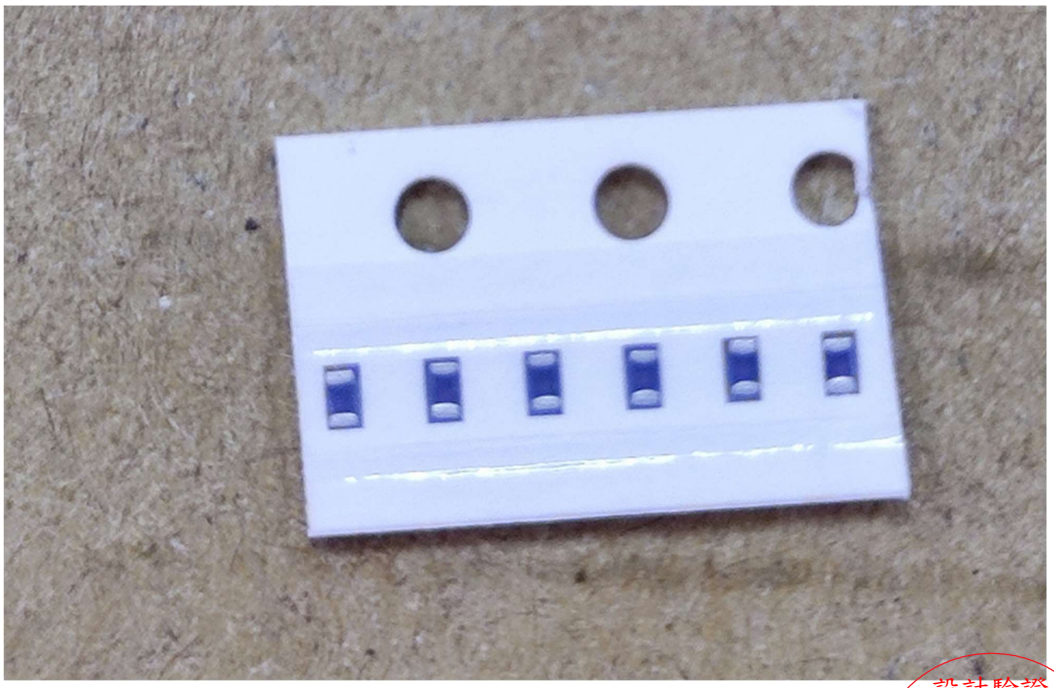


設計驗證
工程課
2023.12.21
發行
鈺邦科技開發股份有限公司

承　　認　　書

SPECIFICATION FOR APPROVAL

客戶名稱：鈺緯科技股份有限公司

產品名稱：ESD Suppressor

產品編號：**0402ESDA-MLP1**

品　　牌：**FUZETEC**

客戶料號：**3D0402ESD1Y** (D0164)

機種號碼：

本承認書內容若貴公司確認無誤,懇請於下方承認欄內簽章寄回		
承認簽章		
	設計驗證 工程課 2023.12.21 發行 鈺緯科技開發股份有限公司	

Optima Comp. Technologies Corp.

奧帝瑪科技股份有限公司

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E-mail:sales@optima-tek.com

0402ESDA-MLP

ESD suppressor



Product features

- Ultra-low capacitance (0.05 pF) ideal for high speed data applications
- Provides Electro Static Discharge (ESD) protection with fast response time (<1 ns) allowing equipment to pass IEC 61000-4-2 Level 4 test
- Single-line, bi-directional device
- 0402 (1005 metric) compact design utilizes less board space

Applications

- ESD port protection for mobile/smart phones
- Game console ESD port protection
- High speed data ports and interface
  - RF Antenna
  - Ethernet
  - USB
  - HDMI
- Set-top-boxes
- Tablets, notebooks, netbooks, laptops
- High definition television (HDTV)
- Media players
- Digital cameras
- Medical equipment
- Computers and peripherals ESD port protection
- Consumer electronics

Ordering

- Specify part number and packaging suffix (e.g. 0402ESDA-MLP1)
  0402ESDA-MLP=part number,
  1=Packaging suffix

