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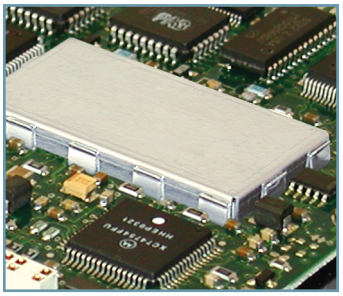
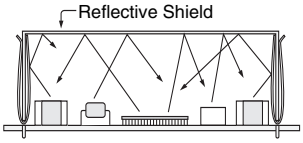


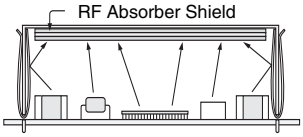
PCB shielded enclosures with RF absorbers

Shielded enclosures for RF radiations from PCB components stop RF energy right at the source, eliminating re-radiation and interference with other nearby components as well as reducing the number of other shielding expenditures such as filters, gaskets and RF hardening of the equipment exterior structure.

The addition of a frequency-tuned absorber membrane layer adds unprecedented performance, assimilating radiated energy without relying on repeated reflections from the interior surfaces of the shield, and without problems of harmonic resonance. Refer to sketches at right.



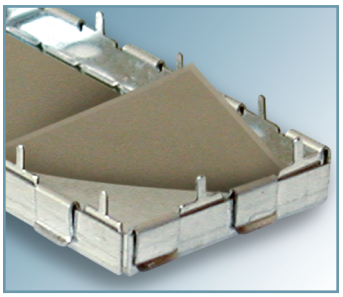
Typical shielding approach allows reflected radiation to affect neighboring components.



RF absorber approach assimilates radiated frequencies and converts to imperceptible heat energy. Specific frequency-tuned absorber material is bonded to the lid interior. A wide range of EMC and Microwave absorbers can be specified from 40 MHz up to 116 GHz.

modular fence and cover design

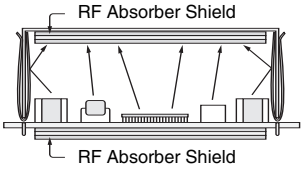
The versatile shield design includes a solderable fence and tight-fitting cover assembly of copper alloy 770 (C77000), a tough solder-compatible material which does not require plating nor has corrosion prone bare edges. The removable cover provides convenient access to circuitry; and is very cost-effective due to the use of universal multi-use manufacturing tooling.



RF absorber membrane partially detached from lid for exhibit purpose only.

custom tuning to the exact frequency

Each enclosure shield size can be combined with frequency-specific absorber material bonded to the cover interior for exacting remediation of otherwise errant frequency emanations - a selection of five EMC absorbers effective from 50 MHz to 1 GHz along with an extra wideband version effective from 40 MHz to 5 GHz; and, ten Microwave versions effective up to 116 GHz.

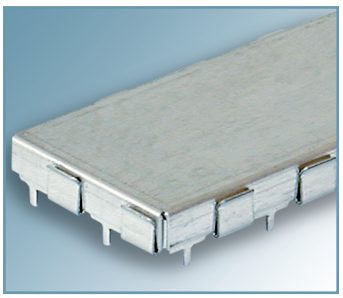


PCB Shield effectiveness can be further enhanced by adding RF absorber material under PCB (see pages 30-34).

absorber membrane specifications
EMC standard series – 50MHz to 1GHz

Five frequency-specific formulations.

Material Characteristic		Measure		
Frequency range		50 MHz - 1 GHz		
Peak frequency choices		100, 300, 400, 500 or 800 MHz		
Temperature range		-20˚C to 100˚C		
Flammability rating		UL94-V0		
Adhesive:	temperature	0˚F to 180˚F	*-18˚C to 83˚C*	ASTM D-3575
	tack	8.4 p.s.i. (stainless steel)		ASTM D-3575
	shear	300+ hrs. @ 2 p.s.i. @ 22˚C		ASTM D-3575
Dimensions:	standard	15.75" W x 15.75 " L x .011" max.	*400,0 x 400,0 x 0,28*	
	maximum	3'-0" W x 65'-0" L x .011" max	*1,0 x 20,0 M x 0,28*	

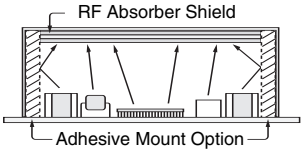


pin mount

EMC extra wideband series

40MHz TO 5GHz @ 3.2GHz PEAK. This all-around universal wideband formula is available in a standard temperature type and a high temperature type (up to 200˚C). Excellent performance from 40MHz to 5GHz (PS3200EMC series, opposite page).

