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# PHE840M

**RoHS**  
Compliant

- EMI suppressor, class X2, metallized polypropylene
- 0.01 – 10.0  $\mu\text{F}$ , 275/280 VAC, +105°C
- Small dimensions including low profile capacitors

## TYPICAL APPLICATIONS

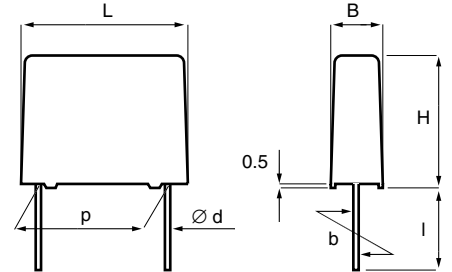
For worldwide use as electromagnetic interference suppressor in all X2 and across-the-line applications.

## CONSTRUCTION

Metallized polypropylene film encapsulated with selfextinguishing epoxy resin in a box of material recognized to UL 94 V-0.

## TECHNICAL DATA

<b>Rated voltage</b>	275 VAC 50/60 Hz (ENEC) 280 VAC 50/60 Hz (UL, CSA)																
<b>Capacitance range</b>	0.01 – 10.0 $\mu\text{F}$																
<b>Capacitance tolerance</b>	$\pm 20\%$ standard, $\pm 10\%$ option, $\pm 5\%$ on request																
<b>Temperature range</b>	-55 to +105°C																
<b>Climatic category</b>	55/105/56/B																
<b>Approvals</b>	ENEC, UL, cUL																
<b>Dissipation factor</b>	Maximum values at +23°C <table border="1"> <thead> <tr> <th></th> <th><math>C \leq 0.1 \mu\text{F}</math></th> <th><math>0.1 \mu\text{F} &lt; C \leq 1 \mu\text{F}</math></th> <th><math>C &gt; 1 \mu\text{F}</math></th> </tr> </thead> <tbody> <tr> <td>1 kHz</td> <td>0.1%</td> <td>0.1%</td> <td>0.1%</td> </tr> <tr> <td>10 kHz</td> <td>0.2%</td> <td>0.4%</td> <td>0.8%</td> </tr> <tr> <td>100 kHz</td> <td>0.6%</td> <td>-</td> <td>-</td> </tr> </tbody> </table>		$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1 \mu\text{F}$	$C > 1 \mu\text{F}$	1 kHz	0.1%	0.1%	0.1%	10 kHz	0.2%	0.4%	0.8%	100 kHz	0.6%	-	-
	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1 \mu\text{F}$	$C > 1 \mu\text{F}$														
1 kHz	0.1%	0.1%	0.1%														
10 kHz	0.2%	0.4%	0.8%														
100 kHz	0.6%	-	-														
<b>Test voltage between terminals</b>	The 100% screening factory test is carried out at 2200 VDC. The voltage level is selected to meet the requirements in applicable equipment standards. All electrical characteristics are checked after the test.																
<b>Insulation resistance</b>	$C \leq 0.33 \mu\text{F}$ : $\geq 30\,000 \text{ M}\Omega$ $C > 0.33 \mu\text{F}$ : $\geq 10\,000 \text{ s}$																
<b>In DC applications</b>	Recommended voltage $\leq 760 \text{ VDC}$																



p	d	std l	max l	b
$7.5 \pm 0.4$	0.6	17	20	$\pm 0.4$
$10.0 \pm 0.4$	0.6	17	30	$\pm 0.4$
$15.0 \pm 0.4$	0.8	17	30	$\pm 0.4$
$22.5 \pm 0.4$	0.8	6	30	$\pm 0.4$
$27.5 \pm 0.4$	0.8	6	30	$\pm 0.4$
$37.5 \pm 0.5$	1.0	6	30	$\pm 0.7$

Tolerance in lead length  
< 30 mm  $\begin{matrix} +0 \\ -1 \end{matrix}$  mm

30 mm  $\begin{matrix} +5 \\ -0 \end{matrix}$  mm

## ENVIRONMENTAL TEST DATA

<b>Endurance</b>	EN/IEC 60384-14:2005	1.25 x $U_R$ VAC 50 Hz, once every hour increased to 1000 VAC for 0.1 s, 1000 h at upper rated temperature	
<b>Vibration</b>	IEC 60068-2-6 Test Fc	3 directions at 2 hours each, 10-55 Hz at 0.75 mm or 98 m/s <sup>2</sup>	No visible damage No open or short circuit
<b>Bump</b>	IEC 60068-2-29 Test Eb	1000 bumps at 390 m/s <sup>2</sup>	No visible damage No open or short circuit
<b>Change of temperature</b>	IEC 60068-2-14 Test Na	Upper and lower rated temperature 5 cycles	No visible damage
<b>Active flammability</b>	EN/IEC 60384-14:2005		
<b>Passive flammability</b>	EN/IEC 60384-14:2005 UL1414	Enclosure material of UL94V-0 flammability class	
<b>Humidity</b>	IEC 60068-2-3 Test Ca	+40°C and 90 – 95% R.H.	56 days

