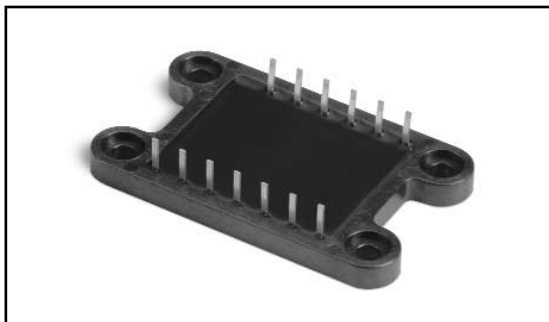


# MODEL 7720 SERIES

## Power Factor Correction Module



### MODELS/RANGE

|         |                            |
|---------|----------------------------|
| 7720-1A | 1,500 Watts / 3,000 Watts* |
| 7720-2A | 1,000 Watts / 2,250 Watts* |
| 7720-3A | 500 Watts / 1,500 Watts*   |

### FEATURES AND BENEFITS

- Module contains all power components necessary to provide power factor correction in a switching power supply.
  - Rectifier bridge
  - Ultrafast platinum output diode
  - 500V .1 $\Omega$  Max. FET (7720-1A)
- Provides optimum use of available line current
- Allows power supply to meet harmonic requirement
- Module design reduces cost of heat sink
- Saves significant space and assembly time
- Low cost
- Internal temperature sensing
- Replaces up to 10 each TO-220 or TO-247 discrete power semiconductors
- Custom module versions available to meet specific requirements such as:
  - Motor drives
  - Power servo amplifiers
  - Solenoid drivers
  - Solid state relays
  - 3 phase rectifier bridges

### APPLICATIONS

Designed to optimally facilitate a boost type power factor correction (PFC) system for designs with up to 20 A rms input current.

\* Based on minimum line voltage of 84 V rms / 168 V rms.  
Specifications subject to change without notice.

Standard applications include switching power supplies from 500 watts to 3,000 watts with line voltages up to 300 V rms.

