

THE GLOBAL EXPERT  
IN **SOLID STATE**  
**POWER SWITCHING**  
TECHNOLOGY



■ Motor Controls



■ Power Supplies



■ Motor Generator Exciters





**C**rydom has a distinguished record of providing advanced, high quality products with timely delivery and competitive pricing. Your success in today's fast-paced global markets

hinges on working with suppliers who respond quickly and appropriately to your every need.

In addition to an extensive selection catalog off-the-shelf items, Crydom offers custom-designed power switching modules. Fact is we specialize in satisfying the most demanding environmental and performance requirements our customer can devise. Give us your specs, and watch us exceed your expectations!

At Crydom's custom-built **100,000 square foot manufacturing facility**, virtually everything is accomplished in-house to assure complete control over delivery, production and above all quality. With design, development, manufacturing and management personnel under one roof, we're geared for fast response to your requirements.

In **Design Engineering**, we focus on pushing performance, reliability and quality standards ever higher. Working under a conservative design and rating philosophy, Crydom's seasoned engineering team makes extensive use of CAD to optimize design of mechanical parts.

As a result of these efforts, Crydom has acquired an impressive list of patents in power switching technology, while continuing to create new circuit and technology-related inventions as part of our ongoing R & D programs.

Once the design is solidified, **Production Engineering** is responsible for the engineering control of the techniques used throughout manufacturing. This department works closely with our design engineering group, establishes assembly processes, and oversees a comprehensive on-premises machine shop which fabricates our assembly fixtures.

As the work progresses, **Material and Production Control** employ our advanced computer system, upgraded with our customized software to keep manufacturing operations humming. The Computer system employs integral MRP and MSP capabilities to generate detailed scheduling and planning information.

**Ceramic Hybrid Manufacturing** also is performed in-house. Crydom manufactures all metallized ceramic substrates used in our relays — a major factor in product performance and reliability, including direct bond copper substrates.

**Quality Assurance** conducts ongoing product reliability verification tests, gathering precise data on the quality of our power semiconductor vendors and the silicon chips they provide. Additional tests are performed to meet specific customer burn-in requirements.



[www.crydom.com](http://www.crydom.com)

Crydom tests are exhaustive, including 100% verification at final test. After units are fully assembled, they must pass a complete set of electrical tests, which are performed twice, once prior to encapsulation and then again afterward.

Because of our dedication to quality, Crydom was one of the first American companies to achieve full certification to the demanding standards of ISO 9001. In addition, most Crydom products are approved by UL, CSA, VDE, TUV and carry the CE Mark signifying conformance with the latest European directives.

Learn how an alliance with the world leader in solid state relays and power modules can pay off for you. For details, call your authorized Crydom distributor today.

## ***Power Modules***

Power Modules are power switching/control circuit elements integrated into convenient isolated-base packages, offering a broad spectrum of commonly used Diode, SCR, or SCR/Diode circuit configurations and ratings. Used in many types of equipment by a variety of industries, they utilize Crydom's renowned advanced thermal management techniques. The modules are mechanically and thermally optimized for ease of assembly, long life and reliable operation. Significant cost savings are realized from reductions in design, volume, mounting, connection, cooling, field maintenance, parts count, acquisition and inventory costs.

## ***Typical Applications***

|                          |                             |
|--------------------------|-----------------------------|
| AC motor drive front end | Medical Electronics         |
| Appliances               | Motor controls, AC          |
| Battery charging         | Motor controls, DC          |
| Cathodic protection      | Motor starters              |
| Converters               | Power Factor Correction     |
| Conveyors                | Power supplies              |
| DC-choppers              | Reverse polarity protection |
| Electroplating           | Traction                    |
| Elevator controls        | Transportation              |
| Heater controls          | UPS systems                 |
| HVAC controls            | Welding                     |
| Inverters                |                             |

## ***Custom Designs***

Crydom's Sales and Technical Support teams work closely with you to define and develop customized solutions for your unique requirements. We can help you get that competitive edge necessary to be a leader in your industry. In-house capabilities include ceramic substrate production, SMT (surface mount technology) placement/insertion robotics assembly and elevated/low temperature monitored testing. All this interprets into fast-track design, prototype preparation, test, evaluate, adjust and finalize as necessary to achieve the specified performance criteria. Upon final customer approval we can quickly gear up to meet your production schedules in our ISO9001 certified manufacturing environment.





**L**  
**15-42.5Amp**  
SCR/Diode Modules  
Low Profile  
Designed for PCB Connections

Circuit Modules provide ratings up to 42.5 amps in a low profile package designed for printed circuit board connections. Available in three standard bridge circuits and an AC switch version, all models have 2500 Vrms isolation and are UL recognized under file E72445. Mounting clip available, order part no. LMC-1.

