



PRODUCT SPECIFICATION SHEET



Customer	-		
Customer P/N	TBA		
Product Type	Temperature Sensing Crystal		
Part Number	9K55200002	Version	S1
Part Description	SMD TSX 2.0 x 1.6 (TH + Xtal)		
Nominal Frequency	55.200000 MHz		

Prepared	Li Xiang
Reviewed	Kuro Peng
Approved	Liu Feng
Date	2024-12-4

Customer's Approval & Date :

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MSL1 Moisture Sensitivity Level	Pb Lead-Free	RoHS Compliant
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AEC-Q200 Qualified

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* Attention

If you intend to use products on the controlling equipment that relate to medical, aeronautical, aerospace, military science, space and etc, please make sure to let us know your intentions in advance.

Ultrasonic related process may cause damage to crystal blank by resonance itself. If ultrasonic related process is used, we strongly recommend to assess the damage risk under related ultrasonic conditions before use in production.

1. History of Specification Revision

Ver.	Content	Date	Reviser	Remark
S0	Initial released	2024-5-31	Li Xiang	
S1	Update NTC thermistor specification table	2024-12-4	Chen Xuanru	

2. Electrical Specifications

2.1 Specifications for operation condition and electrical characteristics

#	Parameter	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency	55.200000			MHz	-
2	Crystal cut type	AT-cut			-	-
3	Mode of vibration	Fundamental			-	-
4	ESD	HBM \geq 2000V				JESD22-A114-B
5	MSL	Level 1				IPC/JEDEC J-STD-033C
6	Load capacitance (C_L)	-	8.0	-	pF	Note 1.
7	Drive level	-	10	200	μ W	-
8	Operating temperature range	-40	-	+115	$^{\circ}$ C	-
9	Storage temperature range	-55	-	+125	$^{\circ}$ C	-
10	Initial frequency tolerance	-10	-	+10	ppm	At 25 \pm 3 $^{\circ}$ C, drive level 10 μ W
11	Frequency drift after reflow	-2.0	-	+2.0	ppm	After two times of reflow
12	Frequency versus temperature characteristics	-29	-	+29	ppm	At -20 $^{\circ}$ C to +65 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-32.4	-	+32.4	ppm	At -40 $^{\circ}$ C to +105 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-32.4	-	+32.4	ppm	At -40 $^{\circ}$ C to +115 $^{\circ}$ C (be +25 $^{\circ}$ C).
		+7.9	+14.2	+20.5	ppm	At -40 $^{\circ}$ C, (be +25 $^{\circ}$ C).
		+16.0	+20.5	+25.0	ppm	At -20 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-29.0	-24.7	-20.3	ppm	At +65 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-32.2	-25.6	-18.9	ppm	At +85 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-19.7	-10.7	-1.7	ppm	At +105 $^{\circ}$ C (be +25 $^{\circ}$ C).
15	Frequency aging	-5.7	+4.5	+14.6	ppm	At+115 $^{\circ}$ C (be +25 $^{\circ}$ C).
		-1	-	+1	ppm	First year
		-6		+2		10 years
-10		+2	15 years			
16	Equivalent series resistance (ESR)	-	-	50	Ω	Note 2.
17	Insulation resistance	500	-	-	M Ω	-
18	Frequency Perturbation due toActivity Dip	-1	-	+1	ppm	Difference from fifth-ordercurve fit Drive level at 50uW

Note 1 The load capacitance is measured according to IEC Standard #60444-8.

Note 2 The ESR max is specified at max drive level minimum Q, drives a smaller ESR; that is, design the crystal to the minimum Q.

2. Electrical Specifications (Cont.)

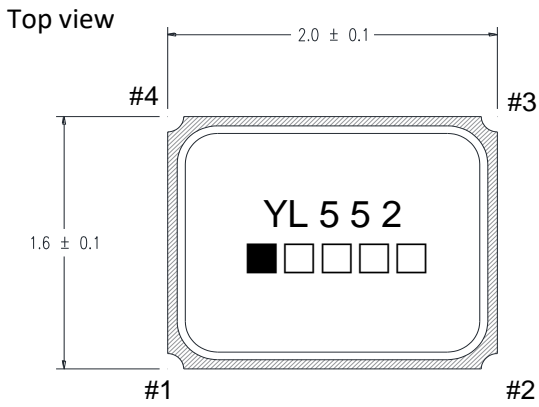
2.2 NTC thermistor specification table

#	Parameter	Min.	Typ.	Max.	Unit	Remark
1	Operating temperature range	-40	-	+115	°C	-
2	Storage temperature range	-50	-	+125	°C	-
3	Resistance	-	10	-	kΩ	At 25°C
4	B-constant	-	3435	-	K	At +25°C to +85°C
5	Tolerance	-	-	1	%	-

