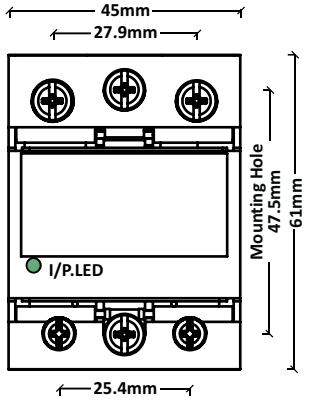
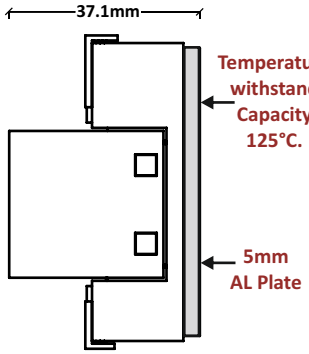
# BS1F SERİSİ DC-DC SOLID STATE RELAY

## OUTPUT DC CONTROL COOL POWER MOSFET & IGBT CONTROL TECHNOLOGY

### PMDD (POWER MOSFET)

**BS1F90D85M**




*SSR with 5mm Aluminium Plate*

### ORDERING FORMAT

PM : POWER MOSFET
IG : IGBT

D : DC Output

Control Input
00 : 4-32 VDC

D : DC Input

Output Voltage

Output Current Rating

**EXAMPLES**

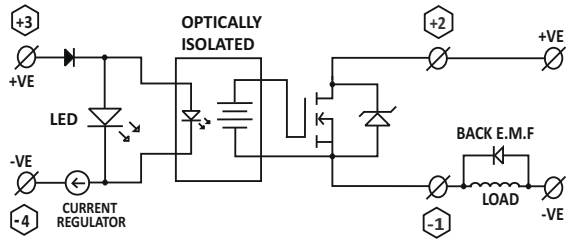
BS1F90D85M

| PM: POWER MOSFET | |
|---|---|
| Output Voltage | Output Current Rating |
| 30: 5-30 VDC | 50 A |
| 30: 5-30 VDC | 100 A |
| 60: 5-60 VDC | 30 A |
| 60: 5-60 VDC | 60 A |
| 85: 5-85 VDC | 45 A |
| 85: 5-85 VDC | 90 A |
| 200: 5-200 VDC | 20 A |
| 200: 5-200 VDC | 30 A |

| IG: IGBT | |
|---|---|
| Output Voltage | Output Current Rating |
| 600: 5-600 VDC | 10 A |
| 600: 5-600 VDC | 20 A |
| 1200: 5-1200 VDC | 10 A |
| 1200: 5-1200 VDC | 20 A |

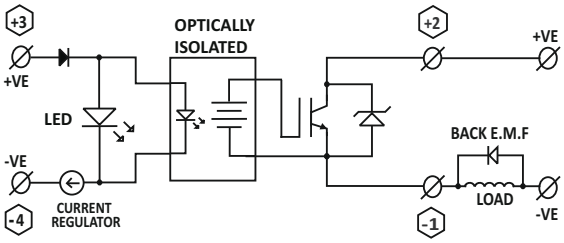
- Product Temperature withstand 125°C.
- PWM capacity 100 Hz.
- With easy open & lock IP 20 protection Flaps on I/P & O/P Terminals.
- Switching Speeds are Inherently Faster.
- No need to De-rate Power Handing Capacity.
- Input LED Green Indication.
- Isolated Drivers, Low Power Transient.
- N/O Configurations only.
- Reverse Polarity Protection on Input Side.
- Power ($P_D$) Increases with Case Temperature Increase.
- Junction Temperature Increases with $R_{DS}$ Increase.

### PMDD- POWER MOSFET DC TO DC



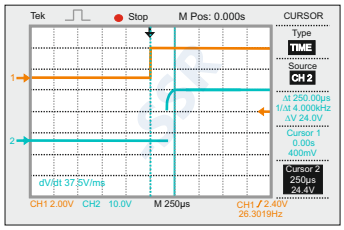

- Ultra Low ON state resistance - MOSFET
- RDS (ON) has Positive Temperature Co-efficient which aids in paralleled Power MOSFET device and Negative Temperature Co-efficient of Trans- Conductance so less susceptible for Thermal Runway.
- Voltage Range available from 30V to 200V (Low Voltage application)