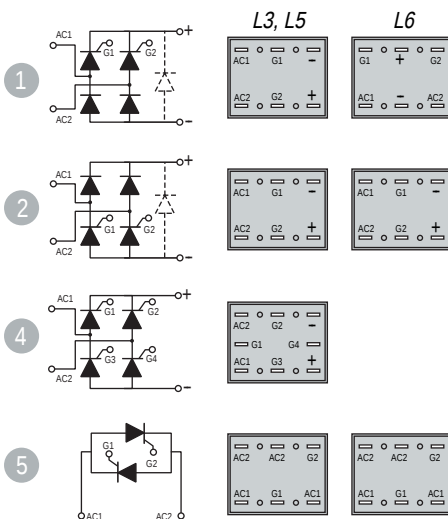
## PART NUMBER IDENTIFICATION

| Series | Current        | Circuit Type             | AC Line Voltage | Options         |
|--------|----------------|--------------------------|-----------------|-----------------|
| L      | 3 - 15 Amps    | 1 - 5                    | 1 - 120 Vac     | F - Free        |
|        | 5 - 25 Amps    | (See schematic diagrams) | 2 - 240 Vac     | Wheeling        |
|        | 6 - 42.5 Amps* |                          | 3 - 280 Vac     | Diode           |
|        |                |                          | 4 - 480 Vac     | (Circuits 1, 2) |

Example: L512F

\* 42.5 Amp Rating Not Available In Circuit 4

| ELECTRICAL SPECIFICATIONS |                                                                      | L3                                          | L5                                          | L6                                          |
|---------------------------|----------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| $I_D$                     | Maximum DC Output Current @ $T_c = 85^\circ\text{C}$                 | 15A                                         | 25A                                         | 42.5A                                       |
| $V_F$                     | Maximum Voltage Drop @ Amps Peak                                     | 2.2V@15A                                    | 1.65V@25A                                   | 1.6V@42.5A                                  |
| $T_J$                     | Operating Junction Temperature Range                                 | $-40^\circ\text{C}$ to $+125^\circ\text{C}$ | $-40^\circ\text{C}$ to $+125^\circ\text{C}$ | $-40^\circ\text{C}$ to $+125^\circ\text{C}$ |
| $di/dt$                   | Critical Rate of Rise of On-State Current @ $T_J=125^\circ\text{C}$  | 100 A/ $\mu\text{s}$                        | 100 A/ $\mu\text{s}$                        | 100 A/ $\mu\text{s}$                        |
| $dv/dt$                   | Critical Rate of Rise of Off-State Voltage                           | 500 V/ $\mu\text{s}$                        | 500 V/ $\mu\text{s}$                        | 500 V/ $\mu\text{s}$                        |
| $V_{RMS}$                 | AC Line Input Voltage<br>(Repetitive Peak Reverse Voltage)           | 120 (400 $V_{RRM}$ )                        | 120 (400 $V_{RRM}$ )                        | 120 (400 $V_{RRM}$ )                        |
|                           |                                                                      | 240 (600 $V_{RRM}$ )                        | 240 (600 $V_{RRM}$ )                        | 240 (600 $V_{RRM}$ )                        |
|                           |                                                                      | 280 (800 $V_{RRM}$ )                        | 280 (800 $V_{RRM}$ )                        | 280 (800 $V_{RRM}$ )                        |
|                           |                                                                      | 480 (1200 $V_{RRM}$ )                       | 480 (1200 $V_{RRM}$ )                       | 480 (1200 $V_{RRM}$ )                       |
| $I_{TSM}$                 | Maximum Non-Repetitive Surge Current<br>( $\frac{1}{2}$ Cycle, 60Hz) | 225 A                                       | 300 A                                       | 600 A                                       |
| $I^2T$                    | Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                       | 210 $\text{A}^2\text{sec}$                  | 375 $\text{A}^2\text{sec}$                  | 1500 $\text{A}^2\text{sec}$                 |
| $I_{GT}$                  | Maximum Required Gate Current to Trigger @ $25^\circ\text{C}$        | 60 mA                                       | 60 mA                                       | 80 mA                                       |
| $V_{GT}$                  | Maximum Required Gate Voltage to Trigger @ $25^\circ\text{C}$        | 2.5V                                        | 2.5V                                        | 3.0V                                        |
| $P_{G(AV)}$               | Average Gate Power                                                   | 0.5W                                        | 0.5W                                        | 0.5W                                        |
| $V_{GM}$                  | Maximum Peak Gate Voltage (Reverse)                                  | 5.0V                                        | 5.0V                                        | 5.0V                                        |
| $R_{\theta JC}$           | Maximum Thermal Resistance Junction to Ceramic Base per Chip         | 1.25 $^\circ\text{C/W}$                     | 0.9 $^\circ\text{C/W}$                      | 0.7 $^\circ\text{C/W}$                      |
| $V_{ISOL}$                | Isolation Voltage                                                    | 2500 $V_{RMS}$                              | 2500 $V_{RMS}$                              | 2500 $V_{RMS}$                              |



