

**POW-R-BRIK™**  
**Phase Control Modules**  
345-800 Amperes/400-3000 Volts

#### Description:

Powerex POW-R-BRIK™ Modules are designed for medium and high current power control applications. POW-R-BRIK™ Modules feature an electrically isolated package that simplifies system packaging, installation and cooling. POW-R-BRIK™ Modules utilize Compression Bonded Encapsulation (CBE) mounting and double side cooling of the semiconductor elements. The Z7A outline POW-R-BRIK™ uses 33mm or 38mm elements and the Z9A outline POW-R-BRIK™ uses 50mm elements. Standard circuit configurations include Dual SCR, Dual Diode, SCR/Diode, and Diode/SCR. Additional circuit configurations, e.g. Single Element, Common Cathode, Common Anode, and special element types, e.g. Fast Switch SCRs, Fast Recovery Diodes, GTOs, and Transistors are available.

#### Outline Drawing

##### Z7A Outline

| Dimension | Inches            | Millimeters       |
|-----------|-------------------|-------------------|
| A         | 6.30              | 153.16            |
| B         | 3.02              | 76.70             |
| C         | 3.15              | 80.01             |
| D         | 2.47              | 62.73             |
| E         | 0.328 Dia.        | Dia. 8.33         |
| F         | 1.83              | 46.48             |
| G         | 5/16-18<br>UNC-2B | 5/16-18<br>UNC-2B |
| H         | 1.27              | 32.25             |
| J         | 2.09              | 53.08             |
| K         | 2.25              | 57.15             |
| L         | 0.56              | 14.22             |

Mounting Bolt (E) Torque Limit is 11 ft.-lb.

Electrical terminal (G) torque limit is 11 ft.-lb. for type Z7A and 20 ft.-lb. for Z9A.

Apply a thin coating of thermal joint compound to heat sink surface prior to module mounting.

Module weights: Z7A weighs 6 lbs. while the Z9A module weighs 11 lbs.

If incoming tests are done for isolation voltage, the voltage should be applied in a slow manner rather than abruptly imposed on the device. The voltage should be applied between the top terminals, which must be shorted together, and the metal case.

The metal case is anodized and provides added voltage isolation capability if not damaged: factory hi-pot test is achieved without the benefit of the anodized coating.

##### Z9A Outline

| Dimension | Inches           | Millimeters      |
|-----------|------------------|------------------|
| A         | 7.50             | 190.50           |
| B         | 3.70             | 93.98            |
| C         | 3.15             | 80.01            |
| D         | 3.15             | 80.01            |
| E         | 0.328 Dia.       | Dia. 8.33        |
| F         | 2.03             | 51.56            |
| G         | 3/8-16<br>UNC-2B | 3/8-16<br>UNC-2B |
| H         | 1.51             | 38.35            |
| J         | 2.52             | 64.00            |
| K         | 2.75             | 69.85            |
| L         | 0.56             | 14.22            |

#### Ordering Information:

Select the complete thirteen digit module part number you desire from the Configuration Reference Description.  
Example: P3Z7ACT700W16 is a 1600 Volt, 375 Ampere Average, Dual SCR POW-R-BRIK™ Module with the standard thermistor.

#### Features:

- Electrically Isolated Packaging
- Anodized Aluminum Housing
- Internal Copper Contacting
- Gold Element Contacting
- Internal Temperature Sensor
- Compression Element Contacting

#### Applications:

- AC Motor Starters
- DC Motor Controls
- Resistance Welding Controls
- Mining Power Centers
- High Voltage Motor Starters
- Transportation Systems

**POW-R-BRIK™**

**Phase Control Modules**

345-800 Amperes/400-3000 Volts

**Configuration Reference:**

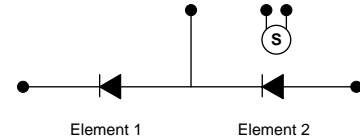
The POW-R-BRIK™ part number system takes the form *P3 Z7A CT7 00 W16* where:

