

WORKING FOR Pb FREE

■Pb Free Policy of QD products and Implementation Schedule





●Implementation Schedule

1. EPSON TOYOCOM started to manufacture Pb free products in April,2002.
2. For the products in mass production now, EPSON TOYOCOM will switch to Pb Free Products with customer's approval.
3. When ordering, please specify if Non-Pb Free products are desired.
Pb free products are EPSON TOYOCOM's standard.

● Eliminated Pb

〈 Basic policy 〉

“Lead in solder” means Soldering- paste for electronic circuit board & Solder Plating on the outer-lead of products.

Products	Notes
<p>●Complete Pb free products.</p> <p>Cylinder type Metal Cap type Metal can type</p> 	Pb used in these products is eliminated.
<p>●Pb free terminal products</p> <p>Plastic package type products</p> 	These products use Pb in high melting temperature type solders or contain Pb in sealing glass exempted by RoHS directive.
<p>●Current Pb free terminal products</p> <p>FC Series FA-365</p> 	Some ceramic package products are already Pb-free terminal type of product, but contain Pb in sealing glass exempted by RoHS directive.
<p>●Current complete Pb free products</p> 	Ceramic package products with metallic lid are already completely Lead-free type of product.

■DISTINCTIONS

●Distinctions between current products and Pb free products. *1

Appearance

- Plastic package type products.

Marking (year part lot No.) will be changed as follows.

Current	Numeric	1	2	3	4	5	6	7	8	9	0
Pb free	Alphabet	A	B	C	D	E	F	G	H	J	K

- Cylinder type products

The glass color of plug will be changed as follows.

Current	Blue or Green etc
Pb free	Gray or White

〈 Exception 〉

*1 Ceramic package type products are originally Pb free terminal designed, so there are no change.

■Pb Free materials of QD products

Pb Free products are complied with RoHS directive.

When ordering, please specify if Non-Pb Free products are desired.

	Model	Terminal Material	Terminal Plating	Complete Lead free	Remarks
kHz range Crystal units	C-xxxx Series	Fe-Ni-Co	Sn-Cu	○	
	FC-xxx Series	W	Au		Contains Pb in sealing glass exempted by RoHS directive.
	MC-xxx Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
MHz range Crystal units	CA-301	Fe-Ni-Co	Sn-Cu	○	
	TSX-xxx Series	W	Au	○	
	FA-238V / 238	W	Au	○	
	FA-365	W	Au		Contains Pb in sealing glass exempted by RoHS directive.
	MA-xxx Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
Resonator	NS-xxx Series	W	Au	○	
	FS-xxx Series	W	Au	○	

