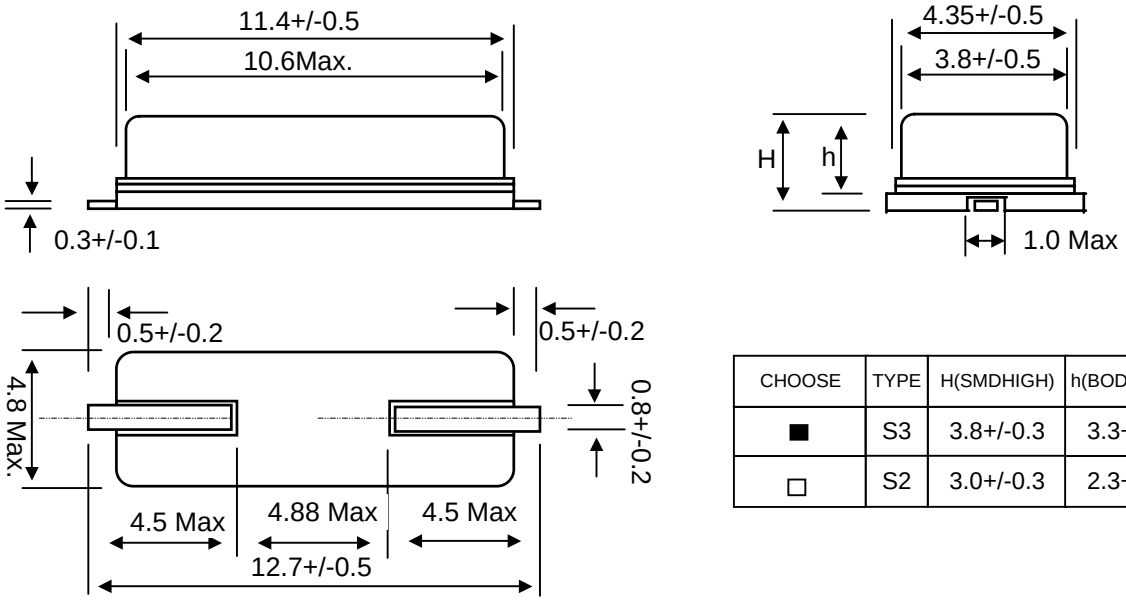
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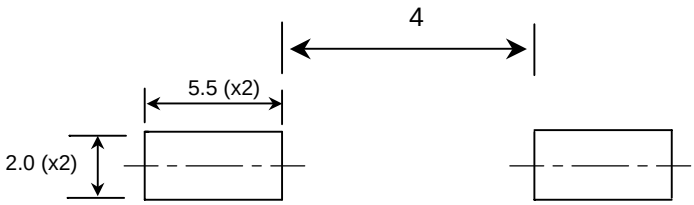
DIMENSIONS

UNIT:mm



CHOOSE	TYPE	H(SMDHIGH)	h(BODY HIGH)
■	S3	3.8+/-0.3	3.3+/-0.3
□	S2	3.0+/-0.3	2.3+/-0.3

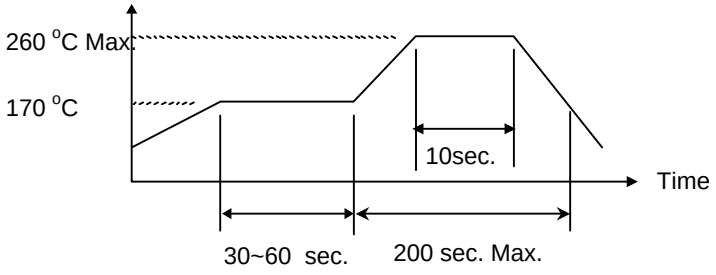
Suggested Layout



SUGGESTED REFLOW PROFILE

Total time : 200 sec. Max.

Solder melting point :220 °C



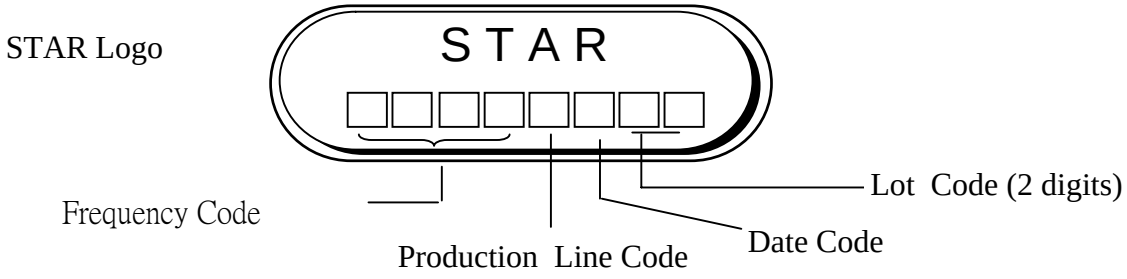
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MARKING

