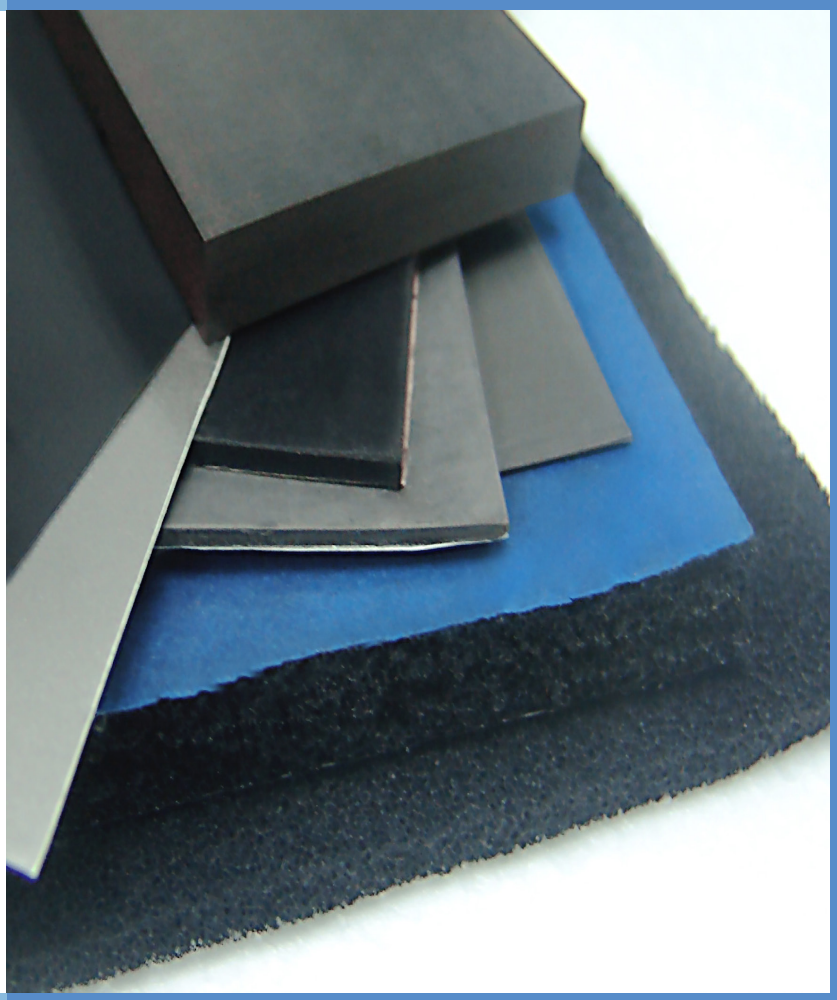
Microwave Absorber

As the technology developed, with faster switching speeds (increasing emissions) and lower circuit voltages (increasing susceptibility), EMC (Electromagnetic compatibility) increasingly became a source of concern, Many more nations were aware of EMC as a growing problem and issued directives to the manufacturers of digital electronic equipment which set out the essential manufacturer requirements before their equipment could be marketed or sold.

Recently the ever-increasing use of mobile communications and broadcast media channels has put huge pressure on the available airspace; Regulatory authorities are squeezing band allocations closer and closer together. We need more sophisticated EMC design methods to keep cross-channel interference to acceptable levels. The use of Microwave Absorbersl will offer far easier way to implement highly EMC capability of different devices.

FRD has extensive experiences in making EMC materials, and FRD engineers know EMC design methods very well. With superior design capability, unique manufacturing processes and test procedures, FRD provide a wide range of standard to most needs, and custom parts to special requirements.



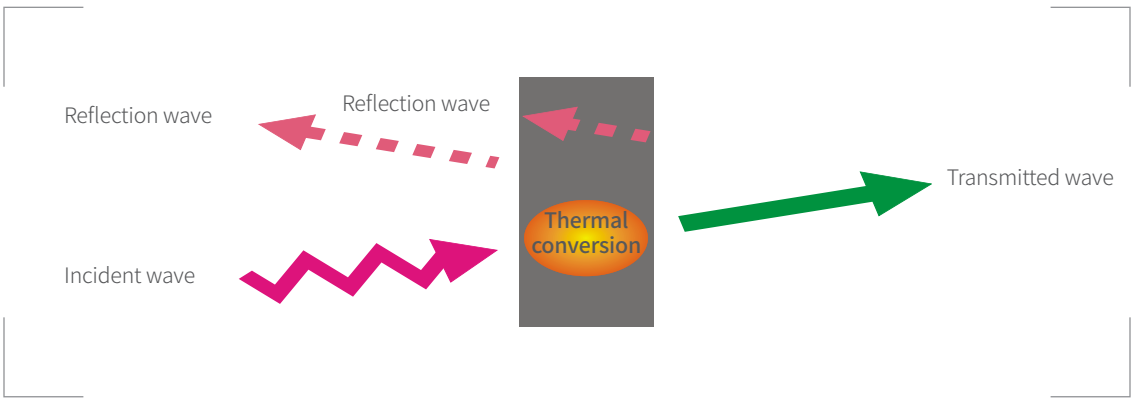
- Suppress electromagnetic interference, improve antenna pattern and improve the accuracy of radar direction finding and ranging;
- Prevent electromagnetic interference, electromagnetic wave radiation and waveform shaping of microwave devices and equipment;
- Microwave anechoic chamber, electromagnetic compatibility chamber, absorbing load, attenuator, radar wave RCS Reduction, etc.

