# PHE840E

RoHS Compliant

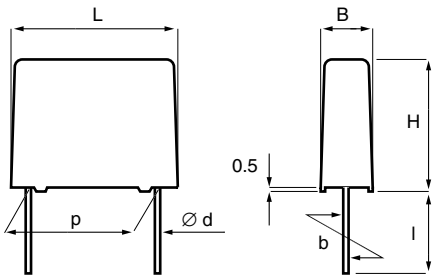
- **EMI suppressor, class X2, metallized polypropylene**
- **0.01 – 10 µF, 300 VAC, +105°C**
- **New improved design: small dimensions including low profile capacitors**

## TYPICAL APPLICATIONS

For worldwide use as electromagnetic interference suppressor in all X2 and across-the-line applications.
Not for use in series with the mains.
See www.kemet.com for more information.

## CONSTRUCTION

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




| P | d | std l | max l | b |
|---|---|---|---|---|
| 10.0 ± 0.4 | 0.6 | 17 | 30 | ±0.4 |
| 15.0 ± 0.4 | 0.8 | 17 | 30 | ±0.4 |
| 22.5 ± 0.4 | 0.8 | 6 | 30 | ±0.4 |
| 27.5 ± 0.4 | 0.8 | 6 | 30 | ±0.4 |
| 37.5 ± 0.5 | 1.0 | 6 | 30 | ±0.7 |

Tolerance in lead length
< 30 mm $^{+0}_{-1}$ mm

30 mm $^{+5}_{-0}$ mm

## TECHNICAL DATA

**Rated voltage** 300 VAC 50/60 Hz

**Capacitance range** 0.01 – 10 µF

**Capacitance tolerance** ± 20% standard, ± 10% option

**Temperature range** –55 to +105°C

**Climatic category** 55/105/56/B

**Approvals** ENEC, UL, cUL

**Dissipation factor tanδ**

Maximum values at +23°C

| | C ≤ 0.1 µF | 0.1µF < C ≤ 1 µF | C > 1 µF |
|---|---|---|---|
| 1 kHz | 0.1% | 0.1% | 0.1% |
| 10 kHz | 0.2% | 0.4% | 0.8% |
| 100 kHz | 0.6% | – | – |

**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 ≤ 0.33 µF: ≥ 30 000 MΩ
C > 0.33 µF: ≥ 10 000 s

**In DC applications** Recommended voltage ≤ 760 VDC

## ENVIRONMENTAL TEST DATA

| | | | |
|---|---|---|---|
| **Endurance** | 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 | |
| **Vibration** | IEC 60068–2–6 Test Fc | 3 directions at 2 hours each, 10–55 Hz at 0.75 mm or 98 m/s² | No visible damage<br>No open or short circuit |
| **Bump** | IEC 60068–2–29 Test Eb | 1000 bumps at 390 m/s² | No visible damage<br>No open or short circuit |
| **Change of temperature** | IEC 60068–2–14 Test Na | Upper and lower rated temperature 5 cycles | No visible damage |
| **Active flammability** | EN/IEC 60384-14:2005 | | |
| **Passive flammability** | EN/IEC 60384-14:2005 | Enclosure material of UL94V–0 flammability class | |
| **Humidity** | IEC 60068-2-3 Test Ca | +40°C and 90 – 95% R.H. | 56 days |

