

GUIDE

Group	Products	Main Composition	Hybrid IC	Resistor Network	Chip Resistor	Potentiometer	High Vol. Resistance	Cemet Resistor	Printed Circuit	Flexible Circuit	Sensor	Ele. Ceramics	Heater	
Conductor Pastes	C-1002	Ag	■	■	■	■		■			■		■	
	C-1003	Ag			■									
	C-1201	Ag/Pd	■	■		■	■				■			
	C-1202	Ag/Pd	■	■		■	■							
	C-1204	Ag/Pd	■	■		■	■							
	C-1205	Ag/Pd	■	■		■	■							
	C-1206	Ag/Pd			■									
	C-1207A	Ag/Pd	■	■	■	■						■		
	C-1211	Ag/Pd	■	■	■	■	■	■				■		
	C-1220	Ag/Pd	■	■			■							
	C-1302	Ag/Pt				■		■				■		
	C-1231A	Ag/Pd/Pt	■	■		■								
	C-1231G	Ag/Pd/Pt	■	■		■	■							
	C-1232	Ag/Pd/Pt	■	■		■								
	C-1158G	Ag											■	■
	C-1160	Ag											■	
	C-1180	Ag											■	
C-1190	Ag											■	■	
C-1192	Ag											■	■	
Resistor Pastes	R-2200	RuO ₂ , Pb ₂ Ru ₂ O ₆	■	■	■			■						
	R-3100R	RuO ₂ , Pb ₂ Ru ₂ O ₆						■						
	R-3200	RuO ₂ , Pb ₂ Ru ₂ O ₆	■			■								
	R-4800	RuO ₂ , Pb ₂ Ru ₂ O ₆					■	■						
	R-5000	RuO ₂	■	■	■	■		■						
	R-6100	RuO ₂ , Pb ₂ Ru ₂ O ₆				■					■			
	R-6200	RuO ₂ , Pb ₂ Ru ₂ O ₆				■					■			
	R-7100	RuO ₂ , Pb ₂ Ru ₂ O ₆	■	■	■								■	
	R-7200	RuO ₂ , Pb ₂ Ru ₂ O ₆	■	■									■	
Dielectric Pastes	I-4337	Glass	■	■			■	■			■			
	I-4347	Glass	■	■			■	■			■			
	I-4350	Glass	■	■			■	■			■			
	I-4311	Glass	■	■	■		■	■			■			
	I-4321	Glass	■	■	■		■				■			
	I-4322	Glass	■	■	■						■			
	I-4323	Glass	■	■	■						■			
	I-4385	Glass	■											
	I-4389	Glass	■										■	
Resin Pastes	C-1630	Ag				■		■	■					
	C-1008	Ag	■	■	■			■						
	R-5800	Carbon				■		■						
	I-1821	Resin	■	■	■			■						
	I-1823	Resin	■	■	■			■						
	I-1830	Resin	■	■		■								

PASTES FOR HIBRID IC and RESISTOR NETWORK

Group	Products	Typical property
Ag Conductors	C-1002	High printability, Excellent solderability, High adhesion, Low cost, Lead free.
Lead-Free Ag/Pd Conductors	C-1201	High solder leaching, High resistance to Ag migration.
	C-1202	High printability, Excellent solderability, High adhesion.
	C-1204	Standard type, Minimal adhesion degradation after the heat cycle.
	C-1205	High printability, Excellent solderability, High adhesion.
	C-1207A	High printability, Excellent solderability, Low cost.
	C-1211	High printability, Excellent solderability, High adhesion strength
	C-1220	High solder leaching, High resistance to Ag migration, High Stability.
Resistors	R-2200 series	0.2~10Mohm/□, Low TCR's, High printability, High reliability.
Dielectrics	I-4337	Light Green , 520~530℃ firing, High printability, High laser trimming Performance.
	I-4347	Light Green, 500℃ Curing, High printability,
	I-4350	Blue, 520~530℃ firing.
	I-4311	Light Green, 600℃ Firing, High printability, High laser trimming Performance.
	I-4321	Black, 600℃ Firing, High acid resistance.
	I-4322	Dark Green, 600℃ Firing, High acid resistance.
	I-4323	White, 600℃ Firing, Marking pastes
Resin Pastes	I-4385	Blue, 850℃ Firing , Use in multilayer crossover
	I-1830	Black, 150~220℃ Curing, One component system, For coating
	I-1821	Black, 200~220℃ curing, for coating, High acid resistance.
	I-1823	Black, 200~220℃ curing, Marking pastes .
Special Require available		