Design principle and leadership

- High performance absorbers such as nano materials, planar hexagonal ferrite, amorphous magnetic fiber and granular film are used as absorption media;
- Using the new absorption principle electromagnetic resonance and eddy current loss, the prepared absorbing plate has the advantages of thin thickness, light weight, wide absorption band and high absorption rate;
- According to Maxwell equation, genetic algorithm (GA) is used to realize electromagnetic wave absorber simulation (CAD), give full play to the characteristics of absorbing medium, shorten the development cycle of materials, and meet the special needs of users.

Applications

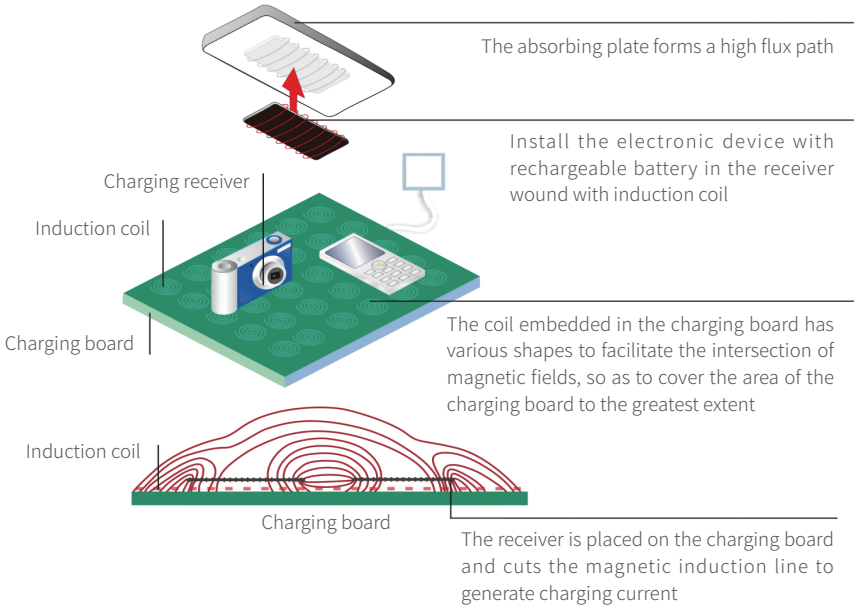
Microwave refers to the electromagnetic wave with the frequency of 300mhz-300ghz. It is the abbreviation of a limited frequency band in radio wave, that is, the electromagnetic wave with the wavelength between 1m (excluding 1m) and 1mm. It is the general name of decimeter wave, centimeter wave and millimeter wave. The microwave frequency is higher than the general radio wave frequency, which is usually called "UHF electromagnetic wave". The basic properties of microwave usually show three characteristics: penetration, reflection and absorption. For glass, plastic and porcelain, microwaves almost pass through without being absorbed. For water and food, it will absorb microwaves and make itself hot. For metal things, they will reflect microwaves.



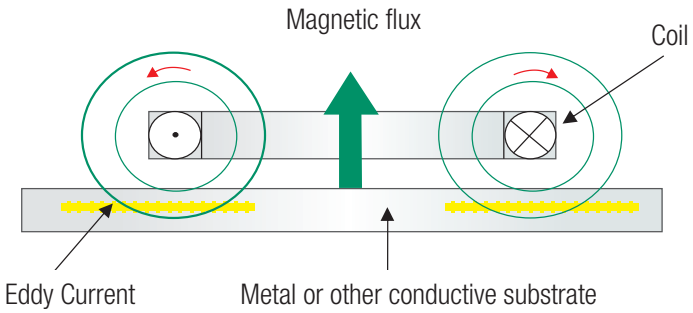
FRD® Application of Absorbing Plate

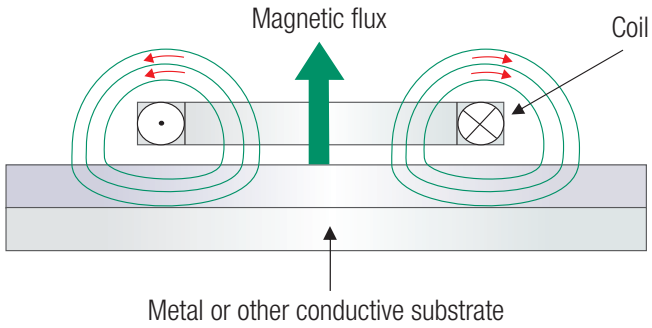
In the field of wireless charging

Wireless charging technology uses electromagnetic induction to generate current through primary and secondary coil induction, so as to transfer energy from the transmission end to the receiving end, so as to realize the purpose of charging mobile phones, MP3, Bluetooth headsets, game consoles, DV and other electronic products. It can also charge low-power wireless sensor networks and medical implant devices in patients.