**F18**  
**25-105Amp**  
Diode, SCR/Diode Modules  
Standard Package and Circuits

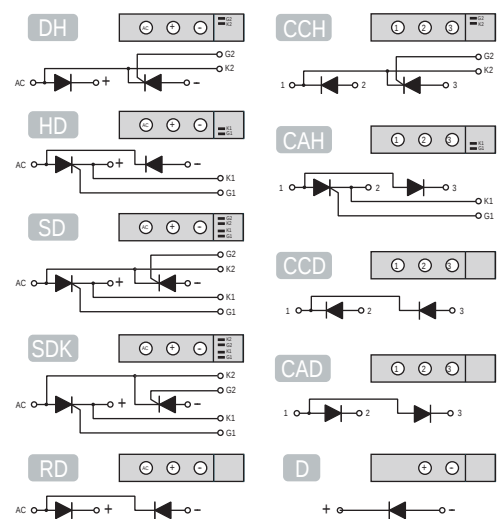
Modules come in an industry standard package, offering nine circuits that can be used singly or as power control building blocks. All models feature highly efficient thermal management for greatly extended cycle life and are UL recognized under file E72445.

## PART NUMBER IDENTIFICATION

| Series | Current        | Circuit Type             | AC Line Voltage |  |
|--------|----------------|--------------------------|-----------------|--|
| F18    | 27 - 25 Amps   | (See schematic diagrams) | 400 - 120 Vac   |  |
|        | 42 - 40 Amps   | Example: SD              | 600 - 240 Vac   |  |
|        | 57 - 55 Amps   |                          | 1000 - 380 Vac  |  |
|        | 92 - 90 Amps   |                          | 1200 - 480 Vac  |  |
|        | 107 - 105 Amps |                          | 1400 - 530 Vac  |  |
|        |                |                          | 1600 - 600 Vac  |  |

Example: F1892SD1200

| ELECTRICAL SPECIFICATIONS |                                                                      | 27                                          | 42                          | 57                          | 92                           | 107                          |
|---------------------------|----------------------------------------------------------------------|---------------------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|
| $I_D$                     | Maximum DC Output Current @ $T_c = 85^\circ\text{C}$                 | 25A                                         | 40A                         | 55A                         | 90A                          | 105A                         |
| $V_F$                     | Maximum Voltage Drop @ Amps Peak                                     | 1.55V@75Apk                                 | 1.4V@120Apk                 | 1.4V@165Apk                 | 1.4V@270Apk                  | 1.65V@300Apk                 |
| $T_J$                     | Operating Junction Temperature Range                                 | $-40^\circ\text{C}$ to $+125^\circ\text{C}$ |                             |                             |                              |                              |
| $di/dt$                   | Critical Rate of Rise of On-State Current @ $T_J=125^\circ\text{C}$  | 100 A/ $\mu\text{s}$                        | 100 A/ $\mu\text{s}$        | 100 A/ $\mu\text{s}$        | 100 A/ $\mu\text{s}$         | 100 A/ $\mu\text{s}$         |
| $dv/dt$                   | Critical Rate of Rise of Off-State Voltage                           | 500 V/ $\mu\text{s}$                        | 500 V/ $\mu\text{s}$        | 500 V/ $\mu\text{s}$        | 500 V/ $\mu\text{s}$         | 500 V/ $\mu\text{s}$         |
| $V_{RRM}$                 | Repetitive Peak Reverse Voltage<br>(AC Line Input Voltage)           | 120 (400 $V_{RRM}$ )                        | 120 (400 $V_{RRM}$ )        | 120 (400 $V_{RRM}$ )        | 120 (400 $V_{RRM}$ )         | 120 (400 $V_{RRM}$ )         |
|                           |                                                                      | 240 (600 $V_{RRM}$ )                        | 240 (600 $V_{RRM}$ )        | 240 (600 $V_{RRM}$ )        | 240 (600 $V_{RRM}$ )         | 240 (600 $V_{RRM}$ )         |
|                           |                                                                      | 280 (800 $V_{RRM}$ )                        | 280 (800 $V_{RRM}$ )        | 280 (800 $V_{RRM}$ )        | 280 (800 $V_{RRM}$ )         | 280 (800 $V_{RRM}$ )         |
|                           |                                                                      | 480 (1200 $V_{RRM}$ )                       | 480 (1200 $V_{RRM}$ )       | 480 (1200 $V_{RRM}$ )       | 480 (1200 $V_{RRM}$ )        | 480 (1200 $V_{RRM}$ )        |
|                           |                                                                      | 530 (1400 $V_{RRM}$ )                       | 530 (1400 $V_{RRM}$ )       | 530 (1400 $V_{RRM}$ )       | 530 (1400 $V_{RRM}$ )        | 530 (1400 $V_{RRM}$ )        |
|                           |                                                                      | 600 (1600 $V_{RRM}$ )                       | 600 (1600 $V_{RRM}$ )       | 600 (1600 $V_{RRM}$ )       | 600 (1600 $V_{RRM}$ )        | 600 (1600 $V_{RRM}$ )        |
| $I_{TSM}$                 | Maximum Non-Repetitive Surge Current<br>( $\frac{1}{2}$ Cycle, 60Hz) | 400A                                        | 1000A                       | 1500A                       | 1950A                        | 2250A                        |
| $I^2T$                    | Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                       | 670 $\text{A}^2\text{sec}$                  | 4150 $\text{A}^2\text{sec}$ | 9350 $\text{A}^2\text{sec}$ | 15800 $\text{A}^2\text{sec}$ | 25000 $\text{A}^2\text{sec}$ |
| $I_{GT}$                  | Maximum Required Gate Current to Trigger @ $25^\circ\text{C}$        | 150mA                                       | 150mA                       | 150mA                       | 150mA                        | 150mA                        |
| $V_{GT}$                  | Maximum Required Gate Voltage to Trigger @ $25^\circ\text{C}$        | 3.0V                                        | 3.0V                        | 3.0V                        | 3.0V                         | 3.0V                         |
| $P_{G(AV)}$               | Average Gate Power                                                   | 0.5W                                        | 0.5W                        | 0.5W                        | 0.5W                         | 0.5W                         |
| $V_{GM}$                  | Maximum Peak Gate Voltage (Reverse)                                  | 5.0V                                        | 5.0V                        | 5.0V                        | 5.0V                         | 5.0V                         |
| $R_{\theta JC}$           | Maximum Thermal Resistance Junction to Ceramic Base per Module       | 0.4 $^\circ\text{C/W}$                      | 0.28 $^\circ\text{C/W}$     | 0.25 $^\circ\text{C/W}$     | 0.14 $^\circ\text{C/W}$      | 0.135 $^\circ\text{C/W}$     |
| $V_{ISOL}$                | Isolation Voltage                                                    | 2500 $V_{RMS}$                              | 2500 $V_{RMS}$              | 2500 $V_{RMS}$              | 2500 $V_{RMS}$               | 2500 $V_{RMS}$               |