PASTES FOR CHIP RESISTOR

Group	Products	Typical Property
Ag Conductors	C-1002	For primary electrode, High printability, High adhesion strength, Low cost, lead free.
	C-1003	For secondary electrode, High acid resistance, High adhesion strength.
Ag/Pd Conductors	C-1206	For primary electrode, High printability, High acid resistance .
	C-1207A	For primary electrode, High printability, High acid resistance, Low cost, Lead free.
Resistors	R-2200 series	0.2~10M ohm /□, Low TCR'S, High printability, High reliability.
Dielectric	I-4311	For primary coating, Light green, 600°C Firing, High printability, High laser trimming performance.
	I-4321	For secondary coating, Black, 600°C Firing, high acid resistance.
	I-4322	For secondary coating, Dark green, 600 °C Firing, High acid resistance.
	I-4323	Marking pastes, White, 600°C Firing, Excellent line resolution
Resin Pastes	I-1821	Black, 200~220°C curing, Good printability, Single composition type, For coating
	I-1823	White, 200°C curing, Marking pastes, Excellent line resolution
	C-1008	For secondary electrode, 200~220°C curing, High adhesion, High acid resistance.

PASTES FOR POTENTIOMETER (CERMET TRIMMER)

Group	Products	Typical Property
Lead-Free Conductors	C-1002	Ag conductor, High printability, High adhesion, Low cost.
	C-1205	Ag/Pd conductor, High printability, Excellent solderability, High adhesion, Low cost.
	C-1231A	Ag/Pd/Pt conductor, High printability, High adhesion, High reliability.
	C-1231G	Ag/Pd/Pt conductor, High adhesion, High solder leaching, High reliability.
	C-1232	Ag/Pd/Pt conductor, Excellent solderability, High reliability
	C-1302	Ag/Pt conductor, High adhesion, High adhesion, Good compatibility.
RESISTORS	R-3200W series	1.0~1M ohm /□, Significantly improved CRV and rotational life.
Special Require Available		

PASTES FOR HIGH VOLTAGE RESISTOR

Group	Products	Typical property
Ag/Pd Lead-Free Conductors	C-1220	Ag/Pd conductor, High printability, High solder leaching, High reliability
	C-1201	Ag/Pd conductor, High solder leaching, High resistance to Ag migration.
	C-1211	Ag/Pd conductor, High printability, Excellent solderability, High adhesion.
	C-1204	Ag/Pd conductor, High printability, High adhesion, Minimal adhesion degradation after the heat cycle.
	C-1205	Ag/Pd conductor, High printability, Excellent solderability, High adhesion, Low cost.
	C-1202	High printability, Excellent solderability, High adhesion.
Resistors	R-4100 series	100K~10M ohm /□, Good for high voltage resistance.
	R-4800 series	1k~100 M ohm /□, Excellent for high voltage resistance.
Dielectrics	I-4337	Light green, 520~530°C firing, High printability.
	I-4347	Light green, 500°C Firing, High printability.
	I-4311	Light green, 600°C firing, High printability.

PASTES FOR CARBON RESISTOR

Group	Products	Typical property
Conductors	C-1630	Ag conductor, 125~130°C curing, One component system.
	C-1008	Ag conductor, 200°C curing, High printability, One component system.
Resistors	R-5800	10 ~100Kohm /□, 180°C curing, Good printability.
Dielectrics	I-1830	Black, 150~220 °C curing, Good printability, Good solvent resistance.
Special Require Available		

PASTES FOR VARISTER & DISK CAPACITOR

Group	Products	Typical property
Conductors	C-1160 series	For ZnO Cycloid varister, High adhesion, High solderability.
	C-1180 series	For disk capacitor, 780~845 °C firing, High printability, High solderability, Lead-free.
	C-1190 series	用 or ZnO varister, 550~650°C firing, High printability, High adhesion
	C-1192 series	For ZnO varister, 550~650 °C firing, High printability, High adhesion, Lead-free.