Material Characteristic		Measure		
Frequency range		40 MHz - 5 GHz		
Peak frequency		3.2 GHz		
Temperature range		-20˚C to 100˚C and -10˚C to 200˚C (high temp)		
Flammability rating		UL94-V0		
Adhesive:	standard temp.	0˚F to 180˚F	*-18˚C to 83˚C*	ASTM D-3575
	high temp.	50˚F to 312˚F	*10˚C to 200˚C*	ASTM D-3575
	tack	8.4 p.s.i. (stainless steel standard)		ASTM D-3575
		8.3 p.s.i. (stainless steel high temperature)		ASTM D-3575
	shear	300+ hrs. @ 2 p.s.i. @ 22˚C		ASTM D-3575
Dimensions:	standard	8.25" W x 15.75 " L x .004" max.	*210,0 x 400,0 x 0,10*	
	maximum	3'-0" W x 65'-0" L x .004" max	*1,0 x 20,0 M x 0,10*	



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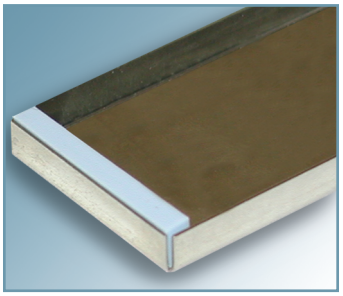
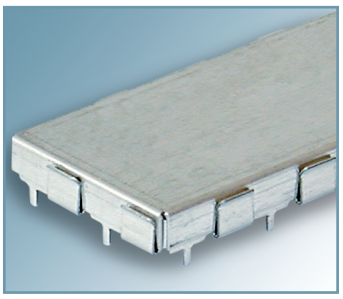


adhesive mount

Microwave series: – up to 116 GHz

The MA series is a high frequency microwave noise absorber in a range of formulations addressing 2.0GHz to 116GHz radiations from electronic components.

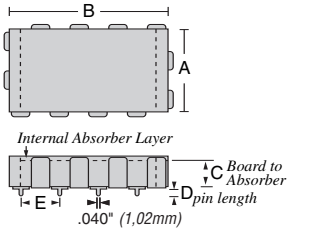
Material Characteristic		Measure	
Frequency range		2.0 MHz - 116.0 GHz	
Peak frequency choices		2.4, 5.8, 10, 18, 24, 26, 38, 60, 76, 110 GHz	
Temperature range		-20˚C to 110˚C	
Flammability rating		UL94-V0	
Adhesive:	temperature	0˚F to 180˚F -18˚C to 83˚C	ASTM D-3575
	tack	8.4 p.s.i. (stainless steel)	ASTM D-3575
	shear	300+ hrs. @ 2 p.s.i. @ 22˚C	ASTM D-3575
Dimensions:	standard	7.875" W x 15.75 " L x .138" max. *200,0 x 400,0 x 3,5*	
	maximum	3'-0" W x 65'-0" L x .138" max *1,0 x 20,0 M x 3,5*	



EMC type PCB shield enclosures

THROUGH-HOLE OR ADHESIVE MOUNT – UP TO 5GHz. The EMC series is available in three standard sizes; each can be combined with an absorber layer bonded to the inside of the lid in seven choices including the "3200" extra wideband absorber with effective characteristics from 40 MHz through 5 GHz, which is also available in a high temperature version. Refer to page 28 for absorber material characteristics, and page 29 for typical absorption rates by frequency.

For recommended Mounting Hole Patterns, visit our web site at www.ferrishield.com under PCB Shield Enclosures and click on link PCB Mounting Hole Patterns. Adhesive mount option provides quick installation, easy retrofit.