- *P3* is the configuration number. The configurations are shown pictorially in the right hand column.
- *Z7A* is the package type per the outline drawings *Z7A* and *Z9A* on this data sheet.
- *CT7* denotes the element code. The Element Code Reference at the end of this data sheet provides information on the standard element codes including the corresponding disc device using the element. Refer to the appropriate disc package data sheets in the Powerex Semiconductor Data Book for additional device specifications.
- *00* denotes special features:
  - *00* – module includes standard thermistor
  - *XT* – no thermistor
  - *AA-ZZ* – denotes unique customer specification
- *W16* denotes voltage code per the table below. Note that not all voltage ratings are available for every element. Refer to the Element Code Reference for available voltage ranges for a given element.

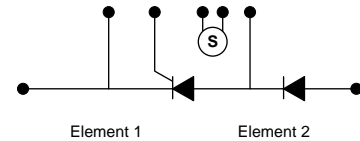
| Elements       | Voltage |
|----------------|---------|
| Voltage Rating | Code    |
| 400            | V04     |
| 600            | V06     |
| 800            | V08     |
| 1000           | W10     |
| 1200           | W12     |
| 1400           | W14     |
| 1600           | W16     |
| 1800           | W18     |
| 2000           | W20     |
| 2200           | W22     |
| 2400           | W24     |
| 2600           | W26     |
| 2800           | W28     |
| 3000           | W30     |

**Circuit Configurations:**

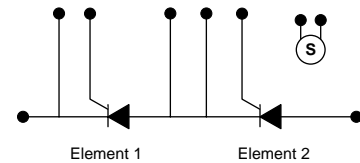
P1 - DIODE  
P4 - FAST DIODE\*



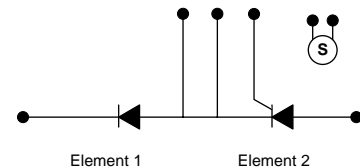
P2 - SCR/DIODE  
P5 - FAST SCR/FAST DIODE\*



P3 - SCR/SCR  
P6 - FAST SCR/FAST SCR\*



P7 - DIODE/SCR  
P8 - FAST DIODE/FAST SCR\*

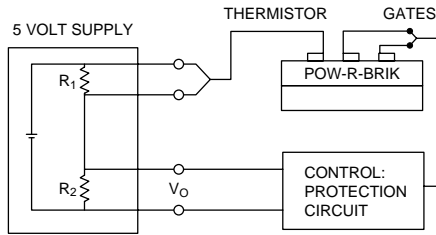


\* Consult Factory for Available Ratings.

**POW-R-BRIK™**  
**Phase Control Modules**  
 345-800 Amperes/400-3000 Volts

### Typical Thermistor Circuit

Thermistor temperatures can be measured using the following circuit arrangement in conjunction with a 5 volt source. Resistance values for  $R_1$  and  $R_2$  are specified for two operating temperature ranges.



1. Temperature range, 75°C through 125°C  
 $R_1 = 3.5K$  ohms  
 $R_2 = 840$  ohms  
 $V_0 = 2.5$  volts at 100°C
2. Temperature range, 90°C through 140°C  
 $R_1 = 2.2K$  ohms  
 $R_2 = 500$  ohms  
 $V_0 = 2.45$  volts at 115°C

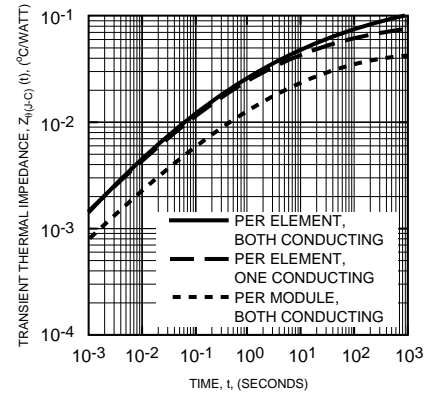
The output signal ( $V_0$ ) is approximately 30 mv/°C over the temperature range indicated.