## ARTICLE TABLE

| Capacitance µF | Box code | Max dimensions in mm B | H | L | $f_o$ MHz | Max dU/dt V/µs | Article code |
|---|---|---|---|---|---|---|---|
| **LEAD SPACING 10 MM** | | | | | | | |
| 0.010 | A01 | 4.0 | 9.0 | 13.0 | 11 | 100 | PHE840EA5100MA01R17 |
| 0.012 | A01 | 4.0 | 9.0 | 13.0 | 10 | 100 | PHE840EA5120MA01R17 |
| 0.015 | A01 | 4.0 | 9.0 | 13.0 | 9.4 | 100 | PHE840EA5150MA01R17 |
| 0.018 | A01 | 4.0 | 9.0 | 13.0 | 8.9 | 100 | PHE840EA5180MA01R17 |
| 0.022 | A01 | 4.0 | 9.0 | 13.0 | 8.6 | 100 | PHE840EA5220MA01R17 |
| 0.027 | A02 | 4.5 | 10.5 | 13.0 | 8.1 | 100 | PHE840EA5270MA02R17 |
| 0.033 | A02 | 4.5 | 10.5 | 13.0 | 7.6 | 100 | PHE840EA5330MA02R17 |
| 0.039 | A03 | 5.0 | 11.0 | 13.0 | 6.6 | 100 | PHE840EA5390MA03R17 |
| 0.047 | A03 | 5.0 | 11.0 | 13.0 | 6.1 | 100 | PHE840EA5470MA03R17 |
| 0.056 | A04 | 6.0 | 12.0 | 13.0 | 5.6 | 100 | PHE840EA5560MA04R17 |
| 0.068 | A04 | 6.0 | 12.0 | 13.0 | 5.0 | 100 | PHE840EA5680MA04R17 |
| **LEAD SPACING 15 MM** | | | | | | | |
| 0.033 | B04 | 5.5 | 10.5 | 18.0 | 5.9 | 100 | PHE840EB5330MB04R17 |
| 0.039 | B04 | 5.5 | 10.5 | 18.0 | 5.4 | 100 | PHE840EB5390MB04R17 |
| 0.047 | B04 | 5.5 | 10.5 | 18.0 | 5.0 | 100 | PHE840EB5470MB04R17 |
| 0.056 | B04 | 5.5 | 10.5 | 18.0 | 4.6 | 100 | PHE840EB5560MB04R17 |
| 0.068 | B04 | 5.5 | 10.5 | 18.0 | 4.2 | 100 | PHE840EB5680MB04R17 |
| 0.082 | B05 | 5.5 | 12.5 | 18.0 | 3.9 | 100 | PHE840EB5820MB05R17 |
| 0.10 | B05 | 5.5 | 12.5 | 18.0 | 3.7 | 100 | PHE840EB6100MB05R17 |
| 0.12 | B10 | 6.5 | 12.5 | 18.0 | 3.3 | 100 | PHE840EB6120MB10R17 |
| 0.15 | B10 | 6.5 | 12.5 | 18.0 | 2.8 | 100 | PHE840EB6150MB10R17 |
| 0.18 | B06 | 7.5 | 14.5 | 18.0 | 2.7 | 100 | PHE840EB6180MB06R17 |
| 0.22 | B06 | 7.5 | 14.5 | 18.0 | 2.6 | 100 | PHE840EX6220MB06R17 * |
| 0.22 | B17 | 13.0 | 12.5 | 18.0 | 2.5 | 100 | PHE840EQ6220MB17R17 |
| 0.22 | B12 | 8.0 | 15.0 | 18.0 | 2.5 | 100 | PHE840EB6220MB12R17 |
| 0.27 | B11 | 8.5 | 16.5 | 18.0 | 2.3 | 100 | PHE840EB6270MB11R17 |
| 0.33 | B11 | 8.5 | 16.5 | 18.0 | 2.2 | 100 | PHE840EX6330MB11R17* |
| 0.33 | B17 | 13.0 | 12.5 | 18.0 | 2.2 | 100 | PHE840EH6330MB17R17 |
| 0.33 | B14 | 9.5 | 17.5 | 18.0 | 2.0 | 100 | PHE840EB6330MB14R17 |
| 0.39 | B16 | 11.0 | 19.0 | 18.0 | 1.9 | 100 | PHE840EB6390MB16R17 |
| 0.47 | B16 | 11.0 | 19.0 | 18.0 | 1.8 | 100 | PHE840EB6470MB16R17 |
| **LEAD SPACING 22.5 MM** | | | | | | | |
| 0.22 | D13 | 6.5 | 14.5 | 26.0 | 2.1 | 100 | PHE840ED6220MD13R06L2 |
| 0.27 | D17 | 7.0 | 16.5 | 26.0 | 1.9 | 100 | PHE840ED6270MD17R06L2 |
| 0.33 | D17 | 7.0 | 16.5 | 26.0 | 1.8 | 100 | PHE840ED6330MD17R06L2 |
| 0.39 | D14 | 8.0 | 16.0 | 26.0 | 1.7 | 100 | PHE840ED6390MD14R06L2 |
| 0.47 | D14 | 8.0 | 16.0 | 26.0 | 1.6 | 100 | PHE840EY6470MD14R06L2* |
| 0.47 | D15 | 9.0 | 18.5 | 26.0 | 1.5 | 100 | PHE840ED6470MD15R06L2 |
| 0.56 | D15 | 9.0 | 18.5 | 26.0 | 1.4 | 100 | PHE840ED6560MD15R06L2 |
| 0.68 | D15 | 9.0 | 18.5 | 26.0 | 1.3 | 100 | PHE840EY6680MD15R06L2* |
| 0.68 | D18 | 10.5 | 19.0 | 26.0 | 1.2 | 100 | PHE840ED6680MD18R06L2 |