Through-hole mount – recommended hole size .050" (1,27mm)
Surface mount – pins formed w/ 90˚ outward bend, add "SM" suffix to the part #
Adhesive mount – no holes required

PART No.	Adhesive Mount	A	B	C	D	E	Frequency Range	Peak Frequency Attenuation
PS100EMC24	PS100EMC24A	1.00 *25,4*	2.00 *50,8*	.198 *5,0*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	100 MHz @ -17.3 dB
PS300EMC24	PS300EMC24A	1.00 *25,4*	2.00 *50,8*	.198 *5,0*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	300 MHz @ -17.6 dB
PS400EMC24	PS400EMC24A	1.00 *25,4*	2.00 *50,8*	.198 *5,0*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	400 MHz @ -17.2 dB
PS500EMC24	PS500EMC24A	1.00 *25,4*	2.00 *50,8*	.189 *4,8*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	500 MHz @ -17.8 dB
PS800EMC24	PS800EMC24A	1.00 *25,4*	2.00 *50,8*	.192 *4,9*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	800 MHz @ -17.9 dB
PS3200EMC24	PS3200EMC24A	1.00 *25,4*	2.00 *50,8*	.196 *5,0*	.100 *2,5*	.500 *12,7*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PS3200EMC24H*	PS3200EMC24HA*	1.00 *25,4*	2.00 *50,8*	.196 *5,0*	.100 *2,5*	.500 *12,7*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PSEMC24	PSEMC24A (w/o absorber)	1.00 *25,4*	2.00 *50,8*	.200 *5,1*	.100 *2,5*	.500 *12,7*	50 MHz to 1 GHz	100 MHz @ -5.3 dB
PS100EMC44	PS100EMC44A	2.00 *50,8*	3.00 *76,2*	.398 *10,1*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	100 MHz @ -17.3 dB
PS300EMC44	PS300EMC44A	2.00 *50,8*	3.00 *76,2*	.398 *10,1*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	300 MHz @ -17.6 dB
PS400EMC44	PS400EMC44A	2.00 *50,8*	3.00 *76,2*	.398 *10,1*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	400 MHz @ -17.2 dB
PS500EMC44	PS500EMC44A	2.00 *50,8*	3.00 *76,2*	.389 *9,9*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	500 MHz @ -17.8 dB
PS800EMC44	PS800EMC44A	2.00 *50,8*	3.00 *76,2*	.392 *10,0*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	800 MHz @ -17.9 dB
PS3200EMC44	PS3200EMC44A	2.00 *50,8*	3.00 *76,2*	.396 *10,1*	.120 *3,0*	.500 *12,7*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PS3200EMC44H*	PS3200EMC44HA*	2.00 *50,8*	3.00 *76,2*	.396 *10,1*	.120 *3,0*	.500 *12,7*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PSEMC44	PSEMC44A (w/o absorber)	2.00 *50,8*	3.00 *76,2*	.400 *10,2*	.120 *3,0*	.500 *12,7*	50 MHz to 1 GHz	100 MHz @ -5.3 dB
PS100EMC59	PS100EMC59A	3.00 *76,2*	4.50 *114,3*	.498 *12,6*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	100 MHz @ -17.3 dB
PS300EMC59	PS300EMC59A	3.00 *76,2*	4.50 *114,3*	.498 *12,6*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	300 MHz @ -17.6 dB
PS400EMC59	PS400EMC59A	3.00 *76,2*	4.50 *114,3*	.498 *12,6*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	400 MHz @ -17.2 dB
PS500EMC59	PS500EMC59A	3.00 *76,2*	4.50 *114,3*	.489 *12,4*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	500 MHz @ -17.8 dB
PS800EMC59	PS800EMC59A	3.00 *76,2*	4.50 *114,3*	.492 *12,5*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	800 MHz @ -17.9 dB
PS3200EMC59	PS3200EMC59A	3.00 *76,2*	4.50 *114,3*	.496 *12,6*	.120 *3,0*	.250 *6,4*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PS3200EMC59H*	PS3200EMC59HA*	3.00 *76,2*	4.50 *114,3*	.496 *12,6*	.120 *3,0*	.250 *6,4*	40 MHz to 5 GHz	3.2 GHz @ -31.3 dB
PSEMC59	PSEMC59A (w/o absorber)	3.00 *76,2*	4.50 *114,3*	.500 *12,7*	.120 *3,0*	.250 *6,4*	50 MHz to 1 GHz	100 MHz @ -5.3 dB