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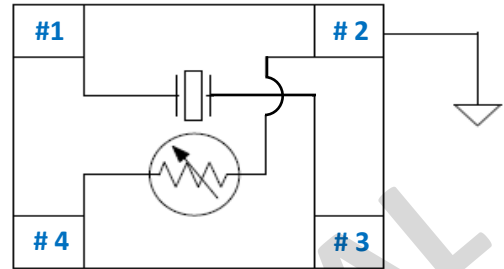
3. Product Design

3.1 Package dimensions and pad functions (Unit : mm)

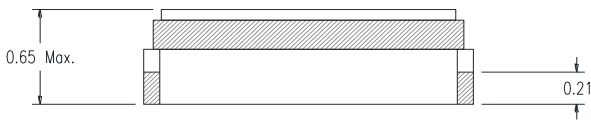


3.2 Pad connection diagram and function

Bottom view

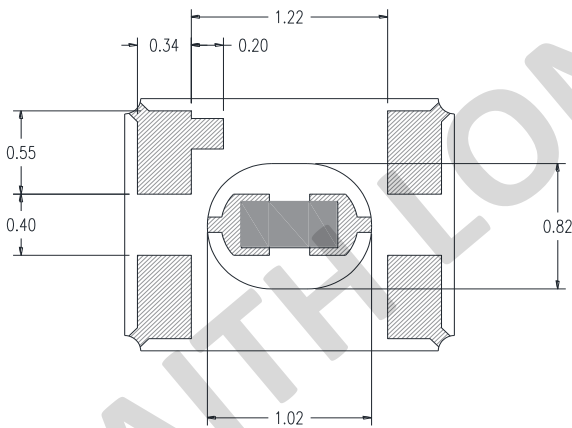


Lateral view

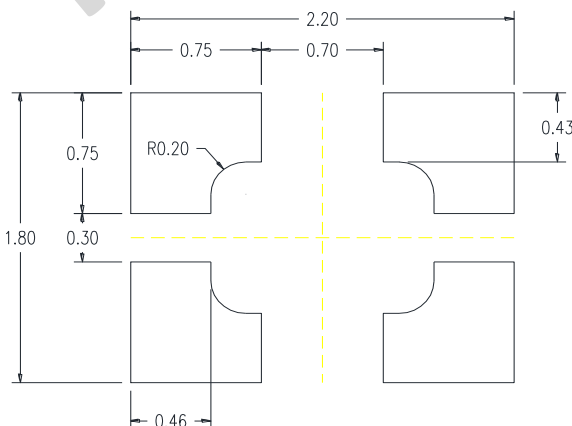


Pad	Function
1	Xtal in
2	Thermistor out, connecting to ground
3	Xtal out
4	Thermistor in