## B48-2T, B48-2

35-50Amp

Diode Modules

Single and Three Phase Circuits

Up to 1600 Volt Blocking Standard

Single- and three-phase diode circuits come in panel mount package that provides 2500 Vrms isolation from the terminals to the ceramic base. Available in ratings up to 1600 Volts, all models are UL recognized under file E72445.

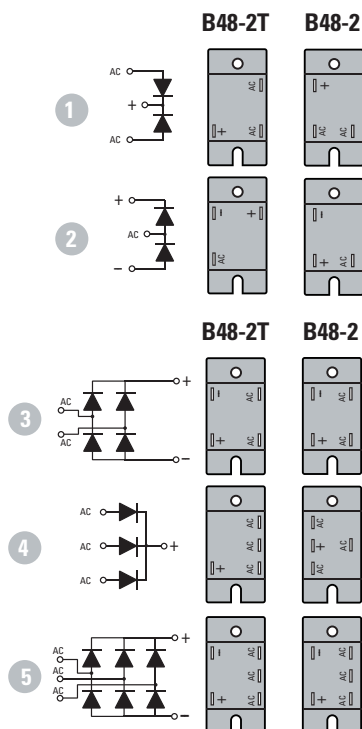
### PART NUMBER IDENTIFICATION

| Series | Circuit Type                      | Voltage                                                                                                                  | Case Style                                   |
|--------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| B48    | 1 - 5<br>(see schematic diagrams) | B - 400 (120Vac)<br>C - 600 (240Vac)<br>E - 1000 (380Vac)<br>F - 1200 (480Vac)<br>G - 1400 (530Vac)<br>H - 1600 (600Vac) | -2T (Standard)<br>-2 With Isolation Barriers |