### POW-R-BRIK™ Thermistor Characteristics

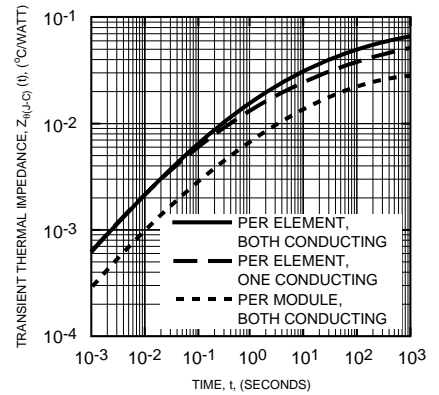
| Thermistor Resistance Ohms<br>① | Thermistor Temp. °C<br>② | Element Average Temperature |                   |
|---------------------------------|--------------------------|-----------------------------|-------------------|
|                                 |                          | Steady State °C (Min.)<br>③ | Dynamic °C (Max.) |
| 12093                           | 40                       | 43                          | 50                |
| 7337                            | 50                       | 53                          | 60                |
| 4990                            | 60                       | 63                          | 70                |
| 3324                            | 70                       | 73                          | 80                |
| 2262                            | 80                       | 83                          | 90                |
| 1569                            | 90                       | 93                          | 100               |
| 1316                            | 95                       | 98                          | 105               |
| 1109                            | 100                      | 103                         | 110               |
| 938                             | 105                      | 108                         | 115               |
| 797                             | 110                      | 113                         | 120               |
| 680                             | 115                      | 118                         | 125               |
| 582                             | 120                      | 123                         | 130               |
| 500                             | 125                      | 128                         | 135               |
| 431                             | 130                      | 133                         | 140               |

- ① Curve matched ±2% over temperature range of +40°C to +125°C. Resistance tolerance specified at +125°C, ±6%.
- ② Without self heating, 10mW maximum thermistor dissipation.
- ③ Use "Sensor at  $T_j$ " ohms from characteristics for recommended steady state overload trip resistance.

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION-TO-CASE) Z7A



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION-TO-CASE) Z9A





Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

POW-R-BRIK™

Phase Control Modules

345-800 Amperes/400-3000 Volts

### Maximum Ratings and Electrical Characteristics

| Part Number | Voltage Gate Current, Speed of Element* |    |                  |        |        |                 |                 |        |                                      |      |                                      |    | Isolation Voltage** | Strike Distance |                  |                  |                   |
|-------------|---|----|------------------|--------|--------|-----------------|-----------------|--------|--------------------------------------|------|--------------------------------------|----|---------------------|-----------------|------------------|------------------|-------------------|
|             | Voltage                                 |    |                  |        | Gate   |                 | Current         |        |                                      |      | Speed                                |    |                     |                 |                  |                  |                   |
|             | V <sub>DRM</sub> /V <sub>RRM</sub> ①    |    | V <sub>RSM</sub> |        | dv/dt② | V <sub>GT</sub> | I <sub>GT</sub> | di/dt④ | I <sub>DRM</sub> /I <sub>RRM</sub> ① |      | I <sub>TSM</sub> /I <sub>FSM</sub> ⑤ |    | SCR Diode           |                 | V <sub>RMS</sub> | I <sub>RMS</sub> | Terminals to Case |
| E1          | E2                                      | E1 | E2               | (V/μs) |        |                 |                 |        | (V)                                  | (mA) | (A/μs)                               | E1 | E2                  | E1              |                  |                  |                   |

#### Diode/Diode

|               |      |      |      |      |   |   |   |   |     |     |    |    |   |    |      |      |      |      |
|---------------|------|------|------|------|---|---|---|---|-----|-----|----|----|---|----|------|------|------|------|
| P1Z7AAR700W__ | 3000 | 3000 | 3100 | 3100 | — | — | — | — | 50  | 50  | 7  | 7  | — | 15 | 3000 | 1.10 | 0.70 | 1.00 |
| P1Z7ABR700W__ | 2200 | 2200 | 2300 | 2300 | — | — | — | — | 50  | 50  | 9  | 9  | — | 10 | 2500 | 0.92 | 0.70 | 1.00 |
| P1Z9AAR900W__ | 3000 | 3000 | 3100 | 3100 | — | — | — | — | 150 | 150 | 16 | 16 | — | 20 | 3000 | 1.70 | 1.00 | 1.15 |
| P1Z9ACR900W__ | 1200 | 1200 | 1300 | 1300 | — | — | — | — | 150 | 150 | 30 | 30 | — | 15 | 2500 | 1.50 | 1.00 | 1.15 |
| P1Z9ADR900V__ | 600  | 600  | 700  | 700  | — | — | — | — | 150 | 150 | 50 | 50 | — | 10 | 2500 | 1.50 | 1.00 | 1.15 |

