



MIL-STD-461 EMI INPUT FILTER

MF10D075P: 10A-75V FILTER MODULE

MF20D075P: 20A-75V FILTER MODULE

Features

- 10A and 20A Filter Module
- Simplifies the System EMC Filter
- Suitable for Vehicle and Airborne Use
- Reduces System EMI
- For Operation in Harsh Environments
- Reduces Cost for COTS Applications
- Industry Standard Mounting and Heatsinks
- 1500Vdc I/O to Case Isolation
- Operating Case Temperature -55 to +110°C
- Filtering for Compliance to MIL-STD-461(F, G)
- Shock & Vibration MIL-STD 810F Compliant
- 5000m Operating Altitude
- Quarter-Brick Compact Size 2.28"x1.45"x0.5"
- Eighth-Brick Compact Size 2.45"x1.05"x0.5"



MODEL NUMBER	INPUT VOLTAGE	OUTPUT RATED CURRENT	DC RESISTANCE (+Vin to +Vo) Typ.	DC RESISTANCE (-Vin to -Vo) Typ.
MF10D075P	75 VDC max.	10 A max.	9.3 mΩ	9.3 mΩ
MF20D075P	75 VDC max.	20 A max.	7.9 mΩ	7.9 mΩ

NOTE:

1. Nominal Input Voltage 28 VDC.

PART NUMBER

Series	Input Current	DC Input	Input Voltage	Pin Type
MF	II	X	YYY	Z
MF : Filter Module	10 : 10A 20 : 20A	D : DC	075 : 75VDC	P : PIN

Part Number Example:

MF10D075P: Filter Module, 10: 10A Input Current, 75Vdc Input Voltage

MF20D075P: Filter Module, 20: 20A Input Current, 75Vdc Input Voltage



MF10/20D075P

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All			75	V _{dc}
Transient	1s max.	All			100	V _{dc}
Operating Case Temperature	With derating	All	-55		110	°C
Storage Temperature		All	-55		125	°C

ELECTRICAL CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	0		75	V _{dc}
Operating Current Range	With derating	MF10D075P MF20D075P	0		10 20	A
Input Surge Voltage	1s max.	All			100	V _{dc}
DC Resistance	+Input to +output -Input to -output	MF10D075P MF20D075P		9.3 7.9		mΩ

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% factory Hi-Pot tested @2sec.)	1 Minute; input to case 1 Minute; output to case	All			1500	V _{dc}
Isolation Resistance	500Vdc, Input/output to case	All	100			MΩ
Isolation Capacitance	Input to case, output to case	MF10D075P MF20D075P		9400 18800		pF

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Weight		MF10D075P MF20D075P		38.3 69.6		grams
Case Material	Plastic, DAP, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non condensing					
Altitude	5000m Operating altitude, 12000m Transport altitude					
Thermal Shock	Meets MIL-STD-810F					
Packaging Information Link	Packaging Information					



MF10/20D075P

1. Introduction

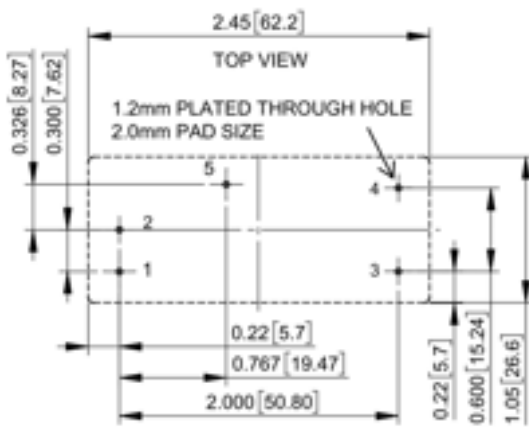
MF10/20D075P filter module is created to accommodate the need to meet MIL-STD-461 standard. This standard filter simplifies the process of meeting the necessary requirements for the application of MIL-STD-461 EMI solutions. The filter module is designed to reduce common mode and differential mode noise of the DC converter. The MF10/20D075P filter module offers maximum current rating of 10A/20A with Derating and maximum input voltage up to 75V.

