

List of Characteristic Values

		Condition	Unit	Al ₂ O ₃					Al ₂ O ₃ /ZrO ₂		AlN			Si ₃ N ₄
				AS970	HA-96-2	HBS	HRA	HA-996	ZTA	HRZ	AN-170	AN-200	AN-230	SN-90
Material		-	-	96.5%	96%	96.5%	96%	99.6%	Al ₂ O ₃ /ZrO ₂	Al ₂ O ₃ /ZrO ₂	AlN	AlN	AlN	Si ₃ N ₄
Color		-	-	White	White	White	White	White	White	White	Gray	Gray	Beige	Gray
Bulk density		-	g/cm ³	3.74	3.75	3.75	3.60	3.90	4.00	3.85	3.30	3.30	3.30	3.22
Surface roughness Ra		-	μm	0.4	0.4	0.3	0.3	0.1	0.2	0.2	0.2	0.3	0.3	0.4
Reflectivity		0.3-0.4mmt	%	70	70	70	85	75	80	87	35	-	-	-
		0.8-1.0mmt		80	80	80	95	85	90	97	25	-	-	-
Mechanical	Bending strength	3-point method	MPa	450	400	500	370	470	700	550	450	400	350	800
	Modulus of elasticity	-	GPa	330	330	330	-	330	310	-	320	-	-	310
	Vickers hardness	-	GPa	14	14	14	-	16	15	14	11	11	11	15
	Fracture toughness	IF method	MPa·m ^{1/2}	3.0	3.0	-	-	-	3.5	-	3.0	2.6	2.4	6.5
Thermal	Coefficient of thermal expansion	40-400°C	10 ⁻⁶ /K	6.7	6.7	6.7	6.7	6.8	7.1	7.1	4.6	4.6	4.6	2.6
		40-800°C		7.8	7.8	7.8	7.8	7.9	8.0	8.0	5.2	5.2	5.2	3.1
	Thermal conductivity	25°C	W/(m·K)	24	24	24	20	29	27	23	180	200	230	85
		300°C		12	12	12	-	13	16	-	120	130	145	-
	Specific heat	25°C	J/(kg·K)	750	750	750	750	780	720	720	720	720	720	680
Electrical	Dielectric constant	1MHz	-	9.8	9.8	9.8	-	9.9	10.2	-	8.5	8.5	8.5	7.8
	Dielectric loss factor	1MHz	10 ⁻³	0.2	0.2	0.2	-	0.2	0.2	-	0.3	0.3	0.3	0.4
	Volume resistivity	25°C	Ω·cm	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹³	>10 ¹⁴
	Breakdown strength	DC	kV/mm	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15	>15
Use/Apprication				Thin Film Metalized Substrates	Glazed Substrates / Thin Film Metalized Substrates	Substrates for Heat Dissipation / Substrates for LED Packages	Substrates for LED Packages	Thin Film Metalized Substrates	Substrates for Heat Dissipation / Substrates for LED Packages	Substrates for LED Packages	Substrates for Heat Dissipation / Substrates for LED Packages / Thin Film Metalized Substrates / Substrates for Power Resistors			Thick Film Substrates / Substrates for Heat Dissipation