Bottom view



3.3 Recommended land pattern (Unit : mm)



3. Product Design (Cont.)

3.4 Marking definition

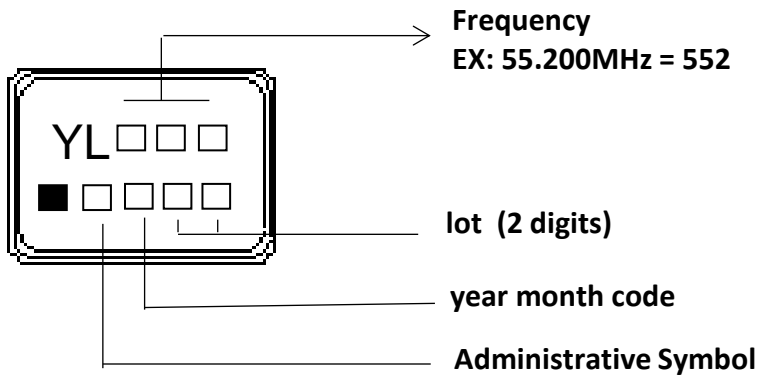
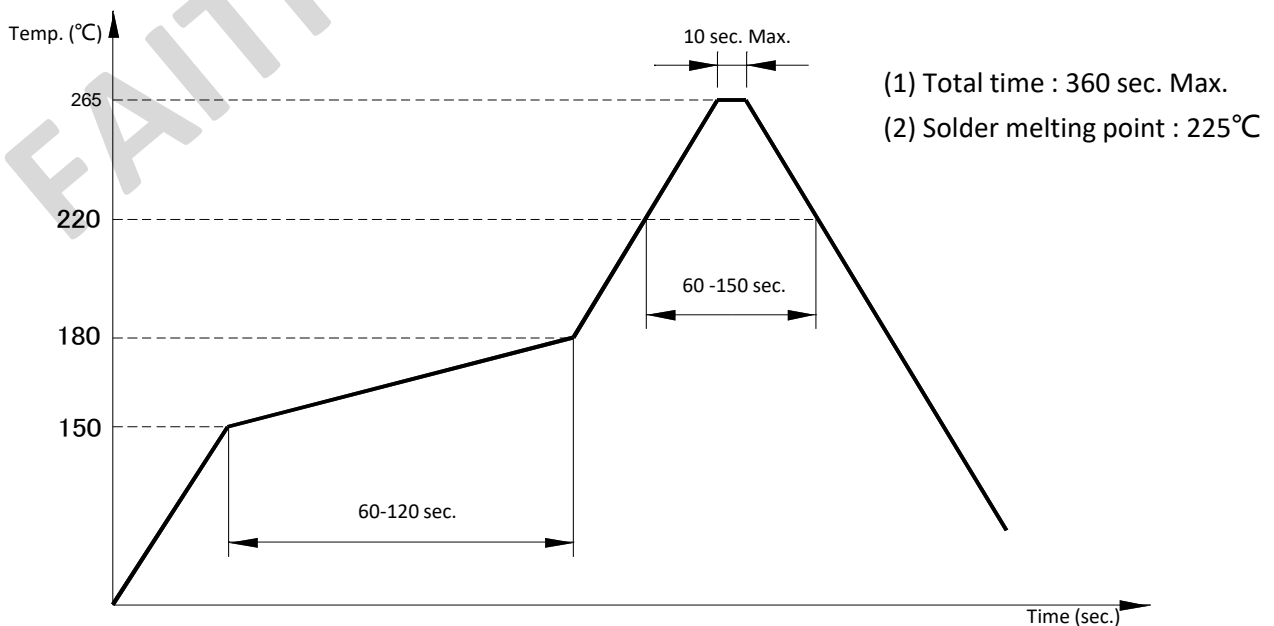


