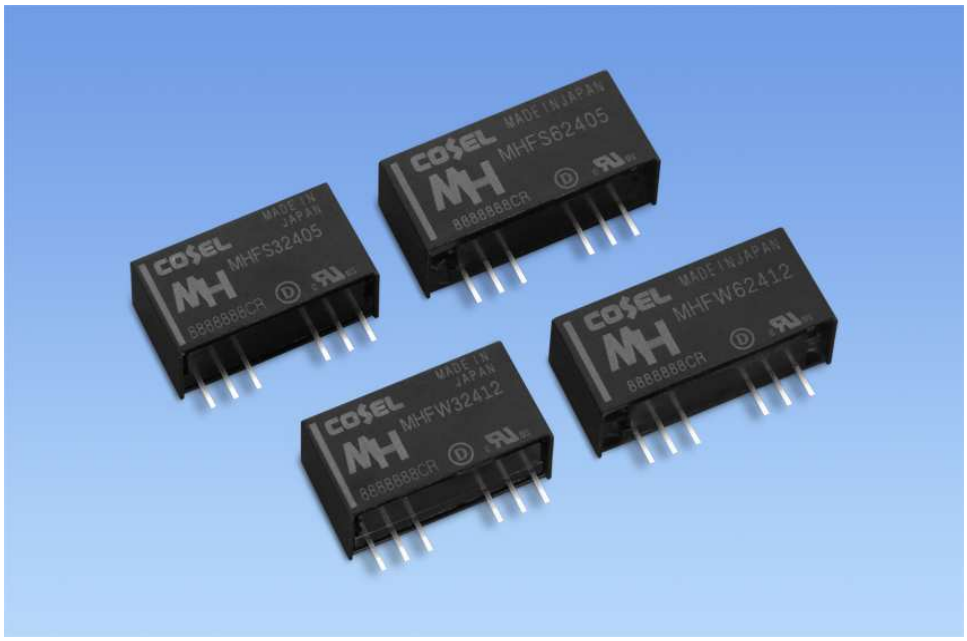
COSEL

Applications Manual for MH series



Ver.2.2E 2024.3.28

MH series

1. Part name description

MHF	□	□	□	□
①	②	③	④	⑤

① Series name
MHF : MH Series

② Output specification
S : Single output
W : Dual outputs

③ Output wattage
3 : 3W type
6 : 6W type

④ Input voltage
12 : 4.5 - 18 VDC
24 : 9 - 36 VDC
48 : 18 - 76 VDC

⑤ Output voltage
MHFS
3R3 : +3.3V
05 : +5V
09 : +9V
12 : +12V
15 : +15V

MHFW
12 : ±12V(+24V)
15 : ±15V(+30V)

2. Connection method for standard use

2.1 Connection for standard use

Fig.2.1.1
Connection circuit
for MHFS□

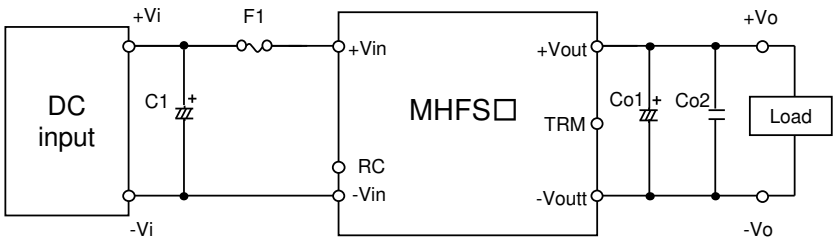


Table 2.1.1
Parts name
for MHFS3

No.	Symbol	MHFS3		
		Model name	Rating	Parts name
1	F1	MHFS312□	3.15A	KMS32
		MHFS324□	2.0A	KMS20
		MHFS348□	1.6A	KMS16
2	C1	MHFS312□	50V 100μF	ELXZ500E□□101MH12D
		MHFS324□	50V 47μF	ELXZ500E□□470MFB5D
		MHFS348□	100V 33μF	UPW2A330MPD □
3	Co1	MHFS3□3R3	25V 220μF	ELXZ250E□□221MH12D
		MHFS3□05	25V 220μF	ELXZ250E□□221MH12D
		MHFS3□09	50V 100μF	ELXZ500E□□101MH12D
		MHFS3□12	50V 100μF	ELXZ500E□□101MH12D
		MHFS3□15	50V 100μF	ELXZ500E□□101MH12D
4	Co2	ALL	25V 22μF	GRM32ER71E226K

