fastRise™ DS

Dimensionally stable lowest loss glass-reinforced prepreg

fastRise™ DS is a thermally stable, industry leading low loss (DF = 0.0018 @ 10 GHz), low temperature prepreg (215 ºC lamination temperature) that is designed to enable the creation of very low loss stripline structures when combined with TSM-DS laminate core material (DF = 0.0010 at 10 GHz). fastRise™ DS is a ceramic filled material with very low fiberglass content (~7 wt%) that rivals the best epoxy materials for registration alignment when fabricating large format advanced multilayers.

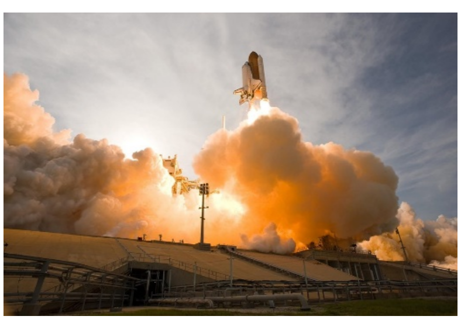
fastRise™ DS is a low flow prepreg that is suitable for Microvia formation and foil lamination. The low fiberglass content does not yield an unusual level of defects normally associated with lasing through fiberglass.

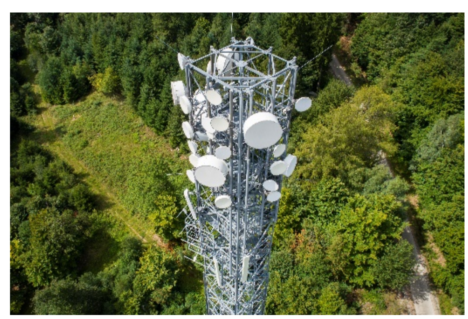
Benefits

- Industry Best DF = 0.0018 at 10 GHz
- 215 ºC lamination temperature reduces cost
- Rivals epoxy in dimensional consistency and predictability of registration
- Low X – Y CTEs for ceramic chip packaging
- Temperature stable DK +/- 0.19% (-30 to 110 ºC)
- Low 7 wt% fiberglass
- Low PTFE content (< 25 wt%)

Applications

- Military
- Phase Array Antennas
- mmWave Antenna/Automotive
- Semiconductor/ATE testing





Asia/Australia
Korea Taconic Company
Republic of Korea
Tel: +82-31-704-1858
sales@taconic.co.kr
www.agc-multimaterial.com

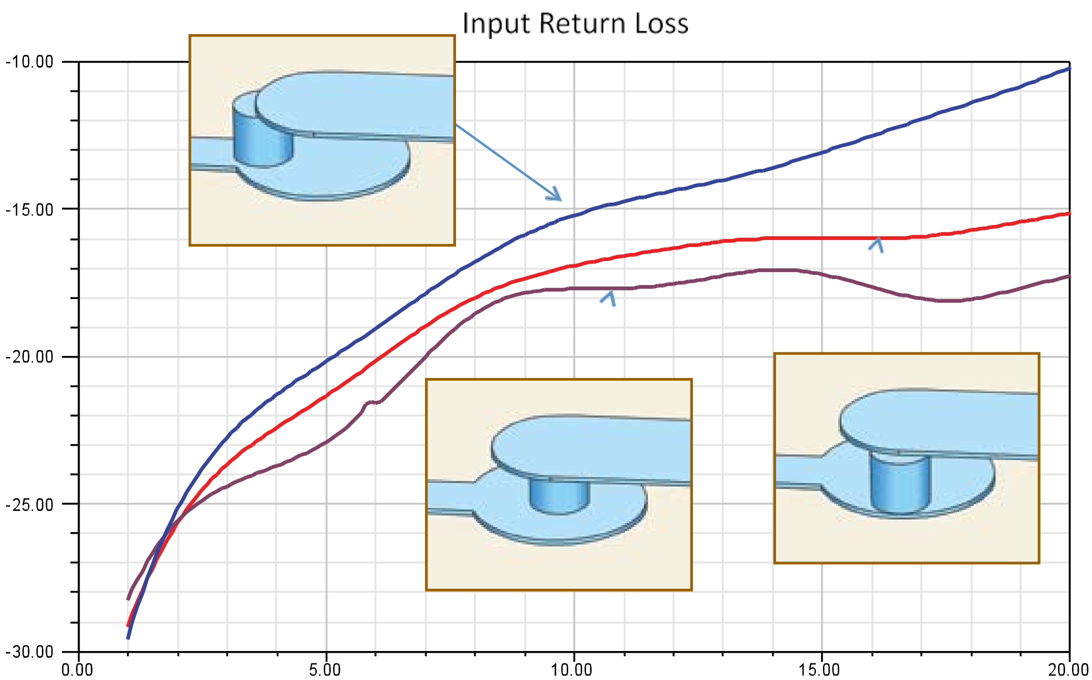
China
AGC Multi Material (Suzhou) Inc.
Suzhou City, China
Tel: +86-512-286-7170
tssales@taconic.co.kr
www.agc-multimaterial.com