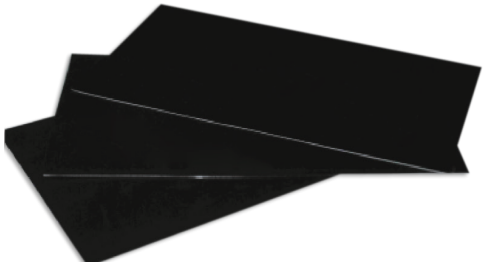


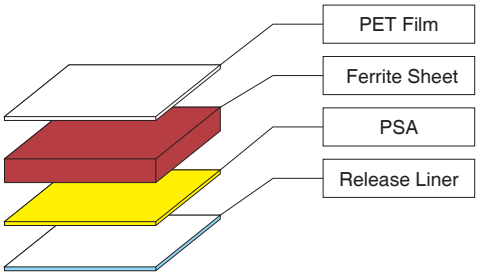
In the field of RFID





JCXB-F Series





JCXB-F Series Features:

- Ferrite, High permeability, Low loss;
- Efficient reduce the metal interference in HF (13.56MHz) RFID system, enhance antenna signal, Lengthen communication distance;
- Customized products for wireless charging

Typical Applications:

- Module NFC;
- Module RFID Tag on/in metal;
- Wireless charging module;

JCXB-F series absorber complies with worldwide directives ecological compatibility, such as RoHS standards and Halogen Free.
Standard size is 65mmx65mm，custom size may be available upon request.

How to order:
JCXB-FX-XX. Series number: F0; F2; F6... Thickness(mm): 010 means 0.1mm, thickness tolerance: ±0.01mm.

AProperties

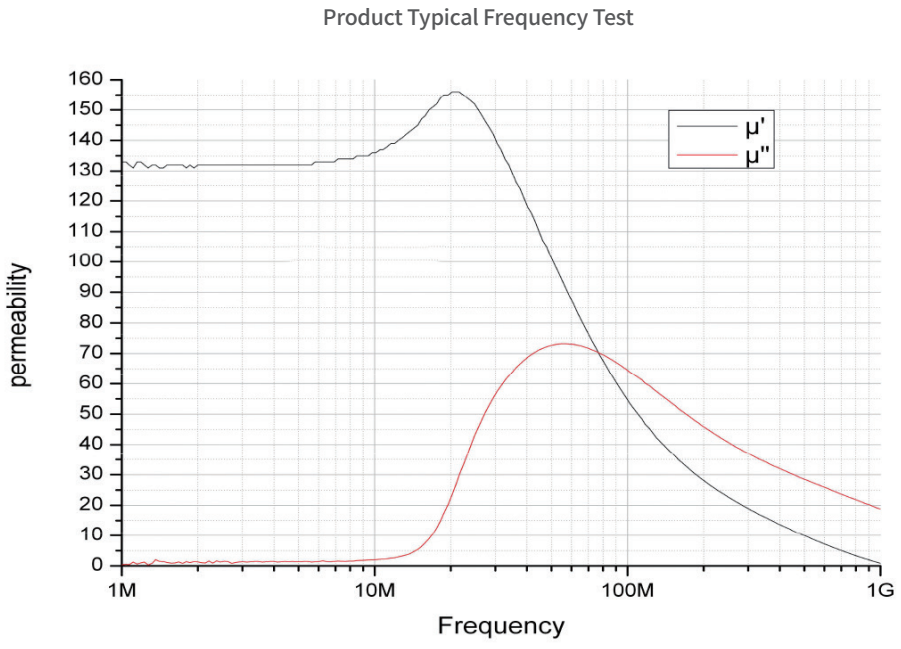
Type	Permeability(13.56MHz)		Thickness(mm)	Operating Temperature(℃)	Surface Resistance(Ω)	Frequency Range(MHz)
	μ'typ	μ''typ				
JCXB-F0	110±20%	3±20%	0.12; 0.17; 0.22	-40~+85	>10^8	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F2	150±20%	5±20%	0.12; 0.17; 0.22	-40~+85	>10^8	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F3	150±20%	2.5±20%	0.08; 0.1; 0.19	-40~+85	>10^8	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F6	150±20%	4±20%	0.07; 0.115;	-40~+85	>10^8	10~900 (13.56 MHz and is mainly used in the following)

Classfication

Type	Ferrite Thickness (mm)	Adhesive Thickness (mm)	PET Film Thickness (mm)	PET Film Colour
F310A	$0.08^{\pm0.01}$	0.013	0.01	Black
F310D	$0.08^{\pm0.01}$	0.013	0.012	White
F310G	$0.08^{\pm0.01}$	0.013	---	---
F312A	$0.1^{\pm0.01}$	0.013	0.01	Black
F312B	$0.08^{\pm0.01}$	0.013	0.03	Black
F312C	$0.08^{\pm0.01}$	0.013	0.03	White
F312D	$0.1^{\pm0.01}$	0.013	0.012	White
F312G	$0.1^{\pm0.01}$	0.013	---	---
F321A	$0.19^{\pm0.01}$	0.01	0.01	---

Note: Product JCXB - F310G / F312G is with adhesive on both side, no pet film.