### IGBT- Insulated Gate Bipolar Transistor DC TO DC

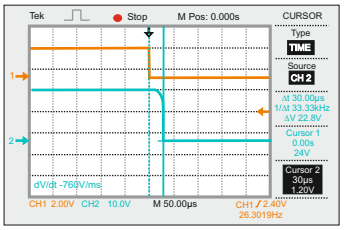



- Ultra Low Output Leakage current - IGBT
- Higher Short Circuit current rating (Isc).
- Voltage Range available from 600V to 1200V (High Voltage application)

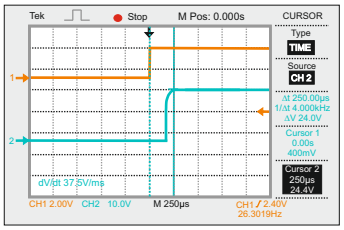
**TURN ON Time 250µS Waveform of Power MOSFET**



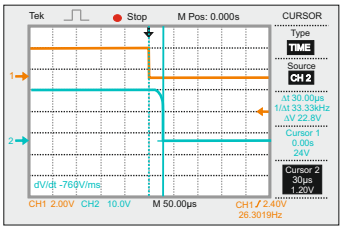
**TURN OFF Time 30µS Waveform of Power MOSFET**



**TURN ON Time 250µS Waveform of IGBT**



**TURN OFF Time 30µS Waveform of IGBT**





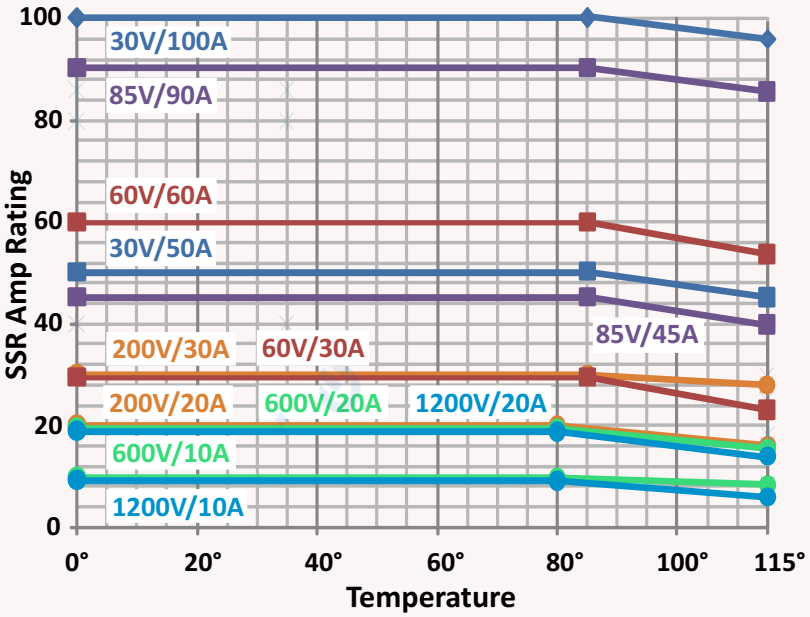
+90 (212) 545 73 50 +90 (532) 545 73 50 info@biltekelektrik.com biltekelektrik.com

Max Barrier Layer Temperature ($T_{max}$)

| General Specification | |
|---|---|
| | < 125 °C |
| Ambient Temperature Range ($T_{amb}$) | 0-85 °C |
| SSR Storage Temperature Range ($T_{st}$) | -40°C to 80°C |
| Input Terminal Screw Torque Range | Ƭ = 1.6 N.m (Max.) |
| Output Terminal Screw Torque Range | Ƭ = 2.5 N.m (Max.) |
| Housing Material | UL-94 V0 Grade |
| Base Plate | Aluminium |
| SSR Weight | 100 grams |
| Control Input Electrical Wire Size ( Max. ) | 4 mm² |
| Power Output Electrical Wire Size ( Max. ) | 25 mm² |
| Test Standards: | ROHS,IP20 |

| Input Technical Specifications | | | |
|---|---|---|---|
| **Parameters** | **Unit** | **Type Selection** | |
| | | **PMDD** | **IGBT** |
| Control Voltage Range | V | 4-32 VDC | 4-32 VDC |
| Reverse Polarity Protection | - | YES | YES |
| Input Frequency Range(PWM) | Hz | Up to 100Hz | Up to 100Hz |
| Control Supply Current Consumption | mA | 9-32 mA | 9-32 mA |
| Input Impedance (Current Regulator Circuit Impedance) | Ω | 0.5kΩ - 1kΩ | 0.5kΩ - 1kΩ |
| Minimum Turn ON Voltage | VDC | 3.5 VDC | 3.5 VDC |
| Turn OFF Voltage | VDC | < 3.5 VDC | < 3.5 VDC |
| Control Input Status Indication | - | Green LED Indication | |

