

### RoHS BA/BB Varistor Series



#### Description


The BA and BB Series transient surge suppressors are heavy-duty industrial Metal-Oxide Varistors (MOVs) designed to provide surge protection for motor controls and power supplies used in oil-drilling, mining, transportation equipment and other heavy industrial AC line applications.

These UL- recognized varistors have similar package construction but differ in size and ratings. The BA models are rated from 130 to 880V<sub>M(AC)</sub>. The BB models from 1100 to 2800V<sub>M(AC)</sub>.

Both the BA and BB Series feature improved creep and strike capability to minimize breakdown along the package surface, a package design that provides complete electrical isolation of the disc subassembly, and rigid terminals to ensure secure wire contacts.

See BA/BB Series Device Ratings and Specifications Table for part number and brand information.

#### Agency Approvals

| Agency  | Agency File Number            |
|---|-------------------------------|
|  | E320116 - for BA Series only. |

#### Features

- High energy absorption capability  $W_{TM}$   
BA Series 3200J  
BB Series 10,000J
- Wide operating voltage range  $V_{M(AC)RMS}$   
BA Series 130V to 880V  
BB Series 1100V to 2800V
- Rigid terminals for secure wire contact
- Case design provides complete electrical isolation of disc subassembly
- Littelfuse largest packaged disc 60mm diameter
- No derating up to 85°C ambient
- RoHS compliant

#### Absolute Maximum Ratings

• For ratings of individual members of a series, see Device Ratings and Specifications chart

| Continuous   | BA Series        | BB Series     | Units      |
|--|------------------|---------------|------------|
| Steady State Applied Voltage:  |                  |               |            |
| AC Voltage Range ( $V_{M(AC)RMS}$ )  | 130 to 880       | 1100 to 2800  | V          |
| DC Voltage Range ( $V_{M(DC)}$ )   | 175 to 1150      | 1400 to 3500  | V          |
| Transients:  |                  |               |            |
| Peak Pulse Current ( $I_{TM}$ )  |                  |               |            |
| For 8/20 $\mu$ s Current Wave (See Figure 2)   | 50,000 to 70,000 | 70,000        | A          |
| Single Pulse Energy Range  |                  |               |            |
| For 2ms Current Squarewave ( $W_{TM}$ )  | 450 to 3200      | 3800 to 10000 | J          |
| Operating Ambient Temperature Range ( $T_A$ )  | -55 to +85       | -55 to +85    | °C         |
| Storage Temperature Range ( $T_{STG}$ )  | -55 to +125      | -55 to +125   | °C         |
| Temperature Coefficient ( $\alpha^V$ ) of Clamping Voltage ( $V_C$ ) at Specified Test Current   | <0.01            | <0.01         | %/°C       |
| Hi-Pot Encapsulation (COATING Isolation Voltage Capability)<br>(Dielectric must withstand indicated DC voltage for one minute per MIL-STD-202, Method 301) | 5000             | 5000          | V          |
| COATING Insulation Resistance  | 1000             | 1000          | M $\Omega$ |