Europe/Middle East
AGC Multi Material Europe SA
Lannemezan, France
Tel: +33-05-6298-5290
neltecsasales@agc-nelco.com
www.agc-multimaterial.com

North&South America
AGC Nelco America Inc.
Tempe, AZ USA 85281
Tel: +602-679-9196
TaconicPO@agc-nelco.com
www.agc-multimaterial.com

fastRise™ DS TYPICAL VALUES					
Property	**Test Method**	**Unit**	**Value**	**Unit**	**Value**
Pressed Thickness Between Ground Planes		mils	5.0		
Dk @ 10 GHz	IPC-650 2.5.5.5.1 (modified)		2.96		2.96
Dk @ 40 GHz	IPC-650 2.5.5.5.1 (modified)		2.81		2.81
T_cK (-30 to 100 ºC)	IPC-650 2.5.5.5.1 (modified)	ppm/ºC	15	ppm/ºC	15
Df @ 10 GHz	IPC-650 2.5.5.5.1 (modified)		0.0018		0.0018
Df @ 40 GHz	Damaskos Open Resonator		0.0030		0.0030
Dielectric Breakdown	ASTM D 149/IPC-650 2.5.6	kV	61.6	kV	61.6
Dielectric Strength	ASTM D 149 (Through Plane)	V/mil	814	V/mm	32,047
Moisture Absorption	IPC-650 2.6.2.1	%	0.10	%	0.10
Flexural Strength (MD)	ASTM D 790(02)	psi	17,200	N/mm^2	118.59
Flexural Strength (CD)	ASTM D 790(02)	psi	8,360	N/mm^2	57.64
Tensile Strength (MD)	ASTM D 3039/IPC-650 2.4.19	psi	12,400	N/mm^2	85.49
Tensile Strength (CD)	ASTM D 3039/IPC-650 2.4.19	psi	4,870	N/mm^2	33.58
Elongation at Break (MD)	ASTM D 3039/IPC-650 2.4.19	%	2.93	%	2.93
Elongation at Break (CD)	ASTM D 3039/IPC-650 2.4.19	%	1.14	%	1.14
Young's Modulus (MD)	ASTM D 3039/IPC-650 2.4.19	psi	968,000	psi	968,000
Young's Modulus (CD)	ASTM D 3039/IPC-650 2.4.19	psi	803,000	psi	803,000
Poisson's Ratio (MD)	ASTM D 3039/IPC-650 2.4.19		0.256		0.256
Poisson's Ratio (CD)	ASTM D 3039/IPC-650 2.4.19		0.185		0.185
Thermal Conductivity	ASTM F433	W/M*K	0.36	W/M*K	0.36
DimensionalStability(MD)	IPC-650 2.4.39 (After Bake)	mils/in.	-0.8	mm/M	-0.8
Dimensional Stability (CD)	IPC-650 2.4.39 (After Bake)	mils/in.	-1.3	mm/M	-1.3
DimensionalStability(MD)	IPC-650 2.4.39 (Thermal Stress)	mils/in.	-1.5	mm/M	-1.5
Dimensional Stability (CD)	IPC-650 2.4.39 (Thermal Stress)	mils/in.	-2.5	mm/M	-2.5
Surface Resistivity	IPC-6502.5.17.1 (aftertemp./humidity)	Mohms	8.22×10^6	Mohms	8.22×10^6
Volume Resistivity	IPC-6502.5.17.1 (aftertemp./humidity)	Mohms/cm	1.01×10^8	Mohms/cm	1.01×10^8
CTE (X axis) (25 to 125 ºC)	IPC-650 2.4.41/TMA	ppm/ºC	10	ppm/ºC	10
CTE (Y axis) (25 to 125 ºC)	IPC-650 2.4.41/TMA	ppm/ºC	17	ppm/ºC	17
CTE (Z axis) (25 to 125 ºC)	IPC-650 2.4.41/TMA	ppm/ºC	66	ppm/ºC	66
Density (Specific Gravity)	ASTM D 792	g/cm^3	1.83	g/cm^3	1.83
Hardness	ASTM D 2240 (Shore D)		80.8		80.8
T_d (2% wt loss)	IPC-650 2.4.24.6 (TGA)	ºF	788	ºC	420
T_d (5% wt loss)	IPC-650 2.4.24.6 (TGA)	ºF	856	ºC	458
Resin Flow	IPC-650 2.3.17	%	5.0	%	5.0