It has Compact Quarter Brick, Eighth Brick size and pinouts. Allowing case operating temperature range of -55 to 110°C . MF10/20D075P is mainly designed for distributed power architecture, telecommunications, battery-powered equipment and industrial applications.

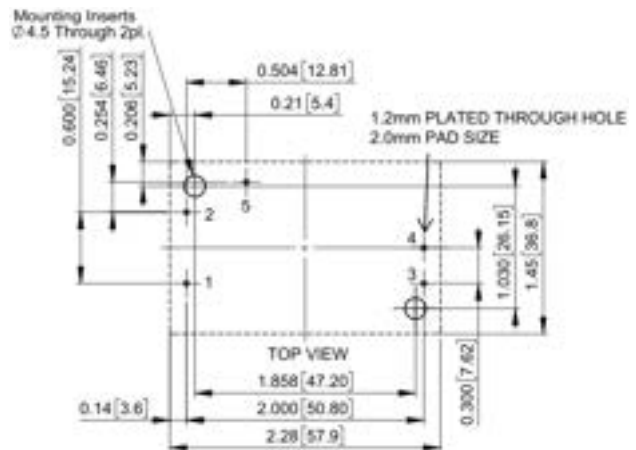
2. Applications

2.1 Recommend PCB Footprint

The system designer or end user must ensure that metal and other components in the vicinity of the module meet the spacing requirements for which the system is approved. Low resistance and inductance PCB layout traces are the norm and should be used where possible. Due consideration must also be given to proper low impedance tracks between power module, input and output grounds. The recommended soldering profile and PCB layout are shown below.



MF10D075P PCB Footprint



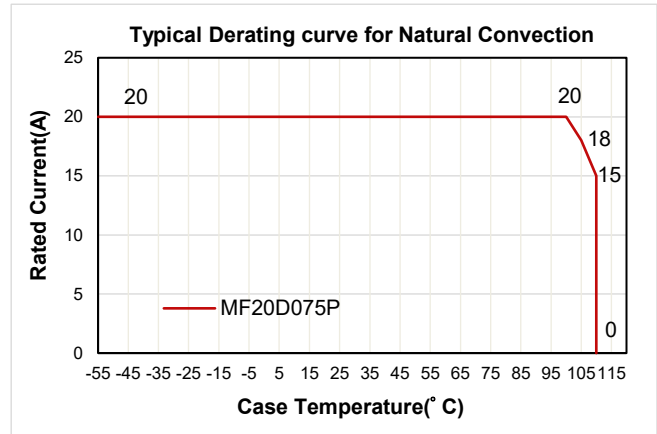
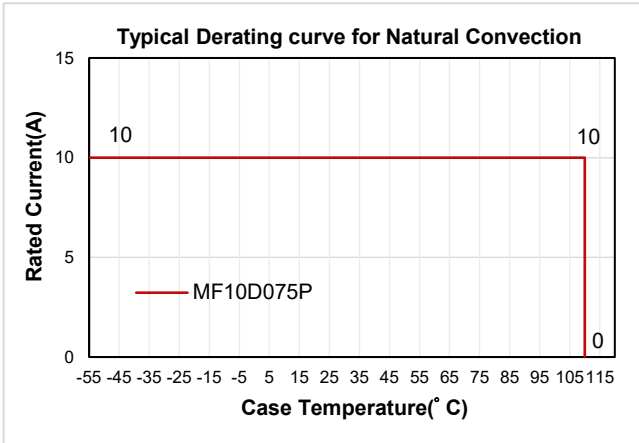
MF20D075P PCB Footprint



MF10/20D075P

3. Power Derating

The operating case temperature range of MF10/20D050P is -55°C to +110°C. When operating the MF10/20D050P, proper derating or cooling is needed. The maximum case temperature under any operating condition should not exceed 110°C. The following curve is the de-rating curve of MF10D075P/MF20D075P.