※or equivalent

Table 2.1.2
Parts name
for MHFS6

No.	Symbol	MHFS6		
		Model name	Rating	Parts name
1	F1	MHFS612□	5.0A	KMS50
		MHFS624□	2.5A	KMS25
		MHFS648□	2.0A	KMS20
2	C1	MHFS612□	50V 100μF	ELXZ500E□□101MH12D
		MHFS624□	50V 47μF	ELXZ500E□□470MFB5D
		MHFS648□	100V 33μF	UPW2A330MPD □
3	Co1	MHFS6□3R3	25V 220μF	ELXZ250E□□221MH12D
		MHFS6□05	25V 220μF	ELXZ250E□□221MH12D
		MHFS6□09	50V 100μF	ELXZ500E□□101MH12D
		MHFS6□12	50V 100μF	ELXZ500E□□101MH12D
		MHFS6□15	50V 100μF	ELXZ500E□□101MH12D
4	Co2	ALL	25V 22μF	GRM32ER71E226K

※or equivalent

Fig.2.1.2
Connection circuit
for MHFW□

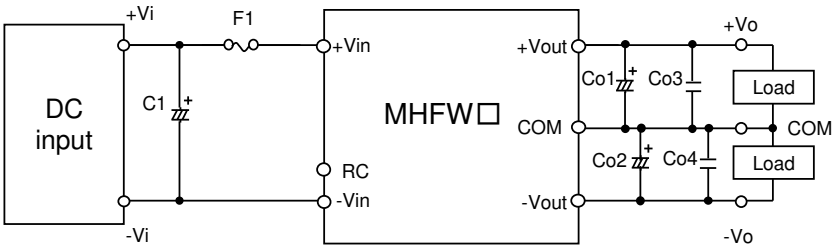


Table 2.1.3
Parts name
for MHFW3

No.	Symbol	MHFW3		
		Model name	Rating	Parts name
1	F1	MHFW312□	3.15A	KMS32
		MHFW324□	2.0A	KMS20
		MHFW348□	1.6A	KMS16
2	C1	MHFW312□	50V 100μF	ELXZ500E□□101MH12D
		MHFW324□	50V 47μF	ELXZ500E□□470MFB5D
		MHFW348□	100V 33μF	UPW2A330MPD □
3	Co1 , Co2	ALL	50V 100μF	ELXZ500E□□101MH12D
4	Co3 , Co4	ALL	25V 22μF	GRM32ER71E226K

※or equivalent

Table 2.1.4
Parts name
for MHFW6

No.	Symbol	MHFW6		
		Model name	Rating	Parts name
1	F1	MHFW612□	5.0A	KMS50
		MHFW624□	2.5A	KMS25
		MHFW648□	2.0A	KMS20
2	C1	MHFW612□	50V 100μF	ELXZ500E□□101MH12D
		MHFW624□	50V 47μF	ELXZ500E□□470MFB5D
		MHFW648□	100V 33μF	UPW2A330MPD □
3	Co1 , Co2	ALL	50V 100μF	ELXZ500E□□101MH12D
4	Co3 , Co4	ALL	25V 22μF	GRM32ER71E226K

※or equivalent

2.2 Wiring input pin

(1) External fuse :F1

- Fuse is not built-in on input side. In order to protect the unit, install the normal-brow type fuse on +Vin of the input side.
- When the input voltage from a front end unit is supplied to multiple unit, install the normal-brow type fuse on input side of the each unit.