Remark : All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

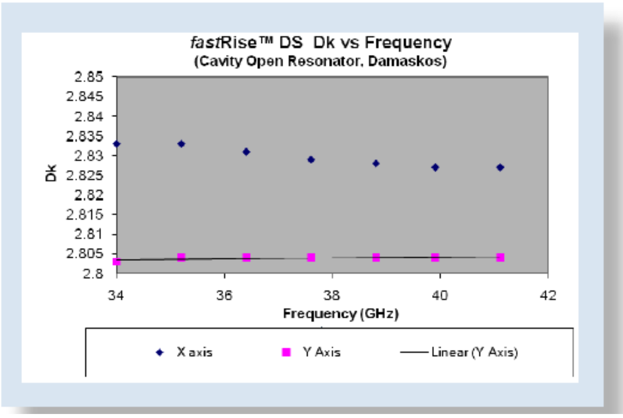


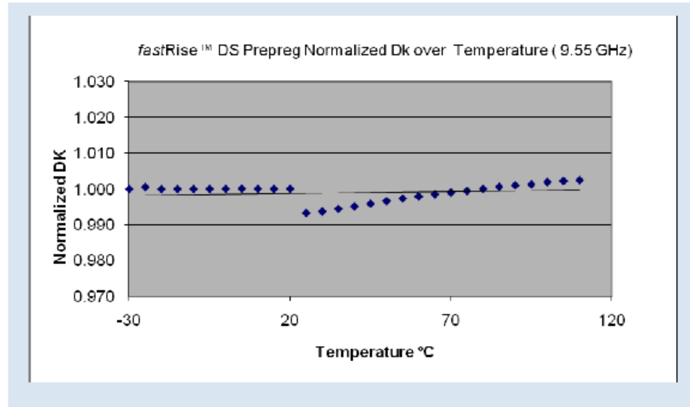
RF designers use stripline structures for the following reasons:

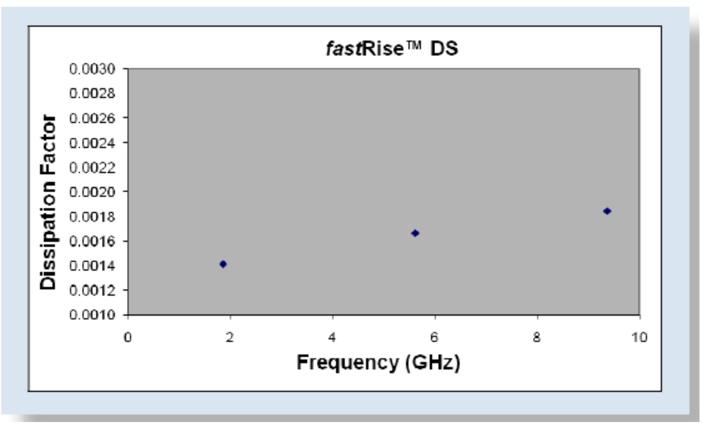
1. Allow densification
2. Eliminate cross talk between multiple channels
3. Create more confined fields
4. EM field distribution is more symmetrical, offering better control over even/odd mode impedances
5. Stripline structures do not radiate as readily
6. Allow for broadband multi-octave couplers and filters