**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### BA/BB Series Ratings & Specifications

| Part Number      | Maximum Rating (85°C) |             |              |                                 | Specifications (25°C)                   |             |      |  |                                 |
|------------------|-----------------------|-------------|--------------|---------------------------------|---|-------------|------|--|---------------------------------|
|                  | Continuous            |             | Transient    |                                 | Varistor Voltage at 1mA DC Test Current |             |      | Maximum Clamping Volt $V_C$ at 200A Current (8/20 $\mu$ s) | Typical Capacitance $f = 1$ MHz |
|                  | $V_{RMS}$             | $V_{DC}$    | Energy (2ms) | Peak Current $8 \times 20\mu s$ |   |             |      |  |                                 |
|                  | $V_{M(AC)}$           | $V_{M(DC)}$ | $W_{TM}$     | $I_{TM}$                        | Min                                     | $V_{N(DC)}$ | Max  | $V_C$  | C                               |
| (V)              | (V)                   | (J)         | (A)          | (V)                             | (V)                                     | (V)         | (V)  | (pF)   |                                 |
| <b>BA Series</b> |                       |             |              |                                 |   |             |      |  |                                 |
| V131BA60         | 130                   | 175         | 450          | 50000                           | 184                                     | 200         | 228  | 340  | 20000                           |
| V151BA60         | 150                   | 200         | 530          | 50000                           | 212                                     | 240         | 268  | 400  | 16000                           |
| V251BA60         | 250                   | 330         | 880          | 50000                           | 354                                     | 390         | 429  | 620  | 10000                           |
| V271BA60         | 275                   | 369         | 950          | 50000                           | 389                                     | 430         | 473  | 680  | 9000                            |
| V321BA60         | 320                   | 420         | 1100         | 50000                           | 462                                     | 510         | 561  | 760  | 7500                            |
| V421BA60         | 420                   | 560         | 1500         | 70000                           | 610                                     | 680         | 748  | 1060   | 6000                            |
| V481BA60         | 480                   | 640         | 1600         | 70000                           | 670                                     | 750         | 825  | 1160   | 5500                            |
| V511BA60         | 510                   | 675         | 1800         | 70000                           | 735                                     | 820         | 910  | 1300   | 5000                            |
| V571BA60         | 575                   | 730         | 2100         | 70000                           | 805                                     | 910         | 1000 | 1420   | 4500                            |
| V661BA60         | 660                   | 850         | 2300         | 70000                           | 940                                     | 1050        | 1160 | 1640   | 4000                            |
| V751BA60         | 750                   | 970         | 2600         | 70000                           | 1080                                    | 1200        | 1320 | 1880   | 3500                            |
| V881BA60         | 880                   | 1150        | 3200         | 70000                           | 1290                                    | 1500        | 1650 | 2340   | 2700                            |
| <b>BB Series</b> |                       |             |              |                                 |   |             |      |  |                                 |
| V112BB60         | 1100                  | 1400        | 3800         | 70000                           | 1620                                    | 1800        | 2060 | 2940   | 2200                            |
| V142BB60         | 1400                  | 1750        | 5000         | 70000                           | 2020                                    | 2200        | 2550 | 3600   | 1800                            |
| V172BB60         | 1700                  | 2150        | 6000         | 70000                           | 2500                                    | 2700        | 3030 | 4300   | 1500                            |
| V202BB60         | 2000                  | 2500        | 7500         | 70000                           | 2970                                    | 3300        | 3630 | 5200   | 1200                            |
| V242BB60         | 2400                  | 3000        | 8600         | 70000                           | 3510                                    | 3900        | 4290 | 6200   | 1000                            |
| V282BB60         | 2800                  | 3500        | 10000        | 70000                           | 4230                                    | 4700        | 5170 | 7400   | 800                             |

NOTE: Average power dissipation of transients not to exceed 2.5W. See Figures 3 and 4 for more information on power dissipation.

**Power Dissipation Ratings**

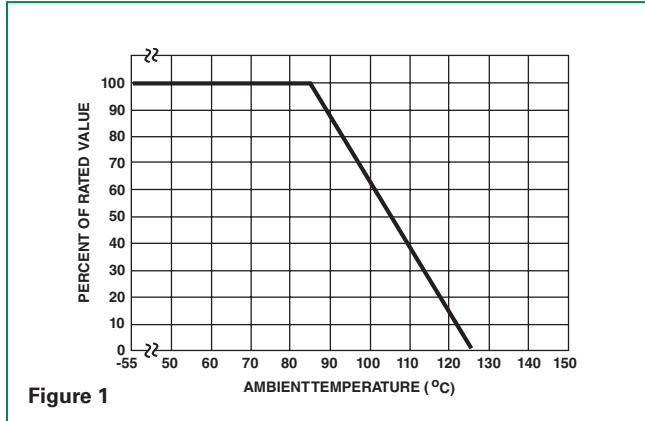


Figure 1

Should transients occur in rapid succession, the average power dissipation required is simply the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be within the specifications shown on the Device Ratings and Characteristics Table for the specific device. Furthermore, the operating values need to be derated at high temperatures as shown in the above diagram. Because varistors can only dissipate a relatively small amount of average power they are, therefore, not suitable for repetitive applications that involve substantial amounts of average power dissipation.

