

# PHE840E

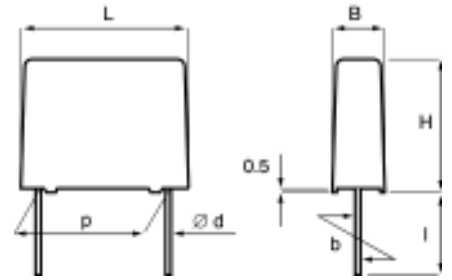
- EMI suppressor, class X2, metallized polypropylene
- 0.01 – 4.7  $\mu\text{F}$ , 300 VAC, +100°C

## TYPICAL APPLICATIONS

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

## CONSTRUCTION

Metallized polypropylene winding, encapsulated in self-extinguishing material meeting the requirements of UL 94 V-0.



## TECHNICAL DATA

<b>Rated voltage</b>	300 VAC 50/60 Hz
<b>Capacitance range</b>	0.01 – 4.7 $\mu\text{F}$
<b>Capacitance tolerance</b>	$\pm 20\%$ standard, $\pm 10\%$ option
<b>Temperature range</b>	-40 to +100°C
<b>Climatic category</b>	40/100/56/C
<b>Approvals</b>	S, VDE, UL, CSA

<b>Dissipation factor <math>\tan\delta</math></b>	Maximum values at +23°C			
		$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 0.47 \mu\text{F}$	$C > 0.47 \mu\text{F}$
	1 kHz	0.1%	0.1%	0.1%
	10 kHz	0.1%	0.2%	0.5%
	100 kHz	0.6%	0.9%	-

p	d	std l	max l	b
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  
 $< 30 \text{ mm}$   $\begin{matrix} +0 \\ -1 \end{matrix} \text{ mm}$   
 $\geq 30 \text{ mm}$   $\begin{matrix} +5 \\ -0 \end{matrix} \text{ mm}$

**Test voltage between terminals** 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.

**Resonance frequency** Tabulated self-resonance frequencies  $f_0$  refer to 5 mm lead length.

**Insulation resistance**  $C \leq 0.33 \mu\text{F}$ :  $\geq 30\,000 \text{ M}\Omega$   
 $C > 0.33 \mu\text{F}$ :  $\geq 10\,000 \text{ s}$

**In DC applications** Recommended voltage  $\leq 760 \text{ VDC}$

## ENVIRONMENTAL TEST DATA

<b>Endurance</b>	IEC 60384-14	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 132400		
<b>Passive flammability</b>	IEC 60384-14 (1993) EN 132400 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