| 0.82 | D16 | 11.0 | 21.5 | 26.0 | 1.1 | 100 | PHE840ED6820MD16R06L2 |
| 1.0 | D16 | 11.0 | 21.5 | 26.0 | 1.1 | 100 | PHE840EY7100MD16R06L2* |
| 1.0 | D20 | 13.5 | 23.0 | 26.0 | 1.0 | 100 | PHE840ED7100MD20R06L2 |
| 1.2 | D19 | 15.5 | 24.5 | 26.0 | 0.90 | 100 | PHE840ED7120MD19R06L2 |
| 1.5 | D19 | 15.5 | 24.5 | 26.0 | 0.85 | 100 | PHE840ED7150MD19R06L2 |
| **LEAD SPACING 27.5 MM** | | | | | | | |
| 0.82 | F11 | 10.5 | 20.5 | 31.5 | 1.0 | 100 | PHE840EF6820MF11R06L2 |
| 1.0 | F11 | 10.5 | 20.5 | 31.5 | 1.0 | 100 | PHE840EZ7100MF11R06L2* |
| 1.0 | F12 | 11.5 | 22.5 | 31.5 | 0.95 | 100 | PHE840EF7100MF12R06L2 |
| 1.0 | F17 | 21.0 | 12.5 | 31.5 | 0.95 | 100 | PHE840ET7100MF17R06L2 |
| 1.2 | F03 | 13.5 | 23.0 | 31.5 | 0.82 | 100 | PHE840EF7120MF03R06L2 |
| 1.5 | F13 | 14.5 | 24.5 | 31.5 | 0.73 | 100 | PHE840EF7150MF13R06L2 |
| 1.8 | F14 | 17.5 | 28.0 | 31.5 | 0.65 | 100 | PHE840EF7180MF14R06L2 |
| 2.2 | F14 | 17.5 | 28.0 | 31.5 | 0.64 | 100 | PHE840EZ7220MF14R06L2* |
| 2.2 | F15 | 19.0 | 29.0 | 31.5 | 0.62 | 100 | PHE840EF7220MF15R06L2 |
| 2.2 | F19 | 27.5 | 16.0 | 31.5 | 0.62 | 100 | PHE840ET7220MF19R06L2 |
| 2.7 | F15 | 19.0 | 29.0 | 31.5 | 0.58 | 100 | PHE840EF7270MF15R06L2 |
| 3.3 | F15 | 19.0 | 29.0 | 31.5 | 0.54 | 100 | PHE840EZ7330MF15R06L2* |
| 3.3 | F16 | 21.0 | 30.0 | 31.5 | 0.50 | 100 | PHE840EF7330MF16R06L2 |
| 3.3 | F18 | 31.0 | 19.0 | 31.5 | 0.50 | 100 | PHE840ET7330MF18R06L2 |
| **LEAD SPACING 37.5 MM** | | | | | | | |
| 1.8 | R05 | 13.0 | 24.0 | 41.0 | 0.60 | 100 | PHE840ER7180MR05R06L2 |
| 2.2 | R05 | 13.0 | 24.0 | 41.0 | 0.58 | 100 | PHE840ER7220MR05R06L2 |
| 2.7 | R04 | 15.0 | 26.0 | 41.0 | 0.53 | 100 | PHE840ER7270MR04R06L2 |
| 3.3 | R04 | 15.0 | 26.0 | 41.0 | 0.49 | 100 | PHE840ER7330MR04R06L2 |
| 3.9 | R02 | 16.5 | 32.0 | 41.0 | 0.46 | 100 | PHE840ER7390MR02R06L2 |
| 4.7 | R03 | 19.0 | 36.0 | 41.0 | 0.44 | 100 | PHE840ER7470MR03R06L2 |
| 5.6 | R06 | 21.0 | 38.0 | 41.0 | 0.41 | 100 | PHE840ER7560MR06R06L2 |
| 6.8 | R06 | 21.0 | 38.0 | 41.0 | 0.39 | 100 | PHE840ER7680MR06R06L2 |
| 8.2 | R08 | 28.0 | 43.0 | 41.0 | 0.30 | 100 | PHE840ER7820MR08R06L2 |
| 10 | R08 | 28.0 | 43.0 | 41.0 | 0.26 | 100 | PHE840ER8100MR08R06L2 |

* Only ± 20% tolerance

## APPROVALS

| Certification Body | Specification |
|---|---|
| ENEC | EN/IEC 60384-14:2005 |
| UL | UL 60384-14 |
| | CAN/CSA-E60384-14:09 |

## 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.

Statements of suitability for certain applications are based on our knowledge of typical operating conditions for such applications, but are not intended to constitute – and we specifically disclaim – any warranty concerning suitability for a specific customer application or use. This Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by us with reference to the use of our products is given gratis, and we assume no obligation or liability for the advice given or results obtained.

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