Example: B483C-2T

### ELECTRICAL SPECIFICATIONS

|                                                                        | SINGLE PHASE                                                                                                                                     | THREE PHASE                                                                                                                                      |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_D$ Maximum DC Output Current ( $T_c = 85^\circ\text{C}$ )           | 35A                                                                                                                                              | 50A                                                                                                                                              |
| $V_F$ Maximum Voltage Drop @ Amps Peak                                 | 1.25V @ 35A                                                                                                                                      | 1.35V @ 50A                                                                                                                                      |
| $T_J$ Operating Junction Temperature Range                             | -40°C to +125°C                                                                                                                                  | -40°C to +125°C                                                                                                                                  |
| $V_{RRM}$ Repetitive Peak Reverse Voltage (Ac Line Input Voltage)      | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ )<br>600 (1600 $V_{RRM}$ ) | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ )<br>600 (1600 $V_{RRM}$ ) |
| $I_{TSM}$ Maximum Non-Repetitive Surge Current ( $1/2$ Cycle, 60Hz)    | 600A                                                                                                                                             | 600A                                                                                                                                             |
| $I^2T$ Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                  | 1500A <sup>2</sup> sec                                                                                                                           | 1500A <sup>2</sup> sec                                                                                                                           |
| $R_{qJC}$ Maximum Thermal Resistance Junction to Ceramic Base per Chip | 0.9°C/W                                                                                                                                          | 0.9°C/W                                                                                                                                          |
| $V_{ISOL}$ Isolation Voltage                                           | 2500 $V_{RMS}$                                                                                                                                   | 2500 $V_{RMS}$                                                                                                                                   |



## B-2T, B-2

25-42.5Amp

SCR/Diode Modules

Eight Standard Circuits

AC or DC Variable Voltage Output to 15KW

Modules come in eight standard circuits and are designed to control AC and DC variable voltage output up to 15KW. The package comes with standard .250 quick-connect terminals. All modes have 2500 Vrms isolation and are UL recognized under file E72445. Optional isolation barriers are available.

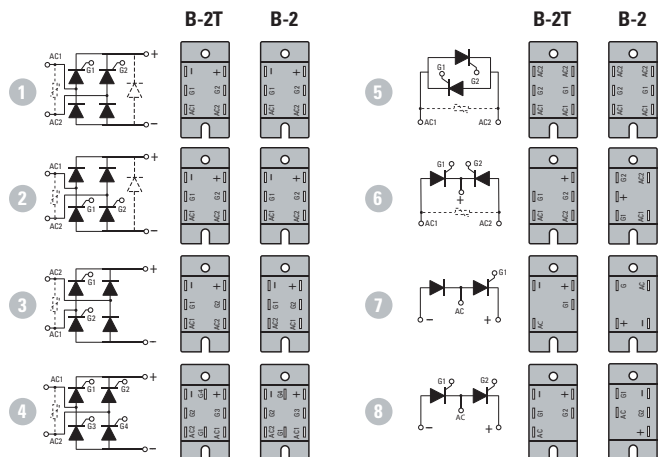
### PART NUMBER IDENTIFICATION

| Series | Current                      | Circuit Type                      | AC Line Voltage                                          | Options*                                                                                                | Case Style                                   |
|--------|------------------------------|-----------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------|
| B      | 5 - 25 Amps<br>6 - 42.5 Amps | 1 - 8<br>(see schematic diagrams) | 1 - 120 Vac<br>2 - 240 Vac<br>3 - 280 Vac<br>4 - 480 Vac | F - Free Wheeling Diode (Circuits 1 & 2 Only)<br>SE - External Suppressor (-2T Only, Circuits 1-6 Only) | -2T (Standard)<br>-2 With Isolation Barriers |

Example: B512FSE-2T

### ELECTRICAL SPECIFICATIONS

|                                                                             | B5                                                                                            | B6                                                                                            |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| $I_D$ Maximum DC Output Current ( $T_c = 85^\circ\text{C}$ )                | 25A                                                                                           | 42.5A                                                                                         |
| $V_F$ Maximum Voltage Drop @ Amps Peak                                      | 1.65V @ 25A                                                                                   | 1.6V @ 42.5A                                                                                  |
| $T_J$ Operating Junction Temperature Range                                  | -40°C to +125°C                                                                               | -40°C to +125°C                                                                               |
| $di/dt$ Critical Rate of Rise of On-State Current @ $T_J=125^\circ\text{C}$ | 100A/ $\mu\text{s}$                                                                           | 100A/ $\mu\text{s}$                                                                           |
| $dv/dt$ Critical Rate of Rise of Off-State Voltage                          | 500V/ $\mu\text{s}$                                                                           | 500V/ $\mu\text{s}$                                                                           |
| $V_{RRM}$ AC Line Input Voltage (Repetitive Peak Reverse Voltage)           | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>280 (800 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ ) | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>280 (800 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ ) |
| $I_{TSM}$ Maximum Non-Repetitive Surge Current ( $1/2$ Cycle, 60Hz)         | 250A                                                                                          | 600A                                                                                          |
| $I^2T$ Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                       | 260A <sup>2</sup> sec                                                                         | 1500A <sup>2</sup> sec                                                                        |
| $I_{GT}$ Maximum Required Gate Current to Trigger @ 25°C                    | 60mA                                                                                          | 80mA                                                                                          |
| $V_{GT}$ Maximum Required Gate Voltage to Trigger @ 25°C                    | 2.5V                                                                                          | 3.0V                                                                                          |
| $G(AV)$ Average Gate Power                                                  | 0.5W                                                                                          | 0.5W                                                                                          |
| $P_{VGM}$ Maximum Peak Gate Voltage (Reverse)                               | 5.0V                                                                                          | 5.0V                                                                                          |
| $R_{qJC}$ Maximum Thermal Resistance Junction to Ceramic Base per Chip      | 0.9°C/W                                                                                       | 0.7°C/W                                                                                       |
| $V_{ISOL}$ Isolation Voltage                                                | 2500 $V_{RMS}$                                                                                | 2500 $V_{RMS}$                                                                                |