JCXB-F3 Typical Permeability



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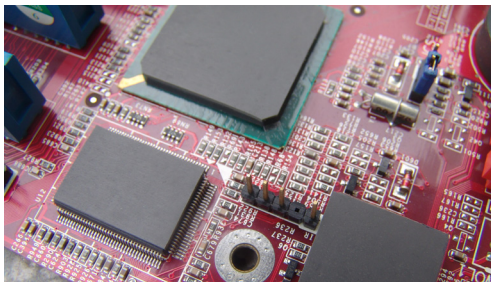
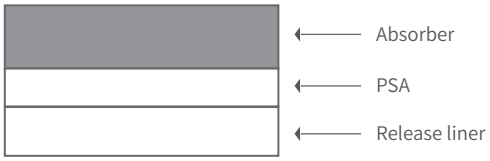
Qzorb Series





Qzorb Series Features and Benefits:

- Wide working frequency range
- Thin, flexible, can be cut and fitted to compound curves
- RoHS complaint
- Halogen-free

Applications:

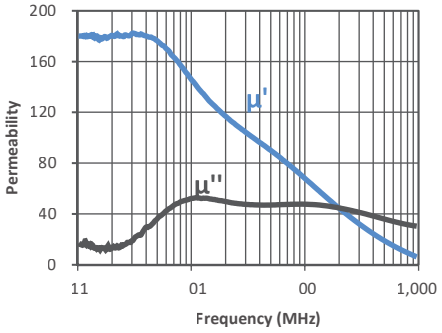
- EMI suppression in 3C products
- Attenuate EMI coupling of HSDLs
- High order harmonic restrain of components
- Reduce cavity resonance of metal housing of RF devices

Qzorb absorber consists Fe-based nanocrystalline filler in organic resin. Qzorb absorber can prevent interference between loop antennas and nearby metal objects with high magnetic permeability. It can be improve magnetic field convergence in NFC and other RFID systems.

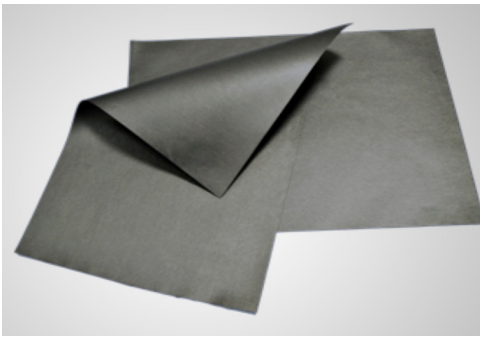
Properties

Property	Typical Value	Remark
Frequency Range	10MHz ~ 6GHz	
Thickness (mm)	0.05 / 0.1 / 0.2 / 0.3 / 0.5	Can be customized
Magnetic Permeability@MHz	120 / 150 / 180	Agilent E4991A
Standard Packaging (mm)	300 x 200	Can be customized
Density (g/cm^3)	3.2 / 3.6	
Surface Resistance (Ω/cm^2)	$>1x10^4$	
PSA Thickness (mm)	0.03	Can be customized
Continuous Use Temperature (°C)	-25 ~ +120	

Qzrob Typical Permeability



JCXB-R Series



JCXB-R Series Features:

JCXB-R series absorber consists Fe-based nanocrystalline fillers in elastomer. This absorber attenuates EMI for broadband radio frequency range (From 10 MHz to 10 GHz).

JCXB-R series absorber’ s common uses include cell phone (EMC and SAR), laptop, flat-panel TV and most of portable electronics.

JCXB-R series absorber can improve magnetic field convergence and prevent interference between loop antennas and nearby metal objects with high magnetic permeability. It can be used in NFC and other RFID systems.

JCXB-R series absorber complies with RoHS standards and it is Sulfur-free (Halogen free type available). Its working temperature range is -25~85°C.

How to order:

JCXB-XX(HF)-P-XXX-(L)

(1) Series Number: R-- relative magnetic permeability is 20, RF---relative magnetic permeability is 40.

(2) HF: Halogen free.

(3) P: with PSA.