**Peak Pulse Current Test Waveform**

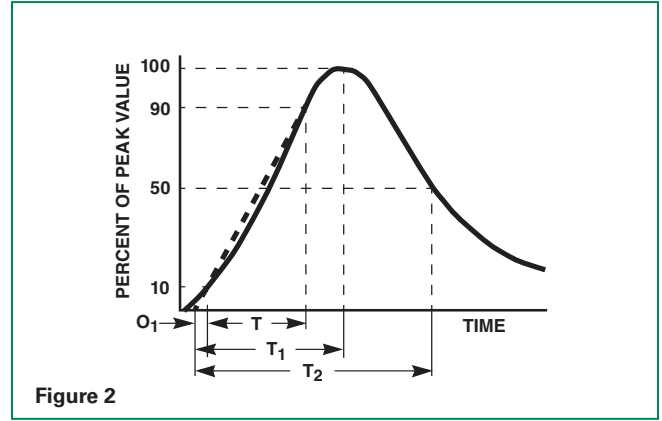


Figure 2

$O_1$  = Virtual Origin of Wave  
 $T$  = Time from 10% to 90% of Peak  
 $T_1$  = Rise Time =  $1.25 \times T$   
 $T_2$  = Decay Time

**Example** - For an  $8/20 \mu s$  Current Waveform:

$8 \mu s = T_1 = \text{Rise Time}$   
 $20 \mu s = T_2 = \text{Decay Time}$

**Stand by Power Dissipation vs Applied  $V_{RMS}$  at Varied Temperatures**

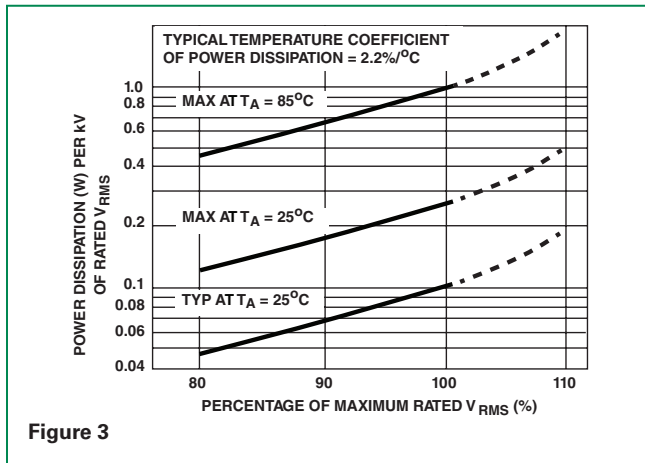


Figure 3

**Typical Stability of Standby Power Dissipation at Rated  $V_{RMS}$  vs Time**

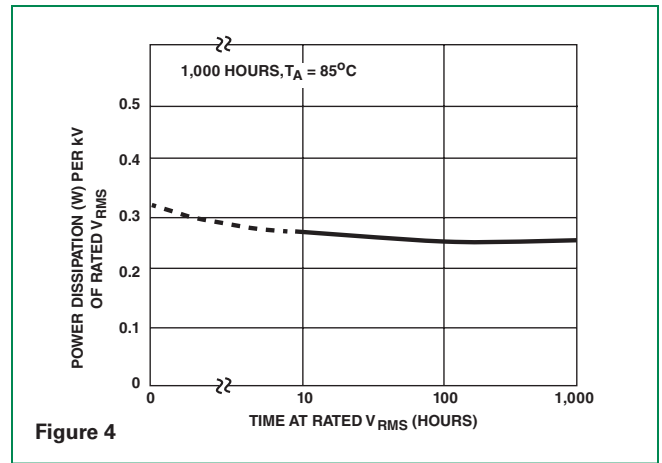


Figure 4

**BA/BB Series**

### Maximum Clamping Voltage BA Series

V131BA60 - V881BA60