#### Half Control SCR/Rectifier ①

|               |      |      |      |      |     |   |     |     |     |     |    |    |     |    |      |      |      |      |
|---------------|------|------|------|------|-----|---|-----|-----|-----|-----|----|----|-----|----|------|------|------|------|
| P2Z7ABB700W__ | 2200 | 2200 | 2300 | 2300 | 300 | 3 | 150 | 600 | 30  | 30  | 9  | 9  | 150 | 10 | 2500 | 0.92 | 0.70 | 1.00 |
| P2Z7ACB700W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 150 | 600 | 30  | 30  | 10 | 14 | 150 | 8  | 2500 | 0.92 | 0.70 | 1.00 |
| P2Z9AAA900W__ | 3000 | 3000 | 3100 | 3100 | 300 | 3 | 200 | 600 | 150 | 150 | 15 | 16 | 400 | 20 | 3000 | 1.70 | 1.00 | 1.15 |
| P2Z9ABA900W__ | 2000 | 2000 | 2100 | 2100 | 300 | 3 | 200 | 600 | 75  | 75  | 17 | 16 | 250 | 20 | 2500 | 1.50 | 1.00 | 1.15 |
| P2Z9ACA900W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 200 | 600 | 75  | 75  | 25 | 16 | 150 | 20 | 2500 | 1.50 | 1.00 | 1.15 |

#### Full Control SCR/SCR

|               |      |      |      |      |     |   |     |     |     |     |    |    |     |   |      |      |      |      |
|---------------|------|------|------|------|-----|---|-----|-----|-----|-----|----|----|-----|---|------|------|------|------|
| P3Z7ABT700W__ | 2200 | 2200 | 2300 | 2300 | 300 | 3 | 150 | 600 | 30  | 30  | 9  | 9  | 150 | — | 2500 | 0.92 | 0.70 | 1.00 |
| P3Z7ACT700W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 150 | 600 | 30  | 30  | 10 | 10 | 150 | — | 2500 | 0.92 | 0.70 | 1.00 |
| P3Z7AAT800W__ | 3000 | 3000 | 3100 | 3100 | 300 | 3 | 150 | 600 | 35  | 35  | 9  | 9  | 200 | — | 2500 | 0.92 | 0.70 | 1.00 |
| P3Z7ABT800W__ | 2200 | 2200 | 2300 | 2300 | 300 | 3 | 150 | 600 | 35  | 35  | 12 | 12 | 200 | — | 2500 | 0.92 | 0.70 | 1.00 |
| P3Z7ACT800W__ | 1400 | 1400 | 1500 | 1500 | 300 | 3 | 150 | 600 | 35  | 35  | 15 | 15 | 200 | — | 2500 | 0.92 | 0.70 | 1.00 |
| P3Z9AAT900W__ | 3000 | 3000 | 3100 | 3100 | 300 | 3 | 200 | 600 | 150 | 150 | 15 | 15 | 400 | — | 3000 | 1.70 | 1.00 | 1.15 |
| P3Z9ABT900W__ | 2000 | 2000 | 2100 | 2100 | 300 | 3 | 200 | 600 | 75  | 75  | 17 | 17 | 250 | — | 2500 | 1.50 | 1.00 | 1.15 |
| P3Z9ACT900W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 200 | 600 | 75  | 75  | 25 | 25 | 150 | — | 2500 | 1.50 | 1.00 | 1.15 |