**NOTE: "H" variations of these "PS3200EMC" types are the high temperature version*

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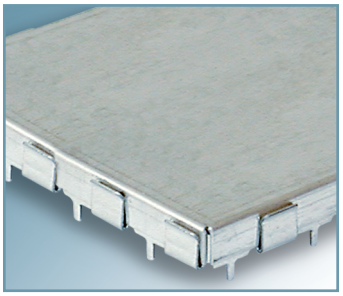
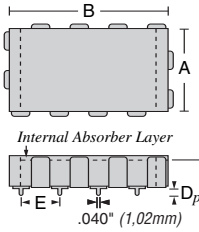


microwave type PCB shield enclosures

THROUGH-HOLE OR ADHESIVE MOUNT – UP TO 116GHz. The microwave series is available in three standard sizes; each can be combined with an absorber membrane bonded to the lid. There are ten types of frequency-sensitive absorber materials with effectiveness up to 116 GHz. The multi-layered absorbers of screened matrixes are tuned for discrete impedance matching to absorb microwaves from a wide range of angles. Refer to page 30 for absorber material characteristics, and to page 31 for typical absorption rates by frequency.

For recommended Mounting Hole Patterns, visit our web site at www.ferrishield.com under PCB Shield Enclosures and click on link PCB Mounting Hole Patterns. Adhesive mount option provides quick installation, easy retrofit.



Through-hole mount – recommended hole size .050" (1,27mm)
Surface mount – pins formed w/ 90˚ outward bend, add "SM" suffix to the part #

