ARLON
MICROWAVE MATERIALS

25N/25FR®

High Frequency, Low Loss Thermoset Laminates and Prepreg for Double Sided, Multilayer and Mixed Dielectric Printed Circuit Boards

Features:

- Low Loss Ceramic-Filled Thermoset Resin
- Tight Dielectric Tolerance Control
- Excellent Dimensional Stability
- Excellent Price/Performance Ratio

Benefits:

- Greater Signal Integrity
- Wider Eye Patterns
- Excellent Dimensional Stability
- Utilizes Standard FR-4 Processes
- Excellent Thermal Properties

Typical Applications:

- Cellular Base Station Antennas, Power Amplifiers, Down Converters
- High Speed Backplanes

Standard Laminate Thickness (inches)		
25N	25FR	Tolerance
0.0060	0.0060	±0.0007
0.0080	0.0080	±0.0010
0.0100	0.0100	±0.0010
0.0120	0.0120	±0.0015
0.0180	0.0180	±0.0020
0.0200	0.0200	±0.0020
0.0240	0.0240	±0.0020
0.0300	0.0300	±0.0030
0.0600	0.0580	±0.0040

**Restrictions apply. Contact customer service for more details.*

Arlon 25N and 25FR are woven fiberglass reinforced, ceramic-filled composite materials engineered for use in microwave and RF multilayer printed circuit boards. Combining a non-polar thermoset resin system with a controlled-expansion ceramic filler, 25N and 25FR offer low dielectric constant and loss combined with a low Thermal Coefficient of Dielectric Constant (TCEr) for signal stability over a wide ambient temperature range. Designed for use in multilayer packages, 25N and 25FR offer prepregs that are identical in chemical composition and physical properties with their copper clad laminates for a completely homogeneous finished package for optimal signal integrity.

The low dielectric constant (Er) and loss properties, low thermal coefficient of dielectric constant (TCEr), and excellent physical stability characteristics offered by 25N and 25FR materials make them ideal for wireless and digital applications, such as cellular telephones, down converters, low noise amplifiers, antennas and other advanced design circuits.

Processing for 25N and 25FR materials is consistent with processing for standard high temperature thermoset based printed circuit board substrates.

Typical Properties: 25N/25FR				
Property	**Test Method**	**Condition**	**25N**	**25FR**
Dielectric Constant @10GHz	IPC TM-650 2.5.5.5	C23/50	3.38	3.58
Dissipation Factor @10 GHz	IPC TM-650 2.5.5.5	C23/50	0.0025	0.0035
Thermal Coefficient of Er (ppm/°C)	IPC TM-650 2.5.5.5 Adapted	-10°C to +140°C	-87	50
Peel Strength (lbs./ in)	IPC TM-650 2.4.8	After Thermal Stress	5	5
Volume Resistivity (MΩ-cm)	IPC TM-650 2.5.17.1	A	1.98 x10^{9}	4.17 x 10^{8} (12 mil)
Surface Resistivity (MΩ)	IPC TM-650 2.5.17.1	A	4.42 E8	8.9 x 10^{8} (12 mil)
Tensile Strength (kpsi)	ASTM D-882	A, 23°C	16.1	14
Flexural Strength (psi)	ASTM D-790	A, 23°C	30195	35024
Density (g/cm^{3})	ASTM D-792 Method A	A, 23°C	1.7	1.8
Water Absorption (%)	IPC TM-650 2.6.2.1	E1/105 + D24/23	0.09	0.09
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis	IPC TM-650 2.4.24	Before Tg	 15 15 52	 16 18 59
Thermal Conductivity	ASTM E-1225	100°C	0.45	0.45
Outgassing Total Mass Loss (%) Collected Volatile Condensable Material (%) Water Vapor Recovered (%) Visible Condensate (±)	ASTM E-595-90 Maximum 1.00% Maximum 0.10%	125°C, ≤10^{-6} torr	 0.17 0.01 0.02	 0.24 0.00 0.07
Flammability UL File E 80166	UL 94 Vertical Burn IPC TM-650 2.3.10	C48/23/50, E24/125	N/A	UL94-V0

Material Availability:

25N and 25FR materials are available in rigid or thin copper-clad laminates or B-stage bonding plies (prepregs), making them ideal for single- and double-sided PWBs and complex multilayer circuits, including dual offset strip line circuitry. Laminates are supplied with 1/2, 1, or 2 ounce H.T.E. electrodeposited copper on both sides. Contact customer service about other laminate options.

Prepregs are available in rolls or precut panels. The table on the right lists available prepreg styles and typical thicknesses.

Prepreg Thickness (inches)		
Glass Style	**25N**	**25FR**
1080	0.0039	0.0039
2112	0.0058	0.0058
2313	0.0067	0.0067

Results listed above are typical properties; they are not to be used as specification limits. The above information creates no expressed or implied warranties. The properties of Arlon laminates may vary, depending on the design and application.