4. Quarter Brick Heat Sinks for MF20D075P:

Heat sinks assembly [refer to Datasheet-Thermal](#)



MF10/20D075P

5. EMC Considerations

EMI Test standard: MIL-STD-461 Conducted Emission
Test Condition: Input Voltage: 28Vdc, Output Load: Full Load

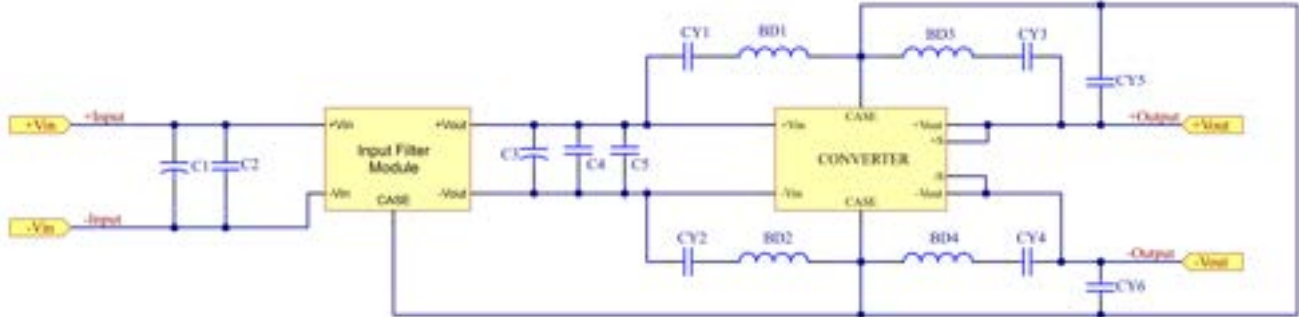
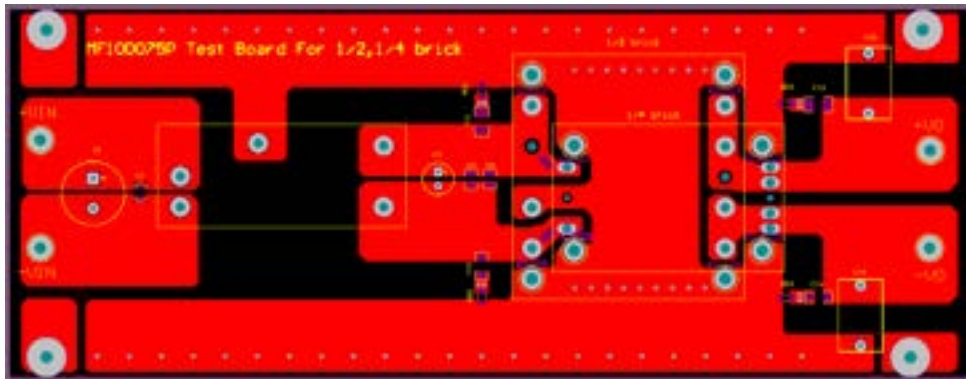
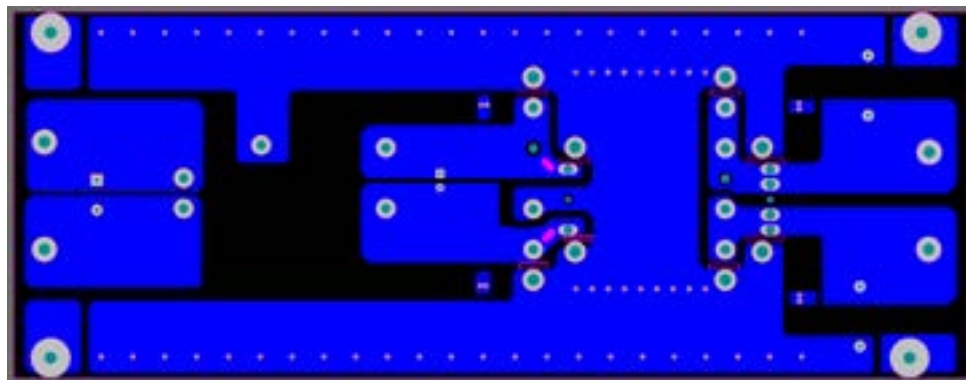