	Model	Terminal Material	Terminal Plating	Complete Lead Free	Definitions
SPXO	SG-350 Series	42Alloy	Sn-Bi	○	
	SG-550 Series	42Alloy	Sn-Bi	○	
	SG-310 Series	W	Au	○	
	SG-645 Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG-710 Series	W	Au	○	
	SG-636 / 615 Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG-51 / 531 Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG-xxxxLA Series	42Alloy	Sn-Bi	○	
	SG-xxxxLB Series	42Alloy	Sn-Bi	○	
	SG-xxxxJC Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG / HG-xxxxJA Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG-xxxxJF Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	SG-xxxxLC Series	42Alloy	Sn-Ag		Contains Pb in sealing glass exempted by RoHS directive.
	SG-xxxxCE Series	W	Au	○	
	SG / HG-xxxxCA Series	W	Au	○	
	TCO-708x Series	W	Au	○	
	TCO-7116H1A	W	Au	○	
	TCO-711A7 / 743 Series	Fe-Ni-Co	Sn-Cu	○	
	TCO-7106X1A / 7107X1A	W	Au	○	
	TCO-391B/C Series	Sn-P-Cu	Sn-Cu	○	
	TCO-393F	Cu	Au	○	
	TCO-3100 Series / 3131	Sn-P-Cu	Sn-Cu	○	
	XG-xxxxCA / CB Series	W	Au	○	
EG-xxxxCA Series	W	Au	○		
MG-5020JE	42Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)	
MG-5100SA	42Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)	
TCXO	TG-xxxxLA / LH Series	42Alloy	Sn-Bi	○	
	TCO-5860 Series	W	Au	○	
	TCO-5890 Series	W	Au	○	
	TCO-5850 Series	W	Au	○	
	TCO-5060 / 5160 Series	W	Au	○	
VCXO	VG-xxxxCA Series	W	Au	○	
	VG-xxxxJA Series	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
	TCO-734A / 735 Series	Fe-Ni-Co	Sn-Ag-Cu	○	
	TCO-7302 Series	Fe-Ni-Co	Sn-Ag-Cu	○	
	TCO-291 Series	Sn-P-Cu	Sn-Cu	○	
	TCO-293 Series	Cu	Au	○	
	TCO-294J	Cu	Au	○	
	TCO-296 Series	Cu	Au	○	
	TCO-2000 / 2100 Series	Sn-P-Cu	Sn-Cu	○	
	TCO-2106 / 2107	Sn-P-Cu	Sn-Cu	○	
	TCO-2110 Series / 2131	Sn-P-Cu	Sn-Cu	○	
	TCO-2152	Ag-Pd	Au	○	
	TCO-726 / 7026 Series	W	Au	○	
	TCO-756 BVX7 / DVX7	Fe-Ni-Co	Sn-Cu	○	
TCO-7116 Series	W	Au	○		
TCO-7106Z1Z	W	Au	○		
OCXO	TCO-6602	Fe-Ni(50%)	Sn-Cu	○	
	TCO-6730				
	TCO-676				
	TCO-6920				
	TCO-679	Fe-Ni-Co	Sn-Ag-Cu	○	
PLL Module	TCM-2021Series	Cu	Au	○	
Real Time Clock Module	RX / RTC-xxxxSA Series	42Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)
	RX / RTC-xxxxNB Series	Cu Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)
	RX / RTC-xxxxJE Series	42Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)
	RX-xxxxLC Series	42Alloy	Sn-Ag		Contains Pb in sealing glass exempted by RoHS directive.
	RTC-4543SB	42Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)
	RTC-7301SF	Cu Alloy	Sn-Ag		High melting temperature type solder. (Pb85%)
	RTC-62423 / 72423	42Alloy	Sn-Bi		High melting temperature type solder. (Pb85%)
Crystal Filter (MCF)	TFx- Series	W	Au	○	
	TSx- Series	W	Au	○	
SAW Filter	FF-xxx Series	W	Au	○	
	TQS Series	W	Au	○	
Sensor	XV-3500CB	W	Au	○	
	HTS-206	Fe-Ni-Co	Sn-Pb		High melting temperature type solder. (Pb85%)
	TSU-10GL/20G/70G/100G	Cu	Sn	○	Terminal that joined pressure.

HANDLING PRECAUTIONS

When using EPSON TOYOCOM products, it is essential to observe the operating conditions specified in their respective specifications or catalogs.

Common points for all products

1. Shock resistance

EPSON TOYOCOM's crystal products are designed to resist physical shocks, but crystal products may be damaged under some conditions, such as dropping from desks or receiving shocks during mounting. Please be sure to re-check the characteristics if product has received any shocks.

