

Certificate of Non-Use of Hazardous Substances

MaxLinear, Inc. certifies that as of the date of this Certificate of Non-Use of Hazardous Substances, the MaxLinear product listed below does not contain hazardous substances above the threshold limits identified in the following pages.

The information contained in this certificate is provided by MaxLinear in good faith to the best of MaxLinear's knowledge. No banned materials are intentionally added to MaxLinear's products.

Environmental Category & Description		Details for: SP481ECN-L/TR
RoHS Exempt	If "7a" or "15", then product contains lead but is compliant meeting the requirements of Directive (EU) 2011/65 pursuant to either exemption 7a or 15. See Appendix A.	N
RoHS	If "Y", then product is RoHS compliant meeting the requirements of Directive (EU) 2015/863 with no exemptions taken. See Appendix B.	Y
Halogen Free	If "Y", then product is halogen and lead (Pb) free. Green products meet RoHS requirements plus additional hazardous material restrictions. See Appendix C.	Y
REACH	If "Y", then product does not use any Substances of Very High Concern (SVHC) under REACH requirements. See Appendix D for a list of these substances.	Y

MaxLinear, Inc.
Quality and Reliability
Feb 22, 2020

Appendix A | RoHS with Exemption

Exemption	Description
7a	Lead in high melting temperature type solders
15	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages

Appendix B | RoHS Directive (EU) 2015/863

Restricted Substance	Allowable Limit (at homogenous material level)
Cadmium (Cd)	100 ppm (0.01 weight %)
Mercury (Hg)	1000 ppm (0.10 weight %)
Lead (Pb)	1000 ppm (0.10 weight %)
Hexavalent Chromium (Cr6+)	1000 ppm (0.10 weight %)
Polybrominated biphenyls (PBB)	1000 ppm (0.10 weight %)
Polybrominated diphenyl ethers (PBDE)	1000 ppm (0.10 weight %)
Bis (2-Ethylhexyl) phthalate (DEHP)	1000 ppm (0.10 weight %)
Benzyl butyl phthalate (BBP)	1000 ppm (0.10 weight %)
Dibutyl phthalate (DBP)	1000 ppm (0.10 weight %)
Diisobutyl phthalate (DIBP)	1000 ppm (0.10 weight %)

Appendix C | Halogen Free

Restricted Substance	Allowable Limit	
Bromine (Br)	900 ppm	1500 ppm Total
Chlorine (Cl)	900 ppm	
Antimony (Sb (Sb ₂ O ₃))	900 ppm	

Appendix D | REACH 201 (Threshold Limit 1000ppm (0.1% w/w))