# ELECTRICAL CHARACTERISTICS

|     | Parameter               | Symbol       | Conditions <sup>1</sup>                 | 7720-X   | Min. | Typ.   | Max.      | Units           |
|-----|-------------------------|--------------|-----------------------------------------|----------|------|--------|-----------|-----------------|
| FET | Drain Leakage Current   | $I_{DSS}$    | $V_{DS} = 500V, V_{GS} = 0V$            | -1       |      |        | 1.0       | mA              |
|     |                         |              |                                         | -2       |      |        | 750       | $\mu A$         |
|     |                         |              |                                         | -3       |      |        | 500       | $\mu A$         |
|     | On-State Voltage        | $V_{DS(on)}$ | $I_{DS} = 28A, V_{GS} = 10V$            | -1       |      | 2.2    | 2.9       | V               |
|     |                         |              | $I_{DS} = 21A$                          | -2       |      | 2.2    | 2.9       | V               |
|     |                         |              | $I_{DS} = 14A$                          | -3       |      | 2.2    | 2.9       | V               |
|     | Threshold Voltage       | $V_{GS(th)}$ | $V_{DS} = 4V, I_{DS} = 1mA$             | -1,-2,-3 | 2.0  | 3.0    | 4.0       | V               |
|     | Gate Leakage Current    | $I_{GSS}$    | $V_{GS} = \pm 15V, V_{DS} = 0V$         | -1       |      |        | $\pm 2$   | $\mu A$         |
|     |                         |              |                                         | -2       |      |        | $\pm 1.5$ | $\mu A$         |
|     |                         |              |                                         | -3       |      |        | $\pm 1$   | $\mu A$         |
|     | Diode Forward Voltage   | $V_{SD}$     | $I_{SD} = 50A, V_{GS} = 0V$             | -1       |      | 0.95   | 1.5       | V               |
|     |                         |              | $I_{SD} = 37.5A$                        | -2       |      | 0.95   | 1.5       | V               |
|     |                         |              | $I_{SD} = 25A$                          | -3       |      | 0.95   | 1.5       | V               |
|     | Input Capacitance       | $C_{iss}$    | $V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz$ | -1       |      | 12     |           | nF              |
|     |                         |              |                                         | -2       |      | 9      |           | nF              |
|     |                         |              |                                         | -3       |      | 6      |           | nF              |
|     | Gate Resistor           | $R_G$        |                                         | -1       |      | 1.28   |           | $\Omega$        |
|     |                         |              |                                         | -2       |      | 1.70   |           | $\Omega$        |
|     |                         |              |                                         | -3       |      | 2.55   |           | $\Omega$        |
|     | Junction Temperature    | $T_j$        |                                         | -1,-2,-3 |      |        | 150       | $^{\circ}C$     |
|     | Thermal Resistance      | $R_{thjc}$   |                                         | -1       |      | 0.19   |           | $^{\circ}C/W$   |
|     |                         |              |                                         | -2       |      | 0.25   |           | $^{\circ}C/W$   |
|     |                         |              |                                         | -3       |      | 0.38   |           | $^{\circ}C/W$   |
|     | Reverse Leakage Current | $I_R$        | $V_R = 600V$                            | -1,-2,-3 |      | 1      | 250       | $\mu A$         |
|     |                         |              |                                         | -1,-2    |      | 1.0    | 1.2       | V               |
|     |                         |              |                                         | -3       |      | 1.0    | 1.2       | V               |
|     | Junction Temperature    | $T_j$        |                                         | -1,-2,-3 |      |        | 150       | $^{\circ}C$     |
|     | Thermal Resistance      | $R_{thjc}$   |                                         | -1,-2    |      | 1.3    |           | $^{\circ}C/W$   |
|     |                         |              |                                         | -3       |      | 1.4    |           | $^{\circ}C/W$   |
|     |                         |              |                                         |          |      |        |           |                 |
| D5  | Forward Voltage         | $V_F$        | $I_F = 25A$                             | -1,-2    |      | 1.5    | 2.8       | V               |
|     |                         |              | $I_F = 18A$                             | -3       |      | 1.5    | 2.8       | V               |
|     |                         |              | $I_F = 18A$                             | -1,-2    |      | 1.3    | 2.5       | V               |
|     | Forward Voltage         | $V_F$        | $I_F = 25A, t = 150^{\circ}C$           | -1,-2    |      | 1.3    | 2.5       | V               |
|     |                         |              | $I_F = 18A$                             | -3       |      | 1.3    | 2.5       | V               |
|     |                         |              |                                         |          |      |        |           |                 |
|     | Reverse Leakage Current | $I_R$        | $V_R = 600V$                            | -1,-2,-3 |      | 1      | 500       | $\mu A$         |
|     | Reverse Leakage Current | $I_R$        | $V_R = 600V, t = 150^{\circ}C$          | -1,-2,-3 |      | 0.3    | 1.5       | mA              |
|     | Reverse Recovery Time   | $t_{rr}$     | $I_F = 1.0A, di/dt = 100A/\mu s$        | -1,-2,-3 |      | 30     | 40        | ns              |
|     | Reverse Recovery Time   | $t_{rr}$     | $I_F = 25A, di/dt = 100A/\mu s$         | -1,-2,-3 |      | 40     | 45        | ns              |
| TH1 | Junction Temperature    | $T_j$        |                                         | -1,-2,-3 |      |        | 175       | $^{\circ}C$     |
|     | Thermal Resistance      | $R_{thjc}$   |                                         | -1,-2    |      | 1.3    |           | $^{\circ}C/W$   |
|     |                         |              |                                         | -3       |      | 1.4    |           | $^{\circ}C/W$   |
|     |                         |              |                                         |          |      |        |           |                 |
|     | Resistance              | $R_{25}$     | $I = 1mA$                               |          | 22.5 | 25     | 27.5      | K $\Omega$      |
|     | Resistance Ratio        | $R_T/R_{25}$ | $t = 80$                                |          |      | 0.126  |           |                 |
|     |                         |              | $t = 90$                                |          |      | 0.0916 |           |                 |
|     |                         |              | $t = 100$                               |          |      | 0.0679 |           |                 |
|     |                         |              | $t = 110$                               |          |      | 0.0511 |           |                 |
|     | Dissipation Constant    | $P_D$        |                                         |          | 1.0  |        |           | mW/ $^{\circ}C$ |
|     | Thermal Time Constant   | $t$          |                                         |          |      |        | 10        | sec             |

