

# VT-4A

UL Approval: E214381 Version: B6

## Aluminum Base Laminate/Prepreg

### General Information

- > VT-4A1 / VT-4A1 PP: Thermal Conductivity - 1.6W/mK, MOT 90°C
- > VT-4A2 / VT-4A2 PP: Thermal Conductivity - 2.2W/mK, MOT 90°C
- > VT-4A2H / VT-4A2H PP: Thermal Conductivity - 2.2W/mK, MOT 105°C
- > Excellent Electrical and Mechanical Characteristics
- > Flammability UL94 V0
- > Halogen Free

### Application

- > Ultra bright LED Substrate
- > Power Conversion
- > PDP, LED, Regulator for TV
- > Monitor Drives
- > Rectifier, Power Supply

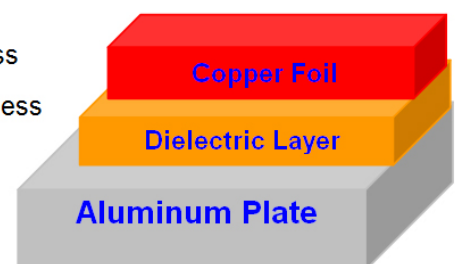
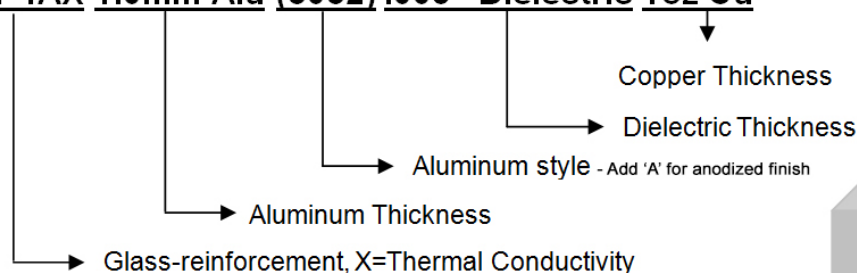
### Storage Condition & Shelf Life

		Prepreg		Laminate
Storage Condition	Temperature	< 23°C (73°F)	< 5°C (41°F)	Room
	Relative Humidity	< 55%	/	/
Shelf Life		3 Months	6 Months	24 months

The RCC & RCF exceeding shelf life should be retested.

### Designation of IMS Laminate

**VT-4AX 1.0mm Alu (5052) .003" Dielectric 1oz Cu**



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### Laminate Properties

Item	Test Method (IPC-TM-650)	Unit	VT-4A1				VT-4A2				VT-4A2H			
			75um	100um	125um	150um	75um	100um	125um	150um	75um	100um	125um	150um
Thermal Conductivity	ISO 22007-2	W/m*K	1.6				2.2				2.2			
Thermal Impedance	ISO 22007-2	°C*in <sup>2</sup> /W	0.074	0.099	0.123	0.148	0.054	0.072	0.089	0.107	0.054	0.072	0.089	0.107
Tg	DSC	2.4.25	130				130				130			
Td	TGA	ASTM D3850	380				380				380			
Thermal Stress	Solder Dip @ 288°C	2.4.13.1	≥5				≥5				≥5			
Hi-Pot Withstand	DC	2.5.7.2	4500	5000	6000	8000	4500	5000	6000	8000	4500	5000	6000	8000
Breakdown Voltage	AC	2.5.6.3	6000	7500	9000	10000	6000	7500	9000	10000	6000	7500	9000	10000
Dk @ 1MHz	C-24 / 23 / 50	2.5.5.3	5.0				5.1				5.1			
Df @ 1MHz	C-24 / 23 / 50	2.5.5.3	0.015				0.014				0.014			
Volume Resistance	After Moisture	2.5.17.1	4.5E+8				5.1E+8				5.1E+8			
	E-24/125		2.3E+7				3.1E+7				3.1E+7			
Surface Resistance	After Moisture	2.5.17.1	2.2E+7				2.3E+7				2.3E+7			
	E-24/125		5.1E+6				5.2E+6				5.2E+6			
Peel strength (1oz)	As received	2.4.8	12				12				12			
CTI	As received	ASTM D3638	600				600				600			
Flammability	As received	UL 94	V0				V0				V0			
RTI	Electric	UL 94	90				90				105			
	Mechanical	UL 94	90				90				105			

All test data provided are typical values and not intended to be specification values.

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### Availability

### Laminate

Item		Availability
Dielectric		.003"([75um), .004"([100um), .005"([125um), .006"([150um), .008"([200um)
Standard Size	Imperial	18.11*24.02, 20.08*24.02, 20.98*24.02, 18.11*48.03, 20.08*48.03, 20.98*48.03
	Metric	460*610, 510*610, 533*610, 460*1220, 510*1220, 533*1220
Copper Weight		Hoz, 1oz, 2oz, 3oz, 4oz, 6oz, 10oz
Aluminum Thickness		0.6mm, 0.8mm, 1.0mm, 1.2mm, 1.5mm, 2.0mm, 3.0mm
Aluminum Alloy		1100, 5052, or as required

### Prepreg

Product	Pressed Thickness (um)	Glass Fabric	Application
VT-4A1	75	106	Circuit Clearance Fill
VT-4A2	100	106	Circuit Clearance Fill
	125	106	Hole Fill
VT-4A2H	125	106	Hole Fill
	150	106	Hole Fill

### Protective Film for Aluminium Plate

Type	Material	Max Operation Temperature
Standard	PET	170 °C
High Temperature	Polyimide	270 °C

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### Aluminum and Aluminum Alloy Information

#### Major Chemical Composition

Alloy Code	Composition	Alloy Code	Composition
1100	Al, Si, Fe, Cu, Zn, Mn	5052	Al, Mg, Fe, Si, Cr, Cu, Zn
3003	Al, Mn, Si, Fe, Cu, Zn	6061	Al, Mg, Si, Fe, Cr, Cu, Zn, Ti, Mn

#### Calorific & Electrical Performance

Alloy	Melting Point Range [°C]	CTE (ppm/°C)		Cp (J/g-°C)	Thermal Conductivity (W/m-K)	Resistivity (Ω-cm)
		20~100°C	20~300°C			
1100	643~657.2	23.6	25.5	0.904	220	3.00E-6
3003	643~654	23.2	25.1	0.893	163	4.16E-6
5052	607.2~649	23.8	25.7	0.880	138	4.99E-6
6061	582~651.7	23.6	25.3	0.896	167	3.99E-6

#### Mechanical Performance

Alloy	Hardness (HB)	Ultimate Tensile Strength (MPa)	Tensile Yield Strength (MPa)	Elongation at Break 1.6mm (%)	Elastic Modulus (GPa)	Poisson Ratio	Fatigue Strength (MPa)	Shear Modulus (GPa)	Shear Strength (MPa)
1100H24	32	124	117	9	68.9	0.330	48.3	26.0	75.8
3003H24	40	152	145	8	68.9	0.330	62.1	25.0	96.5
5052H32	68	262	214	10	70.3	0.330	124	25.9	145
6061T6	95	310	276	12	68.9	0.330	96.5	26.0	207

\*Number of cycles: 5.0E+8

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