Table 2.2.1 Recommend fuse

Model / Model name	MH3	MH6
MHF□□12□	3.15A	5.0A
MHF□□24□	2.0A	2.5A
MHF□□48□	1.6A	2.0A

(2)External capacitor on the input side : Ci (MHFS□･･･C1, MHFW□･･･C1)

- Table 2.2.2 shows the recommended capacitance of external capacitor on the input side.
- Adding a capacitor Ci near the input pin terminal and reduce reflected input noise from a converter.
- When you use a capacitor Ci, please use the one with high frequency and good temperature characteristics.
- If the power supply is to be turned ON/OFF directly with a switch, inductance from the input line will induce a surge voltage several times that of the input voltage and it may damage the power supply. Make sure that the surge is absorbed, for example, by connecting an electrolytic capacitor between the input pins.
- If an external filter containing L (inductance) is added to the input line, or a wire from the input source to the DC-DC converter is long, not only the reflected input noise becomes large, but also the output of the converter may become unstable. In such case, connecting Ci to the input pin terminal is recommended.
- If you use an aluminum electrolytic capacitor, please pay attention to its ripple current rating.
- Please adjust the capacitance in light of the effect you want to achieve.

Table 2.2.2 Recommend external capacitor on the input side : Ci

Model / Model name	MH3	MH6
MHF□□12□	10 - 220 [μF]	10 - 220 [μF]
MHF□□24□	10 - 100 [μF]	10 - 100 [μF]
MHF□□48□	10 - 47 [μF]	10 - 47 [μF]

2.3 Wiring output pin

(1)External capacitor on the output side : Co (MHFS□･･･Co1, MHFW□･･･Co1,Co2)

- Table 2.3.1 shows the recommended capacitance of external capacitor on the output side.
- In order to reduce the output ripple noise, connect the capacitor to the output side.
- If you use a ceramic capacitor, keep the capacitance within the range between about 0.1uF to 22uF.
- Please adjust the capacitance in light of the effect you want to achieve.

Table 2.3.1 Recommend external capacitor on the output side : Co

Model / Output Voltage[V]	MH3	MH6
3.3	0 - 220 [μF]	0 - 220 [μF]
5	0 - 220 [μF]	0 - 220 [μF]
9	0 - 100 [μF]	0 - 100 [μF]
12	0 - 100 [μF]	0 - 100 [μF]
15	0 - 100 [μF]	0 - 100 [μF]
±12	0 - 100 [μF]	0 - 100 [μF]
±15	0 - 100 [μF]	0 - 100 [μF]

2.4 Output voltage adjustment range (Only MHFS□)

- The output voltage is adjustable by an external potentiometer.
- To increase the output voltage, turn the potentiometer so that the resistance value between 2 and 3 becomes small.
- Please use a wire as short as possible to connect to the potentiometer and connect it from the pin on the power supply side.
  Temperature coefficient deteriorates when some types of resistors and potentiometers are used.
  Please use the follwing types.
- Resistor : Metal Film Type, Temperature Coefficient of ±100ppm/℃ or below
  Potentiometer : Cermet Type, Temperature Coefficient of ±300ppm/℃ or below
- When the output voltage adjustment is used, note that the output may be stopped when output voltage is set too high.

Fig.2.4.1
Connecting of
External Devices

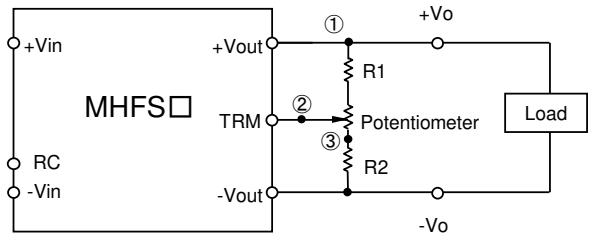
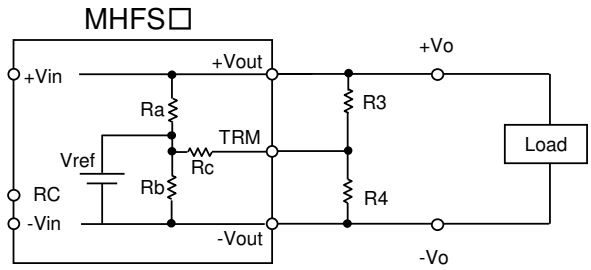


