



# GORE™ Prepreg

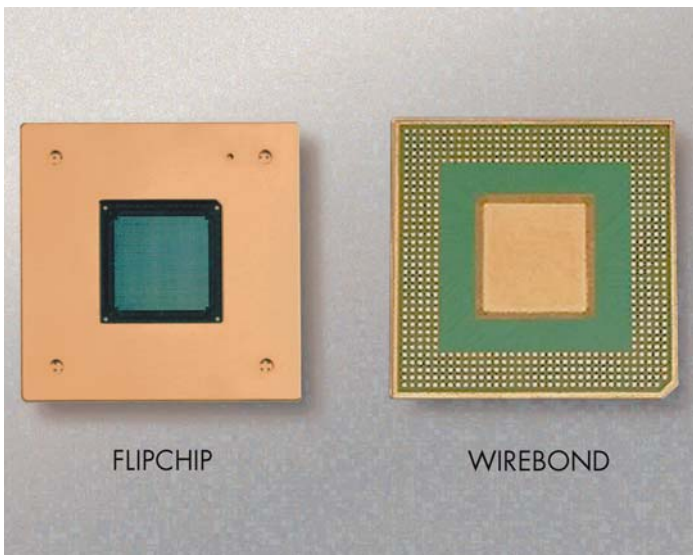
## G410

## Summary

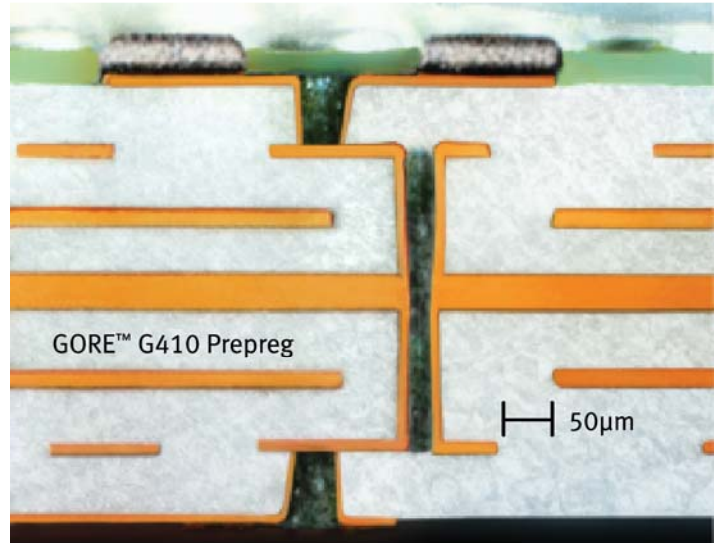
GORE™ G410 Prepreg allows production of reliable, high performance, single-chip substrate packages using modified printed circuit board construction techniques. GORE™ G410 Prepreg delivers the high performance organic substrate at a reasonable cost.

### TYPICAL APPLICATIONS

- Thin-core and coreless chip package substrates
- Telecom and computing ASIC
- Wirebond and flipchip SCM and MCM



Photograph courtesy of 3M Company



### FEATURES AND BENEFITS

- Excellent dimensional stability for fine line processing
- Stable Dk and Df over a wide frequency range
- CTE matched to copper in X, Y, and Z-axis, allowing high aspect ratio vias
- Superior thickness control for superior power distribution impedance
- Proven moisture reliability
- High Tg (225°C)
- Processes with standard PWB techniques



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### TYPICAL MATERIAL PROPERTIES

Property		Method	Value*
Dielectric constant	500MHz	Split post resonant cavity	3.4
	10GHz	Kent cavity	3.4
	40GHz	DI Model 600T Open Resonator	3.3
Loss tangent	500MHz	Split post resonant cavity	0.008
	10GHz	Kent cavity	0.008
	40GHz	DI Model 600T Open Resonator	0.008
Glass transition temperature (Tg)		TMA	220°C
Coefficient of thermal expansion (CTE)		TMA (-55 to +125°C)	19 ppm/°C (X, Y, Z)
Thermal conductivity		(-67 to +257°F) ASTM E1530 at 20°C (68°F)	0.46 W/mK
Flammability		UL	94 V-0**
Tensile modulus		at 25°C (77°F)	12.2 GPa
Moisture absorption		24-hr. immersion, 20°C	0.17% w/w
Peel strength		IPC-TM-650 Method 2.4.9 17 µm copper (1/2 oz)	0.6 Kg/cm
Pressed thickness		IPC-TM-650 Method 2.4.38	63 µm

\*Typical properties are not specification limits, but nominal performance values

\*\* Tested to UL flammability requirements by an independent lab

### SUBSTRATE RELIABILITY INFORMATION

Item	Test Method	Condition	Result
Preconditioning	JEDEC JESD22-A113A Level 3	30°C; 60% RH; followed by 3 reflows at 225°C	Pass
Thermal shock	JESD22-A106A Condition C	15 cycles; -55°C to +125°C; liquid-to-liquid	Pass
Thermal cycling	JESD22-A104A Condition B	3,000 cycles; -55°C to +125°C; air-to-air	Pass
Pressure cooker test	JEDEC JESD22-A102B	168 hrs; 15 psig; 121°C	Pass
High Temperature Storage (HST)	JESD22-A103A	150°C; 1,000 hrs	Pass
Temperature Humidity Bias (THB)	JEDEC JESD22-A101A	85°C; 85% RH; 1,000 hrs; 5V bias	Pass
Solderability	MIL-STD-883 Method 2003	8 hrs steam aging; in solder followed by immersion	Pass
Highly Accelerated Temperature and Humidity (HAST)	JESD22-A110A	130°C; 85% RH; 5V; 96 hrs	Pass

### ROHS STATUS

RoHS Material*	Pass/Fail
Lead (Pb) Content	Pass
Cadmium (Cd) Content	Pass
Hexavalent Chromium (Cr6) Content	Pass
Mercury (Hg) Content	Pass
Bromine Compounds	Pass

\*W. L. Gore & Associates declares that we do not intentionally add substances listed in Directive 2002/95/EU to GORE™ G410 Prepreg. Independent lab tests have been performed and results are available upon request.

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