Figure1 MF10/20D075P For Half Brick, Quarter Brick and Eighth Brick Connection Circuit



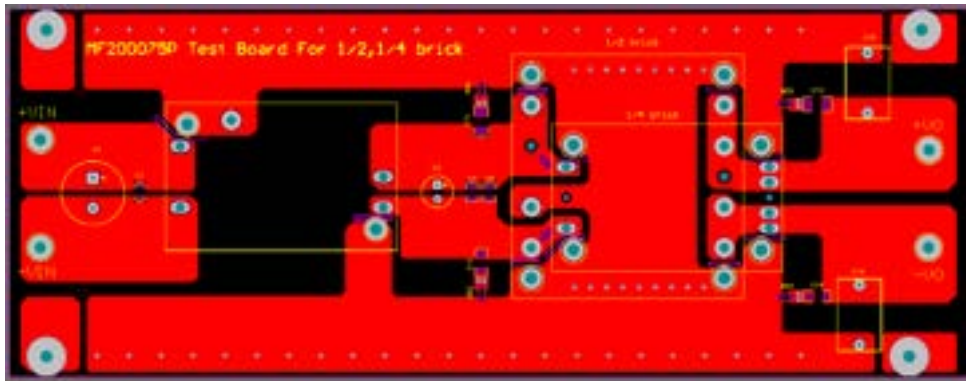
MF10D075P For Half Brick, Quarter Brick and Eighth Brick PCB Top Layout



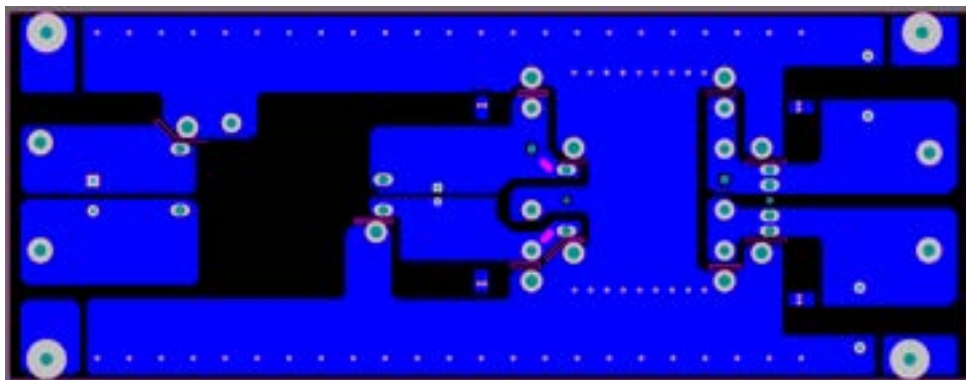
MF10D075P For Half Brick, Quarter Brick and Eighth Brick PCB Bottom Layout