CONDUCTOR PASTES

1.1 Ag CONDUCTOR PASTES

	C-1002	C-1003	C-1180 series	C-1190 series	C-1160 series	C-1158G
Ag Content (%)	72	60	55-65	65-80	60-67	60
Viscosity(kcps) SC4-14 25℃10rpm	240-360	50-100	80-200	30-150	50-120	10-50
Resistivity (m ohm /□)	≤5	≤15	≤10	≤5	≤10	≤10
Fired Thickness(μm)	8~12	8~12	8~12	8~15	9~12	8~12
Adhesion(N) 2x2mm	≥29.4		≥25	≥20	≥15	≥15
Aged Adhesion(N) ^{150℃24hrs}	≥19.6					
Solderability Φ _{4mmx2.85mm} 230℃	≥6.0		≥6.0	≥6.0	≥6.0	≥6.0
Firing(℃)	850	600	800~820	550-650	700-850	550~700
Solid Content (%)				68~87		≥55%
Thinner	V-100					

1.2 LEAD-FREE Ag/Pd CONDUCTOR PASTES

	C-1201	C-1202	C-1204	C-1205	C-1207A	C-1211
Pd/Ag	20/80	3/97	15/85	5/95	0.5/99.5	10/90
Viscosity(Kcps) SC4-14 25℃ 10rpm	170~210	170-270	180~230	170~330	220~320	230~270
Resistivity (m ohm /□)	≤20	≤10	≤20	≤10	≤5	≤10
Fired Thickness (μm)	8~12	8~12	8~12	8~12	8~12	8~12
Adhesion(N)2x2mm	≥40	≥35	≥39.2	≥39.2	≥24.5	≥39.2
Aged Adhesion(N) ^{150℃ 24hrs}	≥15	≥15	≥19.6	≥19.6	≥19.6	≥19.6
SolderabilityΦ _{4mmx2.85mm} 230℃	≥6.0	≥6.5	≥7.0	≥6.0	≥6.0	≥6.5
Solder Leach Resistance 230℃10 second 63Sn/37Pb	≥3	≥2	≥3	≥2	≥1	≥3
Firing (℃)	850					
Thinner	V-100					

1.3 LEAD-FREE Ag/Pt CONDUCTOR

	C-1302	C-1231A	C-1231G
Main Compositions	Ag /Pt	Ag /Pt/Pd	Ag /Pt/Pd
Viscosity HBT SC4-14 25 ℃ 10rpm	150~250	160~220	130~180
Resistivity (m ohm / □)	≤4	≤8	≤15
Fired Thickness (um)	8~12	8~12	8~12
Adhesion(N) 2x2mm	≥40	≥40	≥39.2
Aged Adhesion(N) 150 ℃ 24hrs	≥20	≥15	≥15
Solderability 4mmx2.85mmH230 C10 秒	≥7.0	≥6.5	≥6.5
Solder Leach Resistance 230 ℃10 second 63Sn/37Pb	≥2	≥2	≥3
Firing (℃)	850		
Thinner	V-100		

1.4 Cu / Ag CONDUCTOR

	C-9101
Main Compositions	Cu / Ag
Viscosity HBT SC4-14 25 ℃10rpm	70~150
Fog (μm)	≤8
Resistivity (m ohm / □)	≤4
Fired Thickness (μm)	13~16
Adhesion (N) 2x2mm	≥30
Thinner	V-100

2. RESISTANCE PASTES

2.1 R-2200 SERIES RESISTANCE PASTES

R-2200 series	Resistivity (Ohm /□)	Tolerance (%)	TCR (PPm/°C)	Quan-tech Noise (dB)	STOL (%)	ESD (%)	Viscosity (kcps)	Stability with load (%)			
R-2202	0.2	±15	-200~+70				100~200	±1			
R-2210	1.0		-200~+50								
R-2240	4.0										
R-2211	10		±100						≤-10	±1	±1
R-2212	100										±4
R-2213	1K										±4
R-2214	10K										±1
R-2215	100K										±1
R-2216	1M	-30	±200	≤0							
R-2217	10M										