Capacitance µF	Max dimensions in mm			p	Quantity per package			Weight g	f <sub>0</sub> MHz	Max dU/dt V/µs	Approvals				Article code 1 st block
	B	H	L		Bulk pcs	Tray pcs	reel taped pcs				CS	VDE	UL	CSA	
<b>300 VAC</b>															
<b>LEAD SPACING 10 MM</b>															
0.010	4.0	9.0	13.0	10.0	1000		900	0.7	11	100	√	√	√	√	PHE840EA5100M
0.012	4.0	9.0	13.0	10.0	1000		900	0.7	10	100	√	√	√	√	PHE840EA5120M
0.015	4.0	9.0	13.0	10.0	1000		900	0.7	9.4	100	√	√	√	√	PHE840EA5150M
0.018	4.5	10.5	13.0	10.0	1000		800	0.9	8.7	100	√	√	√	√	PHE840EA5180M
0.022	4.5	10.5	13.0	10.0	1000		800	0.9	8.1	100	√	√	√	√	PHE840EA5220M
0.027	5.0	11.0	13.0	10.0	800		700	1.0	7.5	100	√	√	√	√	PHE840EA5270M
0.033	5.0	11.0	13.0	10.0	800		700	1.0	6.9	100	√	√	√	√	PHE840EA5330M
0.039	6.0	12.0	13.0	10.0	600		500	1.2	6.5	100	√	√	√	√	PHE840EA5390M
0.047	6.0	12.0	13.0	10.0	600		500	1.2	6.0	100	√	√	√	√	PHE840EA5470M
<b>LEAD SPACING 15 MM</b>															
0.010	5.5	10.5	18.0	15.0	800		600	1.4	10	100	√	√	√	√	PHE840EB5100M
0.012	5.5	10.5	18.0	15.0	800		600	1.4	9.7	100	√	√	√	√	PHE840EB5120M
0.015	5.5	10.5	18.0	15.0	800		600	1.4	8.7	100	√	√	√	√	PHE840EB5150M
0.018	5.5	10.5	18.0	15.0	800		600	1.4	7.9	100	√	√	√	√	PHE840EB5180M
0.022	5.5	10.5	18.0	15.0	800		600	1.4	7.2	100	√	√	√	√	PHE840EB5220M
0.027	5.5	10.5	18.0	15.0	800		600	1.4	6.5	100	√	√	√	√	PHE840EB5270M
0.033	5.5	10.5	18.0	15.0	800		600	1.4	5.9	100	√	√	√	√	PHE840EB5330M
0.039	5.5	10.5	18.0	15.0	800		600	1.4	5.4	100	√	√	√	√	PHE840EB5390M
0.047	5.5	10.5	18.0	15.0	800		600	1.4	5.0	100	√	√	√	√	PHE840EB5470M
0.056	5.5	12.5	18.0	15.0	800		600	1.6	4.6	100	√	√	√	√	PHE840EB5560M
0.068	5.5	12.5	18.0	15.0	800		600	1.6	4.2	100	√	√	√	√	PHE840EB5680M
0.082	6.5	12.5	18.0	15.0	600		500	1.9	3.8	100	√	√	√	√	PHE840EB5820M
0.10	6.5	12.5	18.0	15.0	600		500	1.9	3.7	100	√	√	√	√	PHE840EX6100M *
0.10	7.5	14.5	18.0	15.0	400		400	2.2	3.5	100	√	√	√	√	PHE840EB6100M
0.12	7.5	14.5	18.0	15.0	400		400	2.2	3.2	100	√	√	√	√	PHE840EB6120M
0.15	8.0	15.0	18.0	15.0	400		400	2.5	2.8	100	√	√	√	√	PHE840EB6150M
0.18	8.5	16.0	18.0	15.0	400		400	2.9	2.6	100	√	√	√	√	PHE840EB6180M
0.22	8.5	16.0	18.0	15.0	400		400	2.9	2.5	100	√	√	√	√	PHE840EX6220M *
0.22	9.5	17.5	18.0	15.0	300		350	3.5	2.4	100	√	√	√	√	PHE840EB6220M
<b>LEAD SPACING 22.5 MM</b>															
0.10	6.5	14.5	26.0	22.5		234		2.7	2.7	100	√	√	√	√	PHE840ED6100M
0.12	6.5	14.5	26.0	22.5		234		2.7	2.6	100	√	√	√	√	PHE840ED6120M
0.15	6.5	14.5	26.0	22.5		234		2.7	2.5	100	√	√	√	√	PHE840ED6150M
0.18	6.5	14.5	26.0	22.5		234		2.7	2.3	100	√	√	√	√	PHE840ED6180M
0.22	7.0	16.5	26.0	22.5		216		3.2	2.2	100	√	√	√	√	PHE840ED6220M
0.27	8.0	16.0	26.0	22.5		186		3.8	2.0	100	√	√	√	√	PHE840ED6270M
0.33	8.0	16.0	26.0	22.5		186		3.8	1.9	100	√	√	√	√	PHE840EY6330M *
0.33	9.0	18.5	26.0	22.5		168		5.0	1.7	100	√	√	√	√	PHE840ED6330M
0.39	9.0	18.5	26.0	22.5		168		5.0	1.6	100	√	√	√	√	PHE840ED6390M
0.47	9.0	18.5	26.0	22.5		168		5.0	1.5	100	√	√	√	√	PHE840EY6470M *
0.47	10.5	19.0	26.0	22.5		264		5.8	1.4	100	√	√	√	√	PHE840ED6470M
0.56	11.0	21.5	26.0	22.5		253		6.6	1.3	100	√	√	√	√	PHE840ED6560M
0.68	11.0	21.5	26.0	22.5		253		6.6	1.2	100	√	√	√	√	PHE840EY6680M *
0.82	15.5	24.5	26.0	22.5		176		10.6	1.1	100	√	√	√	√	PHE840ED6820M
1.0	15.5	24.5	26.0	22.5		176		10.0	1.0	100	√	√	√	√	PHE840ED7100M
<b>LEAD SPACING 27.5 MM</b>															
0.47	10.5	20.5	31.5	27.5		216		8.0	1.3	100	√	√	√	√	PHE840EF6470M
0.56	10.5	20.5	31.5	27.5		216		8.0	1.2	100	√	√	√	√	PHE840EF6560M
0.68	10.5	20.5	31.5	27.5		216		8.0	1.1	100	√	√	√	√	PHE840EF6680M
0.82	11.5	22.5	31.5	27.5		198		9.1	1.0	100	√	√	√	√	PHE840EF6820M
1.0	11.5	22.5	31.5	27.5		198		9.1	1.0	100	√	√	√	√	PHE840EZ7100M *
1.0	13.5	23.0	31.5	27.5		171		10.8	0.94	100	√	√	√	√	PHE840EF7100M
1.2	14.5	24.5	31.5	27.5		153		14.5	0.87	100	√	√	√	√	PHE840EF7120M