Table 2.4.1
Constant of
External Devices

Output Voltage		Constant of External Devices [Ω]		
		Potentiometer	R1	R2
3.3V (-5%, +10%)		1k	680	150
5V (-5%, +20%)	MH3	1k	330	33
	MH6	1k	2.2k	220
9V (-5%, +20%)		5k	6.8k	680
12V (-5%, +20%)		5k	12k	1.2k
15V (-5%, +20%)		5k	12k	220

- Output voltage can be set with R3 and R4, as shown in Fig.2.4.2.
- When setting the output voltage by R3 and R4, consider the output voltage setting accuracy due to individual product differences. (ex. MHFS31205:4.90-5.21[V])

Fig.2.4.2
Connecting of
External Devices



$$Vo = \frac{(1/Ra+1/Rb+1/Rc)-(1/Rc)^2 \times (1/Rc+1/R3+1/R4)^{-1}}{(1/Ra)+(1/Rc) \times (1/R3) \times (1/Rc+1/R3+1/R4)^{-1}} \times Vref$$

Table2.4.2
Value of
internal parts

OutputVoltage	Value of internal parts [Reference]			
	Ra [Ω]	Rb [Ω]	Rc [Ω]	Vref [V]
3.3V (MHFS□□3R3)	3.69k	2.2k	8.2k	1.240
5V (MHFS3□05)	2.247k	2.2k	4.7k	2.495
5V (MHFS6□05)	6.8k	2.2k	4.7k	1.240
9V (MHFS□□09)	5.78k	2.2k	4.7k	2.495
12V (MHFS□□12)	8.42k	2.2k	3.3k	2.495
15V (MHFS□□15)	11.1k	2.2k	6.8k	2.495

- The output voltage can be set by applying a voltage to the TRM pin, as shown in Fig.2.4.3.
- When changing the output voltage, apply the voltage shown in Fig. 2.4.4.
- Avoid settings outside the output voltage adjustment range. The output voltage may become unstable or malfunction.
- Make sure that the wiring to the TRM terminal is not affected by noise.

Fig.2.4.3
Example
Circuit of connect

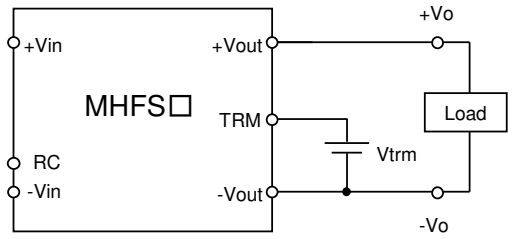
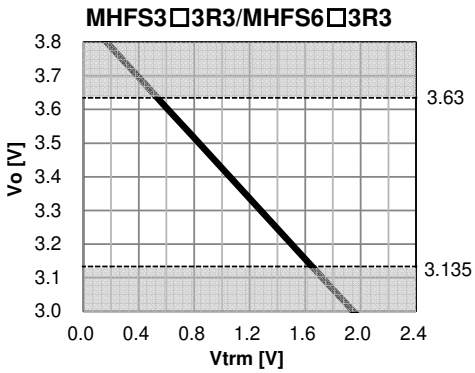
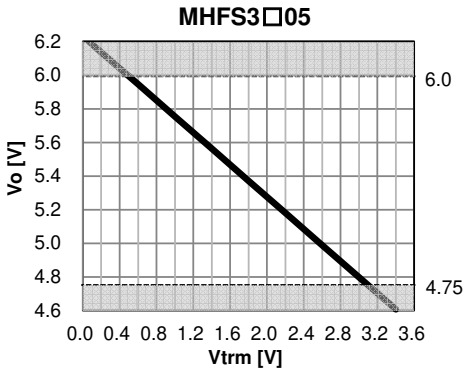
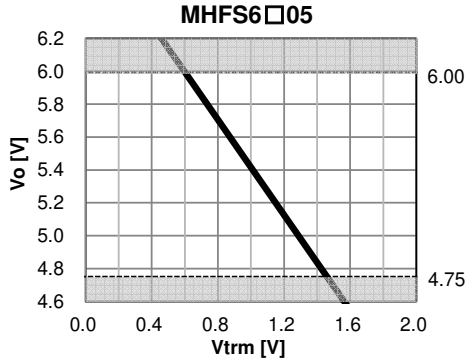
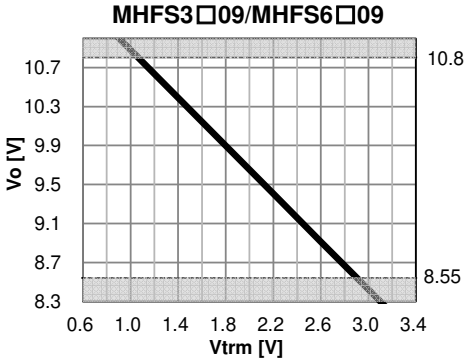