\*F option available in 1 and 2 circuits only, SE option available on -2T in circuits 1-6 only.



## M50 SCR/Diode Modules 50-100Amp

Over 40KW Output Capability

The M50 Series modules utilize highly efficient thermal management to provide high surge capability, long lifetime and reliable performance. Available in eight standard circuits, all models come in an industry standard package, provide 2500 Vrms from all terminals to the base plate and are UL recognized under file E72445.

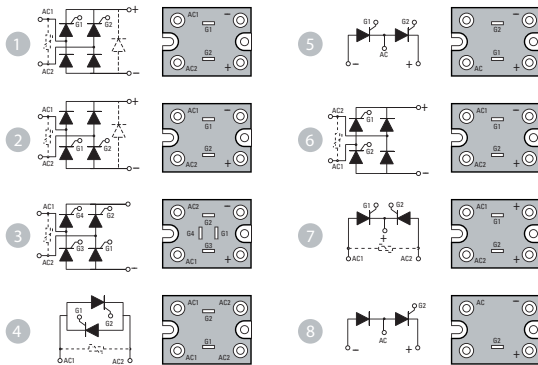
### PART NUMBER IDENTIFICATION

| Series | Current        | Circuit Type             | AC Line Voltage | Options*                |
|--------|----------------|--------------------------|-----------------|-------------------------|
| M50    | 50 - 50 Amps   | 1 - 8                    | 1 - 120 Vac     | F - Free Wheeling Diode |
|        | 100 - 100 Amps | (see schematic diagrams) | 2 - 240 Vac     | V - External Suppressor |
|        |                |                          | 3 - 280 Vac     |                         |
|        |                |                          | 4 - 380 Vac     |                         |
|        |                |                          | 5 - 480 Vac     |                         |

Example: M505012FV

### ELECTRICAL SPECIFICATIONS

|                                                                             | M5050                                                                                                                  | M50100                                                                                                                 |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| $I_D$ Maximum DC Output Current ( $T_c = 85^\circ\text{C}$ )                | 50A                                                                                                                    | 100A                                                                                                                   |
| $V_F$ Maximum Voltage Drop @ Amps Peak                                      | 1.7V @ 50A                                                                                                             | 1.4V @ 100A                                                                                                            |
| $T_J$ Operating Junction Temperature Range                                  | $-40^\circ\text{C}$ to $+125^\circ\text{C}$                                                                            | $-40^\circ\text{C}$ to $+125^\circ\text{C}$                                                                            |
| $di/dt$ Critical Rate of Rise of On-State Current @ $T_J=125^\circ\text{C}$ | 100A/ $\mu\text{s}$                                                                                                    | 100A/ $\mu\text{s}$                                                                                                    |
| $dv/dt$ Critical Rate of Rise of Off-State Voltage                          | 500V/ $\mu\text{s}$                                                                                                    | 500V/ $\mu\text{s}$                                                                                                    |
| $V_{RMS}$ AC Line Input Voltage<br>(Repetitive Peak Reverse Voltage)        | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>280 (800 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ ) | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>280 (800 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ ) |
| $I_{TSM}$ Maximum Non-Repetitive Surge Current<br>( $1/2$ Cycle, 60Hz)      | 600A                                                                                                                   | 1500A                                                                                                                  |
| $I^2T$ Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                       | 1500 $\text{A}^2 \text{ sec}$                                                                                          | 9350 $\text{A}^2 \text{ sec}$                                                                                          |
| $I_{GT}$ Maximum Required Gate Current<br>to Trigger @ $25^\circ\text{C}$   | 150mA                                                                                                                  | 150mA                                                                                                                  |
| $V_{GT}$ Maximum Required Gate Voltage<br>to Trigger @ $25^\circ\text{C}$   | 3.0V                                                                                                                   | 3.0V                                                                                                                   |
| $P_{G(AV)}$ Average Gate Power                                              | 0.5W                                                                                                                   | 0.5W                                                                                                                   |
| $V_{GM}$ Maximum Peak Gate Voltage (Reverse)                                | 5.0V                                                                                                                   | 5.0V                                                                                                                   |
| $R_{qJC}$ Maximum Thermal Resistance Junction to<br>Ceramic Base per Chip   | 0.7 $^\circ\text{C/W}$                                                                                                 | 0.36 $^\circ\text{C/W}$                                                                                                |
| $V_{ISOL}$ Isolation Voltage                                                | 2500 $V_{RMS}$                                                                                                         | 2500 $V_{RMS}$                                                                                                         |



\*F option available in 1 and 2 circuits only, V option available in circuits 1,2,3,4,6 and 7 only.