2.2 R-3100R SERIES RESISTOR PASTES

R-3100R series	Resistivity (ohm /□)	Tolerance (%)	TCR (ppm/°C)	ESD (%)	Viscosity (Kcps)	Load life (%)	Thermal Ageing (%)	humidity Ageing (%)
			HTCR					
R-3150R	5	±15	-50~+200	±1.5	100~200	±1	±1	±1
R-3111R	10							
R-3131R	30							
R-3112R	100							
R-3113R	1K							
R-3114R	10K							
R-3115R	100K							
R-3116R	1M							

2.3 R-3200 SERIES RESISTOR PASTES

R-3200 series	Resistivity (ohm/□)	Tolerance (%)	TCR (ppm/°C)	CRV (%)	Rotational life (%)	Viscosity (Kcps)	Load Stability (%)	stability (%)
R-3212	100	±15	±100	±2	±0.5	140~220	±1	±1
R-3213	1 K							
R-3214	10 K							
R-3215	100 K		150					
R-3216	1 M							

2.4 R-3200W SERIES RESISTOR PASTES

R-3200W series	Resistivity (ohm /□)	Tolerance (%)	TCR (ppm/°C)	CRV (%)	Rotation life (%)	Viscosity (Kcps)	Load Stability (%)	Stability (%)	
								A	B
R-3210W	1	±15	-100~+200	2.0	±2	140~220	±1	±1	2
R-3250W	5								
R-3211W	10								
R-3212W	100								
R-3213W	1K								
R-3214W	10K								
R-3215W	100K								
R-3216W	1M								

2.5 R-4800 SERIES RESISTOR PASTES

R-4800 series	Resistivity (ohm/□)	Tolerance (%)	TCR (ppm/ °C)	Viscosity (Kcps)	load life (%)	High voltage load life (%)	VCR ppm/v/mm	ESD (%)
R-4813	1K	±15	positive ±150 negative -300~100	120-220	±1	±1	0~ -200 0~ -300	±1
R-4814	10K							
R-4815	100K							
R-4816	1M							
R-4817	10M							
R-4818	100M							

2.6 R-4800B SERIES RESISTOR PASTES

R-4800B series	Resistivity (ohm /□)	Tolerance (%)	TCR (ppm/°C)	Viscosity (Kcps)	Power Capacity (%)	Thermal Ageing (%)	humidity Ageing (%)	ESD (%)
R-4813B	1K	±15	-50 - 200	100-200	±1	±1	0~ -200	±1.5
R-4814B	10K							
R-4815B	100K							
R-4816B	1M							

2.7 R-5000 LEAD-FREE RESISTANCE PASTES

R5000 Series	Resistivity (ohm /□)	Tolerance (%)	Viscosity (keps)	HTCR (ppm/°C)
R-5010	1	±15%	100~200	250
R-5011	10			100
R-5012	100			100
R-5013	1K			100



2.8 R-6100 PASTE FOR LINEAR PTC THERMISTOR

Resistivity(ohm / □)	PTCR(ppm/°C)	Load Stability (%)	Explain
1.0 ±30%	≥2500	±1	TCR Test: 25~125°C (Power Capacity): 0.04W/mm ² 100Hrs
10.0 ±30%	≥1500		
1K ±30%	≥1500		
1.0K ±30%	≥1500		

2.9 R-6200 PASTE FOR LINEAR NTC THERMISTOR

Resistivity(ohm/ □)	(Hot) TCR(ppm/°C)	TCR (ppm/°C)	Explain
100 ±20%		-1000 ± 200	TCR Test: 25~125°C
1K ±20%		-1600 ±300	
10K ±20%		-1800 ±300	
100K ± 20%		-2700 ±300	
1M ±30%		-4000 ±500	
10M ±30%		-6000 ±500	