Packaging suffixes

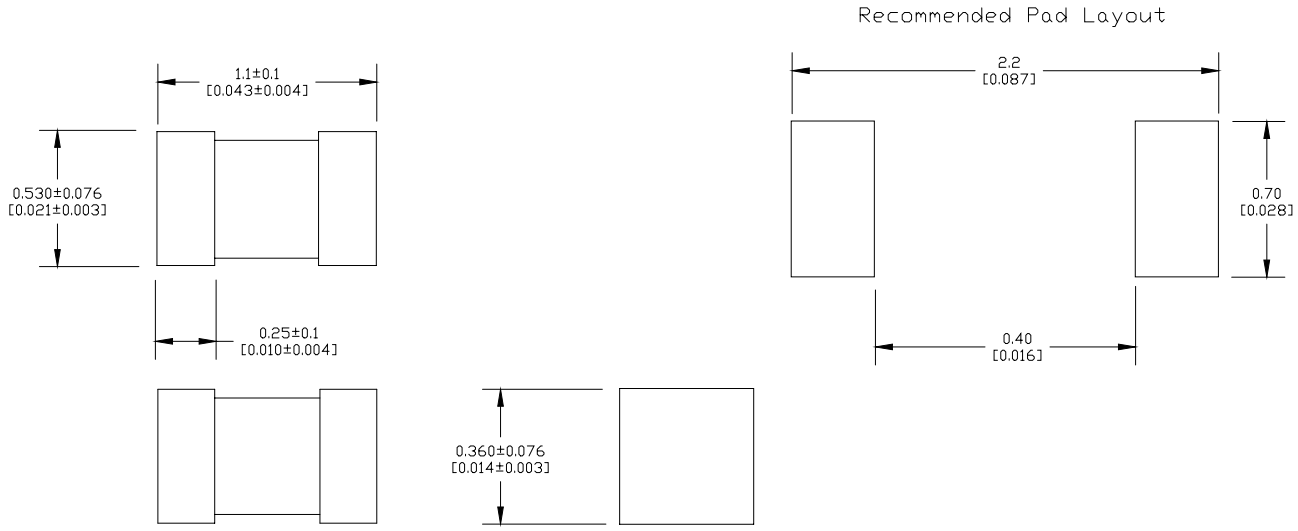
- 1 (Dip termination, Packaged: Tape and reel, 10 000 parts per 7" diameter reel)

Product specifications

Part number[4]	Rated voltage (V_{dc}) maximum	Clamping voltage[1] (V) typical	Trigger voltage[2] (V) typical	Capacitance @ 1 MHz (pF) typical	Capacitance @ 1 MHz (pF) maximum	Attenuation change (0–6 GHz) (dB) typical	Leakage current @ 12 V_{dc} (nA) typical	ESD capability IEC61000-4-2 Direct discharge (kV) typical	ESD capability IEC61000-4-2 Air discharge (kV) typical	ESD pulse withstand[3] typical
0402ESDA-MLP	30	35	300	0.05	0.15	-0.2	<0.1	8	15	>1000

1. Clamping voltage: Per IEC61000-4-2, Level 4 waveform (8 kV direct 30 A) measured 30 ns after initial pulse.
2. Trigger voltage: Trigger measurement made using Transmission Line Pulse (TLP) method.
3. Minor shifting in characteristics may be observed over multiple ESD pulses at very rapid rate.
4. Part Number Definition: 0402ESDA-MLP
   0402ESDA= Product code and size
   -MLP= Form designation

Dimensions—mm [in]



Design considerations

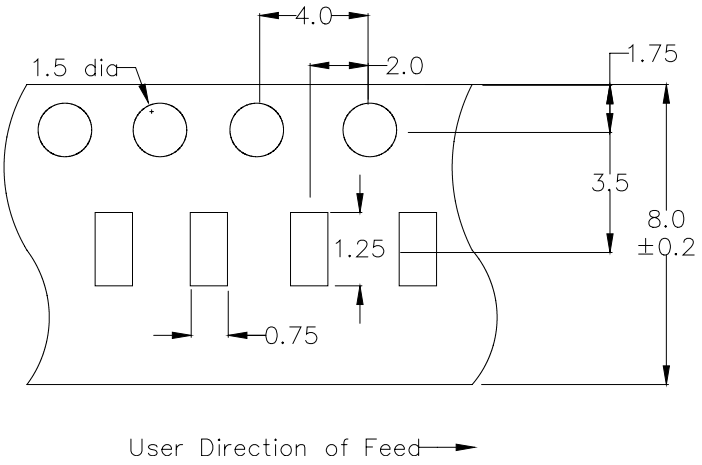
The location in the circuit for the 0402ESDA-MLP has to be carefully determined. For better performance, the device should be placed as close to the signal input as possible and ahead of any other component. Due to the high current associated with an ESD event, it is recommended to use a "0-stub" pad design (pad directly on the signal/data line and second pad directly on common ground).