#### Half Control Rectifier/SCR ⑧

|               |      |      |      |      |     |   |     |     |     |     |    |    |     |    |      |      |      |      |
|---------------|------|------|------|------|-----|---|-----|-----|-----|-----|----|----|-----|----|------|------|------|------|
| P7Z7ABB700W__ | 2200 | 2200 | 2300 | 2300 | 300 | 3 | 150 | 600 | 30  | 30  | 9  | 9  | 150 | 10 | 2500 | 0.92 | 0.70 | 1.00 |
| P7Z7ABC700W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 150 | 600 | 30  | 30  | 14 | 10 | 150 | 8  | 2500 | 0.92 | 0.70 | 1.00 |
| P7Z9AAA900W__ | 3000 | 3000 | 3100 | 3100 | 300 | 3 | 200 | 600 | 150 | 150 | 16 | 15 | 400 | 20 | 3000 | 1.70 | 1.00 | 1.15 |
| P7Z9AAB900W__ | 2000 | 2000 | 2100 | 2100 | 300 | 3 | 200 | 600 | 75  | 75  | 16 | 17 | 250 | 20 | 2500 | 1.50 | 1.00 | 1.15 |
| P7Z9AAC900W__ | 1600 | 1600 | 1700 | 1700 | 300 | 3 | 200 | 600 | 75  | 75  | 16 | 25 | 150 | 20 | 2500 | 1.50 | 1.00 | 1.15 |

① Applies for zero or negative gate bias.

② Higher dv/dt ratings available, consult factory.

③ With recommended gate drive.

④ Per JEDEC standard RS-397, 5.2.2.6.

⑤ Per JEDEC RS-397, 5.2.2.1.

⑥ Bottom side cooled.

⑦ Consult recommended mounting procedures.

⑧ Designs are available for "Current Source Inverter" applications, consult factory.

⑨ Reflects substantial derating necessary with single 0.08°C/W or 0.10°C/W sink.

\* Element location indicated by E1 or E2.

\*\* Hi-Pot. 60Hz, 1 min. test



Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

**POW-R-BRIK™**

**Phase Control Modules**

345-800 Amperes/400-3000 Volts

| Part Number | Current and Thermal Ratings of Module |                      |                               |                     |                            |                                       |  |                            | Circuit Currents                        |                                     |  |                                    |   | Element Data Model* |    |
|-------------|---------------------------------------|----------------------|-------------------------------|---------------------|----------------------------|---------------------------------------|--|----------------------------|---|-------------------------------------|--|------------------------------------|---|---------------------|----|
|             | Current                               |                      |                               | Thermal             |                            |                                       |  |                            | Units per Sink →<br>T <sub>A</sub> (°C) | 1 AC Switch<br>I <sub>RMS</sub> (A) | 3 AC Switch <sup>③</sup><br>I <sub>RMS</sub> (A) | 2 1Ø Bridge<br>I <sub>DC</sub> (A) | 3 3Ø Bridge <sup>③</sup><br>I <sub>DC</sub> (A) | E1                  | E2 |
|             | I <sub>T(av)</sub> <sup>⑤</sup> (A)   | @T <sub>C</sub> (°C) | Maximum Power Dissipation (W) | T <sub>j</sub> (°C) | Sensor @T <sub>j</sub> (Ω) | R <sub>θ(J-C)</sub> per Module (°C/W) | R <sub>θ(C-S)</sub> per Module <sup>⑦</sup> (°C/W) | R <sub>θ(C-A)</sub> (°C/W) |   |                                     |  |                                    |   |                     |    |