Table of Year and Month code

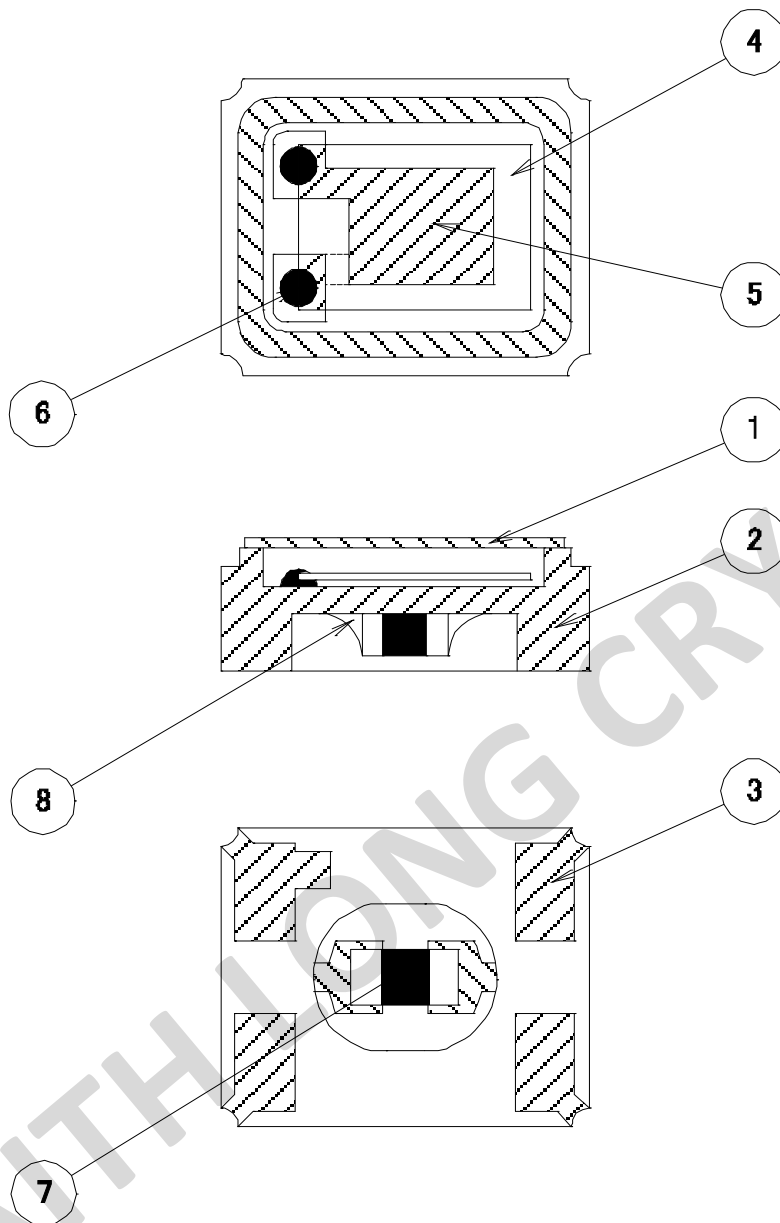
		Month											
Year		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2017	2021	A	B	C	D	E	F	G	H	J	K	L	M
2018	2022	N	P	Q	R	S	T	U	V	W	X	Y	Z
2019	2023	a	b	c	d	e	f	g	h	j	k	l	m
2020	2024	n	p	q	r	s	t	u	v	w	x	y	z

3.5 Recommended reflow profile



3. Product Design (Cont.)

3.6 Structure illustration



#	Components	Materials	QTY	Finish/Specifications
1	Cap (Lid)	Kovar (Fe + Co + Ni)	1	Ni plating
2	Base (Package)	Ceramic (Al ₂ O ₃) + Kovar (Fe + Co + Ni)	1	Alumina ceramics
3	Pad (Package)	Ni + Au	4	Tungsten metalization + Ni plating + Au plating
4	Crystal blank	SiO ₂	1	-
5	Electrode	Cr + Nobel material	2	
6	Conductive adhesive	Ag	2	Silicone resin
7	Thermistor	Alumina Ceramics (Al ₂ O ₃), Ni + Ag+ Sn	1	-
8	Solder	Sn + Ag + Cu	2	-

4. Reliability

4.1 Test items and conditions

#	Item	Test Condition	Reference
1	High temperature Exposure (storage)	1000 hours, unpowered. Tested at maximum specified operating temperature or maximum specified storage temperature (whichever is higher).	AEC-Q200 Test 3 MIL-STD-202 Method 108
2	Temperature cycling	1000 cycles, unpowered. Lower temperature of the chamber: -55°C. Upper temperature of the chamber: maximum specified operating temperature and shall not exceed 85°C. Dwell time (soak time): 30 minutes. Transition time: 1 minute maximum.	AEC-Q200 Test 4 JESD22-A104
3	Biased humidity	1000 hours. 85°C/85%RH with V_{DD} applied.	AEC-Q200 Test 7 MIL-STD-202 Method 103
4	High temperature operating life	1000 hours, with V_{DD} applied. Temperature of the chamber: maximum specified operating temperature.	AEC-Q200 Test 8 MIL-STD-202 Method 108
5	External visual	Inspect device construction, marking and workmanship.	AEC-Q200 Test 9 MIL-STD-883 Method 2009
6	Physical dimension	Verify the physical dimensions.	AEC-Q200 Test 10 JESD22-B100
7	Mechanical shock	Condition C, 100g's, 6 sec., half-sine, three shocks in each direction along the three mutually perpendicular axes.	AEC-Q200 Test 13 MIL-STD-202 Method 213
8	Vibration	Test from 10 Hz to 2000 Hz. 5g's for 20 minutes. 12 cycles each of 3 orientations.	AEC-Q200 Test 14 MIL-STD-202 Method 204
9	Resistance to soldering heat	Condition K, time above 217 °C ± 5 °C, 60 sec. to 150 sec., reflow 3 cycles.	AEC-Q200 Test 15 MIL-STD-202 Method 210