## THERMAL DERATING CURVE WITH HEAT SINK

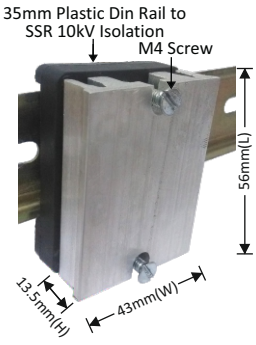



| Output Technical Specifications @ 25°C Unless Specified - FOR POWER MOSFET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Parameters** | **Symbol** | **Unit** | **30V / 50Amp** | **30V / 100Amp** | **60V / 30Amp** | **60V / 60Amp** | **85V / 45Amp** | **85V / 90Amp** | **200V / 20Amp** | **200V / 30Amp** |
| Output Circuit - Switching Element | | | POWER MOSFET | | | | | | | |
| Operating Output DC Voltage Range | V | VDC | 5-30 | 5-30 | 5-60 | 5-60 | 5-85 | 5-85 | 5-200 | 5-200 |
| Maximum Drain To Source Break Down Voltage | $I_D$ | *Amp* | ***50*** | ***100*** | ***30*** | ***60*** | ***45*** | ***90*** | ***20*** | ***30*** |
| Static Drain To Source ON Resistance | $V_{(BR)DSS}$ | VDC | 30 | 30 | 60 | 60 | 85 | 85 | 200 | 200 |
| ***Safe Continuos Drain Current @ Tc=55°C with Suitable Heat Sink*** | $R_{DS(ON)}$ | mΩ | 1.6 | 0.8 | 4.1 | 2 | 2.8 | 1.4 | 15 | 7.5 |
| On state Voltage Drop @ Rated Current | $V_{DSS}$ | VDC | < 0.4 | < 0.4 | < 0.7 | < 0.7 | < 0.3 | < 0.3 | < 0.9 | < 0.9 |
| Pulse Drain Current(less than 60 µS) | $I_{DM}$ | Amp | 1000 | 2000 | 200 | 500 | 800 | 1600 | 100 | 300 |
| Required minimum LOAD current | $mA_{DC}$ | mA | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| SSR Turn ON Delay Time (Response Time) | $T_{D(ON)}$ | µS | 192 | 202 | 192 | 58 | 228 | 280 | 100 | 48 |
| SSR Turn Off Delay Time | $T_{D(OFF)}$ | µS | 18 | 22 | 22 | 22 | 22 | 22 | 34 | 32 |
| Minimum Isolation Resistance between Input Terminals (+I/P,-I/P) to Output Terminals (-O/P,+O/P) @ 500 VDC | Ω | GΩ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Isolation Voltage Input Terminals (+3,-4) to Output Terminals (-1,+2) for 1 Minute | $V_{ISO}$ | kV | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Isolation Voltage Input & Output Terminal (+3,-4,-1,+2) to Body Isolation for 1 Minute | $V_{ISO}$ | kV | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Maximum Junction Temperature | $T_{j(max.)}$ | °C | 125 °C | | | | | | | |
| Thermal Resistance Rθ (Junction To Case) | $R_{θ(j-c)}$ | °C/W | 1.65 | 0.45 | 0.7 | 0.1 | 3.1 | 1.15 | 0.7 | 0.9 |