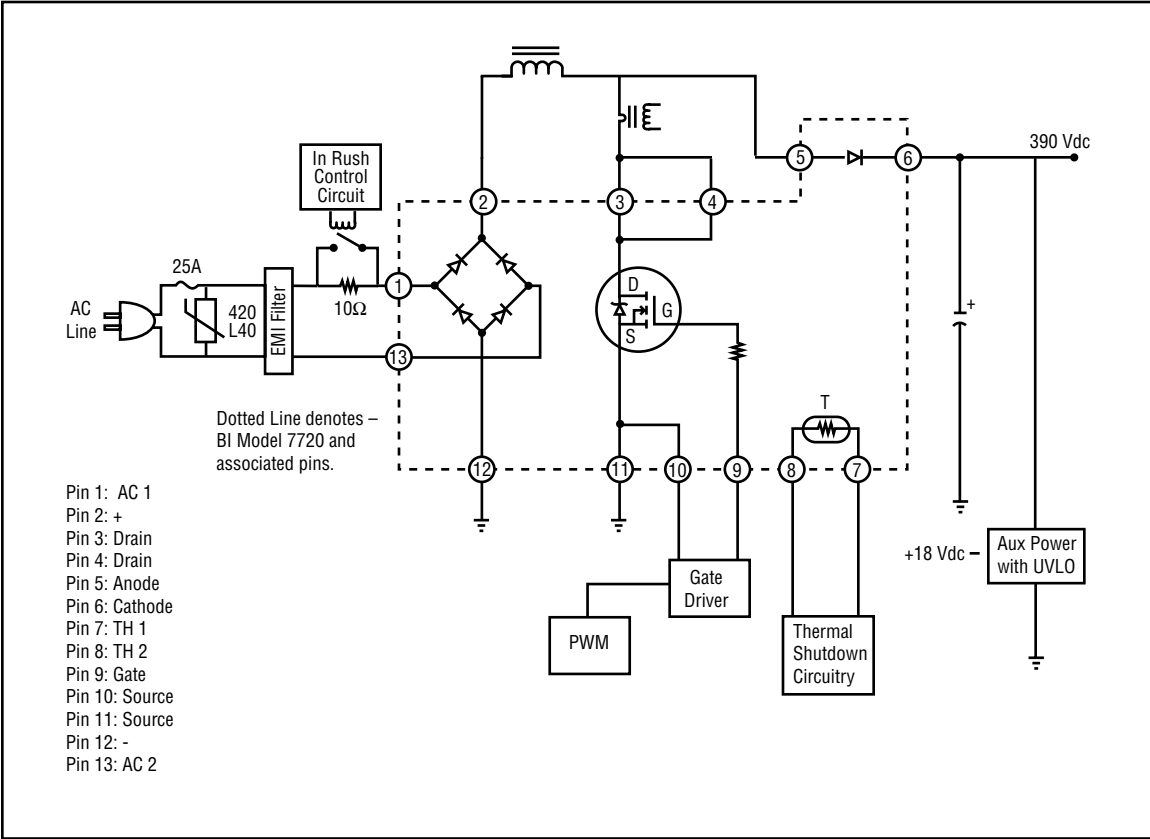
1 -  $T_{Case} = 25^{\circ}C$  unless otherwise specified.



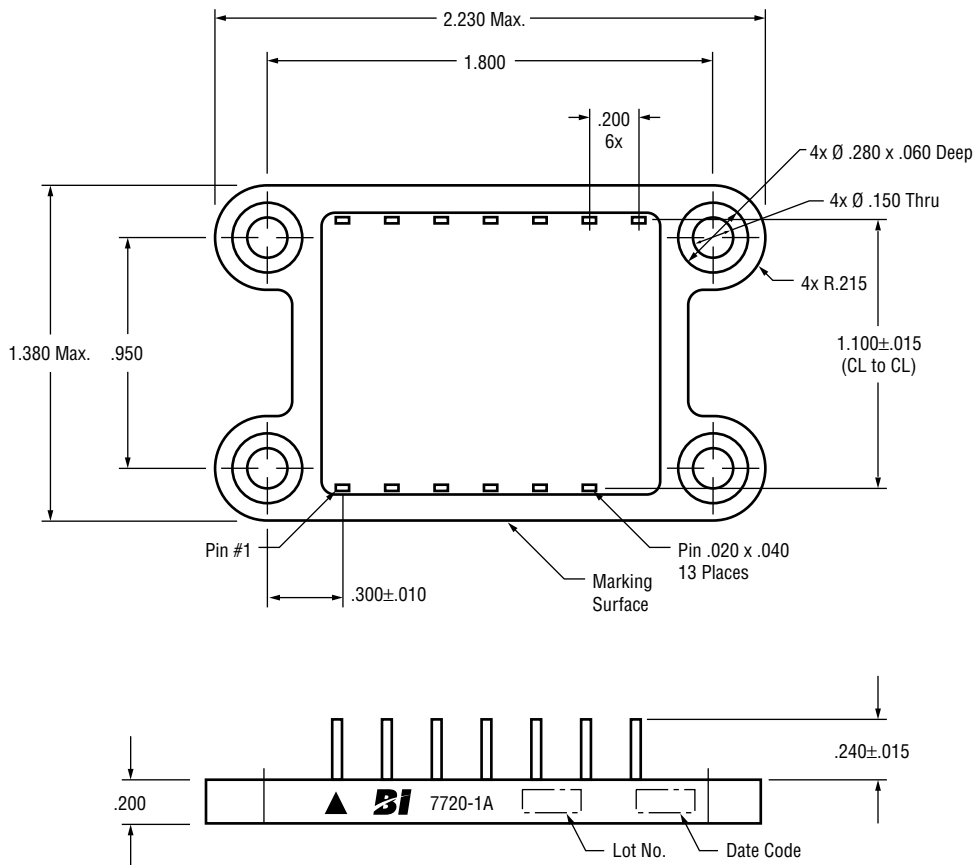
## ENVIRONMENTAL

|                                              |                 |
|----------------------------------------------|-----------------|
| Operating Temperature Range                  | -40°C to +125°C |
| Recommended Operating Case Temperature, Max. | +100°C          |

## SYSTEM DIAGRAM



## OUTLINE DIMENSIONS (Inch)



## ORDERING INFORMATION

Model 77 2 0 1A

Package Size \_\_\_\_\_

Power Level:  
 -1A = 1,500W to 3,000W  
 -2A = 1,000W to 2,250W  
 -3A = 500W to 1,500W

Circuit Function:  
 0 = Power Factor Correction