**Diode/Diode**

|               |     |     |      |     |     |      |       |      |    |   |   |     |     |     |     |
|---------------|-----|-----|------|-----|-----|------|-------|------|----|---|---|-----|-----|-----|-----|
| P1Z7AAR700W__ | 355 | 105 | 1125 | 150 | 315 | 0.04 | 0.010 | 0.10 | 40 | — | — | 385 | 400 | AR7 | AR7 |
| P1Z7ABR700W__ | 435 | 105 | 1125 | 150 | 315 | 0.04 | 0.010 | 0.10 | 40 | — | — | 440 | 465 | BR7 | BR7 |
| P1Z9AAR900W__ | 590 | 105 | 1500 | 150 | 315 | 0.03 | 0.008 | 0.08 | 40 | — | — | 570 | 600 | AR9 | AR9 |
| P1Z9ACR900W__ | 740 | 105 | 1500 | 150 | 315 | 0.03 | 0.008 | 0.08 | 40 | — | — | 670 | 705 | CR9 | CR9 |
| P1Z9ADR900V__ | 800 | 110 | 1330 | 150 | 315 | 0.03 | 0.008 | 0.08 | 40 | — | — | 775 | 805 | DR9 | DR9 |

**Half Control SCR/Diode<sup>⑧</sup>**

|               |     |    |      |     |     |      |       |      |    |     |     |     |     |     |     |
|---------------|-----|----|------|-----|-----|------|-------|------|----|-----|-----|-----|-----|-----|-----|
| P2Z7ABB700W__ | 380 | 85 | 1100 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 560 | 275 | 330 | 350 | BT7 | BR7 |
| P2Z7ACB700W__ | 395 | 85 | 1100 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 590 | 290 | 345 | 365 | CT7 | BR7 |
| P2Z9AAA900W__ | 430 | 85 | 1325 | 125 | 640 | 0.03 | 0.008 | 0.08 | 40 | 630 | 310 | 370 | 390 | AT9 | AR9 |
| P2Z9ABA900W__ | 520 | 85 | 1465 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 740 | 365 | 435 | 460 | BT9 | AR9 |
| P2Z9ACA900W__ | 590 | 85 | 1465 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 800 | 385 | 470 | 495 | CT9 | AR9 |

**Full Control SCR/SCR**

|               |     |    |      |     |     |      |       |      |    |     |     |     |     |     |     |
|---------------|-----|----|------|-----|-----|------|-------|------|----|-----|-----|-----|-----|-----|-----|
| P3Z7ABT700W__ | 345 | 85 | 1095 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 505 | 250 | 300 | 315 | BT7 | BT7 |
| P3Z7ACT700W__ | 375 | 85 | 1095 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 550 | 270 | 320 | 335 | CT7 | CT7 |
| P3Z7AAT800W__ | 300 | 85 | 1095 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 445 | 220 | 255 | 265 | AT8 | AT8 |
| P3Z7ABT800W__ | 390 | 85 | 1095 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 560 | 275 | 330 | 345 | BT8 | BT8 |
| P3Z7ACT800W__ | 450 | 85 | 1095 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 630 | 300 | 385 | 405 | CT8 | CT8 |
| P3Z9AAT900W__ | 355 | 85 | 1295 | 125 | 640 | 0.03 | 0.008 | 0.08 | 40 | 535 | 260 | 310 | 330 | AT9 | AT9 |
| P3Z9ABT900W__ | 470 | 85 | 1460 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 675 | 335 | 400 | 420 | BT9 | BT9 |
| P3Z9ACT900W__ | 600 | 85 | 1460 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 815 | 375 | 460 | 480 | CT9 | CT9 |

**Half Control SCR/Diode<sup>⑧</sup>**

|               |     |    |      |     |     |      |       |      |    |     |     |     |     |     |     |
|---------------|-----|----|------|-----|-----|------|-------|------|----|-----|-----|-----|-----|-----|-----|
| P7Z7ABB700W__ | 380 | 85 | 1100 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 560 | 275 | 330 | 350 | BR7 | BT7 |
| P7Z7ABC700W__ | 395 | 85 | 1100 | 130 | 530 | 0.04 | 0.010 | 0.10 | 40 | 590 | 290 | 345 | 365 | BR7 | CT7 |
| P7Z9AAA900W__ | 430 | 85 | 1325 | 125 | 640 | 0.03 | 0.008 | 0.08 | 40 | 630 | 310 | 370 | 390 | AR9 | AT9 |
| P7Z9AAB900W__ | 520 | 85 | 1465 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 740 | 365 | 435 | 460 | AR9 | BT9 |
| P7Z9AAC900W__ | 590 | 85 | 1465 | 130 | 530 | 0.03 | 0.008 | 0.08 | 40 | 800 | 385 | 470 | 495 | AR9 | CT9 |

① Applies for zero or negative gate bias.