MF10/20D075P



MF20D075P For Half Brick, Quarter Brick and Eighth Brick PCB Top Layout



MF20D075P For Half Brick, Quarter Brick and Eighth Brick PCB Bottom Layout

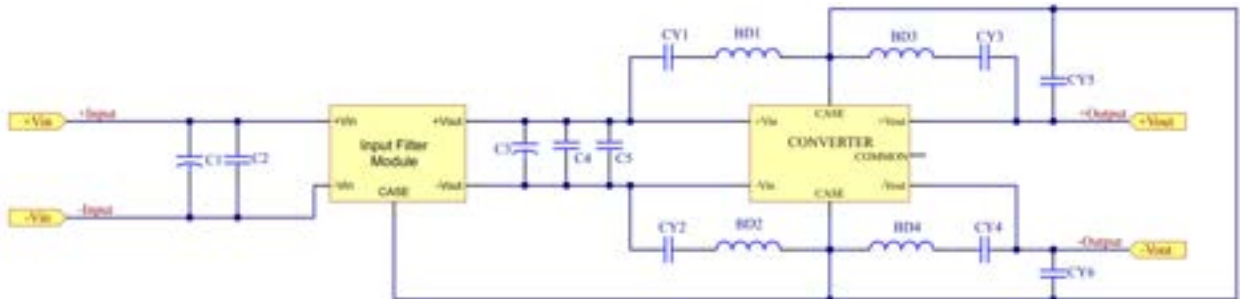
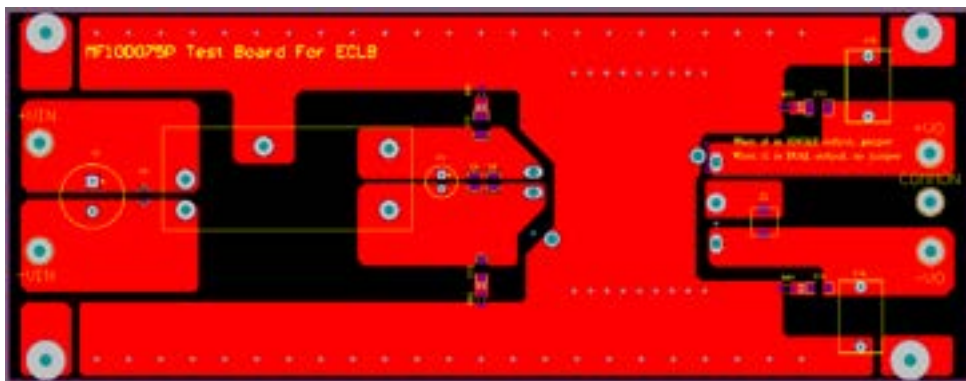


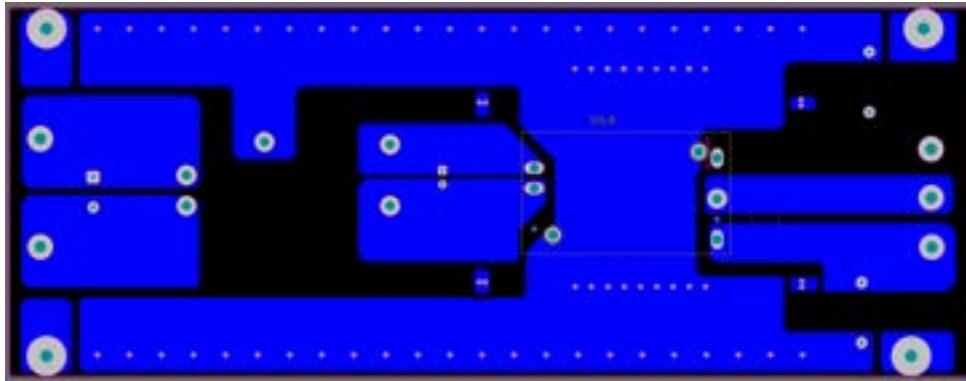
Figure2 MF10D075P For ECLB & B CASE Connection Circuit



MF10D075P For ECLB & B CASE PCB Top Layout



MF10/20D075P



MF10D075P For ECLB & B CASE PCB Bottom Layout

Components value:

Input Filter Module: MF10D075P/MF20D075P								
DC-DC	C1	C2	C3	C4, C5	CY1, CY3	CY2, CY4	BD1, BD2, BD3, BD4	CY5, CY6
CQB50W8-36S24	220uF/100V	0.47uF/100V	47uF/100V	10uF/100V	0.01uF/3KV	4700pF/3KV	Bead Core	0.068uF/350Vac
CQB75W8-36S24								
CEB100W-24S24-F								
ECLB60W-24D12								
ECLB75W-24D12								
CQB150W-24S24								

Note:

1. C1: NIPPON CHEMI-CON URZ Series aluminum capacitor or equivalent
2. C2: 1206 MLCC Capacitor
3. C4, C5: 1206 MLCC Capacitor
4. CY1, CY2: 1812 MLCC Capacitor
5. CY3, CY4: 1808 MLCC Capacitor
6. CY5/CY6: TDK Y2 DIP capacitor or equivalent
7. C3: NIPPON CHEMI-CON UVY Series aluminum capacitor or equivalent
8. BD1, BD2, BD3, BD4: HFZ3216PF-121T60, TAI-TECH