Date of Inclusion: July 16, 2019		EC Number	CAS Number
201	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, its salts and its acyl halides	-	-
200	2-methoxyethyl acetate	203-772-9	110-49-6
199	4-tert-butylphenol	202-679-0	98-54-4
198	Tris(4-nonylphenyl, branched and linear) phosphite (TNPP) with ≥0.1% w/w of 4-nonylphenol, branched and linear (4-NP)	-	-
Date of Inclusion: January 15, 2019		EC Number	CAS Number
197	1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one	239-139-9	15087-24-8
196	Pyrene	204-927-3	129-00-0
195	Phenanthrene	201-581-5	85-01-8
194	Fluoranthene	205-912-4	206-44-0
193	Benzo[k]fluoranthene	205-916-6	207-08-9
192	2,2-bis(4'-hydroxyphenyl)-4-methylpentane	401-720-1	6807-17-6
Date of Inclusion: Jun 27, 2018		EC Number	CAS Number
191	Benzene-1,2,4-tricarboxylic acid 1,2 anhydride	209-008-0	552-30-7
190	Benzo[ghi]perylene	205-883-8	191-24-2
189	Decamethylcyclopentasiloxane	208-764-9	541-02-6
188	Dicyclohexyl phthalate	201-545-9	84-61-7
187	Disodium octaborate	234-541-0	12008-41-2
186	Dodecamethylcyclohexasiloxane	234-541-0	540-97-6
185	Ethylenediamine	208-762-8	107-15-3
184	Lead NOTE: Does not exceed threshold levels specified in RoHS Directive (EU) 2015/863	203-468-6	7439-92-1
183	Octamethylcyclotetrasiloxane	231-100-4	556-67-2
182	Terphenyl, hydrogenated	209-136-7	61788-32-7
Date of Inclusion: Jan 15, 2018		EC Number	CAS Number
181	Benz[a]anthracene	200-280-6	56-55-3 1718-53-2
180	Cadmium carbonate	208-168-9	513-78-0
179	Cadmium hydroxide	244-168-5	21041-95-2
178	Cadmium nitrate	233-710-6	10022-68-1 10325-94-7
177	Chrysene	205-923-4	218-01-9 1719-03-5
176	Dodecachloropentacyclo[12.2.1.16.9.02,13.05,10]octadeca-7,15-diene ("Dechlorane Plus™")	-	-
175	Reaction products of 1,3,4-thiadiazolidine-2,5-dithione, formaldehyde and 4-heptylphenol, branched and linear (RP-HP)	-	-
Date of Inclusion: Jul 07, 2017		EC Number	CAS Number
174	Perfluorohexane-1-sulphonic acid and its salts (PFHxS)	206-587-1	355-46-4
Date of Inclusion: Dec 19, 2016		EC Number	CAS Number
173	p-(1,1-dimethylpropyl)phenol	201-280-9	80-46-6
172	4-heptylphenol, branched and linear	-	-
171	Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts	206-400-3 221-470-5	335-76-2 3830-45-3 3108-42-7
170	4,4'-isopropylidenediphenol (bisphenol A)	201-245-8	80-5-7
Date of Inclusion: Jun 20, 2016		EC Number	CAS Number
169	Benzo[def]chrysene (Benzo[a]pyrene)	200-028-5	50-32-8
Date of Inclusion: Dec 17, 2015		EC Number	CAS Number
168	1,3-propanesultone	214-317-9	1120-71-4
167	2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol (UV-327)	223-383-8	3864-99-1
166	2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol (UV-350)	253-037-1	36437-37-3
165	Nitrobenzene	202-716-0	98-95-3
164	Perfluorononan-1-ic-acid and its sodium and ammonium salts	206-801-3	4149-60-4 375-95-1 21049-39-8
Date of Inclusion: Jun 15, 2015		EC Number	CAS Number
163	1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥0.3% of dihexyl phthalate (EC No. 201-559-5)	272-013-1 271-094-0	68648-93-1 68515-51-5
162	5-sec-butyl-2-(2,4-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [1], 5-sec-butyl-2-(4,6-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [2] [covering any of the individual stereoisomers of [1] and [2] or any combination thereof]	-	-
Date of Inclusion: Dec 17, 2014		EC Number	CAS Number
161	2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	247-384-8	25973-55-1
160	2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	223-346-6	3846-71-7
159	2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)	239-622-4	15571-58-1
158	Cadmium fluoride	232-222-0	7790-79-6
157	reaction mass of 2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate and 2-ethylhexyl 10-ethyl-4-[[2-[(2-ethylhexyl)oxy]-2-oxoethyl]thio]-4-octyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (reaction mass of DOTE and MOTE)	-	-
156	Cadmium sulphate	233-331-6	10124-36-4 31119-53-6
Date of Inclusion: Jun 16, 2014		EC Number	CAS Number
155	1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	271-093-5	68515-50-4
154	Sodium perborate, perboric acid, sodium salt	234-390-0 239-172-9	11138-47-9 15120-21-5
153	Sodium peroxometaborate	231-556-4	7632-04-4
152	Cadmium chloride	233-296-7	10108-64-2
Date of Inclusion: Dec 16, 2013		EC Number	CAS Number
151	Cadmium sulphide	215-147-8	1306-23-6