## ARTICLE TABLE

Capaci- Box Max dimensions Max  
tance code in mm f<sub>o</sub> dU/dt Article code  
µF B H L MHz V/µs

## LEAD SPACING 7.5 MM

0.010	K01	4.0	8.0	10.0	14	100	PHE840MK5100MK01R17
0.012	K01	4.0	8.0	10.0	13	100	PHE840MK5120MK01R17
0.015	K01	4.0	8.0	10.0	12	100	PHE840MK5150MK01R17
0.018	K03	5.0	11.0	10.0	11	100	PHE840MK5180MK03R17
0.022	K03	5.0	11.0	10.0	10	100	PHE840MK5220MK03R17
0.027	K03	5.0	11.0	10.0	9.5	100	PHE840MK5270MK03R17
0.033	K03	5.0	11.0	10.0	8.8	100	PHE840MK5330MK03R17
0.039	K03	5.0	11.0	10.0	8.3	100	PHE840MK5390MK03R17
0.047	K04	6.0	12.0	10.0	7.5	100	PHE840MK5470MK04R17

## LEAD SPACING 10 MM

0.022	A01	4.0	9.0	13.0	8.5	100	PHE840MA5220MA01R17
0.027	A01	4.0	9.0	13.0	8.0	100	PHE840MA5270MA01R17
0.033	A01	4.0	9.0	13.0	7.6	100	PHE840MA5330MA01R17
0.039	A02	4.5	10.5	13.0	6.7	100	PHE840MA5390MA02R17
0.047	A02	4.5	10.5	13.0	5.9	100	PHE840MA5470MA02R17
0.056	A03	5.0	11.0	13.0	5.5	100	PHE840MA5560MA03R17
0.068	A03	5.0	11.0	13.0	4.9	100	PHE840MA5680MA03R17
0.082	A04	6.0	12.0	13.0	4.4	100	PHE840MA5820MA04R17
0.10	A05	9.5	7.5	13.0	4.0	100	PHE840MP6100MA05R17
0.10	A04	6.0	12.0	13.0	4.0	100	PHE840MA6100MA04R17

## LEAD SPACING 15 MM

0.047	B04	5.5	10.5	18.0	5.0	100	PHE840MB5470MB04R17
0.056	B04	5.5	10.5	18.0	4.6	100	PHE840MB5560MB04R17
0.068	B04	5.5	10.5	18.0	4.2	100	PHE840MB5680MB04R17
0.082	B05	5.5	12.5	18.0	3.9	100	PHE840MB5820MB05R17
0.10	B05	5.5	12.5	18.0	3.7	100	PHE840MB6100MB05R17
0.12	B10	6.5	12.5	18.0	3.3	100	PHE840MB6120MB10R17
0.15	B10	6.5	12.5	18.0	2.8	100	PHE840MB6150MB10R17
0.18	B06	7.5	14.5	18.0	2.7	100	PHE840MB6180MB06R17
0.22	B06	7.5	14.5	18.0	2.6	100	PHE840MX6220MB06R17*
0.22	B17	13.0	12.5	18.0	2.5	100	PHE840MQ6220MB17R17
0.22	B12	8.0	15.0	18.0	2.5	100	PHE840MB6220MB12R17
0.27	B11	8.5	16.0	18.0	2.3	100	PHE840MB6270MB11R17
0.33	B11	8.5	16.0	18.0	2.2	100	PHE840MX6330MB11R17*
0.33	B17	13.0	12.5	18.0	2.2	100	PHE840MH6330MB17R17*
0.33	B14	9.5	17.5	18.0	2.0	100	PHE840MB6330MB14R17
0.39	B16	11.0	19.0	18.0	1.9	100	PHE840MB6390MB16R17
0.47	B16	11.0	19.0	18.0	1.8	100	PHE840MB6470MB16R17

Capaci- Box Max dimensions Max  
tance code in mm f<sub>o</sub> dU/dt Article code  
µF B H L MHz V/µs