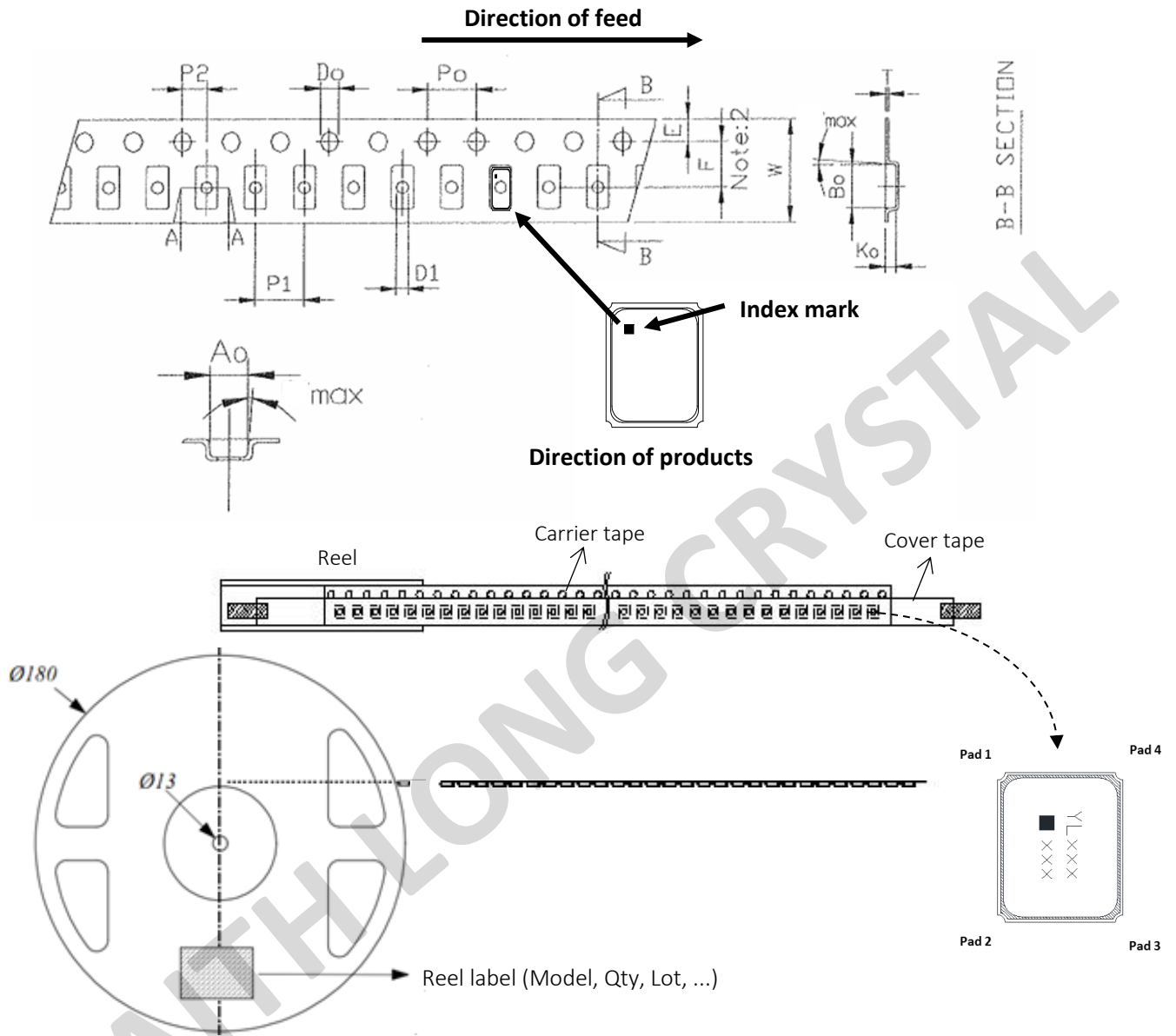
4. Reliability (Cont.)