Environmental data

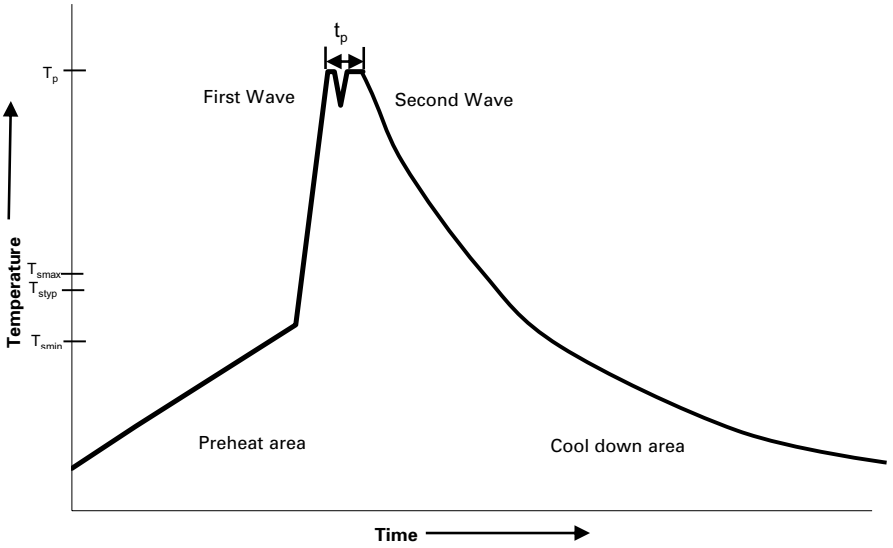
Operating temperature: - 55 °C to +125 °C
Storage temperature (component): - 55 °C to +125 °C
Load humidity: 12 VDC per EIA/IS- 722 +85 °C, 85% relative humidity for 1000 hours
Thermal shock: 10 cycles, - 55 °C to +125 °C, 30 minute dwell time
Moisture resistance: MIL-STD-202G, method 106G, 10 cycles
Mechanical shock: EIA/IS- 722 paragraph 4.9
Mechanical vibration: EIA/IS- 722 paragraph 4.10
Resistance to solvent: EIA/IS- 722 paragraph 4.11

Packaging information—mm

Supplied in tape-and-reel packaging, 10,000 parts per reel, 7" diameter reel.



Wave solder profile



Reference EN 61760-1:2006

Profile feature		Standard SnPb solder	Lead (Pb) free solder
Preheat	• Temperature min. (T_{smin})	100 °C	100 °C
	• Temperature typ. (T_{styp})	120 °C	120 °C
	• Temperature max. (T_{smax})	130 °C	130 °C
	• Time (T_{smin} to T_{smax}) (t_s)	70 seconds	70 seconds
Δpreheat to max Temperature		150 °C max.	150 °C max.
Peak temperature (Tp)*		235 °C – 260 °C	250 °C – 260 °C
Time at peak temperature (t_p)		10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate		~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to peak temperature		4 minutes	4 minutes

Manual solder

+350 °C, 4-5 seconds (by soldering iron), generally manual hand soldering is not recommended.

