

## Material Data Sheet

Date : March 21, 2017  
 Company : Automotive & Industrial Systems Company, Panasonic Corporation  
 Address : 401 Sadamasa-cho, Fukui City, Fukui Japan  
 Department : Device Solutions Business Division Environment Management Section  
 Approved by : Hirohazu Yamada  
 Prepared by : Takeshi Tani  
 Telephone : +81-776-56-8028

Product P/N		IERJ8ENF88@V	
Product Classification		Electric/Electronic component/Passive component	
Product Name	Chip Resistor	Substitute P/N	No
Pb	Pb free	Packaging Material	Not included
			Weight TOTAL(mg)
			949487

Part Name	Material Name	Chemical Name	CASNo.	Remark	Weight of each chemical material in a part (mg)	Weight of a part (mg)	Rate of each chemical material in a part (%)	Rate of each chemical material in a product (wt%)	Rate of each part in a
Substrate	Ceramics	Aluminum oxide ; Alumina; Corundum; Al <sub>2</sub> O <sub>3</sub>	1344-28-1		8.1144	8.4	96.8	88.468676	85460.734
		Silica; Silicon dioxide	7631-86-9		0.1764		2.1		1.857846
		Magnesium oxide; MgO	1309-48-4		0.0284		1		0.834889
Top Terminal	Other special metals	Silver; Ag	7440-22-4		0.0252	0.06605	0.3	0.695672	0.265407
		Palladium; Pd	7440-05-3		0.004		0.67408		
		Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monoxide; Lead(2+) oxide	1317-39-8		0.000859		0.009047		
Bottom Terminal	Other special metals	Cupric oxide; CuO	1317-39-0		0.000395	0.04984	0.50106	0.524927	0.004182
		Silica; Silicon dioxide	7631-86-9		0.000199		0.002096		
		Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monoxide; Lead(2+) oxide	1317-39-8		0.004499		0.004788		
Resistive Element	Glass	Silica; Silicon dioxide	7631-86-9		0.000499	0.02509	1.001204	0.26389	0.005256
		Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monoxide; Lead(2+) oxide	1317-39-8		0.01102		43.992015		0.116084
		Ruthenium(IV) oxide; RuO <sub>2</sub>	12036-10-1		0.00097		38.203593		0.100792
First Protective Coating	Glass	Boron oxide; B <sub>2</sub> O <sub>3</sub>	1303-86-2		0.003758	0.00356	15.001996	0.374962	0.03958
		Other antimony compounds	-		0.000469		1.872256		0.00494
		Manganese dioxide; MnO <sub>2</sub>	1313-13-9		0.000233		0.93014		0.002454
Second Protective Coating	EP (Epoxy resin)	Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monoxide; Lead(2+) oxide	1317-39-8		0.019578	0.10129	54.99438	1.066809	0.206217
		Silica; Silicon dioxide	7631-86-9		0.009114		25.601124		0.039399
		Boron oxide; B <sub>2</sub> O <sub>3</sub>	1303-86-2		0.004593		12.901886		0.043374
Marking 1	EP (Epoxy resin)	Zinc oxide; ZnO	1314-13-2		0.001496	0.00408	4.202248	0.042983	0.015756
		Chromium(III) oxide; Pigment green 17 (C.I.); Cr <sub>2</sub> O <sub>3</sub>	1308-38-9		0.000819		2.300562		0.008626
		Epichlorohydrin, o-cresol, formaldehyde polymer; Formaldehyde, polymer with (chloromethyl)oxirane and 2-methylphenol	29890-82-2		0.069889		68.998913		0.736093
Side Terminal	Ceramics	Silica; Silicon dioxide	7631-86-9		0.023297	0.21496	23.000297	2.263983	0.245364
		Carbon black; C	1333-86-4		0.000194		8.000079		0.003352
		Epichlorohydrin, o-cresol, formaldehyde polymer; Formaldehyde, polymer with (chloromethyl)oxirane and 2-methylphenol	29890-82-2		0.002488		60.990392		0.028215
Middle Terminal	EP (Epoxy resin)	Silica; Silicon dioxide	7631-86-9		0.001245	0.00408	30.514706	0.042983	0.013113
		Titanium dioxide; Pigment white 6; TiO <sub>2</sub>	13463-87-7		0.000347		8.504902		0.003655
		Other nonferrous metals	7440-22-4		0.102534		47.699103		1.07991
Outer Terminal	EP (Epoxy resin)	Bisphenol A, epichlorohydrin polymer; Epoxy resin; Epon 820; Araldite GY 250	25069-38-6		0.089639	0.21496	41.700317	2.263983	0.44079
		Carbon black; C	1333-86-4		0.012983		5.900168		0.133578
		Other nonferrous metals	Potassium titanate; Potassium titanium oxide; K <sub>2</sub> TiO <sub>3</sub>	12056-51-8			0.010104		4.70041
Outer Terminal	EP (Epoxy resin)	Nickel and Nickel alloys	7440-02-0		0.333	0.333	100	3.507157	3.507157
		Other nonferrous metals	Tin; Sn	7440-31-5			0.265		0.265

RoHS exemption 7e(1)  
 Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound