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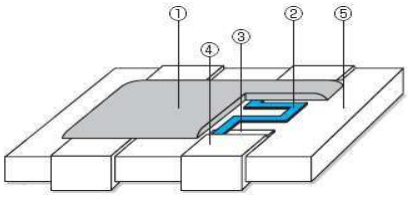
RESISTORS MATERIAL COMPOSITION – CTN Series

1. Epoxy Protective Film
2. Ni-Cr Resistive Element
3. Cu Electrode
4. Ni Plating and Tin Plating



European Union on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The definition of LEAD-FREE products is external terminal meet Lead Free. RoHS exemption 7 (c)-1, Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronics devices, or in a glass or ceramic matrix compound (2011/65/EU)

CAS no.	Material	Substance	CTN1A		CTN1D		CTN2D		CTN6D		CTNS6D	
			Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%
1344-28-1	Ceramic Substrate	Al2O3	7.4778	87.54%	7.4778	87.54%	3.6667	86.04%	9.0731	86.71%	9.0731	86.71%
7631-86-9		SiO2	0.3116	3.65%	0.3116	3.65%	0.1528	3.58%	0.3780	3.61%	0.3780	3.61%
7440-22-4	Conductor Layer (Bottom)	Ag	0.0266	0.31%	0.0266	0.31%	0.0233	0.55%	0.0388	0.37%	0.0388	0.37%
65997-17-3		Glass	0.0014	0.02%	0.0014	0.02%	0.0012	0.03%	0.0020	0.02%	0.0020	0.02%
7440-22-4	Conductor Layer (Top)	Ag	0.0919	1.08%	0.0919	1.08%	0.0456	1.07%	0.1171	1.12%	0.1171	1.12%
7440-05-03		Pd	0.0012	0.01%	0.0012	0.01%	0.0006	0.01%	0.0015	0.01%	0.0015	0.01%
65997-17-3		Glass	0.0233	0.27%	0.0233	0.27%	0.0116	0.27%	0.0296	0.28%	0.0296	0.28%
7440-02-0	Resistive Element	Ni	0.0109	0.13%	0.0109	0.13%	0.0049	0.11%	0.0142	0.14%	0.0142	0.14%
7440-47-3		Cr	0.0174	0.20%	0.0174	0.20%	0.0078	0.18%	0.0227	0.22%	0.0227	0.22%
65997-17-3		Glass	0.0152	0.18%	0.0152	0.18%	0.0068	0.16%	0.0196	0.19%	0.0198	0.19%
25068-38-6	Over-Coating	Epoxy	0.1121	1.31%	0.1121	1.31%	0.0665	1.56%	0.1425	1.36%	0.1425	1.36%
25068-38-6	Marking	Epoxy	0.0115	0.13%	0.0115	0.13%	0.0036	0.08%	0.0146	0.14%	0.0146	0.14%
7440-02-0	End Terminal	Ni	0.0038	0.04%	0.0038	0.04%	0.0027	0.06%	0.0058	0.06%	0.0058	0.06%
7440-47-3		Cr	0.0010	0.01%	0.0010	0.01%	0.0007	0.02%	0.0015	0.01%	0.0015	0.01%
7440-02-0	Ni Plating	Ni	0.2310	2.70%	0.2310	2.70%	0.1411	3.31%	0.3187	3.05%	0.3187	3.05%
7440-31-5	Sn Plating	Sn	0.2060	2.41%	0.2060	2.41%	0.1259	2.95%	0.2843	2.72%	0.2843	2.72%
All of the above are approximate values by the component parts of the material			8.5426	100%	8.5426	100%	4.2616	100%	10.4640	100%	10.4642	100%

CAS no.	Material	Substance	CTN8U/CTN8D		CTNS8D		CTNW8U		CTNM16U		CTN16U	
			Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%
1344-28-1	Ceramic Substrate	Al2O3	39.9311	86.81%	7.4778	87.54%	64.9066	86.64%	82.1554	86.14%	128.2179	86.69%
7631-86-9		SiO2	1.6638	3.62%	0.3116	3.65%	2.7044	3.61%	3.4231	3.59%	5.3424	3.61%
7440-22-4	Conductor Layer (Bottom)	Ag	0.1042	0.23%	0.0266	0.31%	0.1550	0.21%	0.2495	0.26%	0.2980	0.20%
65997-17-3		Glass	0.0055	0.01%	0.0014	0.02%	0.0082	0.01%	0.0131	0.01%	0.0157	0.01%
7440-22-4	Conductor Layer (Top)	Ag	0.4335	0.94%	0.0919	1.08%	0.6833	0.91%	0.9390	0.98%	1.3413	0.91%
7440-05-03		Pd	0.0055	0.01%	0.0012	0.01%	0.0086	0.01%	0.0119	0.01%	0.0170	0.01%
65997-17-3		Glass	0.1097	0.24%	0.0233	0.27%	0.1730	0.23%	0.2377	0.25%	0.3396	0.23%
7440-02-0	Resistive Element	Ni	0.0762	0.17%	0.0109	0.13%	0.1306	0.17%	0.1632	0.17%	0.2580	0.17%
7440-47-3		Cr	0.1219	0.26%	0.0174	0.20%	0.2090	0.28%	0.2611	0.27%	0.4127	0.28%
65997-17-3		Glass	0.1066	0.23%	0.0152	0.18%	0.1829	0.24%	0.2285	0.24%	0.3612	0.24%
25068-38-6	Over-Coating	Epoxy	0.7686	1.67%	0.1121	1.31%	1.3129	1.75%	1.6141	1.69%	2.5954	1.75%
25068-38-6	Marking	Epoxy	0.0536	0.12%	0.0115	0.13%	0.0842	0.11%	0.1051	0.11%	0.1652	0.11%
7440-02-0	End Terminal	Ni	0.0134	0.03%	0.0038	0.04%	0.0191	0.03%	0.0325	0.03%	0.0361	0.02%
7440-47-3		Cr	0.0033	0.01%	0.0010	0.01%	0.0048	0.01%	0.0081	0.01%	0.0090	0.01%
7440-02-0	Ni Plating	Ni	1.3757	2.99%	0.2310	2.70%	2.2895	3.06%	3.1362	3.29%	4.4912	3.04%
7440-31-5	Sn Plating	Sn	1.2273	2.67%	0.2060	2.41%	2.0425	2.73%	2.7979	2.93%	4.0068	2.71%
All of the above are approximate values by the component parts of the material			45.9998	100%	8.5426	100%	74.9145	100%	95.3765	100%	147.9074	100%