## M50 Diode Modules 60-100Amp

High Surge Current Rectifier Circuits  
Up to 1600 Volt Blocking Standard

Single- and three-phase diode circuits incorporate highly efficient thermal management to provide high surge capability, extended life, and reliable performance. Available in five circuits, all models come in an industry standard package, provide 2500 Vrms from all terminals to the baseplate, and are UL recognized under file E72445.

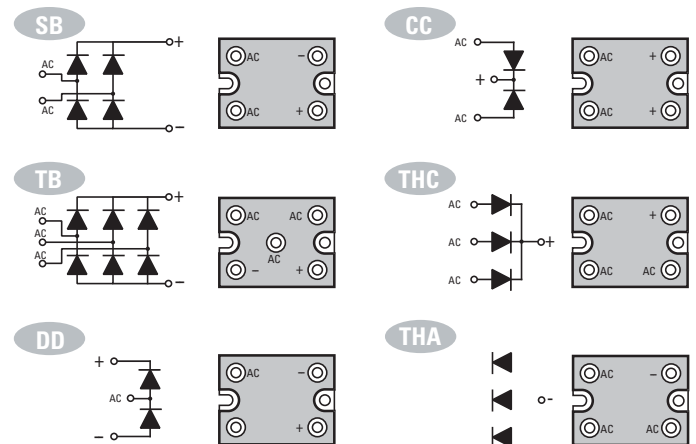
### PART NUMBER IDENTIFICATION

| Series | Current        | Circuit Type             | Voltage                     |
|--------|----------------|--------------------------|-----------------------------|
| M50    | 60 - 60 Amps   | (see schematic diagrams) | 400 (120Vac) 1200 (480Vac)  |
|        | 100 - 100 Amps |                          | 600 (240Vac) 1400 (530Vac)  |
|        |                | Example: TB              | 1000 (380Vac) 1600 (600Vac) |

Example: M50100TB1200

### ELECTRICAL SPECIFICATIONS

|                                                                                 | M5060                                                                                                                                            | M50100                                                                                                                                           |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_D$ Maximum DC Output Current ( $T_c = 85^\circ\text{C}$ )                    | 60A                                                                                                                                              | 100A                                                                                                                                             |
| $V_F$ Maximum Voltage Drop @ Amps Peak                                          | 1.35V @ 60A                                                                                                                                      | 1.2V @ 100A                                                                                                                                      |
| $T_J$ Operating Junction Temperature Range                                      | $-40^\circ\text{C}$ to $+125^\circ\text{C}$                                                                                                      | $-40^\circ\text{C}$ to $+125^\circ\text{C}$                                                                                                      |
| $V_{RRM}$ (Repetitive Peak Reverse Voltage (AC Line))                           | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ )<br>600 (1600 $V_{RRM}$ ) | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ )<br>600 (1600 $V_{RRM}$ ) |
| $I_{TSM}$ Maximum Non-Repetitive Surge Current<br>( $1/2$ Cycle, 60Hz)          | 800A                                                                                                                                             | 1500A                                                                                                                                            |
| $I^2T$ Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                           | 2650 $\text{A}^2 \text{ sec}$                                                                                                                    | 9350 $\text{A}^2 \text{ sec}$                                                                                                                    |
| $R_{\theta JC}$ Maximum Thermal Resistance Junction to<br>Ceramic Base per Chip | 0.45 $^\circ\text{C/W}$                                                                                                                          | 0.3 $^\circ\text{C/W}$                                                                                                                           |
| $V_{ISOL}$ Isolation Voltage                                                    | 2500 $V_{RMS}$                                                                                                                                   | 2500 $V_{RMS}$                                                                                                                                   |





## EF

50-170Amp

Diode, SCR/Diode Modules  
High Thermal Efficiency

These circuits provide complete power control in a single package, utilizing high thermal efficiency to assure long life and reliable performance. Twelve standard models provide 2500 Vrms isolation from all terminals to ceramic base and are UL recognized under file E72445.