| Output Technical Specifications @ 25°C Unless Specified - FOR IGBT | | | | | | |
|---|---|---|---|---|---|---|
| **Parameters** | **Symbol** | **Unit** | **600V / 10Amp** | **600V / 20Amp** | **1200V / 10Amp** | **1200V / 20Amp** |
| Output Circuit - Switching Element | | | IGBT | | | |
| Operating Output DC Voltage Range | V | VDC | 5-600 | 5-600 | 5-1200 | 5-1200 |
| ***Safe Continuos Collector Current @ Tc=55°C with Suitable Heat Sink*** | $I_C$ | *Amp* | ***10*** | ***20*** | ***10*** | ***20*** |
| Maximum Collector To Emmiter Voltage | $V_{CES}$ | VDC | 600 | 600 | 1200 | 1200 |
| Short Current | $I_{SC}$ | Amp | 75 | 75 | 75 | 75 |
| On state Voltage Drop @ Rated Current | $V_{CESAT}$ | VDC | < 1.8 | < 1.8 | < 2 | < 2 |
| Required minimum LOAD current | $mA_{DC}$ | mA | 3 | 3 | 3 | 3 |
| SSR Turn ON Delay Time | $T_{D(ON)}$ | µS | 86 | 146 | 436 | 860 |
| SSR Turn Off Delay Time | $T_{D(OFF)}$ | µS | 22 | 22 | 22 | 22 |
| Minimum Isolation Resistance between Input Terminals (+I/P,-I/P) to Output Terminals (-O/P,+O/P) @ 500 VDC | Ω | GΩ | 1 | 1 | 1 | 1 |
| Isolation Voltage Input Terminals (+I,-I) to Output Terminals (-O/P,+O/P) for 1 Minute | $V_{ISO}$ | kV | 2.5 | 2.5 | 2.5 | 2.5 |
| Isolation Voltage Input & Output Terminal (+I/P,-I/P,-O/P,+O/P) to Body Isolation for 1 Minute | $V_{ISO}$ | kV | 2.5 | 2.5 | 2.5 | 2.5 |
| Maximum Junction Temperature | $T_{j(max.)}$ | °C | 125 °C | | | |
| Thermal Resistance Rθ (Junction To Case) | $R_{θ(j-c)}$ | °C/W | 0.7 | 0.35 | 0.3 | 0.2 |

## TYPE OF HEATSINKS / CURRENT RATING / RθSA / SURFACE AREA / MECHANICAL DIMENSIONS / WEIGHT

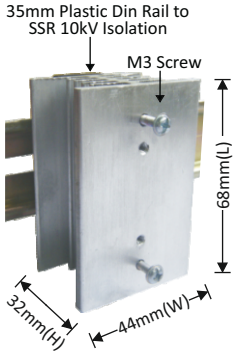
### HEAT SINK TYPE "C-56" + DIN RAIL




**TYPE "C-56"**
**Model 901-1 Nos.**
**Current upto 16Amp @40°C with Din Rail 42mm, Thermal Resistance**
RθSA = 4°C/W
RθSA = 277.15 K/W
ΔT= 75°C
Surface Area:
353mm²x56mm
=19768mm³
43mm(W)x 56mm(L) x 13.5mm(H) + SSR

**Inbuilt Heat Sink IN 901 SSR MODEL**
**No Separate Heat Sink available**
**Weight : @ 57gms**

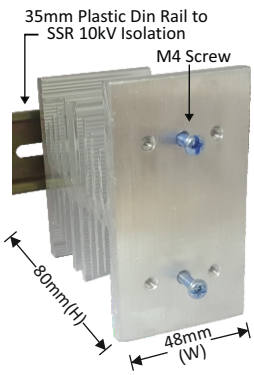
### HEAT SINK TYPE "G-68" + DIN RAIL




**TYPE "G-68"**
**Model 901-1 Nos.**
**Model 808-1 Nos.**
**Current upto 26Amp @40°C with Din Rail 22.5mm, Thermal Resistance**
RθSA = 2.5°C/W
RθSA = 275.65 K/W
ΔT= 75°C
Surface Area:
491mm²X68mm
=33388 mm³
44mm(W) X 68mm(L) X 32mm(H) + SSR

**Weight : @ 95gms**

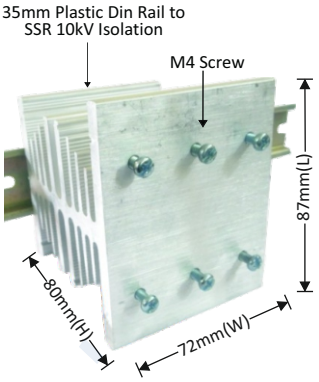
### HEAT SINK TYPE "B-48" + DIN RAIL




**TYPE "B-48"**
**Model 803-Upto 2 Nos.**
**Model 901-1 Nos.**
**Current upto 36Amp @40°C with Din Rail 42mm Thermal Resistance**
RθSA = 1.17°C/W
RθSA = 274.32 K/W
ΔT= 75°C
Surface Area:
2630mm²X48mm
=126240 mm³
48mm(W) X 87mm(L) X 80mm(H) + SSR