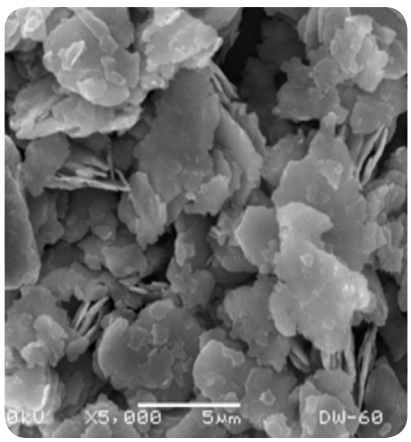
(4) Thickness(mm): 100 means 1.0mm, thickness tolerance: ±0.2mm.

(5) L: Laminating Film.

Standard size is 140mmx180mm, custom size may be available upon request.

Properties

Type	Thickness (mm)	Frequency Range(GHz)	Surface resistivity	Surface density
JCXB-RF(HF)-010	0.1	10MHz-900MHz	>10^5	⩽ 0.3
JCXB-RF(HF)-030	0.3	10MHz-900MHz	>10^5	⩽ 0.7
JCXB-RF(HF)-050	0.5	10MHz-900MHz	>10^5	⩽ 1.2
JCXB-R(HF)-030	0.3	10MHz-10GHz	>10^5	⩽ 0.7
JCXB-R(HF)-050	0.5	10MHz-10GHz	>10^5	⩽ 1.2
JCXB-R(HF)-080	0.8	10MHz-10GHz	>10^6	⩽ 1.8
JCXB-R(HF)-100	1.0	10MHz-10GHz	>10^6	⩽ 2.3

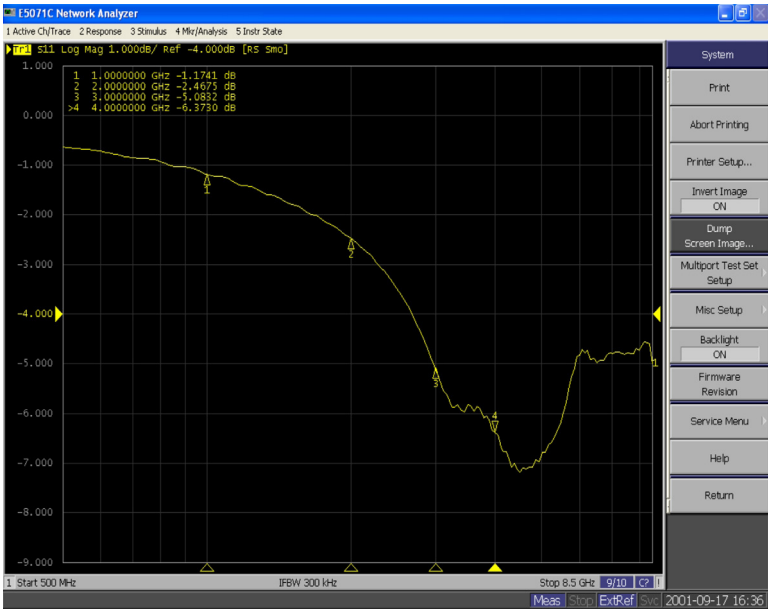


Absorbent

JCXB-R Series Typical Permeability

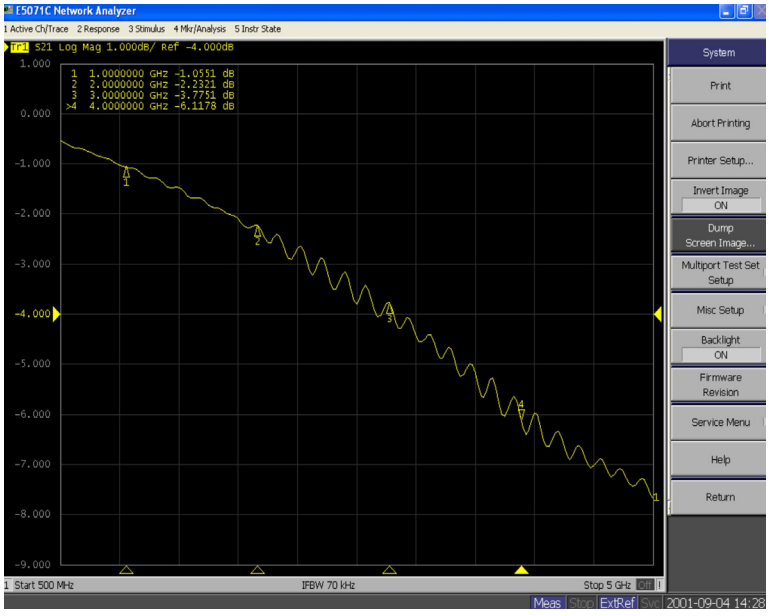
JCXB-R-050

Return loss（7mm Coaxial Method）



JCXB-R-050

Transmission (7mm Coaxial Method)



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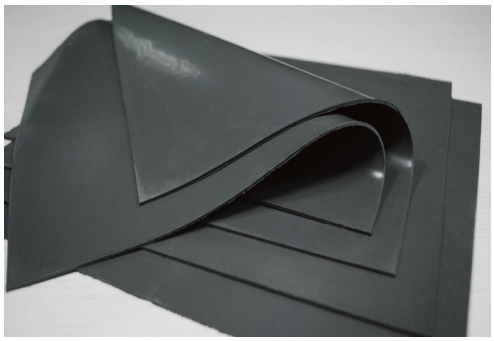
JCXB-S(V) Series



JCXB-S(V) Series Features:

JCXB-S（V）is a flexible elastomeric magnetic absorbing material. The cermet fillers work well in suppressing resonant cavity modes, reduce EMI, and attenuating surface currents. It is thin，flexible and easy to bond on the surface of metal or PCBAs..