### PART NUMBER IDENTIFICATION

| Series | Current (Amps)  | Circuit Type                   | Voltage                                                                                                  | Options                                      |
|--------|-----------------|--------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------|
| EF     | 1Ø 3Ø           | AC SW (see schematic diagrams) | B - 400 (120 Vac)<br>C - 500 (240 Vac)<br>E - 1000 (380 Vac)<br>F - 1200 (480 Vac)<br>G - 1400 (530 Vac) | F - Free Wheeling Diode (Circuits 1,2,16,19) |
|        | D - 50 70 55    | Example: 01                    |                                                                                                          |                                              |
|        | E - 75 100 85   |                                |                                                                                                          |                                              |
|        | F - 100 135 110 |                                |                                                                                                          |                                              |
|        | G - 125 170 140 |                                |                                                                                                          |                                              |

Example: EFD02CF

### ELECTRICAL SPECIFICATIONS

|                                                                              | D                                                                                                                       | E                      | F                                                                                                                       | G                       |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------|
| $I_D$ Maximum DC Output Current ( $T_c = 85^\circ\text{C}$ )                 | See Part Number Identification Above for Ratings of Single Phase, Three Phase and AC Switch Circuits                    |                        |                                                                                                                         |                         |
| $V_F$ Maximum Voltage Drop @ Amps Peak                                       | 1.7V @ 50A                                                                                                              | 1.85V @ 75A            | 1.4V @ 100A                                                                                                             | 1.55V @ 125A            |
| $T_J$ Operating Junction Temperature Range                                   | -40°C to +125°C                                                                                                         |                        | -40°C to +125°C                                                                                                         |                         |
| $di/dt$ Critical Rate of Rise of On-State Current @ $T_J=125^\circ\text{C}$  | 100A/ $\mu\text{s}$                                                                                                     |                        | 100A/ $\mu\text{s}$                                                                                                     |                         |
| $dv/dt$ Critical Rate of Rise of Off-State Voltage                           | 500V/ $\mu\text{s}$                                                                                                     |                        | 500V/ $\mu\text{s}$                                                                                                     |                         |
| $V_{RRM}$ Repetitive Peak Reverse Voltage (AC Line)                          | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ ) |                        | 120 (400 $V_{RRM}$ )<br>240 (600 $V_{RRM}$ )<br>380 (1000 $V_{RRM}$ )<br>480 (1200 $V_{RRM}$ )<br>530 (1400 $V_{RRM}$ ) |                         |
| $I_{TSM}$ Maximum Non-Repetitive Surge Current ( $1/2$ Cycle, 60Hz)          | 400A                                                                                                                    | 600A                   | 1500A                                                                                                                   | 1950A                   |
| $I^2T$ Maximum $I^2T$ for Fusing ( $t=8.3\text{ms}$ )                        | 670A <sup>2</sup> sec                                                                                                   | 1500A <sup>2</sup> sec | 9340A <sup>2</sup> sec                                                                                                  | 15800A <sup>2</sup> sec |
| $I_{GT}$ Maximum Required Gate Current to Trigger @ 25°C                     | 60mA                                                                                                                    | 80mA                   | 150mA                                                                                                                   | 150mA                   |
| $V_{GT}$ Maximum Required Gate Voltage to Trigger @ 25°C                     | 2.5V                                                                                                                    | 3.0V                   | 3.0V                                                                                                                    | 3.0V                    |
| $P_{G(AV)}$ Average Gate Power                                               | 0.5W                                                                                                                    | 0.5W                   | 0.5W                                                                                                                    | 0.5W                    |
| $V_{GM}$ Maximum Peak Gate Voltage (Reverse)                                 | 5.0V                                                                                                                    | 5.0V                   | 5.0V                                                                                                                    | 5.0V                    |
| $R_{\theta JC}$ Maximum Thermal Resistance Junction to Ceramic Base per Chip | 0.8°C/W                                                                                                                 | 0.7°C/W                | 0.36°C/W                                                                                                                | 0.3°C/W                 |
| $V_{ISOL}$ Isolation Voltage                                                 | 2500 $V_{RMS}$                                                                                                          | 2500 $V_{RMS}$         | 2500 $V_{RMS}$                                                                                                          | 2500 $V_{RMS}$          |

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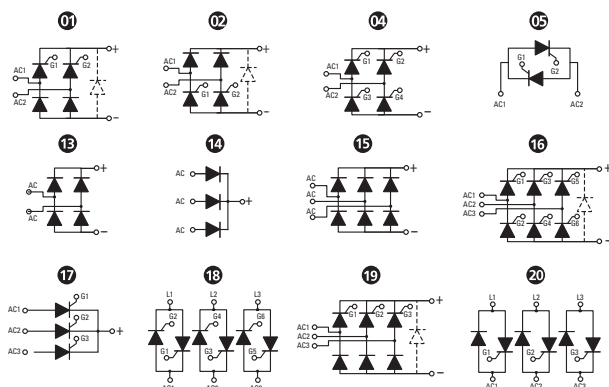
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