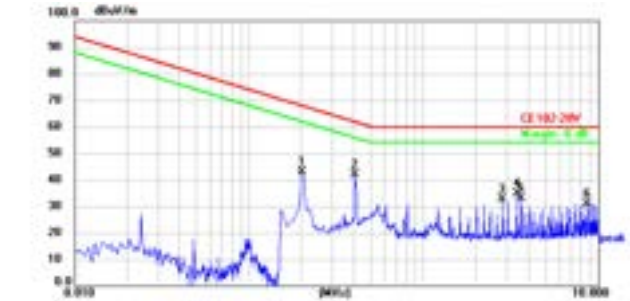
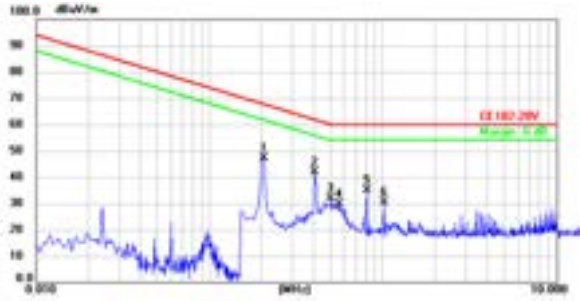
MF10/20D075P

Conducted Emission:

1. MF10D075P

EMI Conducted MIL-STD-461 CE102 of CQB50W8-36S24
Line

Neutral

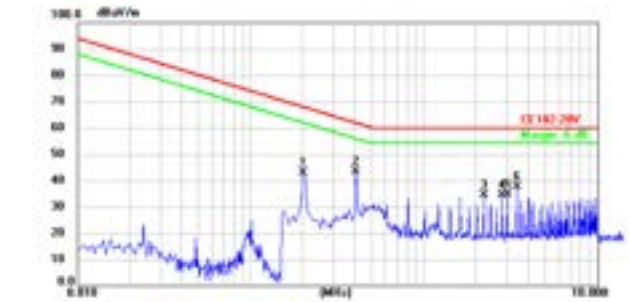
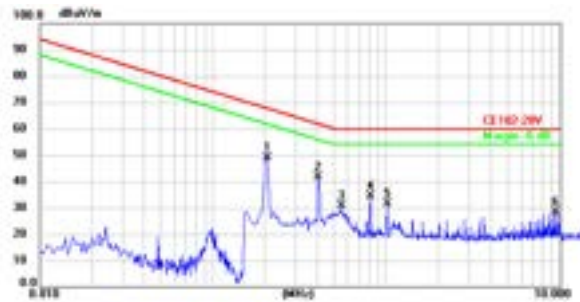


Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: L
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: M
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

EMI Conducted MIL-STD-461 CE102 of CQB75W8-36S24
Line

Neutral

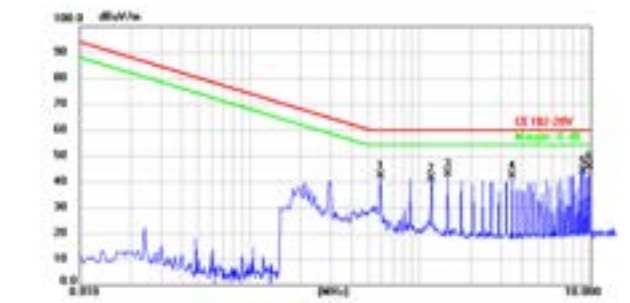
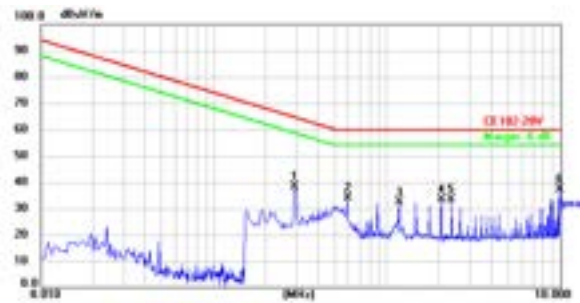


Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: L
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: N
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

EMI Conducted MIL-STD-461 CE102 of CEB100W-24S24-F
Line

Neutral



Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: L
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