150	Disodium 4-amino-3-[[4'-[(2,4-diaminophenyl)azo][1,1'-biphenyl]-4-yl]azo]-5-hydroxy-6-(phenylazo)naphthalene-2,7-disulphonate (C.I. Direct Black 38)	217-710-3	1937-37-7
149	Dihexyl phthalate	201-559-5	84-75-3
148	Imidazolidine-2-thione; (2-imidazoline-2-thiol)	202-506-9	96-45-7
147	Trixylyl phosphate	246-677-8	25155-23-1
146	Disodium 3,3'-[[1,1'-biphenyl]-4,4'-diylbis(azo)]bis(4-aminonaphthalene-1-sulphonate) (C.I. Direct Red 28)	209-358-4	573-58-0
145	Lead di(acetate)	206-104-4	301-04-2
Date of Inclusion: Jun 20, 2013		EC Number	CAS Number
144	Cadmium	231-152-8	7440-43-9
143	Ammonium pentadecafluorooctanoate (APFO)	223-320-4	3825-26-1
142	Pentadecafluorooctanoic acid (PFOA)	206-397-9	335-67-1
141	Dipentyl phthalate (DPP)	205-017-9	131-18-0
140	4-Nonylphenol, branched and linear, ethoxylated	-	-
139	Cadmium oxide	215-146-2	1306-19-0
Date of Inclusion: Dec 19, 2012		EC Number	CAS Number
138	Trilead dioxide phosphonate	235-252-2	12141-20-7
137	Trilead bis(carbonate)dihydroxide	215-290-6	1319-46-6
136	Tricosafuorododecanoic acid	206-203-2	307-55-1
135	Tetralead trioxide sulphate	235-380-9	12202-17-4
134	Tetraethyllead	201-075-4	78-00-2
133	Sulfurous acid, lead salt, dibasic	263-467-1	62229-08-7
132	Silicic acid, lead salt	234-363-3	11120-22-2
131	Silicic acid (H ₂ Si ₂ O ₅), barium salt (1:1), lead-doped	272-271-5	68784-75-8
130	Pyrochlore, antimony lead yellow	232-382-1	8012-00-8
129	Pentalead tetraoxide sulphate	235-067-7	12065-90-6
128	Pentacosafuorotridecanoic acid	276-745-2	72629-94-8
127	Orange lead (lead tetroxide)	215-235-6	1314-41-6
126	o-Toluidine	202-429-0	95-53-4
125	o-aminoazotoluene	202-591-2	97-56-3
124	N-pentyl-isopentylphthalate	-	776297-69-9
123	N-methylacetamide	201-182-6	79-16-3
122	N,N-dimethylformamide	200-679-5	68-12-2
121	Methyloxirane (Propylene oxide)	200-879-2	75-56-9
120	Methoxyacetic acid	210-894-6	625-45-6
119	Lead titanium zirconium oxide	235-727-4	12626-81-2
118	Lead titanium trioxide	235-038-9	12060-00-3
117	Lead oxide sulfate	234-853-7	12036-76-9
116	Lead monoxide (lead oxide)	215-267-0	1317-36-8
115	Lead dinitrate	233-245-9	10099-74-8
114	Lead cyanamidate	244-073-9	20837-86-9
113	Lead bis(tetrafluoroborate)	237-486-0	13814-96-5
112	Hexahydromethylphthalic anhydride	243-072-0	19438-60-9
		260-566-1	57110-29-9
		256-356-4	48122-14-1
		247-094-1	25550-51-0
111	Heptacosafuorotetradecanoic acid	206-803-4	376-06-7
110	Henicosafuoroundecanoic acid	218-165-4	2058-94-8
109	Furan	203-727-3	110-00-9
108	Fatty acids, C16-18, lead salts	292-966-7	91031-62-8
107	Dioxobis(stearato)trilead	235-702-8	12578-12-0
106	Dinoseb (6-sec-butyl-2,4-dinitrophenol)	201-861-7	88-85-7
105	Dimethyl sulphate	201-058-1	77-78-1
104	Diisopentylphthalate	210-088-4	605-50-5
103	Diethyl sulphate	200-589-6	64-67-5
102	Dibutyltin dichloride (DBTC)	211-670-0	683-18-1
101	Diazene-1,2-dicarboxamide (C,C'-azodi(formamide))	204-650-8	123-77-3
100	Cyclohexane-1,2-dicarboxylic anhydride [1], cis-cyclohexane-1,2-dicarboxylic anhydride [2], trans-cyclohexane-1,2-dicarboxylic anhydride [3] [The individual cis- [2] and trans- [3] isomer substances and all possible combinations of the cis- and trans-isomers [1] are covered by this entry]	201-604-9	13149-00-3
		236-086-3	85-42-7
		238-009-9	14166-21-3
99	Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)	214-604-9	1163-19-5
98	Biphenyl-4-ylamine	202-177-1	92-67-1
97	Acetic acid, lead salt, basic	257-175-3	51404-69-4
96	[Phthalato(2-)]dioxotrilead	273-688-5	69011-06-9
95	6-methoxy-m-toluidine (p-cresidine)	204-419-1	120-71-8
94	4-Nonylphenol, branched and linear	-	-
93	4-methyl-m-phenylenediamine (toluene-2,4-diamine)	202-453-1	95-80-7
92	4-Aminoazobenzene	200-453-6	60-09-3
91	4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated	-	-
90	4,4'-oxydianiline and its salts	202-977-0	101-80-4
89	4,4'-methylenedio-toluidine	212-658-8	838-88-0
88	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	421-150-7	143860-04-2
87	1-bromopropane (n-propyl bromide)	203-445-0	106-94-5
86	1,2-Diethoxyethane	211-076-1	629-14-1
85	1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	284-032-2	84777-06-0
Date of Inclusion: Jun 18, 2012		EC Number	CAS Number
84	α,α-Bis[4-(dimethylamino)phenyl]-4 (phenylamino)naphthalene-1-methanol (C.I. Solvent Blue 4) [with ≥ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	229-851-8	6786-83-0
83	N,N,N',N'-tetramethyl-4,4'-methylenedianiline (Michler's base)	202-959-2	101-61-1
82	1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione (β-TGIC)	423-400-0	59653-74-6
81	Diboron trioxide	215-125-8	1303-86-2
80	1,2-bis(2-methoxyethoxy)ethane (TEGDME; triglyme)	203-977-3	112-49-2