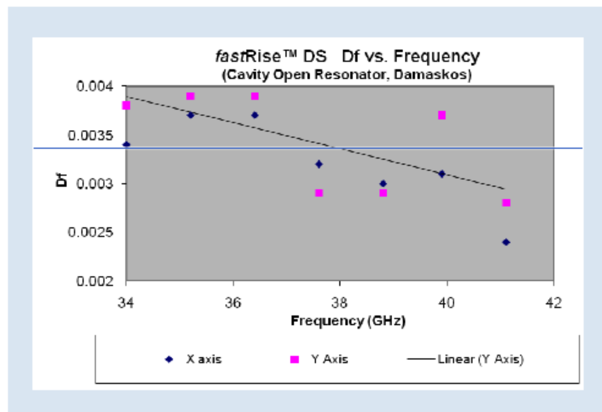
To achieve these goals without compromising RF properties, registration is critical to stripline structures. Fusion bonding is the melting of PTFE cores with PTFE unclad “prepregs” or modified PTFE materials like FEP or PFA. Similar prepregs are available with high levels of FEP, PFA or PTFE to enable the bonding. Pure PTFE is the worst case with fusion bonding in the 350-400 ºC range. FEP is the lowest temperature material suitable for fusion bonding at 295 ºC. FEP and PFA both lead to thermal shock problems and drilling defects**. FEP, PFA and PTFE melt during drilling causing drill smear and reliability risks, FEP being the lowest melting of the group (mp = 255 ºC). fastRise™ DS contains no FEP or PFA and contains less than 25% PTFE.

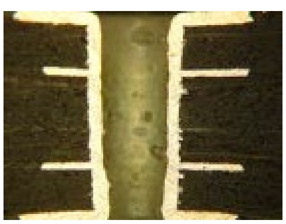
** For more information, please visit www.agc-multimaterial.com and view Technical Topic:
TSM-DS Manufactured with Various Prepregs.



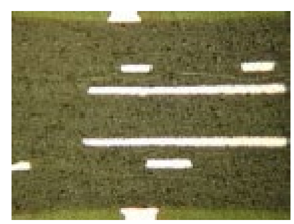


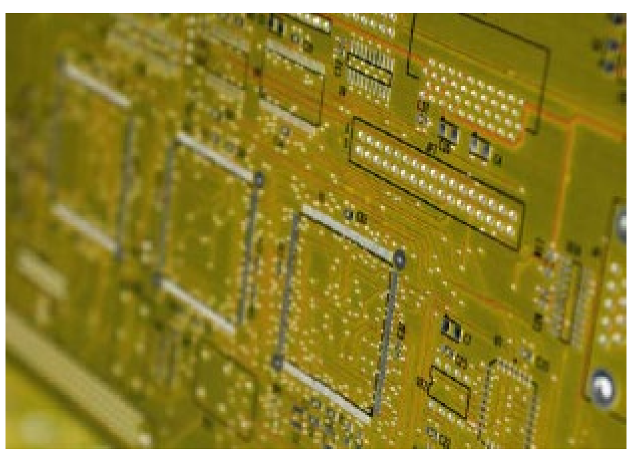






6 mil Microvia laser ablated by Micron Technology, Inc. Preliminary data suggests that the optimal lasing conditions are a combination of CO_2 and UV lasers.





*PWB fabrication and development courtesy of **Delta Circuits, Fairfield, NJ.**
PWBs passed 5X lead free SMT assembly cycles with no defects; 100% electrical retest passed.