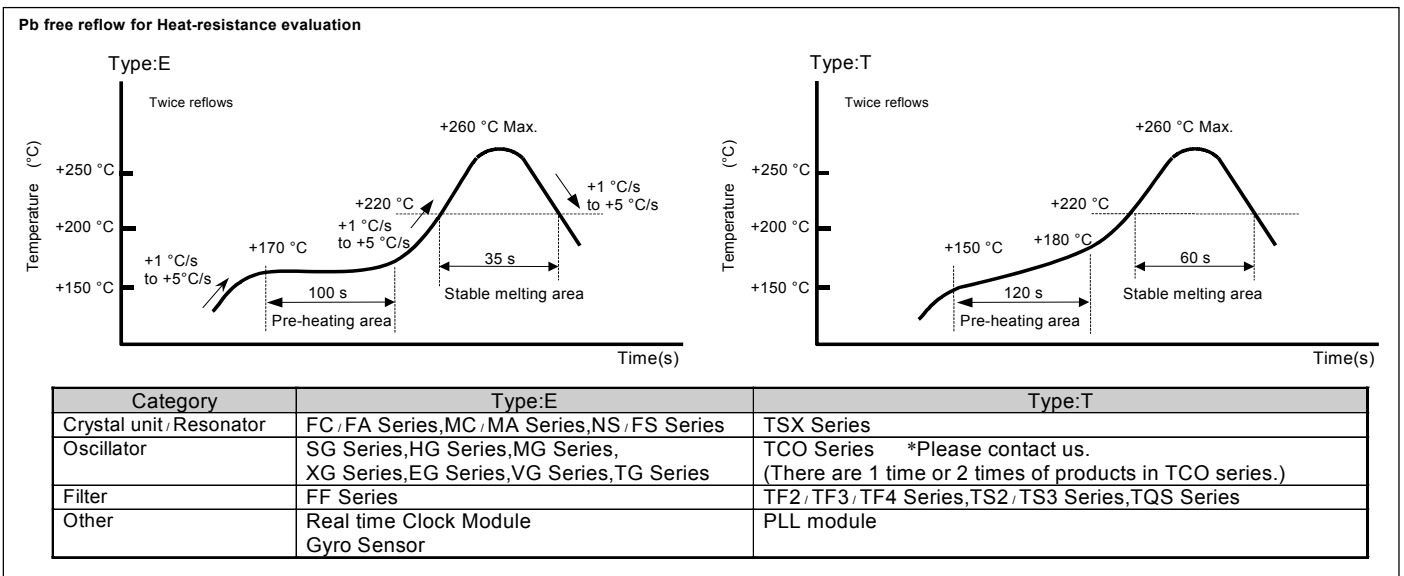
2. Soldering heat resistance

EPSON TOYOCOM's crystal products except SMD products use solder having a +180°C to +200°C melting point. Heating up the package more than +150°C may deteriorate the characteristics or damage the products. If the crystal products need to be soldered at temperature of more than +150°C, SMD products are recommended. Using higher temperatures over the following reflow conditions to crystal products, even SMD products, may cause the characteristics to deteriorate. The reflow conditions within following profile is recommended. Always check the soldering temperature and time before mounting these products. Also, please check them again when the mounting conditions are changed. Please contact us for inquiries about heat-resistance if crystal products need to be soldered over the following profile.

(1) Cylinder products and DIP products

Model	Soldering conditions
[Cylinder] C-TYPE, C-2-TYPE, C-4-TYPE, HTS-206	+280 °C or under @ max. 5 s. Do not heat the package at more than +150 °C.
[Cylinder] CA-301 [DIP] SG-51 / 531, SG-8002DB / DC, RTC-62421 / 72421 / 7301DG, TCO-711A7, TCO-743A7 / HC7, TCO-756BVX7, DVX7 TCO-734A / 735 / 7302	+260 °C or under @ max. 10 s. Do not heat the package at more than +150 °C.

(2) SMD products Reflow profile (example)



Please make temperature rate as gentle a curve as possible. Also, if the package is cellular, the possibility of cracking is inevitable, so please store it for a short duration and take measures to protect product from dampness when you store it in high humidity.

3. Mounting precautions

Shocks by auto mounting

Shocks caused by auto mounting and vacuuming may deteriorate the characteristics and affect the products. Please set the mounting conditions to minimize the shocks as much as possible, and be sure that there is no affect on the characteristics before mounting. Please review the conditions after the conditions are changed. Also please be sure that crystal products don't hit machines or other electric boards, etc. before or after mounting.

(1) a) Ceramic package products and SON products

Bending the board after soldering ceramic package products and SON products (MC-146, RTC-****NB, RX-****NB) may cause peeling off portions of soldering or package cracks by mechanical stress. Particularly, in the case of cutting boards after soldering these products, please be sure to layout the crystal on a less stressed location and use less stressed cutting method.

b) Ceramic package products

In the case of soldering ceramic package products on a different expansion-coefficient board (ex. Epoxy Glass), soldering crack at the foot pattern would be expected under repeated temperature changes for a long period. Under these conditions, be sure to check the solderability in advance.