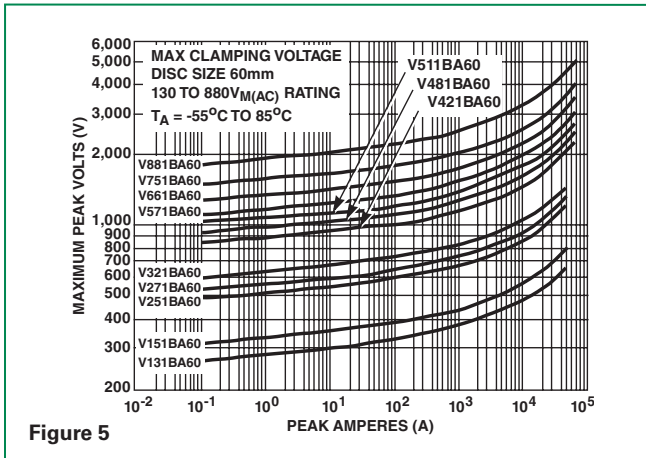


Figure 5

### Maximum Clamping Voltage BB Series

V112BB60 - V282BB60

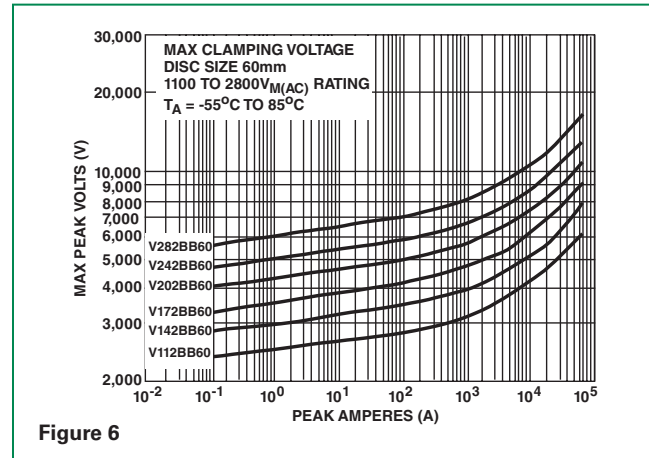


Figure 6

### Repetitive Surge Capability BA Series

V131BA60 - V321BA60

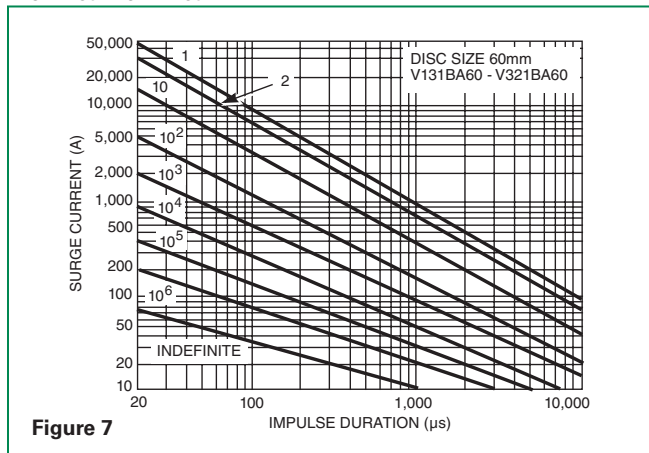


Figure 7

### Repetitive Surge Capability BB Series

V421BA60 - V282BB60

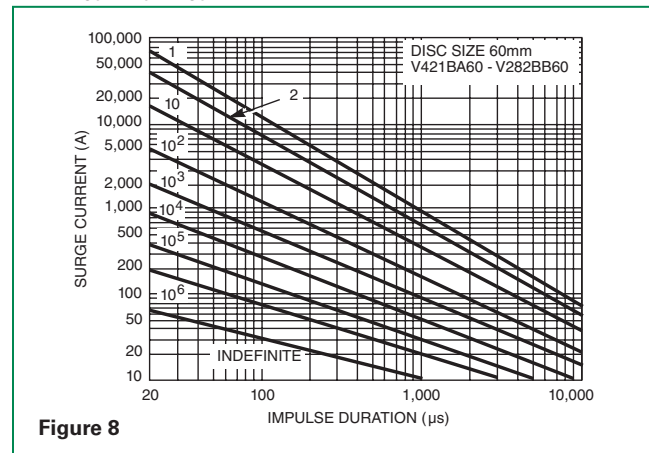


Figure 8

NOTE: If pulse ratings are exceeded, a shift of  $V_{CL}(DC)$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{CL}(DC)$ , may result in the device not meeting the original published specifications, but it does not prevent the device from continuing to function, and to provide ample protection.