2.10 R-7100 PASTES FOR SURGE PROTECT

Resistivity (ohm / □)	0.05	0.1	0.2	0.5	1.0	5.0
Tolerance (%)	±20%					
TCR (ppm/ °C)	500 ± 200				0~300	±100
Surge Stability (%)	(Pulse)10/1000 μs、 100time					±0.1
Overglazing Drift (%)	±6.0					

2.11 R-7200 FOR HIGH POWER CAPACITY APPLICATION

R-7200 Series	Resistivity (ohm /□) Tol. : ±15%	Power Capacity	TCR (ppm/°C)	STOL (%)	ESD (%)	Load Stability (%)
R-7210	1	1W/mm ²	±250	±1	±1	±1
R-7250	5					
R-7211	10		±100			
R-7212	100					
R-7213	1K					
R-7214	10K					
R-7215	100K		±150			
R-7216	1M					



3. DIELECTRIC PASTES

3.1 LOW TEMPERATURE OVERGLAZE

	I-4337	I-4337C	I-4347	I-4347C	I-4350
Viscosity HBT SC4-14 25 °C 10 rpm	80~150Kcps				
Color	Light Green	White	Light Green	White	Blue
Print Screen Mech	200~325mesh				
Drying	100~125°C、10~15min				
Firing	520~530°C、(Peak)5min		500°C、(Peak)5min		520~530°C
Fired Thickness (um)	8~12μ m				
Thinner	V-100				

3.2 OVERGLAZE FOR CHIP RESISTOR

	(Test Method)	I-4311	I-4321	I-4322	I-4323
Specific Gravity		2.8	2.2	2.2	1.6
Viscosity (Kcps)	HBT SC4-14 25 °C 10rpm	80~150	120~200	120~200	250~400
Color		Light Green	Black	Green	White
Acid Resistant	5% H ₂ SO ₄ 30min	Good			
Print Screen Mech (Mesh)	Stainless Steel	200~250	200~250	200~250	325
Screen Thickness (μm)		70	115	115	60
Drying		100~150°C, 10~15min			
Firing		600°C, (Peak)5min			
Fired Thickness (μm)		8~12	10~15	10~15	8~12
Thinner		V-100			

3.3 DIELECTRIC PASTES

Product	I-4385	I-4389
Color	Blue	Blue
Viscosity (Kcps)	150~250	100~200
Dielectric Constant	9~15	9~15
Breakdown Voltage (V)	>400	>400
Insulation Resistance (ohm)	>10 ¹²	>10 ¹²
Dissipation Factor (%)	<1	<1
Fired(°C)	850	850
Fired Thickness(μ m)	>40	>40
Use	(Multi-layer crossover)	(Stainless steel substrates)



4 THICK FILM POLYMER PASTES

4.1 CONDUCTIVE RESIN PASTES

	C-1630	C-1008
Ag content (%)	70	65
Viscosity (Kcps) SC 4-14 25°C 10rpm	15-30	80~150
Resistivity (m ohm /□)	≤30	≤150
Curing Thickness (μm)	10-25	20~25
Adhesion(N) ^{2x2mm}	Good	Good
Curing Temperature (°C)	150 - 180	200
Thinner	V-100	

4.2 RESISTANCE RESIN PASTES

R-5800* series	Resistivity (ohm /□)	Tolerance (%)	TCR (ppm/°C)	Curing Temperature (°C)	Viscosity (Kcps)
R-5811	10	±30	±800	130	30 - 130
R-5821	20				
R-5851	50				
R-5812	100				
R-5852	500				
R-5813	1K				
R-5814	10K				
R-5854	50K				
R-5815	100K				

* R-5800E is for flexible substrate; Curing Temperature: 180 °C

4.3 DIELECTRIC RESIN PASTES

	I-1821	I-1823	I-1835	I-1835G	I-1830
Color	Black	White	Blue	Green	Black
Viscosity HBT SC4-14 25 °C 10 rpm	80~150Kcps				
Print Screen Mech	200~325 mesh				
Drying	100~150°C、10~15min				
Curing	200~220°C、30min~80min				
Curing film thickness	20~50 μ m				
Thinner	V-1 V-252				V-0
Storage	0~10°C				