Adhesive mount – no holes required

PART No.	Adhesive Mount	A	B	C	D	E	Frequency Range	Peak Frequency Attenuation
PS24MA24	PS24MA24A	1.00 *25,4*	2.00 *50,8*	.062 *1,6*	.100 *2,5*	.500 *12,7*	2.2 - 2.6 GHz	2.4 GHz @ -21.0 dB
PS58MA24	PS58MA24A	1.00 *25,4*	2.00 *50,8*	.100 *2,5*	.100 *2,5*	.500 *12,7*	5.5 - 6.2 GHz	5.8 GHz @ -23.5 dB
PS100MA24	PS100MA24A	1.00 *25,4*	2.00 *50,8*	.145 *3,7*	.100 *2,5*	.500 *12,7*	9.2 - 10.8 GHz	10.0 GHz @ -23.5 dB
PS180MA24	PS180MA24A	1.00 *25,4*	2.00 *50,8*	.160 *4,1*	.100 *2,5*	.500 *12,7*	16.5 - 19.5 GHz	18.0 GHz @ -24.1 dB
PS240MA24	PS240MA24A	1.00 *25,4*	2.00 *50,8*	.176 *4,5*	.100 *2,5*	.500 *12,7*	22.5 - 25.5 GHz	24.0 GHz @ -24.3 dB
PS260MA24	PS260MA24A	1.00 *25,4*	2.00 *50,8*	.173 *4,4*	.100 *2,5*	.500 *12,7*	25.2 - 27.0 GHz	26.0 GHz @ -21.4 dB
PS380MA24	PS380MA24A	1.00 *25,4*	2.00 *50,8*	.176 *4,5*	.100 *2,5*	.500 *12,7*	35.8 - 40.2 GHz	38.0 GHz @ -21.4 dB
PS600MA24	PS600MA24A	1.00 *25,4*	2.00 *50,8*	.165 *4,2*	.100 *2,5*	.500 *12,7*	52.0 - 64.2 GHz	60.0 GHz @ -21.6 dB
PS760MA24	PS760MA24A	1.00 *25,4*	2.00 *50,8*	.184 *4,7*	.100 *2,5*	.500 *12,7*	72.0 - 80.0 GHz	76.0 GHz @ -20.0 dB
PS1100MA24	PS1100MA24A	1.00 *25,4*	2.00 *50,8*	.184 *4,7*	.100 *2,5*	.500 *12,7*	104.0 - 116.0 GHz	110.0 GHz @ -21.2 dB
PS24MA44	PS24MA44A	2.00 *50,8*	3.00 *76,2*	.262 *6,7*	.120 *3,0*	.500 *12,7*	2.2 - 2.6 GHz	2.4 GHz @ -21.0 dB
PS58MA44	PS58MA44A	2.00 *50,8*	3.00 *76,2*	.300 *7,6*	.120 *3,0*	.500 *12,7*	5.5 - 6.2 GHz	5.8 GHz @ -23.5 dB
PS100MA44	PS100MA44A	2.00 *50,8*	3.00 *76,2*	.345 *8,8*	.120 *3,0*	.500 *12,7*	9.2 - 10.8 GHz	10.0 GHz @ -23.5 dB
PS180MA44	PS180MA44A	2.00 *50,8*	3.00 *76,2*	.360 *9,1*	.120 *3,0*	.500 *12,7*	16.5 - 19.5 GHz	18.0 GHz @ -24.1 dB
PS240MA44	PS240MA44A	2.00 *50,8*	3.00 *76,2*	.376 *9,6*	.120 *3,0*	.500 *12,7*	22.5 - 25.5 GHz	24.0 GHz @ -24.3 dB
PS260MA44	PS260MA44A	2.00 *50,8*	3.00 *76,2*	.373 *9,5*	.120 *3,0*	.500 *12,7*	25.2 - 27.0 GHz	26.0 GHz @ -21.4 dB
PS380MA44	PS380MA44A	2.00 *50,8*	3.00 *76,2*	.376 *9,6*	.120 *3,0*	.500 *12,7*	35.8 - 40.2 GHz	38.0 GHz @ -21.4 dB
PS600MA44	PS600MA44A	2.00 *50,8*	3.00 *76,2*	.365 *9,3*	.120 *3,0*	.500 *12,7*	52.0 - 64.2 GHz	60.0 GHz @ -21.6 dB
PS760MA44	PS760MA44A	2.00 *50,8*	3.00 *76,2*	.384 *9,8*	.120 *3,0*	.500 *12,7*	72.0 - 80.0 GHz	76.0 GHz @ -20.0 dB
PS1100MA44	PS1100MA44A	2.00 *50,8*	3.00 *76,2*	.384 *9,8*	.120 *3,0*	.500 *12,7*	104.0 - 116.0 GHz	110.0 GHz @ -21.2 dB
PS24MA59	PS24MA59A	3.00 *76,2*	4.50 *114,3*	.362 *9,2*	.120 *3,0*	.250 *6,4*	2.2 - 2.6 GHz	2.4 GHz @ -21.0 dB
PS58MA59	PS58MA59A	3.00 *76,2*	4.50 *114,3*	.400 *10,2*	.120 *3,0*	.250 *6,4*	5.5 - 6.2 GHz	5.8 GHz @ -23.5 dB
PS100MA59	PS100MA59A	3.00 *76,2*	4.50 *114,3*	.445 *11,3*	.120 *3,0*	.250 *6,4*	9.2 - 10.8 GHz	10.0 GHz @ -23.5 dB
PS180MA59	PS180MA59A	3.00 *76,2*	4.50 *114,3*	.460 *11,7*	.120 *3,0*	.250 *6,4*	16.5 - 19.5 GHz	18.0 GHz @ -24.1 dB
PS240MA59	PS240MA59A	3.00 *76,2*	4.50 *114,3*	.476 *12,1*	.120 *3,0*	.250 *6,4*	22.5 - 25.5 GHz	24.0 GHz @ -24.3 dB
PS260MA59	PS260MA59A	3.00 *76,2*	4.50 *114,3*	.473 *12,0*	.120 *3,0*	.250 *6,4*	25.2 - 27.0 GHz	26.0 GHz @ -21.4 dB
PS380MA59	PS380MA59A	3.00 *76,2*	4.50 *114,3*	.476*12,1*	.120 *3,0*	.250 *6,4*	35.8 - 40.2 GHz	38.0 GHz @ -21.4 dB
PS600MA59	PS600MA59A	3.00 *76,2*	4.50 *114,3*	.465 *11,8*	.120 *3,0*	.250 *6,4*	52.0 - 64.2 GHz	60.0 GHz @ -21.6 dB
PS760MA59	PS760MA59A	3.00 *76,2*	4.50 *114,3*	.484 *12,3*	.120 *3,0*	.250 *6,4*	72.0 - 80.0 GHz	76.0 GHz @ -20.0 dB
PS1100MA59	PS1100MA59A	3.00 *76,2*	4.50 *114,3*	.484 *12,3*	.120 *3,0*	.250 *6,4*	104.0 - 116.0 GHz	110.0 GHz @ -21.2 dB

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