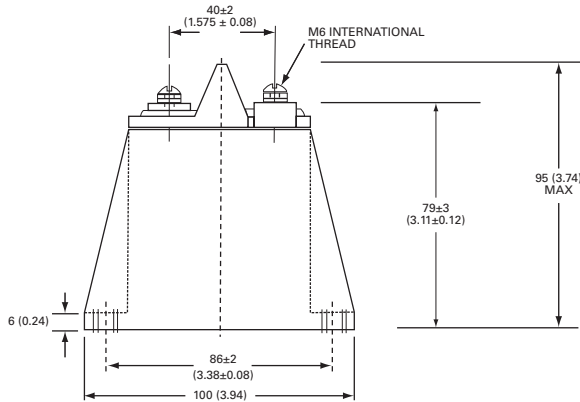
### Physical Specifications

|                            |  |
|----------------------------|--|
| <b>Lead Material</b>       | BA / BB – Copper with Tin Plating                                |
| <b>Insulating Material</b> | Cured, flame retardant epoxy polymer meets UL94V-0 requirements. |
| <b>Device Labeling</b>     | Marked with LF, Part Number and Date code                        |

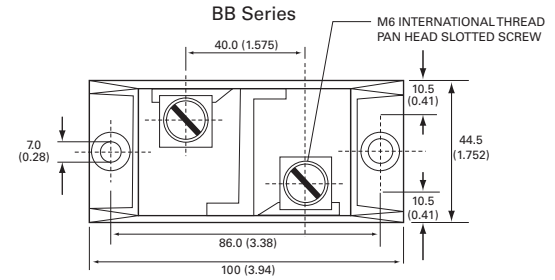
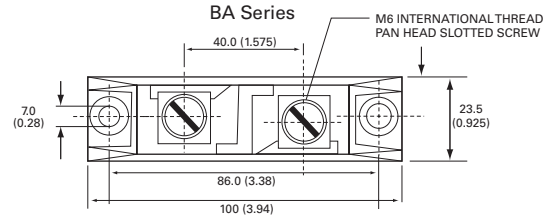
### Environmental Specifications

|                                      |   |
|--------------------------------------|---|
| <b>Operating/Storage Temperature</b> | -55°C to +85°C/<br>-55°C to +125°C                            |
| <b>Humidity Aging</b>                | +85°C, 85% RH, 1000 hours<br>+/- 5% typical resistance change |
| <b>Thermal Shock</b>                 | +85°C to -40°C 10 times<br>+/- 5% typical resistance change   |
| <b>Solvent Resistance</b>            | MIL-STD-202, Method 215F                                      |
| <b>Moisture Sensitivity</b>          | Level 1, J-STD-020C   |

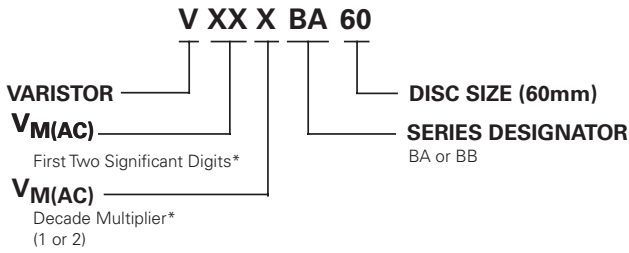
**Dimensions**



Notes:  
Typical weight: BA Series:250g and BB Series: 600g  
Dimensions are in mm; inches in parentheses for reference only.



**Part Numbering System**



\*Refer to Rating & Specifications table  
Examples:  
130 V<sub>M(AC)</sub> = 131  
2800 V<sub>M(AC)</sub> = 282

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)