Site LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: N
Power: 0.02W
Distance: 3m
Temperature: 20 C
Humidity: 54%

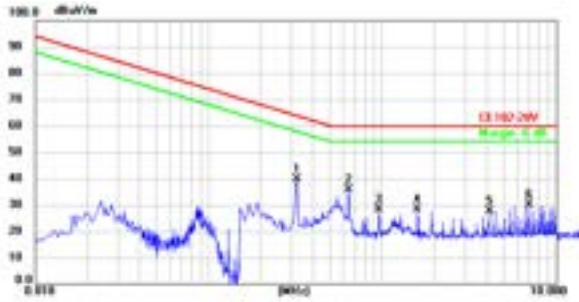


MF10/20D075P

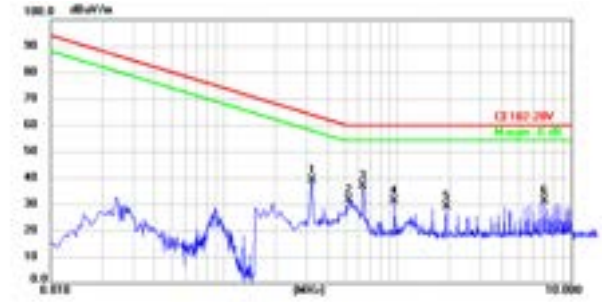
EMI Conducted MIL-STD-461 CE102 of ECLB60W-24D12

Line

Neutral



Site: LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: L
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %

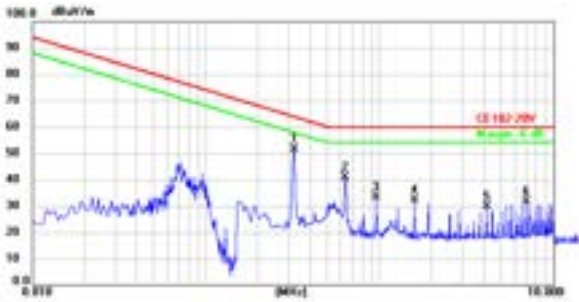


Site: LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: N
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %

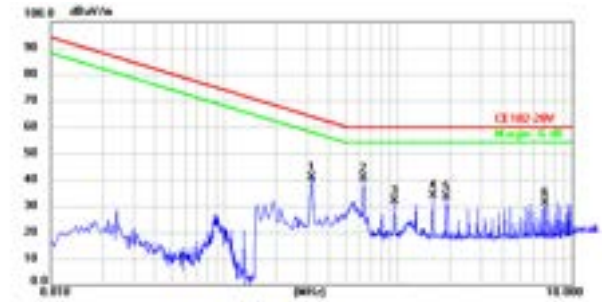
EMI Conducted MIL-STD-461 CE102 of ECLB75W-24D12

Line

Neutral



Site: LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: L
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %



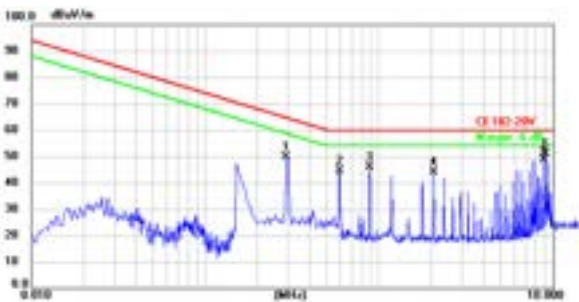
Site: LAB
Limit: CE102-20V
EUT: MF10D075P
Polarization: N
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %

2. MF20D075P

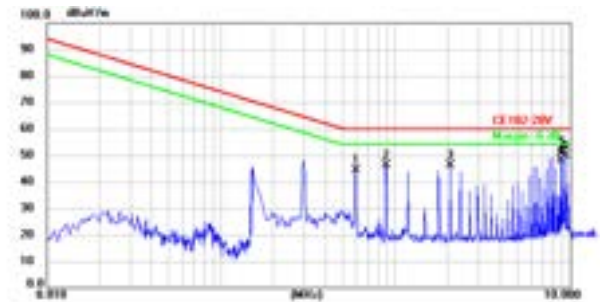
EMI Conducted MIL-STD-461 CE102 of CQB150W-24S24