79	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol [with ≥ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	209-218-2	561-41-1
78	Lead(II) bis(methanesulfonate)	401-750-5	17570-76-2
77	Formamide	200-842-0	75-12-7
76	[4-[4,4'-bis(dimethylamino) benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride (C.I. Basic Violet 3) [with ≥ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	208-953-6	548-62-9
75	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	203-794-9	110-71-4
74	[4-[[4-anilino-1-naphthyl]]4-(dimethylamino)phenyl]methylene]cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride (C.I. Basic Blue 26) [with ≥ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	219-943-6	2580-56-5
73	1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	219-514-3	2451-62-9
72	4,4'-bis(dimethylamino)benzophenone (Michler's ketone)	202-027-5	90-94-8
Date of Inclusion: Dec 19, 2011		EC Number	CAS Number
71	4-(1,1,3,3-tetramethylbutyl)phenol	205-426-2	140-66-9
70	N,N-dimethylacetamide	204-826-4	127-19-5
69	Phenolphthalein	201-004-7	77-09-8
68	Lead diazide, Lead azide	236-542-1	13424-46-9
67	Lead dipicrate	229-335-2	6477-64-1
66	1,2-dichloroethane	203-458-1	107-06-2
65	Calcium arsenate	231-904-5	7778-44-1
64	Dichromium tris(chromate)	246-356-2	24613-89-6
63	2-Methoxyaniline; o-Anisidine	201-963-1	90-04-0
62	Pentazinc chromate octahydroxide	256-418-0	49663-84-5
61	Arsenic acid	231-901-9	7778-39-4
60	Potassium hydroxyoctaoxidizincatedichromate	234-329-8	11103-86-9
59	Formaldehyde, oligomeric reaction products with aniline	500-036-1	25214-70-4
58	Lead styphnate	239-290-0	15245-44-0
57	Trilead diarsenate	222-979-5	3687-31-8
56	Zirconia Aluminosilicate Refractory Ceramic Fibres	-	-
55	Bis(2-methoxyethyl) phthalate	204-212-6	117-82-8
54	Aluminosilicate Refractory Ceramic Fibres	-	-
53	Bis(2-methoxyethyl) ether	203-924-4	111-96-6
52	2,2'-dichloro-4,4'-methylenedianiline	202-918-9	101-14-4
51	Cobalt dichloride	231-589-4	7646-79-9
Date of Inclusion: Jun 20, 2011		EC Number	CAS Number
50	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich	276-158-1	71888-89-6
49	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters	271-084-6	68515-42-4
48	Strontium chromate	232-142-6	7789-06-2
47	1-Methyl-2-pyrrolidone	212-828-1	872-50-4
46	1,2,3-Trichloropropane	202-486-1	96-18-4
45	2-Ethoxyethyl acetate	203-839-2	111-15-9
44	Hydrazine	206-114-9	302-01-2 7803-57-8
Date of Inclusion: Dec 15, 2010		EC Number	CAS Number
43	Cobalt(II) diacetate	200-755-8	71-48-7
42	Cobalt(II) sulphate	233-334-2	10124-43-3
41	2-Ethoxyethanol	203-804-1	110-80-5