Solder reflow profile

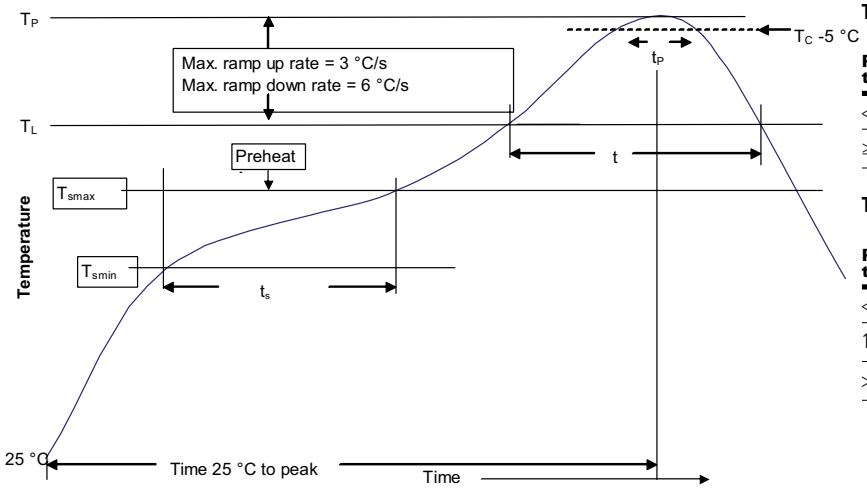


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm)	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm^3 <350	Volume mm^3 350 - 2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference JDEC J-STD-020

Profile feature		Standard SnPb solder	Lead (Pb) free solder
Preheat and soak	• Temperature min. (T_{smin})	100 °C	150 °C
	• Temperature max. (T_{smax})	150 °C	200 °C
	• Time (T_{smin} to T_{smax}) (t_S)	60-120 seconds	60-120 seconds
Average ramp up rate T_{smax} to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time at liquidous (t_L)		183 °C 60-150 Seconds	217 °C 60-150 Seconds
Peak package body temperature (Tp)*		Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_C)		20 seconds**	30 seconds**
Average ramp-down rate (T_p to T_{smax})		6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature		6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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加拿大環境保護法(CEPA)調查表

Supplier Name **供應商名稱**	**Eaton**	**DATE** **填寫日期**	**2022/2/17**
Product Name **產品名稱**	**ESD suppressor**	**Yuan P/N** **聰泰料號**	
Name of Contact Person **聯絡人名稱**	**Luo Jiaying**	**Manufacture P/N** **供應商產品料號**	**0402ESDA-MLP1**
Contact Preson's TEL **聯絡人電話**	**86 021 28994074**	**Division date Contact Preson** **聯絡人部門/職稱**	**R&D/Operator**
Signature of Authorized Company Representative **公司之受權代表簽名**		**Contact Person's E-mail** **聯絡人電子郵件**	JiayingLuo@eaton.com