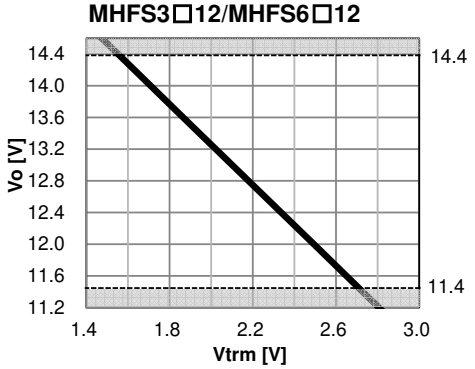
Fig.2.4.4
TRM pin applied voltage
(Reference)

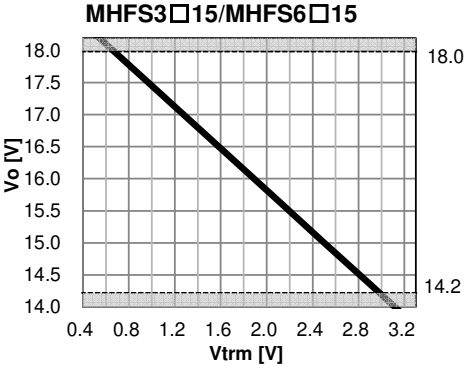












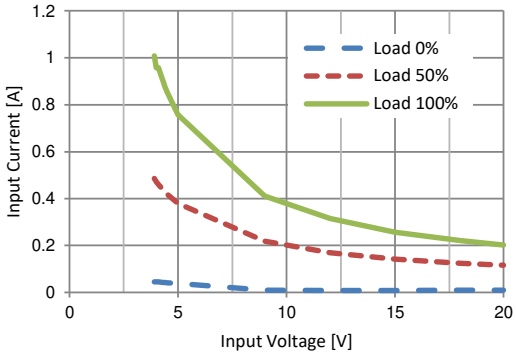
: Out of specification

2.5 Input voltage / Current range

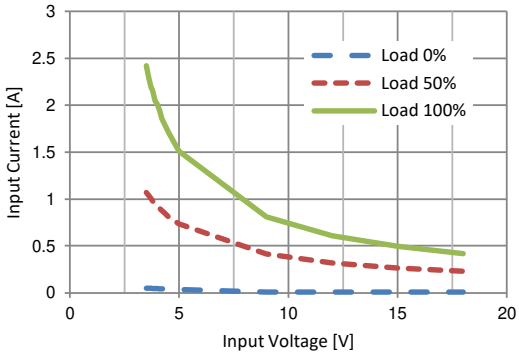
- If you use a non-regulated power source for input, please check and make sure that its voltage fluctuation range and ripple voltage do not exceed the input voltage range shown in specifications.
- Please select an input power source with enough capacity, taking into consideration of the start-up current (Ip), which flows when a DC-DC converter starts up.