MARKING For Pb Free Parts：

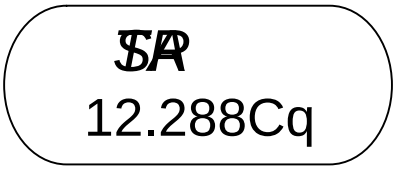


Date Code:

YEAR \ MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2001 2005 2009 2013 2017	A	B	C	D	E	F	G	H	J	K	L	M
2002 2006 2010 2014 2018	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003 2007 2011 2015 2019	a	b	c	d	e	f	g	h	j	k	l	m
2004 2008 2012 2016 2020	n	p	q	r	s	t	u	v	w	x	y	z

*This date code will be cycled every four years.

For example : Marking



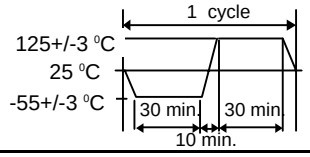
Introduction： 49S 7.3728 MHz
Fundamental
Made in 2012/03 01Lot

SMD QUARTZ CRYSTAL UNIT

(9C SERIES) HC-49/S SMD PACKAGE

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RELIABILITY SPECIFICATIONS

No.	TEST ITEM	TEST METHODS	TEST CRITERIA	REF. DOC
1	Drop Test	50 cm Height, Fall freely onto firm wood for 3 Times.	dF/F<+/-5ppm dRs<+/-10%	JIS C6701
2	Fine Leak	Helium Bombing 5Kgf / cm^2 for 2 Hours .	Leak Rate Less Than $2x10^{-8}$ atm.cc/sec	MIL-STD-883E Method 1014.10
3	Gross Leak	125°C FC#40 ,120 Seconds.	No Continuous Bubble .	MIL-STD-883E Method 1014.10
4	Mechanical Shock	Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times.	dF/F<+/-5ppm dRs<+/-10%	MIL-STD-883E Method 2002.4
5	Vibration	Frequency range 10 ~ 55 Hz Amplitude 10G Sweep Time 1 minute Test Time X,Y,Z Plan,each 2 hrs.	dF/F<+/-5ppm dRs<+/-10%	MIL-STD-883E Method 2007.3
6	Solderability	Temperature 260 °C +/- 5 °C Material H63A (Silver 2~3 %) Immersing depth 0.5 mm minimum Immersion time 5 +/- 0.5 seconds Flux Rosin resin methyl alcohol solvent (1 : 4)	Check by Microscope At Least 95% Coated	MIL-STD-883E Method 2003.7
7	Resistance To Soldering Heat	Test Temperature 260 +/- 5 °C Test Time 10 +/- 1 sec.	dF/F<+/-5ppm dRs<+/-10%	MIL-STD-202F Method 210D
8	Terminal Strength	2.5mm From terminal , bend 90°,3 times.	Lead without crack or broken.	MIL-STD-202F Method 208F
9	Thermal Shock	Total 5 cycles of the following temperature cycle 	dF/F<+/-5ppm dRs<+/-10%	MIL-STD-883E Method 1011.8

Measure in room temperature after each tests.

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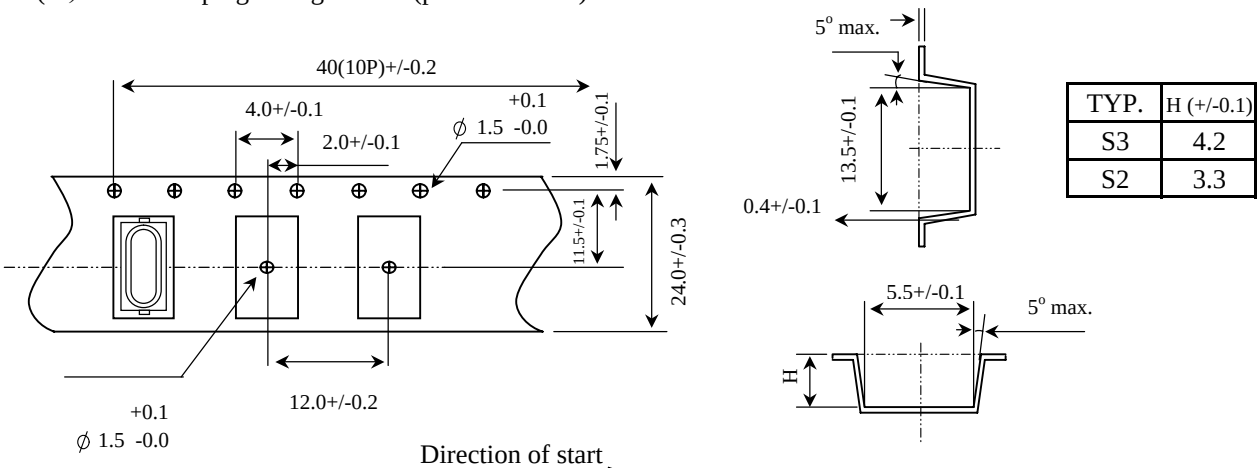
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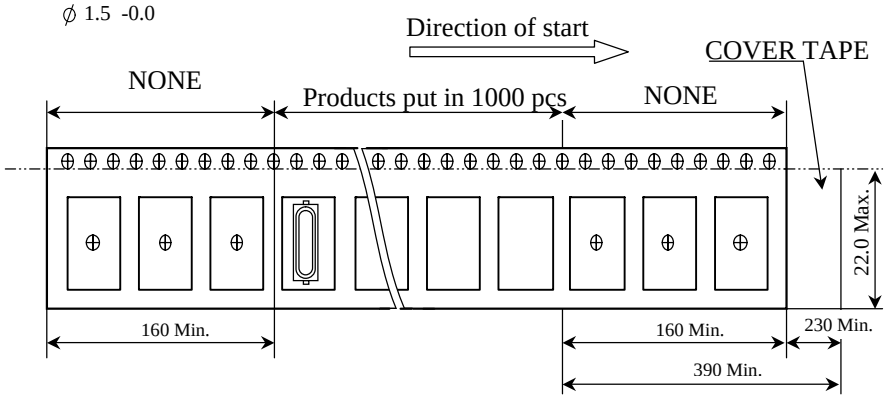
(9C SERIES) HC-49/S SMD PACKAGE

