



## DE104i High Performance Laminate and Prepreg

**DE104i** offers excellent thermal resistance, due to the special resin system and the low coefficient of thermal expansion in the Z-axis, enabling a lifespan up to 1000 cycles at temperature change (-40°C to +125°C) and the ability to withstand up to 10 cycles of lead-free soldering.

The glass transition temperature (Tg) is 140°C (DSC). Time to delamination of the laminate at a temperature of 260°C is greater than 60 minutes and the decomposition temperature (Td) is 330°C. The product is listed as FR-4 and can be processed using standard parameters. DE104i multilayer (ML) corresponds to NEMA-grade FR-4 and meets the requirements of IPC-4104C /21 /121.

[www.isola-group.com/products/DE104i](http://www.isola-group.com/products/DE104i)

### ORDERING INFORMATION:

Contact your local sales representative or visit [www.isola-group.com](http://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](mailto:info@isola-group.com)

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

## High Performance

# DE104i Data Sheet

**Tg 140, Td 330  
Dk 4.00, Df 0.022  
/21 /121**

### Features

- High Thermal Performance
  - ▶ Tg: 140°C (DSC)
  - ▶ Td: 330°C (TGA @ 5% wt loss)
- T260: 60 minutes
- T288: >5 minutes
- RoHS Compliant
- UV Blocking and AOI Fluorescence
  - ▶ High throughput and accuracy during PCB fabrication and assembly
- Core Material Standard Availability
  - ▶ Thickness: 0.002" (0.05 mm) to 0.093" (2.4 mm)
  - ▶ Available in full size sheet or panel form
- Prepreg Standard Availability
  - ▶ Roll or panel form
  - ▶ Tooling of prepreg panels available
- Copper Foil Type Availability
  - ▶ Standard HTE Grade 3
  - ▶ RTF (Reverse Treat Foil)
- Copper Weights
  - ▶ ½, 1 and 2 oz (18, 38 and 70 µm) available
  - ▶ Heavier copper available upon request
  - ▶ Thinner copper foil available upon request
- Glass Fabric Availability
  - ▶ Standard E-glass
  - ▶ Square weave glass fabric available
- Industry Approvals
  - ▶ IPC-4101C /21 /121
  - ▶ UL – File Number E41625
  - ▶ Qualified to UL's MCIL Program

# DE104i Specifications

Property	Typical Values			
	Typical Value	Specification	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC	140	150-200	°C	2.4.25
Decomposition Temperature (Td) by TGA @ 5% weight loss	330	–	°C	ASTM D3850
T260	60	–	Minutes	2.4.25
T288	>5	–	Minutes	2.4.25
CTE, Z-axis	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24
CTE, X-, Y-axes	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24
Z-axis Expansion (50-260°C)	3.0	AABUS	%	2.4.24
Thermal Conductivity	0.36	–	W/mK	ASTM D5930
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched B. Etched	Pass Pass Visual	Rating	2.4.13.1
Dk, Permittivity (Laminate & prepreg as laminated) Split Post Method, Tested at 50% resin	A. @ 2 GHz	4.00	5.40	2.5.5.3
	B. @ 5 GHz	4.00	–	2.5.5.9
	C. @ 10 GHz	–	–	2.5.5.5
Df, Loss Tangent (Laminate & prepreg as laminated) Split Post Method, Tested at 50% resin	A. @ 2 GHz	0.020	0.035	2.5.5.3
	B. @ 5 GHz	0.022	–	2.5.5.9
	C. @ 10 GHz	–	–	2.5.5.5
Volume Resistivity	A. 96/35/90	–	–	2.5.17.1
	B. After moisture resistance	1.3x10 <sup>6</sup>	1.0x10 <sup>4</sup>	
	C. At elevated temperature	3.4x10 <sup>7</sup>	1.0x10 <sup>3</sup>	
Surface Resistivity	A. 96/35/90	–	–	2.5.17.1
	B. After moisture resistance	1.0x10 <sup>6</sup>	1.0x10 <sup>4</sup>	
	C. At elevated temperature	7.2x10 <sup>6</sup>	1.0x10 <sup>3</sup>	
Dielectric Breakdown	>50	40	kV	2.5.6
Arc Resistance	105	60	Seconds	2.5.1
Electric Strength (Laminate & prepreg as laminated)	54 (1350)	29 (736)	kV/mm (V/mil)	2.5.6.2
Comparative Tracking Index (CTI)	3 (175-249)	–	Class (Volts)	–
Peel Strength	A. Low profile copper foil and very low profile – all copper weights >17 microns	1.23 (7.0)	0.70 (4.0)	2.4.8
	B. Standard profile copper	–	–	2.4.8.2
	1. After thermal stress	1.58 (9.0)	1.05 (6.0)	2.4.8.3
	2. At 125°C (257°F)	1.23 (7.0)	0.70 (4.0)	–
	3. After process solutions	1.58 (9.0)	0.80 (4.5)	–
Flexural Strength	A. Lengthwise direction	84,200	–	2.4.4
	B. Crosswise direction	65,200	–	
Tensile Strength	A. Lengthwise direction	57,100	–	–
	B. Crosswise direction	42,400	–	
Young's Modulus	A. Grain direction	3476	–	ksi
	B. Fill direction	3089	–	vw
Poisson's Ratio	A. Grain direction	0.182	–	xx
	B. Fill direction	0.172	–	
Moisture Absorption	0.3	0.8	%	2.6.2.1
Flammability (Laminate & prepreg as laminated)	V-0	V-0	Rating	UL 94
Max Operating Temperature	130	–	°C	–

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.

[www.isola-group.com/products/DE104i](http://www.isola-group.com/products/DE104i)

The Isola name and logo are registered trademarks of Isola Corp. USA in the USA and other countries. All other trademarks mentioned herein are property of their respective owners. © 2012, Isola Group, All rights reserved.

9/12 DSDE104IA

**isola**