

# 3M™ Flux Field Directional Materials RFIC Series

## Product Description

3M™ Flux Field Directional Materials (FFDM) RFIC Series are magnetic sheets for radio frequency application. 3M FFDM RFIC series is designed to have a high magnetic permeability and low magnetic loss over 1MHz. These products help solve the metal interference effect of tag and reader when metal surrounds the atmosphere.

3M FFDM RFIC series includes product numbers RFIC10, RFIC15, RFIC20, RFIC25, and RFIC30 and is available in sheets. Standard size is 210mm x 297mm.

## Features and Benefits

- Minimizes the occurrence of eddy currents in localized metalized surfaces that can reduce the associated antenna performance
- Makes it possible to mount the antenna on metal surfaces
- Helps solve the metal interference effect of tag and reader when the antenna is on or near metal surfaces
- Consists of dark color magnetic material layer and pressure-sensitive adhesive

## Applications

3M FFDM RFIC series is typically used for the 13.56MHz NFC antenna tag or reader applications. 3M FFDM RFIC series is normally attached to the NFC antenna and positioned between the antenna and the metal or other conductive surface that the antenna/FFDM is attached to. By inserting the 3M FFDM RFIC series between the antenna and conductor surface, it is possible to significantly limit occurrences of eddy current and correct for resonant frequency shifts to the antenna, which are caused by the interaction of the antenna and the conductor surface (i.e. metal surface).

An NFC antenna near a metal surface can induce eddy currents in the metal surface, which in turn can degrade the antenna performance for read range. 3M FFDM RFIC series redirects the flux field of the antenna away from the metal surface and limits the eddy current generation and associated negative performance impact.

## RFIC Effectiveness

Many factors determine the true communication range such as antenna size, sensitivity, field intensity, modulation algorithm and environment. To maximize the performance, it is necessary to take into account the fact that the inductance of the antenna may be changed by 3M FFDM RFIC series. It is necessary to adjust the resonance frequency of the antenna and circuit by changing the circuit capacitance and inductance value to be optimized with the FFDM addition.



**3M™ Flux Field Directional Materials RFIC Series Typical Properties (Sheet Package Available)**

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

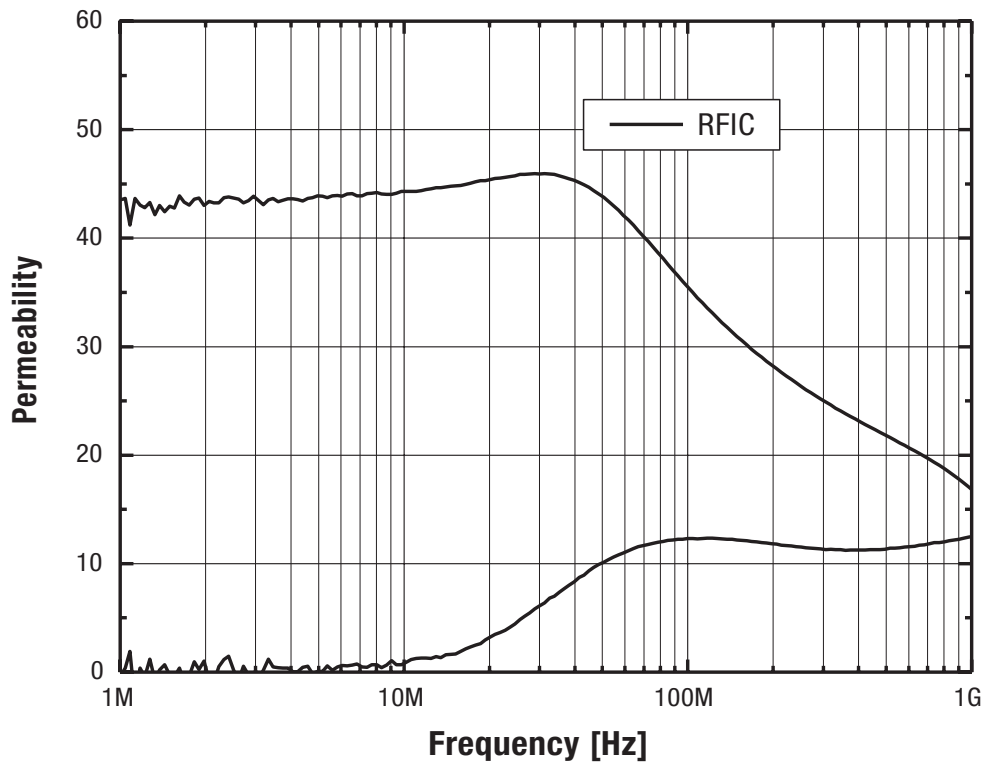
Properties	Typical Value																		
Type of Absorber Material	Magnetic particle embedded in polymer resin composite																		
Product Structure	FFDM sheet with one side double coated adhesive tape																		
Thickness	<table border="1"> <thead> <tr> <th></th> <th>RFIC10</th> <th>RFIC15</th> <th>RFIC20</th> <th>RFIC25</th> <th>RFIC30</th> </tr> </thead> <tbody> <tr> <td>Absorber:</td> <td>0.10mm</td> <td>0.15mm</td> <td>0.20mm</td> <td>0.25mm</td> <td>0.30mm</td> </tr> <tr> <td>Adhesive:</td> <td colspan="5">0.01, 0.02, 0.03 (standard) mm</td> </tr> </tbody> </table>		RFIC10	RFIC15	RFIC20	RFIC25	RFIC30	Absorber:	0.10mm	0.15mm	0.20mm	0.25mm	0.30mm	Adhesive:	0.01, 0.02, 0.03 (standard) mm				
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Absorber:	0.10mm	0.15mm	0.20mm	0.25mm	0.30mm														
Adhesive:	0.01, 0.02, 0.03 (standard) mm																		
Magnetic Permeability <sup>1</sup>	42.5 ~ 47																		
Standard Size	210mm x 297mm																		
Resistivity <sup>2</sup>	Min. $1 \times 10^6 \Omega$																		
Operating Temperature	-30 ~ +85°C																		
Tensile Strength <sup>3</sup>	6MPa (min.)																		

<sup>1</sup>This value was measured with Agilent E4991A RF Impedance/Material analyzer.

<sup>2</sup>Tested in accordance with ASTM D257 test method.

<sup>3</sup>Test method is JIS K6251.

• **Electromagnetic Properties of 3M FFDM RFIC Series material**



### Storage and Shelf Life

The shelf life of 3M™ Flux Field Directional Materials RFIC Series is 12 months from the shipment date from the manufacturing location when stored in original packaging at 21°C (70°F) and 50% relative humidity.

### Regulatory

For regulatory information about this product, contact your 3M representative.

### Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

### Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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