Line

Neutral



Site: LAB
Limit: CE102-20V
EUT: MF20D075P
Polarization: L
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %



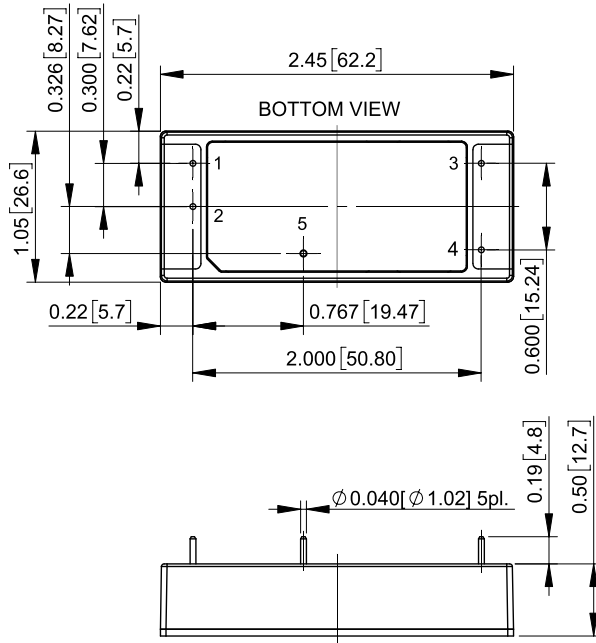
Site: LAB
Limit: CE102-20V
EUT: MF20D075P
Polarization: N
Power: DC20V
Distance: 3m
Temperature: 20 C
Humidity: 54 %



MF10/20D075P

MECHANICAL SPECIFICATION

MF10D075P



All Dimensions in Inches[mm]

Tolerance Inches: x.xx=±0.02, x.xxx=±0.010

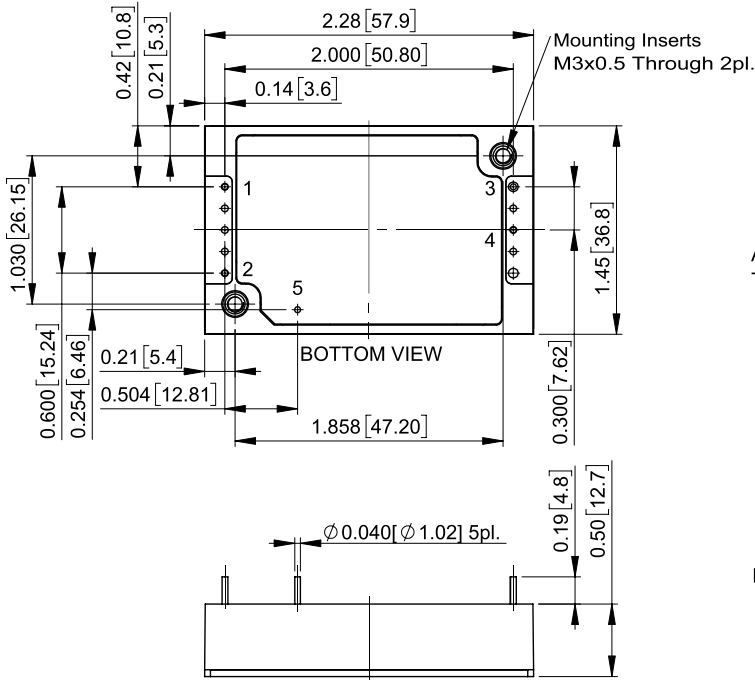
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

Pin	Function
1	-V Input
2	+V Input
3	-V Output
4	+V Output
5	CASE

Note: Pin Size is $\phi 0.04 \pm 0.004$ Inch [$\phi 1.0 \pm 0.1$ mm]

MF20D075P



All Dimensions in Inches[mm]

Tolerance Inches: x.xx=±0.02, x.xxx=±0.010

Millimeters: x.x=±0.5, x.xx=±0.25

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