Key Features:

- Large working frequency range and high loss.
- High strength(tensile strength>0.5MPa).
- Halogen and Sulfur free, RoHS compliant.
- Fire retardant versions to UL 94 V0 are available(With V in PN).
- Service temperature: -40°C~+150°C.

Applications:

- Attenuation or modification of radiating patterns of antenna elements and microwave dishes.
- Isolation for waveguides.
- Suppression of EMI.
- Reduction of RCS.

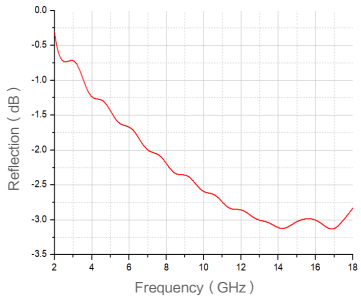
Properties

PN	Average Reflection(dB)	Thickness (mm)
JCXB-S-025S	>1.5@6-18GHz	0.25+/-0.05
JCXB-S-050S	>5@18-32GHz	0.50+/-0.10
JCXB-S-050T	>5@8-18GHz	0.50+/-0.10
JCXB-S-070S	>8@8-18GHz	0.70+/-0.10
JCXB-S-090S	>9@10-18GHz	0.90+/-0.10
JCXB-S-100S	>12@12-22GHz	1.00+/-0.10
JCXB-S-100J	>10@6-10GHz	1.00+/-0.10
JCXB-S-100T	>8@8-18GHz	1.00+/-0.10
JCXB-S-130S	>15@8-12GHz	1.30+0/-0.20
JCXB-S-150S	>12@6-12GHz	1.50+0/-0.20
JCXB-S-180S	>12@4-8GHz	1.80+/-0.20

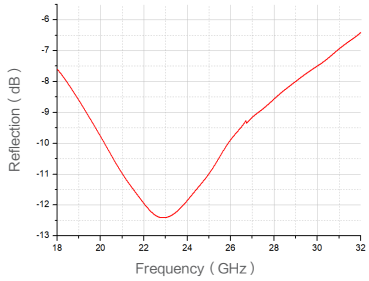
PN	Average Reflection(dB)	Thickness (mm)
JCXB-SC-100S	>4@0.5-2GHz	1.00+/-0.10
JCXB-SC-180S	>12@3-6GHz	1.80+/-0.20
JCXB-SC-200S	>10@2-5GHz	2.00+/-0.20
JCXB-SC-250S	>13@2-4GHz	2.50+/-0.20
JCXB-SC-300S	>8@2-6GHz	3.00+/-0.20
JCXB-SM-030S	>2@26-40GHz	0.30+/-0.05
JCXB-SM-050S	>6@30-40GHz	0.50+/-0.10
JCXB-SM-060S	>10@30-40GHz	0.60+/-0.10
JCXB-SM-080S	>10@30-40GHz	0.80+0/-0.20
JCXB-SZ-200S	>4@2-8GHz	2.00+/-0.20
JCXB-SZ-400S	>8@0.5-2GHz	4.00+/-0.30

