FR408
High Performance Laminate and Prepreg

FR408 is a high-performance FR-4 epoxy laminate and prepreg system designed for advanced circuitry applications.

Its low dielectric constant (Dk) and low dissipation factor (Df) make it an ideal candidate for broadband circuit designs requiring faster signal speeds or improved signal integrity. FR408 is compatible with most FR-4 processes. This feature allows the use of FR408 without adding complexity to current fabrication techniques.

Product Attributes
Legacy Materials

Typical Market Applications

ORDERING INFORMATION:
Contact your local sales representative or visit www.isola-group.com for further information.

Isola Group
3100 West Ray Road
Suite 301
Chandler, AZ 85226
Phone: 480-893-6527
Fax: 480-893-1409
info@isola-group.com

Isola Asia Pacific (Hong Kong) Ltd.
Unit 3512 - 3522, 35/F
No. 1 Hung To Road, Kwn Tong,
Kowloon, Hong Kong
Phone: 852-2418-1318
Fax: 852-2418-1533
info.hkg@isola-group.com

Isola GmbH
Isola Strasse 2
D-52348 Düren, Germany
Phone: 49-2421-8080
Fax: 49-2421-808164
info-dur@isola-group.com

Data Sheet
Tg 180°C
Td 360°C
Dk 3.67
Df 0.0120

IPC-4101 - / 24 / 121 / 124
UL - File Number E41625

Last Updated May 17, 2019
Revision No: C

Product Features
- Industry Recognition
  - UL File Number: E41625
  - Qualified to UL’s MCIL Program
  - RoHS Compliant
- Performance Attributes
- Processing Advantages
  - FR-4 process compatible
  - UV blocking and AOI fluorescence

Product Availability
- Standard Material Offering: Laminate
  - 2 to 125 mil (0.05 to 3.2 mm)
  - Available in full size sheet or panel form
- Copper Foil Type
  - HTE Grade 3
  - RTF (Reverse Treat Foil)
- Copper Weight
  - ½ to 2 oz (18 to 70 µm) available
  - Heavier copper available
  - Thinner copper foil available
- Standard Material Offering: Prepreg
  - Roll or panel form
  - Tooling of prepreg panels
- Glass Fabric Availability
  - E-glass
  - Square weave glass
# FR408 Typical Values

<table>
<thead>
<tr>
<th>Property</th>
<th>Typical Value</th>
<th>Units</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Transition Temperature (Tg) by DSC</td>
<td>180</td>
<td>°C</td>
<td>2.4.25C</td>
</tr>
<tr>
<td>Decomposition Temperature (Td) by TGA @ 5% weight loss</td>
<td>360</td>
<td>°C</td>
<td>2.4.24.6</td>
</tr>
</tbody>
</table>
| Time to Delaminate by TMA (Copper removed) | A. T260 60
B. T288 15 | Minutes | 2.4.24.1 |
| Z-Axis CTE | A. Pre-Tg 60
B. Post-Tg 228
C. 50 to 260°C, (Total Expansion) 3.5 | ppm/°C, ppm/% | 2.4.24C |
| X/Y-Axis CTE | Pre-Tg 13 | ppm/°C | 2.4.24C |
| Thermal Conductivity | 0.4 | W/mK | ASTM E1952 |
| Thermal Stress 10 sec @ 288°C (550.4°F) | A. Unetched Pass
B. Etched Pass Visual | Pass | 2.4.13.1 |
| Dk, Permittivity | A. @ 100 MHz 3.69
B. @ 1 GHz 3.66
C. @ 2 GHz 3.67
D. @ 5 GHz 3.66
E. @ 10 GHz 3.65 | — | 2.5.5.3, 2.5.5.9 |
| Df, Loss Tangent | A. @ 100 MHz 0.0094
B. @ 1 GHz 0.0171
C. @ 2 GHz 0.0120
D. @ 5 GHz 0.0127
E. @ 10 GHz 0.0125 | — | 2.5.5.3, 2.5.5.9 |
| Volume Resistivity | A. After moisture resistance 4.6 x 10^7
B. At elevated temperature 2.8 x 10^8 | MQ-cm | 2.5.17.1 |
| Surface Resistivity | A. After moisture resistance 2.81 x 10^6
B. At elevated temperature 2.64 x 10^8 | MQ | 2.5.17.1 |
| Dielectric Breakdown | >50 | kV | 2.5.6B |
| Arc Resistance | 120 | Seconds | 2.5.1B |
| Electric Strength (Laminate & laminated prepreg) | 55 (1400) | kV/mm (V/mil) | 2.5.6.2A |
| Comparative Tracking Index (CTI) | 3 (175-249) | Class (Volts) | UL 746A, ASTM D3638 |
| Peel Strength | A. Low profile copper foil and very low profile copper foil all copper foil >17 μm [0.669 mil] 1.14 (6.5)
B. Standard profile copper 1. After thermal stress 1.225 (7.0)
2. At 125°C (257°F) 1.14 (6.5)
3. After process solutions 0.90 (5.1) | N/mm (lb/inch) | 2.4.8C |
| Flexural Strength | A. Length direction 81.4
B. Cross direction 64.1 | ksi | 2.4.4B |
| Tensile Strength | A. Length direction 59.3
B. Cross direction 42.0 | ksi | ASTM D3039 |
| Young’s Modulus | A. Length direction 3685
B. Cross direction 3044 | ksi | ASTM D790-15e2 |
| Poisson’s Ratio | A. Length direction 0.162
B. Cross direction 0.138 | — | ASTM D3039 |
| Moisture Absorption | 0.15 | % | 2.6.2.1A |
| Flammability (Laminate & laminated prepreg) | V-0 | Rating | UL 94 |
| Relative Thermal Index (RTI) | 130 | °C | UL 796 |

The data, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

---

https://www.isola-group.com/products/all-printed-circuit-materials/fr408/

The Isola name and logo are registered trademarks of Isola Corp. USA in the USA and other countries. FR408 is a registered trademark of Isola USA Corp. in the USA. All other trademarks mentioned herein are property of their respective owners.

© 2016, Isola Group. All rights reserved.
Visit our site http://www.isola-group.com for more details.

Revisions:
A: Initial release - 4/17
B: Corrected units for Flexural and Tensile Strength - 8/18
C: Change MOT to RTI 5/19