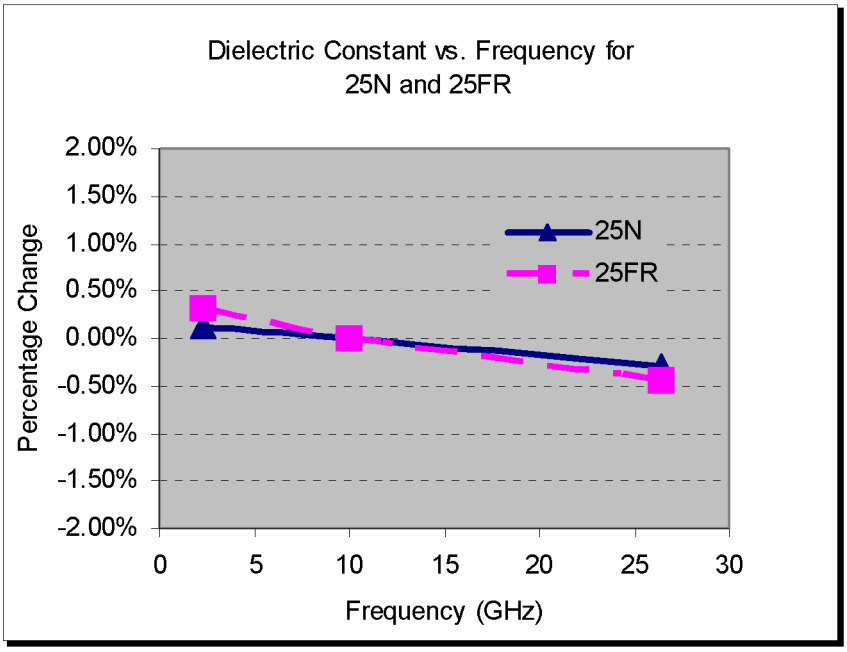

Figure 1

Demonstrates the Stability of Dielectric Constant across Frequency. This information was correlated from data generated by using a free space and circular resonator cavity. This characteristic demonstrates the inherent robustness of Arlon Laminates across Frequency, thus simplifying the final design process when working across EM spectrum. When transitioning from FR-4 designs to higher frequency, the stability of the Dielectric Constant of 25N/25FR over frequency ensures easy design transition and scalability of design.

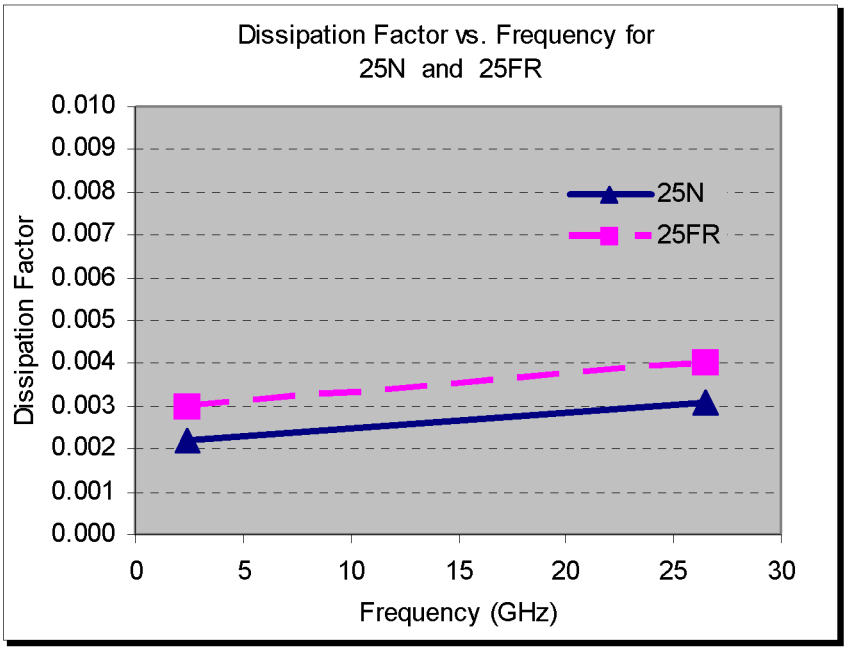

Figure 2

Demonstrates the Stability of Dissipation Factor across Frequency. This characteristic demonstrates the inherent robustness of Arlon Laminates across Frequency, providing a stable platform for high frequency applications where signal integrity is critical to the overall performance of the application.

ARLON
MATERIALS FOR ELECTRONICS

CONTACT INFORMATION:

For samples, technical assistance, customer service or for more information, please contact Arlon Materials for Electronics Division at the following locations:

NORTH AMERICA:
Arlon, Inc.
Electronic Substrates
9433 Hyssop Drive
Rancho Cucamonga, CA 91730
Tel: (909) 987-9533
Fax: (909) 987-8541

Arlon, Inc.
Microwave Materials
1100 Governor Lea Road
Bear, DE 19701
Tel: (800) 635-9333
Outside U.S. & Canada: (302) 834-2100
Fax: (302) 834-2574

EUROPE:
Arlon, Inc.
44 Wilby Avenue
Little Lever
Bolton, Lancaster BL31QE
United Kingdom
Tel: (44) 120-457-6068
Fax: (44) 120-479-6463

SOUTHERN CHINA:
Arlon, Inc.
Room 805, Unit 3, Bldg 4
Liyuan, Xincun Holiday Road
Huaqiao Cheng, Shenzhen 518053
China
Tel/Fax: (86) 755-269-066-12

NORTHERN CHINA:
Arlon, Inc.
Room 11/401, No. 8
Hong Gu Road
Shanghai, China 200336
Tel/Fax: (86) 21-6209-0202

2005 Rev C

Or visit us on the web at:
www.arlon-med.com