JCXB-S(V) Series Typical Reflectivity Performance

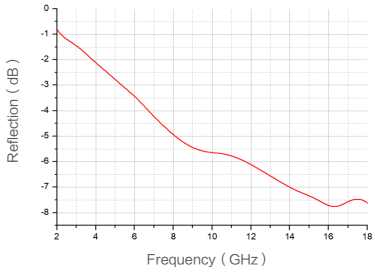
JCXB-S-025S



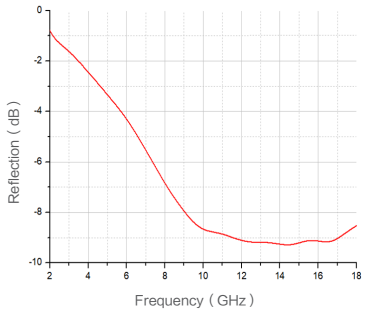
JCXB-S-050S



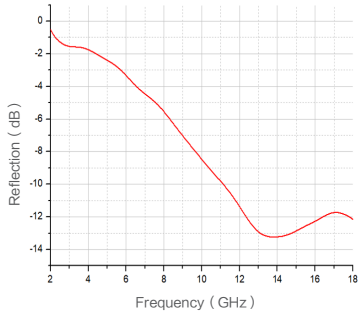
JCXB-S-050T



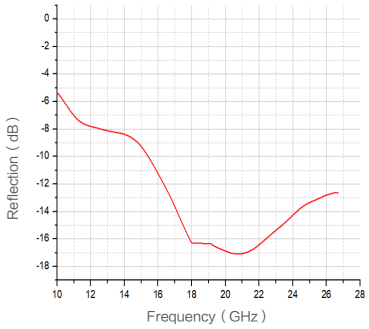
JCXB-S-070S



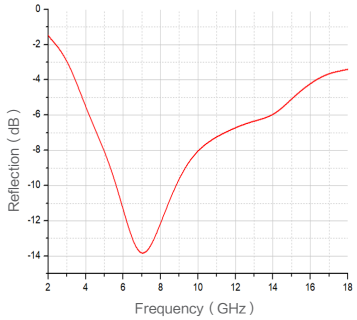
JCXB-S-090S



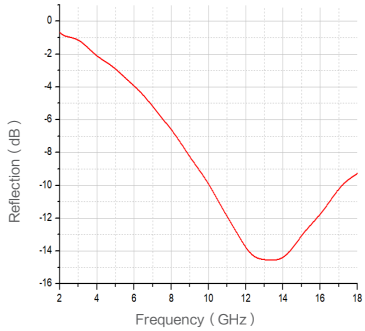
JCXB-S-100S



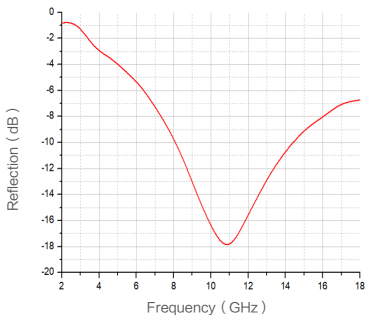
JCXB-S-100J



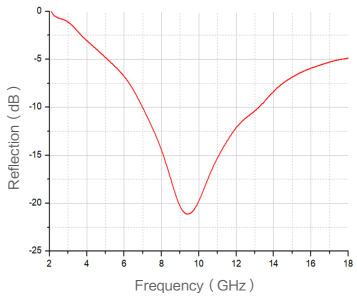
JCXB-S-100T



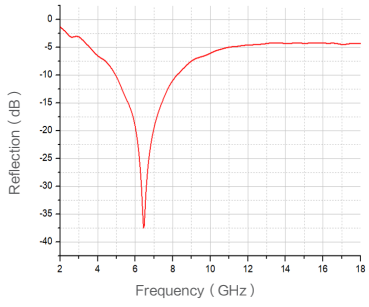
JCXB-S-130S



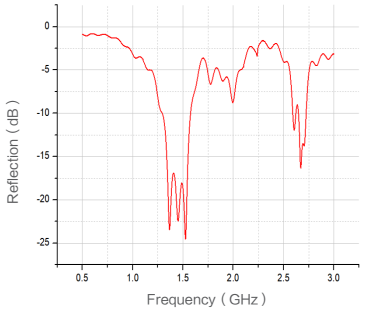
JCXB-S-150S



JCXB-S-180S



JCXB-SC-100S



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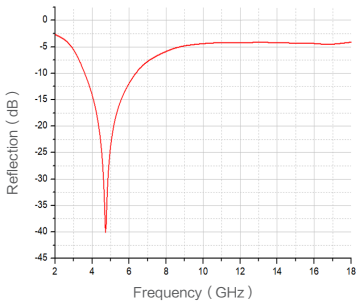
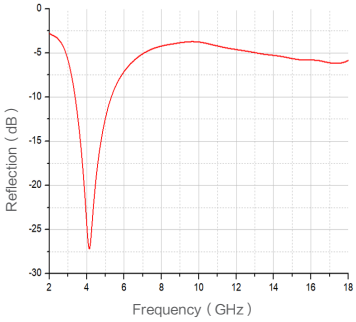
JCXB-S(V) Series Typical Reflectivity Performance