40	Acids generated from chromium trioxide and their oligomers. Names of the acids and their oligomers: Chromic acid, Dichromic acid, Oligomers of chromic acid and dichromic acid.	231-801-5 236-881-5	13530-68-2 7738-94-5
39	2-Methoxyethanol	203-713-7	109-86-4
38	Chromium trioxide	215-607-8	1333-82-0
37	Cobalt(II) carbonate	208-169-4	513-79-1
36	Cobalt(II) dinitrate	233-402-1	10141-05-6
Date of Inclusion: Jun 18, 2010		EC Number	CAS Number
35	Trichloroethylene	201-167-4	79-01-6
34	Potassium dichromate	231-906-6	7778-50-9
33	Tetraboron disodium heptaoxide, hydrate	235-541-3	12267-73-1
32	Ammonium dichromate	232-143-1	7789-09-5
31	Boric acid	233-139-2 234-343-4	11113-50-1 10043-35-3
30	Sodium chromate	231-889-5	7775-11-3
29	Disodium tetraborate, anhydrous	215-540-4	12179-04-3 1303-96-4 1330-43-4
28	Potassium chromate	232-140-5	7789-00-6
Date of Inclusion: Mar 30, 2010		EC Number	CAS Number
27	Acrylamide	201-173-7	79-06-1
Date of Inclusion: Jan 13, 2010		EC Number	CAS Number
26	Lead sulfochromate yellow (C.I. Pigment Yellow 34)	215-693-7	1344-37-2
25	Lead chromate molybdate sulphate red (C.I. Pigment Red 104)	235-759-9	12656-85-8
24	Anthracene oil	292-602-7	90640-80-5
23	2,4-Dinitrotoluene	204-450-0	121-14-2
22	Anthracene oil, anthracene paste, anthracene fraction	295-275-9	91995-15-2
21	Anthracene oil, anthracene-low	292-604-8	90640-82-7
20	Tris(2-chloroethyl)phosphate	204-118-5	115-96-8
19	Diisobutyl phthalate	201-553-2	84-69-5
18	Lead chromate	231-846-0	7758-97-6
17	Anthracene oil, anthracene paste	292-603-2	90640-81-6
16	Pitch, coal tar, high temp.	266-028-2	65996-93-2
15	Anthracene oil, anthracene paste, distn. lights	295-278-5	91995-17-4
Date of Inclusion: Oct 28, 2008		EC Number	CAS Number
14	Lead hydrogen arsenate	232-064-2	7784-40-9

13	Benzyl butyl phthalate (BBP)	201-622-7	85-68-7
12	Bis (2-ethylhexyl)phthalate (DEHP)	204-211-0	117-81-7
11	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	201-329-4	81-15-2
10	Diarsenic trioxide	215-481-4	1327-53-3
9	Bis(tributyltin)oxide (TBTO)	200-268-0	56-35-9
8	Triethyl arsenate	427-700-2	15606-95-8
7	Diarsenic pentaoxide	215-116-9	1303-28-2
6	Sodium dichromate	234-190-3	10588-01-9 7789-12-0
5	Dibutyl phthalate (DBP)	201-557-4	84-74-2
4	4,4'- Diaminodiphenylmethane (MDA)	202-974-4	101-77-9
3	Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	287-476-5	85535-84-8
2	Anthracene	204-371-1	120-12-7
1	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified: Alpha-hexabromocyclododecane Beta-hexabromocyclododecane Gamma-hexabromocyclododecane	247-148-4 221-695-9	25637-99-4 134237-52-8 3194-55-6 134237-50-6 134237-51-7