4.1 Test items and conditions (Cont.)

#	Item	Test Condition	Reference
10	Solderability	Method B1, Coating Durability Category 2. Method D, Coating Durability Category 2.	AEC-Q200 Test 18 J-STD-002
11	Electrical characterization	Summary to show minimum, maximum, mean and standard deviation at room, minimum and maximum operating temperatures.	AEC-Q200 Test 19 Product specification sheet
12	Board flex (SMD)	Board bending displacement: 2.5 mm, holding time: 60 sec.	AEC-Q200 Test 21 AEC-Q200-005
13	Terminal strength (SMD)	Force: 1.8 kg, holding time: 60 sec.	AEC-Q200-006

5. Taping and Packing

5.1 Tape and reel (EIA-481-2)



Package Type	Dimension (Unit : mm)						
2016 TSX(8mm)	A ₀	B ₀	K ₀	T	W	E	F
	1.9±0.1	2.3±0.1	1.25±0.10	0.25±0.05	8.00±0.3	1.75±0.1	3.50±0.1
	P1	P2	D1	D ₀	P ₀		
	4.00±0.1	2.00±0.1	1.00±0.05	1.55±0.05	4.00±0.1		

Standard Reel Quantity is 3000 pcs per reel.

The inspection standard of tape tension

Item		Defect	Method
Appearance	All	1. The tape is not coincidence 2. The bubble	Visual inspection
Tape tension	2016 8mm	Overstep 34±6g (28 to 40g)	Pull test



5. Taping and Packing (Cont.)

5.2 Packing standard

Out-going packing instruction

Reel packing	Inner packing	Carton
Name : Reel Standard : Diameter 18cm Material : Plastics Name : Anti-static shielding bag Standard : 205×250mm Material : APET/ CPP	Name : Bubble wrap Standard : 430×330×(t)20mm Material : HDPE Quantity : Max.15 reels	Name : Carton Standard : 400×400×(H)280mm Material : AB corrugated paper Quantity : 4 bags
		

The label information

Label	Label Drawing	Name of Article	Spec.	Label size	Printing
L1		条码标签 Bar Code Label (Chintz Paper)	1. Part No. 2. Lot No. 3. Q'ty 4. Freq.	70×50mm	White
L2		条码标签 Bar Code Label (Chintz Paper)	1. Part No. 2. Date Code 3. Q'ty 4. Freq.	70×50mm	White

Remark: Specifications on the label is for default templates purpose and may change with different product.
 If any specified requirements for labels packaging is needed, please provide the instruction information.

6. Specification of the Environment-related Substances

#	Range	Max. concentration (ppm; mg/kg)	
	Banned Substances	Product	Packing
1	镉及镉化合物 Cadmium and cadmium compounds	100	100
2	铅及铅化合物 Lead and lead compounds	1000	100
3	汞及汞化合物 Mercury and mercury compounds	1000	100
4	六价铬化合物 Hexavalent-Chromium VI (Cr ⁺⁶)	1000	100
5	聚溴联苯 PBB Polybrominated biphenyls	1000	N/A
6	聚溴二苯醚 PBDE Polybrominated diphenyl ethers	1000	N/A
7	邻苯二甲酸二(2-乙基己基)酯 DEHP Di (2-ethylhexyl) phthalate	1000	N/A
8	邻苯二甲酸丁苄酯 BBP Butyl Benzyl Phthalate	1000	N/A
9	邻苯二甲酸二丁酯 DBP Dibutyl Phthalate	1000	N/A
10	邻苯二甲酸二异丁酯 DIBP Diisobutyl Phthalate	1000	N/A
11	氟(F)、氯(Cl)、溴(Br)、碘(I) Fluorine, Chlorine, Bromine, Iodine	900、900、900、900 注：Br + Cl < 1000	N/A
12	包装材料中重金属(汞、镉、六价铬、铅、PBB、PBDE)之总量 Heavy metals (mercury, cadmium, lead, Cr ⁺⁶ , PBB and PBDE) in packing materials	N/A	100 铅(Pb) + 镉(Cd) + 汞(Hg) + 六价铬(Cr+6) < 100ppm
13	高度关注物质 SVHC-Substances of Very High Concern	1000	N/A