

# Material Data Sheet

Date : March 21, 2017  
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|                        |   |                    |              |
|------------------------|---|--------------------|--------------|
| Product P/N            | IERJ14NF@@@U                                    |                    |              |
| 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)       |   |                    |              |
| 15.9252                |   |                    |              |

| 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  |   | 13.524  | 14                   | 96.8  | 87.910903  | 84.921929              |           |           |          |          |
|                           |                         | Silica; Silicon dioxide  | 7631-86-9  |   | 0.294   |                      |   |  |                        | 2.1       | 1.848131  |          |          |
|                           |                         | Magnesium oxide; MgO   | 1309-48-4  |   | 0.14  |                      |   |  |                        | 1         | 0.879111  |          |          |
|                           |                         | Calcium oxide; CaO   | 1305-73-8  |   | 0.042   |                      |   |  |                        | 0.3       | 0.263733  |          |          |
| Top Terminal              | Other special metals    | Silver; Ag   | 7440-22-4  |   | 0.109203  | 0.1127               | 96.89707                                    | 0.707711   | 0.68575                |           |           |          |          |
|                           |                         | Palladium; Pd  | 7440-05-3  |   | 0.001466  |                      |   |  |                        | 1.200799  | 0.009206  |          |          |
|                           | RoHS exemption          | Glass  | Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monooxide; Lead(2+) oxide                             | 1317-39-8   |   |                      |   |  |                        | 0.001015  | 0.000622  | 0.006374 | 0.006374 |
|                           |                         | Cupric oxide; CuO  | 1317-38-0  |   | 0.000677  |                      |   |  |                        | 0.60071   | 0.004252  |          |          |
| Bottom Terminal           | Other special metals    | Silver; Ag   | 7440-22-4  |   | 0.102033  | 0.10465              | 97.499283                                   | 0.657142   | 0.640708               |           |           |          |          |
|                           |                         | Palladium; Pd  | 7440-05-3  |   | 0.00157   |                      |   |  |                        | 1.500239  | 0.009859  |          |          |
|                           | RoHS exemption          | Glass  | Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monooxide; Lead(2+) oxide                             | 1317-39-8   |   |                      |   |  |                        | 0.001047  | 1.000478  | 0.006575 | 0.006575 |
|                           |                         | Silica; Silicon dioxide  | 7631-86-9  |   | 0.000338  |                      |   |  |                        | 0.300789  | 0.002129  |          |          |
| Resistive Element         | RoHS exemption          | Glass  | Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monooxide; Lead(2+) oxide                             | 1317-39-8   | 0.95153   | 0.12535              | 43.9892                                     | 0.787129   | 0.346332               |           |           |          |          |
|                           |                         |  | Ruthenium(IV) oxide; RuO <sub>2</sub>  | 12038-10-1  | 0.047894  |                      |   |  |                        | 38.2024   | 0.300691  |          |          |
|                           |                         |  | Boron oxide; B <sub>2</sub> O <sub>3</sub>   | 1303-86-2   | 0.018803  |                      |   |  |                        | 15.000399 | 0.118071  |          |          |
|                           |                         |  | Other antimony compounds   | -   | 1.869965  |                      |   |  |                        | 0.014719  | 0.009611  |          |          |
|                           |                         |  | Manganese dioxide; MnO <sub>2</sub>  | 1313-13-9   | 0.001166  |                      |   |  |                        | 0.930196  | 0.007322  |          |          |
|                           |                         |  | Lead(II) oxide; Lead oxide (PbO); C.I. Pigment Yellow 46; Lead monooxide; Lead(2+) oxide                             | 1317-39-8   | 0.047051  |                      |   |  |                        | 54.998245 | 0.295483  |          |          |
| First Protective Coating  | RoHS exemption          | Glass  | Silica; Silicon dioxide  | 7631-86-9   | 0.021801  | 0.08555              | 54.998245                                   | 0.537213   | 0.137525               |           |           |          |          |
|                           |                         |  | Boron oxide; B <sub>2</sub> O <sub>3</sub>   | 1303-86-2   | 0.011838  |                      |   |  |                        | 12.800958 | 0.069298  |          |          |
|                           |                         |  | Zinc oxide; ZnO  | 1314-13-2   | 0.003594  |                      |   |  |                        | 4.201052  | 0.022568  |          |          |
|                           |                         |  | Chromium(III) oxide; Pigment green 17 (C.I.); Cr <sub>2</sub> O <sub>3</sub>   | 1308-38-9   | 0.001968  |                      |   |  |                        | 2.30041   | 0.012358  |          |          |
|                           |                         |  | Epichlorohydrin, o-cresol, formaldehyde polymer; Formaldehyde, polymer with (chloromethyl)oxirane and 2-methylphenol | 29890-82-2  | 0.125289  |                      |   |  |                        | 68.999338 | 0.786747  |          |          |
|                           |                         |  | Ceramics   | Silica; Silicon dioxide   | 7631-86-9                                       |                      |   |  |                        | 0.041794  | 23.000331 | 0.282251 |          |
| Second Protective Coating | EP (Epoxy resin)        | Ceramics   | Carbon black; C  | 1333-86-4   | 0.014527  | 0.18158              | 68.999338                                   | 1.140219   | 0.901221               |           |           |          |          |
|                           |                         |  | Epichlorohydrin, o-cresol, formaldehyde polymer; Formaldehyde, polymer with (chloromethyl)oxirane and 2-methylphenol | 29890-82-2  | 0.003275  |                      |   |  |                        | 80.968964 | 0.020572  |          |          |
|                           |                         |  | Ceramics   | Silica; Silicon dioxide   | 7631-86-9                                       |                      |   |  |                        | 0.001138  | 30.502794 | 0.010286 |          |
|                           |                         |  | Others (Powder, etc)   | Titanium dioxide; Pigment white 6; TiO <sub>2</sub>                           | 13463-87-7                                      |                      |   |  |                        | 0.000457  | 8.510242  | 0.00287  |          |
| Marking 1                 | EP (Epoxy resin)        | Ceramics   | Silver; Ag   | 7440-22-4   | 0.16689   | 0.00537              | 80.968964                                   | 0.033728   | 0.020572               |           |           |          |          |
|                           |                         |  | Others (Powder, etc)   | Bisphenol A, epichlorohydrin polymer; Epoxy resin; Epon 820; Araldite GY 250  | 25069-38-6                                      |                      |   |  |                        | 0.14595   | 47.7      | 2.197776 |          |
|                           |                         |  | Others (Powder, etc)   | Carbon black; C   | 1333-86-4                                       |                      |   |  |                        | 0.02685   | 5.9       | 0.916472 |          |
|                           |                         |  | Other nonferrous metals  | Potassium titanate; Potassium titanium oxide; K <sub>2</sub> TiO <sub>3</sub> | 12058-51-8                                      |                      |   |  |                        | 0.01645   | 4.7       | 0.103296 |          |
| Middle Terminal           | Other nonferrous metals | Nickel; Ni   | 7440-02-0  |   | 0.501   | 0.501                | 100   | 3.145958   | 3.145958               |           |           |          |          |
|                           |                         |  | 7440-02-0  |   | 0.501   |                      |   |  |                        | 100       | 2.882225  |          |          |
| Outer Terminal            | Other nonferrous metals | Tin; Sn  | 7440-31-5  |   | 0.459   | 0.459                | 100   | 2.882225   | 2.882225               |           |           |          |          |
|                           |                         |  | 7440-31-5  |   | 0.459   |                      |   |  |                        | 100       | 2.882225  |          |          |

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