項次	**物質名稱** **Substance name**	**CAS #**	**法規要求(禁用)** **Regulatory Requirements (Prohibited Substances)**	**Select substance content status** **選擇是否含有該物質** **(Please select Yes /No Applicable)** **(是/否)**
1	阿特靈 Aldrin	309-00-2	Pesticides/Insecticides	not intentionally add
2	α-六氯環己烷 Alpha hexachlorocyclohexane	319-84-6	Pesticides/Insecticides	not intentionally add
3	β-六氯環己烷 Beta hexachlorocyclohexane	319-85-7	Pesticides/Insecticides	not intentionally add
4	可氯丹 Chlordane	57-74-9	Pesticides/Insecticides	not intentionally add
5	十氯酮 Chlordecone	143-50-0	Pesticides/Insecticides	not intentionally add
6	滴滴涕 DDT	50-29-3	Pesticides/Insecticides	not intentionally add
7	十溴二苯醚 Decabromodiphenyl ether (commercial mixture, c-decaBDE	1163-19-5	Plastics/polymers/composites, textiles, adhesives, sealants, coatings and inks. DecaBDE-containing plastics are used in computer and television housings, wires and cables, pipes and carpets	not intentionally add
8	地特靈 Dieldrin	60-57-1	Pesticides/Insecticides	not intentionally add
9	安特靈 Endrin	72-20-8	Pesticides/Insecticides	not intentionally add
10	飛佈達 Heptachlor	76-44-8	Pesticides/Insecticides	not intentionally add
11	六溴聯苯 Hexabromobiphenyl	36355-01-8	Flame retardants	not intentionally add
12	六溴環十二烷 Hexabromocyclododecane (HBCDD)	25637-99-4 3194-55-6	Flame Retardant Additives	not intentionally add
13	六溴二苯醚和七溴二苯醚 Hexabromodiphenyl ether and heptabromodiphenyl ether	68631-49-2 207122-15-4 446255-22-7 207122-16-5	The c-OctaBDE mixture is highly persistent and has high potential for bioaccumulation and food web biomagnification as well as long-distance transport. The only degradation route is through debromination and production of other brominated diphenyl ethers	not intentionally add
14	六氯苯 Hexachlorobenzene (HCB)	118-74-1	Pesticides/Insecticides	not intentionally add
15	六氯-1,3-丁二烯 Hexachlorobutadiene	87-68-3	Most commonly used as a solvent for other chlorine-containing compounds	not intentionally add
16	靈丹 Lindane	58-89-9	Pesticides/Insecticides	not intentionally add
17	滅蟻樂 Mirex	2385-85-5	Flame retardants/concentrates/insecticides in plastics, rubber and electronics	not intentionally add
18	五氯苯 Pentachlorobenzene	608-93-5	Pentachlorobenzene is used in the presence of impurities in products such as PCB products/dye carriers/fungicides/flame retardants/chemical intermediates/solvents or pesticides.	not intentionally add
19	五氯酚及其鹽、酯類 Pentachlorophenol and its salts and esters	87-86-5（五氯苯酚） 131-52-2（五氯酚鈉） 27735-64-4（作為一水合物） 3772-94-9（五氯苯基月桂酸酯） 1825- 21-4（五氯苯甲醚）	Pesticides/Insecticides	not intentionally add
20	全氟辛烷磺酸、其鹽類和全氟辛基磺醯氟 Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	1763-23-1 307-35-7	Electrical and Electronic Components, Firefighting Foams, Photo Imaging, Hydraulic Fluids and Textiles	not intentionally add
21	多氯聯苯 (PBBs) Polychlorinated biphenyls (PCB)	1336-36-3	Additives in coatings, carbonless paper and plastics	not intentionally add
22	呋喃 Polychlorinated dibenzofurans (PCDF)	51207-31-9	Emissions from waste incinerators and cars	not intentionally add
23	戴奧辛 Polychlorinated dibenzo-p-dioxins (PCDD)	1746-01-6	Unintentionally produced by incomplete combustion, and in the manufacture of pesticides and other chlorinated substances. They mainly come from the burning of hospital waste, municipal waste and hazardous waste, as well as the burning of car exhaust, peat, coal and wood	not intentionally add
24	氯化萘 Polychlorinated naphthalenes	70776-03-3	PCN makes an effective insulating coating for electrical wires. Others have been used as wood preservatives, rubber and plastic additives, in capacitor dielectrics and lubricants。	not intentionally add
25	短鏈氯化石蠟 Short-chain chlorinated paraffins (SCCPs)	85535-84-8	Plasticizers in rubber, paints, adhesives, plastic flame retardants, and extreme pressure lubricants in metalworking fluids	not intentionally add

26	安殺番 Technical endosulfan and its related isomers	959-98-8 33213-65-9	Pesticides/Insecticides	not intentionally add
27	四溴二苯醚和五溴二苯醚 Tetrabromodiphenyl ether and pentabromodiphenyl ether	5436-43-1 60348-60-9		not intentionally add
28	毒殺芬 Toxaphene	8001-35-2	Pesticides/Insecticides	not intentionally add
29	多氯三聯苯(PCT) Polychlorinated Terphenyls	-	Listed substances are permitted only	not intentionally add
30	二氯甲醚 Bis(chloromethyl) ether	-	Listed substances are permitted only	not intentionally add
31	氯甲基甲基醚 Chloromethyl methyl ether	107-30-2	Listed substances are permitted only	not intentionally add
32	4-氯苯基環內基甲基酮 (4-Chlorophenyl) cyclopropylmethanone	6640-25-1	Listed substances are permitted only	not intentionally add
33	N-亞硝基二甲胺 (NDMA) N-Nitrosodimethylamine	62-75-9	Listed substances are permitted only	not intentionally add
34	六氯苯 Hexachlorobenzene	118-74-1	Listed substances are permitted only	not intentionally add
35	聯苯胺及聯苯胺鹽酸鹽 Benzidine and Benzidine dihydrochloride	92-87-5 531-85-1	Listed substances are permitted in all applications If the product contains a specific designated substance and exceeds the set amount or/and concentration, it is necessary to notify the competent authority	not intentionally add
36	Hexane, 1,6-diisocyanato-, homopolymer, reaction products with alpha-fluoro-omega-2-hydroxyethyl-poly(difluoromethylene), C16-20-branched alcohols and 1-octadecanol	126927-97-7	Listed substances are permitted only	not intentionally add
37	2-Propenoic acid, 2-methyl-, hexadecyl ester, polymers with 2-hydroxyethyl methacrylate, gamma-omega-perfluoro-C10-16-alkyl acrylate and stearyl methacrylate	203743-03-7	Listed substances are permitted only	not intentionally add
38	2-Propenoic acid, 2-methyl-, 2-methylpropyl ester, polymer with butyl 2-propenoate and 2,5 furandione, gamma-omega-perfluoro-C8-14-alkyl esters, tert-Bu benzenecarboperoxoate-initiated	459415-06-6	Listed substances are permitted only	not intentionally add
39	2-Propen-1-ol, reaction products with pentafluoroiodoethane tetrafluoroethylene telomer, dehydroiodinated, reaction products with epichlorohydrin and triethylenetetramine	464178-90-3	Listed substances are permitted only	not intentionally add
40	多溴聯苯醚 (PBDE) 4 ≤ n ≤ 10 Polybrominated diphenyl ethers	-	Listed substances are permitted only	not intentionally add
41	2-甲氧基乙醇 2-Methoxyethanol	109-86-4	Listed substances are permitted only	not intentionally add
42	四氯苯 Tetrachlorobenzenes	634-66-2 634-90-2 95-94-3	Listed substances are permitted only	not intentionally add
43	多氯化奈 Polychlorinated naphthalenes (PCNs)	70776-03-3 and others	All products, parts, components and materials	not intentionally add
44	短鏈氯化石蠟 Alkanes C10-C13, chloro (Short Chain Chlorinated Paraffins) (SCCP)	85535-84-8 and others	All products, parts, components and materials	not intentionally add
45	三丁基錫 Tributyltins	-	The concentration of the toxicant contained in this table shall not exceed the limit for specific products	not intentionally add
46	六溴環十二烷及所有主要被辨別出的異構物(α- HBCDD, β- HBCDD, γ- HBCDD) Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)	25637-99-4 3194-55-6 134237-50-6 134237-51-7 134237-52-8	All products, parts, components and materials	not intentionally add
47	全氟辛酸及其鹽類 PFOA, its salts	335-67-1 and its salts	Listed substances are permitted for specific applications	not intentionally add
48	PFAS		Listed substances are permitted for specific applications	not intentionally add
49	多溴聯苯醚 (PBDE) Polybrominated diphenyl ethers		Prohibited use for specific products	not intentionally add
50	全氟辛烷磺酸 Perfluorooctane sulfonates (PFOS)		Listed substances are permitted for specific applications Listed substances are permitted in all applications The concentration of the listed toxicant in a specific product for a specific purpose shall not exceed the limit value	not intentionally add
51	多氯萘 (PCN) Polychlorinated naphthalenes	70776-03-3	All products, parts, components and materials	not intentionally add
52	C10-13氯代烴 ; 短鏈氯化石蠟 Chloroalkanes C10-13	85535-84-8	All products, parts, components and materials	not intentionally add
53	Hexabromocyclododecane	25637-99-4 3194-55-6 134237-50-6 134237-51-7 134237-52-8	All products, parts, components and materials	not intentionally add
54	CFCs, Bromofluorocarbons, Bromochlorodifluoromethane, Tetrachloromethane, 1,1,1-Trichloroethane, HBFCs and Bromochloromethane (CFCs)	-	All products, parts, components and materials	not intentionally add

55	HCFCs	-	All products, parts, components and materials	not intentionally add
56	HFCs	-	All products, parts, components and materials	not intentionally add
57	Hexabromocyclododecane (HBCDD ; HBCD)	3194-55-6	All products, parts, components and materials	not intentionally add
58	Hexabromocyclododecane, which has the molecular formula C12H18Br6	3194-55-6	All products, parts, components and materials	not intentionally add
59	Hexabromocyclododecane (HBCDD ; HBCD)	3194-55-6	All products, parts, components and materials	not intentionally add
60	Mercury	7439-97-6	All products, parts, components and materials	not intentionally add
61	Asbestos	-	All products, parts, components and materials	not intentionally add