**Weight : @ 310gms**

### HEAT SINK TYPE "B-72" + DIN RAIL

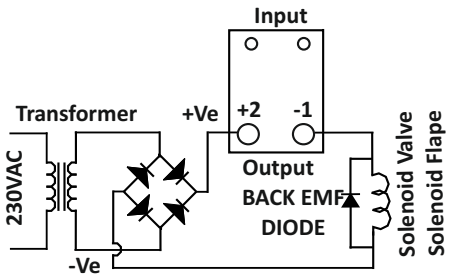



**TYPE "B-72"**
**Model 803-Upto 3 Nos.**
**Model 901-1 Nos.**
**Current upto 60Amp @40°C with Din Rail 42mm Thermal Resistance**
RθSA = 0.85°C/W
RθSA = 274 K/W
ΔT= 75°C
Surface Area:
2630mm²X72mm
=189360 mm³
72mm(W) X 87mm(L) X 80mm(H) + SSR

**Weight : @ 500gms**


### Solenoid Valve / DC Load Application

**For Power Mosfet**

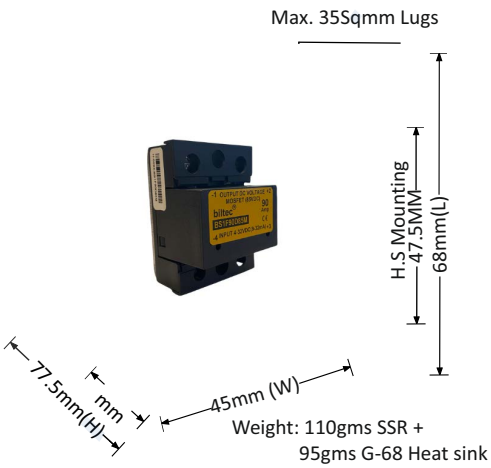



### HEAT SINK SELECTION GUIDE

| | PMDD | | | | | | | | IGDD | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **901 MODEL / HEAT SINK** | **30V / 50Amp** | **30V / 100Amp** | **60V / 30Amp** | **60V / 60Amp** | **85V / 45Amp** | **85V / 90Amp** | **200V / 20Amp** | **200V / 30Amp** | **600V / 10Amp** | **600V / 20Amp** | **1200V / 10Amp** | **1200V / 20Amp** |
| **C-56** | 20 Amp | - | 20 Amp | - | 20 Amp | - | 10 Amp | - | - | - | - | - |
| **G-68** | 30 Amp | - | 30 Amp | - | 30 Amp | - | 20 Amp | 30 Amp | 10 Amp | - | 10 Amp | - |
| **B-48** | 50 Amp | - | - | 60 Amp | 45 Amp | 60 Amp | - | - | - | 20 Amp | - | 20 Amp |
| **B-72** | - | 100 Amp | - | - | - | 90 Amp | - | - | - | - | - | - |

* All above SSR Rating & Heat Sink Selections are considered on environment temperature @ 55°C

### 90AMP - MODEL BS1F




Weight: 110gms SSR + 95gms G-68 Heat sink

# APPLICATIONS

## AUTOMATED EQUIPMENT

- **DC brake Motor**
- Brake Clutch
- DC Switching in Locomotive Engine
- Breakers in Railways & Electrical Distribution Systems
- **Electro Magnetic Break**

## SOLAR ENERGY / WIND ENERGY

- **Wind Turbine**
- Solar Cold Storage
- Solar Cookers
- **Solar Cells**

## LASER TECHNOLOGY

- Laser Etching
- Laser Cutting
- Laser Welding
- Jewellery Manufacturing
- Laser Marking
- Diamond Cutting Machine
- **DC Motor H-Bridge**
- **Laser Engraving**


## INDUSTRIAL & HOTEL AUTOMOTIVE

- **Golf Carts**
- Fork Lift
- Tractors accessories laser guided land leveling

## MEDICAL EQUIPMENT & ALTERNATOR

- **Brushless Alternator**
- **X - Ray Machine**

## SWITCHING OF SOLENOID / PNEUMATIC VALVE

- **DC Plunger**
- Elevators Break
- Solenoid Valve
- **Pneumatic Valve**

**Cost Efficient**

**Space Optimization**

**Timely Delivery**


**User Friendly**

**Minimizing Energy Cost**

**Long Term Reliability**



+90 (212) 545 73 50 +90 (532) 545 73 50 info@biltekelektrik.com biltekelektrik.com