② Higher dv/dt ratings available, consult factory.

③ With recommended gate drive.

④ Per JEDEC standard RS-397, 5.2.2.6.

⑤ Per JEDEC RS-397, 5.2.2.1.

⑥ Bottom side cooled.

⑦ Consult recommended mounting procedures.

⑧ Designs are available for "Current Source Inverter" applications, consult factory.

⑨ Reflects substantial derating necessary with single 0.08°C/W or 0.10°C/W sink.

\* Reference element data model on the following page.



Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

**POW-R-BRIK™**

**Phase Control Modules**

345-800 Amperes/400-3000 Volts

**Element Code Reference**

| Element Code     | Element Type | Comparable Disc Device | Available Voltage Range | Coefficients for $V_{TM}$ , $V_F$ , Model <sup>① ②</sup> |          |          |          |
|------------------|--------------|------------------------|-------------------------|--|----------|----------|----------|
|                  |              |                        |                         | A  | B        | C        | D        |
| AR7              | 33mm Diode   | R7S0 __ 08XX00         | 2200-3000               | 0.89605  | -0.08108 | 0.00045  | 0.02836  |
| BR7              | 33mm Diode   | R7S0 __ 12XX00         | 1200-2200               | 0.63200  | -0.02192 | 0.00013  | 0.02065  |
| CR7 <sup>③</sup> | 33mm Diode   | R7S0 __ 16XX00         | 800-1200                | 0.45000  | 0.02800  | 0.00008  | 0.01128  |
| AR9              | 50mm Diode   | R9G0 __ 12XX00         | 2200-3000               | 0.39964  | 0.05540  | 0.00024  | 0.00319  |
| CR9              | 50mm Diode   | R9G0 __ 18XX00         | 800-1200                | 0.60627  | -0.00168 | 0.00005  | 0.00766  |
| DR9              | 50mm Diode   | R9G0 __ 22XX00         | 400-800                 | 0.46319  | 0.02950  | 0.00006  | 0.00061  |
| BT7              | 33mm SCR     | T7S0 __ 6504DN         | 1400-2200               | 0.74419  | 0.00380  | 0.000325 | 0.01882  |
| CT7              | 33mm SCR     | T7S0 __ 7504DN         | 800-1600                | 0.58729  | 0.06654  | 0.000416 | 0.00060  |
| AT8              | 38mm SCR     | T820 __ 6003DH         | 2200-3000               | 1.02841  | 0.13475  | 0.001179 | -0.03631 |
| BT8              | 38mm SCR     | T820 __ 7503DH         | 1200-2200               | 0.88287  | -0.07743 | 0.00010  | 0.03081  |
| CT8              | 38mm SCR     | T820 __ 9003DH         | 800-1400                | 1.08412  | -0.13881 | -0.00013 | 0.03756  |
| AT9              | 50mm SCR     | T9G0 __ 0803DH         | 2200-3000               | 1.43303  | -0.10092 | 0.000620 | 0.01789  |
| BT9              | 50mm SCR     | T9G0 __ 1003DH         | 1200-2000               | 0.96195  | -0.08755 | 0.000074 | 0.03286  |
| CT9              | 50mm SCR     | T9G0 __ 1203DH         | 800-1600                | 0.55570  | 0.05740  | 0.000135 | 0.00104  |
| 9HP <sup>③</sup> | 50mm SCR     | T9GH __ 0903DH         | 1200-2200               | 0.95642  | -0.00285 | 0.000225 | -0.00178 |

<sup>①</sup>  $V_{TM}$ ,  $V_F = A + B \times \ln(I) + C \times I + D \times \sqrt{I}$  (I = Amps Peak)

<sup>②</sup> Coefficients are for  $T_j = 130^\circ\text{C}$ , 50A through 3000A Peak

<sup>③</sup> Module ratings for these elements are not shown, consult factory.