(A) Tape and reel configuration:(Unit：mm)

(a) Emboss taping configuration. (per EIA-481-2)



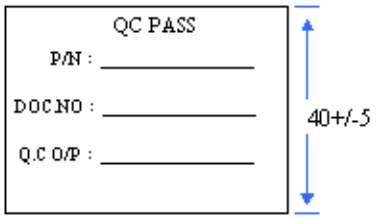
TYP.	H (+/-0.1)
S3	4.2
S2	3.3

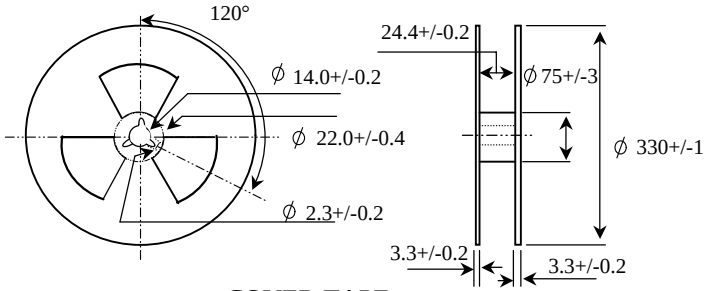


(b) Reel configuration.

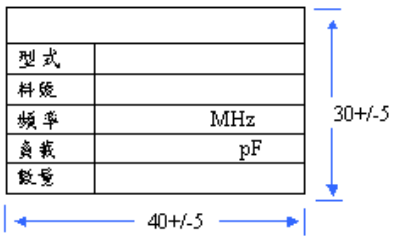
(B) Packing & Label :(Unit：mm)

Label a

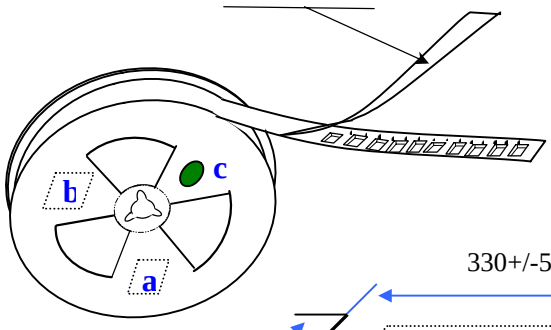




Label b

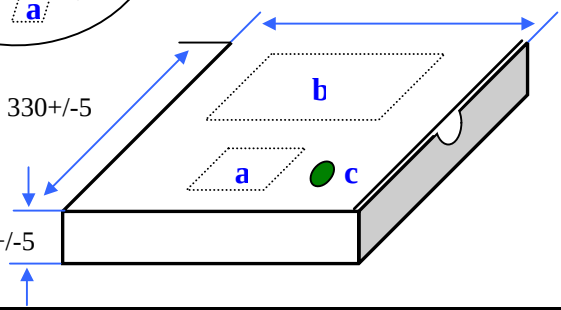


COVER TAPE

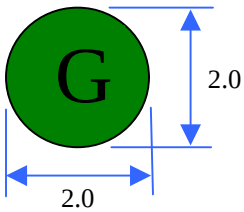


PUT IN

330+/-5



Label c



* "G" ： Pb-Free Product