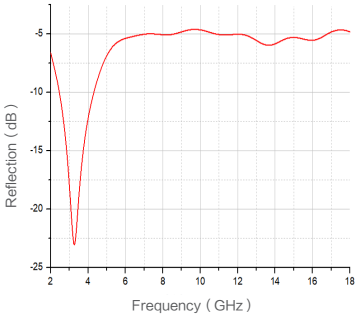
JCXB-SC-180S



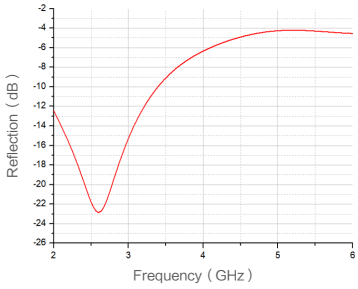
JCXB-SC-200S



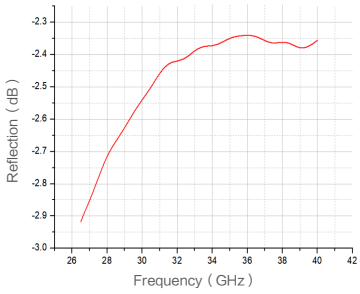
JCXB-SC-250S



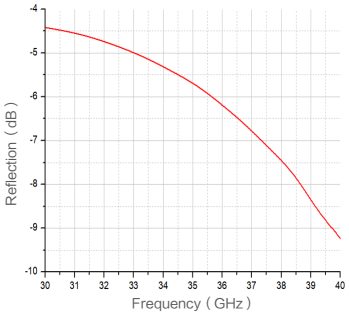
JCXB-SC-300S



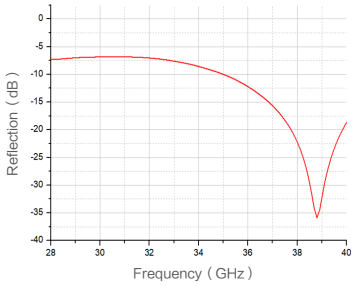
JCXB-SM-030S



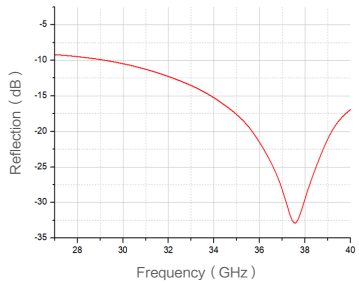
JCXB-SM-050S



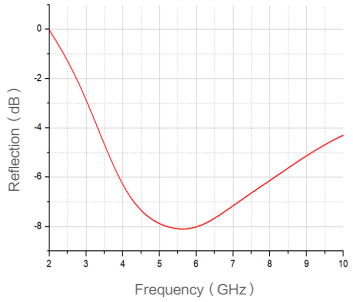
JCXB-SM-060S



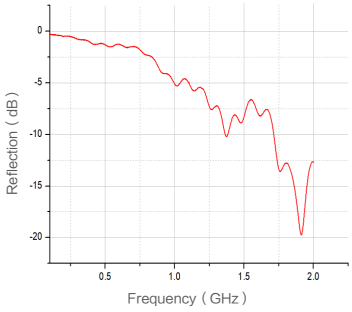
JCXB-SM-080S



JCXB-SZ-200S

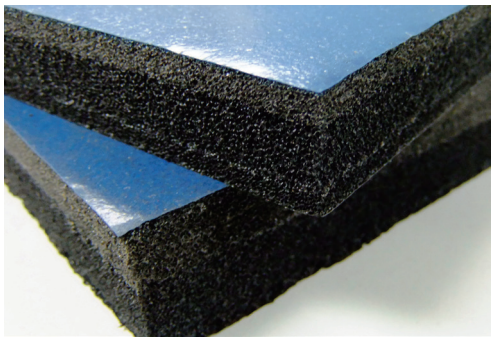


JCXB-SZ-400S



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

FLXB Series



FLXB Series Features:

FLXB series absorber is widely known and used foam sheet product which is high loss, low density, flexible and low cost.
FLXB series absorber is used to isolate the microwave transmission and specular reflection by insertion loss, and it can also lower cavity Q' s. It is very useful in radar systems, RF components, telecom systems and test devices.
FLXB series absorber will not drop any conductive powders for safety use, and has weatherproof coating for outdoor applications.
FLXB series absorber complies with RoHS standards, and can achieve GB FH-1 flame retardant grade. Its working temperature range is -25~85°C.

How to order :

FLXB-XX-X

(1) Thickness(mm): 05 means 5mm.

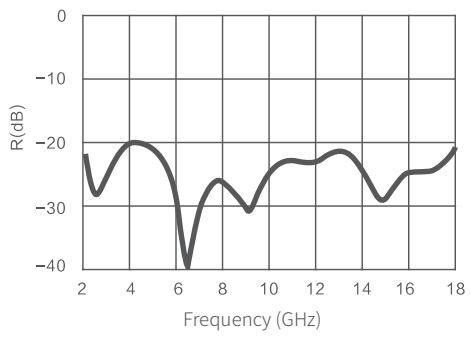
(2) P means with PSA.

Standard size is 400mmx400mm, custom size may be available upon request.

Properties

Type	Frequency Range (GHz)	AverageReflectivity (dB)	Thickness (mm)	Surface resistivity (kg/m^2)
FLXB-03	10 ~ 18	>8	3±1	0.3
FLXB-06	6 ~ 18	>8	6±1	0.6
FLXB-12	5 ~ 18	>10	12±2	1.0
FLXB-20	4 ~ 18	>15	20±2	1.5
FLXB-40	3 ~ 18	>20	40±3	3.0
FLXB-55	2 ~ 18	>20	55±4	4.0

FLXB-55



FLXB-12

