Meterial and process change approval test requirement.

Meterial	Initial electronical characteristic	External visual	Dimension	Clamping	Surge	Energy	Capaci-tance	Voltage proof	Pull strength	Bending strength	Solder-ability	Solder heat	Dry heat Loading	Temp. storage	Thermal cycle	Surge Life	Solvent resistance of marking	Component solvent resistance
Metal oxide powder	★			★	★	★	★						★	★	★	★		
Silver paste	★			★	★	★	★		★		★	★	★			★		
Solder paste	★	★		★	★	★			★		★	★	★	★	★	★		
Copper wire		★	★						★	★	★	★			★			
Epoxy	★	★	★		★			★					★		★	★	★	★
Flux	★				★								★			★		
Clear solvent	★				★											★		
Package meterial		★	★															
Process																		
Curing	★	★	★		★			★					★	★	★	★	★	★
Coating	★	★	★		★			★						★	★	★	★	★
Soldering	★	★		★	★				★		★	★	★	★	★	★		
Silver firing	★			★	★	★	★		★		★	★	★			★		
sintering	★		★	★	★	★	★						★	★	★	★		
De-binding	★			★	★	★	★						★			★		
Disk form	★	★	★	★	★	★	★						★			★		
Ball milling	★			★	★	★	★						★			★		
Marking		★															★	
Package size		★	★															

Basis Characteristic Test Items

No.	Test Item	Reference Method	Condition	S.S & Acc	Frequency
1	Initial electronically characteristic	Spec.	**Vb**: measured at a specified current(1mA or 0.1mA) **Alpha**: log(I1 / I2) / log(V1 / V2) **IL**: Maximum current with 80%Vb	Acc=0	Each lot
2	External visual	Spec.	Inspector visual by spec.	Acc=0	Each lot
3	Dimension	Spec.	Refer drawing or catalog	Acc=0	Each lot
4	Clamping	IEC 1051-1 4.6	Peak voltage across the varistor with a specified peak impulse current 8/20 micro second.	n=5; Acc=0	Each lot
5	Withstanding Surge current	IEC 1051-1 4.5	The maximum peak current that can be applied to the varistor for a single 8/20 micro second current waveform, with line voltage applied, without causing device failure.	n=5; Acc=0	Each lot
7	Capacitance	IEC 1051-1 4.7	Capacitance between the two terminals of the varistor at 1Vac and 1k Hz.	Typical	Each lot

Reliability Test Items

No.	Test Item	reference Method	Condition	S.S & Acc	Frequency (month)
1	Pull strength	IEC 1051-1 4.10.2	Pulling time 10±1 second and loading with below condition. Diameter Loading 0.6mm 0.5kg 0.8mm 1.0kg 1.0mm 2.0kg	n=16; Acc=0	6
2	Bending strength	IEC 1051-1 4.10.3	Bending 2 times and loading with below condition. Diameter Loading 0.6mm 0.5kg 0.8mm 1.0kg 1.0mm 2.0kg	n=16; Acc=0	6
3	Solderability	IEC 1051-1 4.11	Product dipping in a soldering bath of 235±5°C or 260±5°C for 10+1(D5 5±1)second and shall be 95% tinned.	n=16; Acc=0	6
4	Solder heat	IEC 1051-1 4.12	Product dipping in a soldering bath of 260±5°C for 10±1(D5 5±1)second or iron of 400±5°C for 3±0.5 second.	n=16; Acc=0	12
5	Dry heat loading	IEC 1051-1 4.17	Ambient temp: 85±5 °C Period: 1000±24 hours Voltage: operate voltage	n=16; Acc=0	12
6	Temp. storage	MIL-STD-1344A 1005.1	Ambient temp: 125±5°C or -40±5 °C Period: 1000±24 hours	n=16; Acc=0	12
7	Damp heat loading	IEC 1051-1 4.18	Ambient temp: 40±5 °C Ambient humidity: 90~95 R.H.% Period: 1000± 24 hours Voltage: operate voltage	n=16; Acc=0	24
8	Thermal cycle	IEC 1051-1 4.13	Step1: 125+5 oC(30min.) Step2: room temp(15min.) Step3: -55+5 oC(30min.) Step4: room temp(15min.) Duration 5 cycle.	n=16; Acc=0	12
9	Loading life	IEC 1051-1 4.17 JIS C 5036	Ambient temp: 125±5 °C Period: 1000±24 hours Voltage: operate voltage	n=16; Acc=0	12
10	Surge life	IEC 1051-1 4.5	Waveform: 8/20 or 10/1000 micro second Current: refer catalog V-I surge life time rating(2 times)	n=5; Acc=0	6
11	Energy	IEC 1051-1 4.5	Waveform: 10/1000 micro second Equation: J(joule) = K * Vc * Ip * T(second)	n=5; Acc=0	6
12	Voltage proof	IEC 1051-1 4.8	Loading 2500 Vac or 3500 Vac duration 60 second or 3 second and the leakage current must below 0.5 mA	n=16; Acc=0	6
13	Vibration	IEC 1051-1 4.16	The total amplitude of 1.5mm and a varying frequency of 10~55Hz(each minute) for a period 2 hours respectively in each X, Y, Z directions.	n=16; Acc=0	36
14	Solvent resistance of marking	IEC 1051-1 4.21	Solvent temperature: 23±5°C Product dipping in a solvent 5+0.5 min. Then used cotton wool attrition 10times.	n=16; Acc=0	-----
15	Component solvent resistance	IEC 1051-1 4.22	Solvent temperature: 23±5°C Product dipping in a solvent(IPA) 5+0.5 min. Then recovery in 48hours.	n=16; Acc=0	-----
16	Flammability	IEC 1051-1 4.19	Give fire to a varistor for 10 seconds, then withdraw fire. The fire on varistion shall extinguish within 5 seconds.	n=5; Acc=0	24