## LEAD SPACING 22.5 MM

0.22	D13	6.5	14.5	26.0	2.1	100	PHE840MD6220MD13R06L2
0.27	D17	7.0	16.5	26.0	1.9	100	PHE840MD6270MD17R06L2
0.33	D17	7.0	16.5	26.0	1.8	100	PHE840MD6330MD17R06L2
0.39	D14	8.0	16.0	26.0	1.7	100	PHE840MD6390MD14R06L2
0.47	D14	8.0	16.0	26.0	1.6	100	PHE840MY6470MD14R06L2*
0.47	D15	9.0	18.5	26.0	1.5	100	PHE840MD6470MD15R06L2
0.56	D15	9.0	18.5	26.0	1.4	100	PHE840MD6560MD15R06L2
0.68	D15	9.0	18.5	26.0	1.3	100	PHE840MY6680MD15R06L2*
0.68	D18	10.5	19.0	26.0	1.2	100	PHE840MD6680MD18R06L2
0.82	D16	11.0	21.5	26.0	1.1	100	PHE840MD6820MD16R06L2
1.0	D16	11.0	21.5	26.0	1.1	100	PHE840MY7100MD16R06L2*
1.0	D20	13.5	23.0	26.0	1.0	100	PHE840MD7100MD20R06L2
1.2	D19	15.5	24.5	26.0	0.90	100	PHE840MD7120MD19R06L2
1.5	D19	15.5	24.5	26.0	0.85	100	PHE840MD7150MD19R06L2

## LEAD SPACING 27.5 MM

0.82	F11	10.5	20.5	31.5	1.0	100	PHE840MF6820MF11R06L2
1.0	F11	10.5	20.5	31.5	1.0	100	PHE840MZ7100MF11R06L2*
1.0	F12	11.5	22.5	31.5	0.95	100	PHE840MF7100MF12R06L2
1.2	F03	13.5	23.0	31.5	0.82	100	PHE840MF7120MF03R06L2
1.5	F13	14.5	24.5	31.5	0.73	100	PHE840MF7150MF13R06L2
1.8	F14	17.5	28.0	31.5	0.65	100	PHE840MF7180MF14R06L2
2.2	F14	17.5	28.0	31.5	0.64	100	PHE840MZ7220MF14R06L2*
2.2	F15	19.0	29.0	31.5	0.62	100	PHE840MF7220MF15R06L2
2.7	F15	19.0	29.0	31.5	0.58	100	PHE840MF7270MF15R06L2
3.3	F15	19.0	29.0	31.5	0.54	100	PHE840MZ7330MF15R06L2*
3.3	F16	21.0	30.0	31.5	0.50	100	PHE840MF7330MF16R06L2
3.3	F18	31.0	19.0	31.5	0.50	100	PHE840MT7330MF18R06L2

## LEAD SPACING 37.5 MM

1.8	R05	13.0	24.0	41.0	0.60	100	PHE840MR7180MR05R06L2
2.2	R05	13.0	24.0	41.0	0.58	100	PHE840MR7220MR05R06L2
2.7	R04	15.0	26.0	41.0	0.53	100	PHE840MR7270MR04R06L2
3.3	R04	15.0	26.0	41.0	0.49	100	PHE840MR7330MR04R06L2
3.9	R02	16.5	32.0	41.0	0.46	100	PHE840MR7390MR02R06L2
4.7	R03	19.0	36.0	41.0	0.44	100	PHE840MR7470MR03R06L2
5.6	R06	21.0	38.0	41.0	0.41	100	PHE840MR7560MR06R06L2
6.8	R06	21.0	38.0	41.0	0.39	100	PHE840MR7680MR06R06L2
8.2	R08	28.0	43.0	41.0	0.30	100	PHE840MR7820MR08R06L2
10.0	R08	28.0	43.0	41.0	0.26	100	PHE840MR8100MR08R06L2

\* Only ± 20% tolerance

## APPROVALS

Certification Body	Specification
ENEC	EN/IEC 60384-14:2005
UL	UL 1283 (U <sub>R</sub> = 280 VAC) UL 1414 (U <sub>R</sub> = 250 VAC)
cUL recognition	C 22.2 No. 8 (U <sub>R</sub> = 280 VAC) C 22.2 No. 1 (U <sub>R</sub> = 250 VAC)

## MARKING

- RIFA
- RIFA article code
- Rated capacitance
- Capacitance tolerance code
- Rated voltage
- X2
- Approval marks
- Manufacturing date code
- IEC climatic category
- Passive flammability class

## ORDERING INFORMATION

The article code for the standard part is given in the article table.  
For other options, see page 11.