\* Only ±20 %

**ARTICLE TABLE**

Capacitance µF	Max dimensions in mm			p	Quantity per package			Weight g	f <sub>0</sub> MHz	Max dU/dt V/µs	Approvals				Article code 1 st block
	B	H	L		Bulk pcs	Tray pcs	reel taped pcs				S	VDE	UL	CSA	

**300 VAC**

**LEAD SPACING 27.5 MM**

1.5	17.5	28.0	31.5	27.5		126	17.0	0.78	100	√	√	√	√	PHE840EF7150M
1.8	19.0	29.0	31.5	27.5		117	19.5	0.72	100	√	√	√	√	PHE840EF7180M
2.2	19.0	29.0	31.5	27.5		117	19.5	0.70	100	√	√	√	√	PHE840EZ7220M *
2.2	21.0	30.0	31.5	27.5		108	22.6	0.66	100	√	√	√	√	PHE840EF7220M

**LEAD SPACING 37.5 MM**

1.0	13.0	24.0	41.0	37.5		140	14.0	0.93	100	√	√	√	√	PHE840ER7100M
1.2	13.0	24.0	41.0	37.5		140	14.0	0.84	100	√	√	√	√	PHE840ER7120M
1.5	13.0	24.0	41.0	37.5		140	14.0	0.74	100	√	√	√	√	PHE840ER7150M
1.8	15.0	26.0	41.0	37.5		119	17.0	0.67	100	√	√	√	√	PHE840ER7180M
2.2	15.0	26.0	41.0	37.5		119	17.0	0.60	100	√	√	√	√	PHE840ER7220M
2.7	16.5	32.0	41.0	37.5		105	23.0	0.54	100	√	√	√	√	PHE840ER7270M
3.3	19.0	36.0	41.0	37.5		91	28.5	0.48	100	√	√	√	√	PHE840ER7330M
3.9	19.0	36.0	41.0	37.5		91	28.5	0.44	100	√	√	√	√	PHE840ER7390M
4.7	21.0	38.0	41.0	37.5		84	34.4	0.39	100	√	√	√	√	PHE840ER7470M

\* Only ±20 %

**APPROVALS/REFERENCE DOCUMENTS**

Country	Specification	Approval reference PHE840E
S = Sweden	EN 132400	9934306/01
VDE = Germany	EN 132400	124109 123570
UL = USA	UL 1283	E100117 (U <sub>R</sub> = 300 VAC)
	UL 1414	E73869 (U <sub>R</sub> = 250 VAC)
CSA = Canada	C 22.2 No. 8	E100117 (U <sub>R</sub> = 300 VAC)
(cUL recognition)	C 22.2 No. 1	E73869 (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**

Article code												
1st block						2nd block						
See article table Pos. 13 Capacitance tolerance code: M = ± 20% standard K = ± 10% option						If not standard lead length, add R06 – R30 in pos. 14–16. For reel taped, add 17T0 or 17T1 in pos. 14–15. For packing on trays (6 mm lead length), add L2 in pos. 17–18.						
P	H	E	8	4	0	R	0	6				
1	2	3	4	5	6	14	15	16	17	18	19	20

**PACKING**

The box dimensions for bulk packaging are 245 x 145 x 80 mm. Quantity/package as per article table.

Reels with taped capacitors are packed 10 in a box with dimension 370 x 370 x 560 mm. Quantity/reel according to article table. The standard quantity/reel is for 360 mm reel. If 500 mm reel is required, it must be specified when ordering and the quantity is 2 x the given quantity.