Fig.2.5.1
Input current
(Reference)

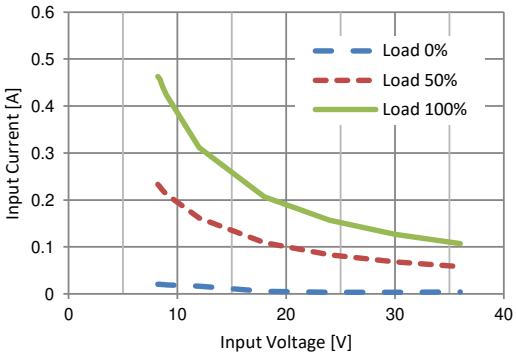
MHF□312□



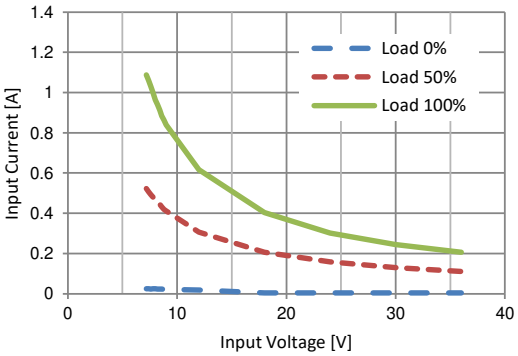
MHF□612□



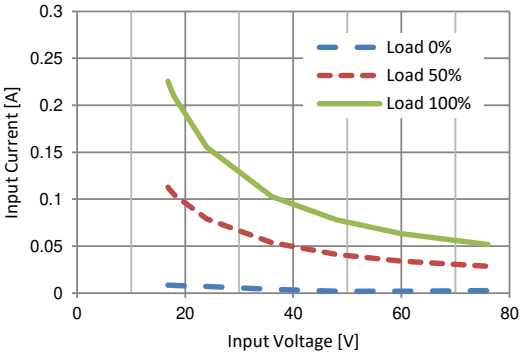
MHF□324□



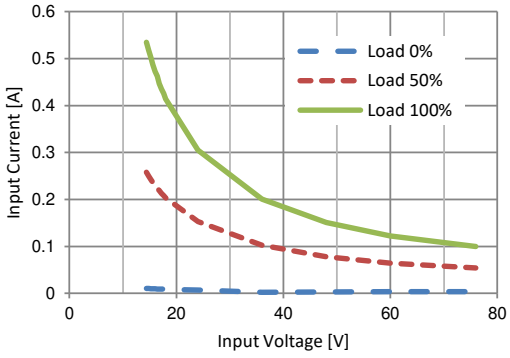
MHF□624□



MHF□348□



MHF□648□

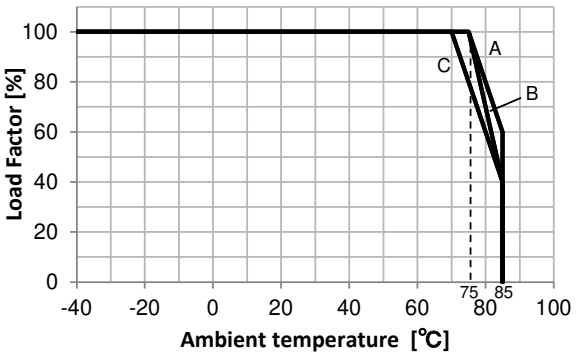


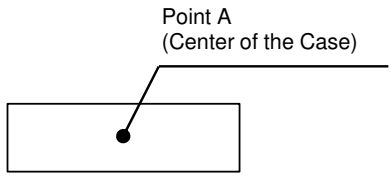
3. Derating

3.1 Ambient temperature Derating(MH3)

- Please use it when the ambient temperature of the power supply is less than the derating value shown in Fig. 3.1.1.
- Make sure that the temperature at point A does not exceed 105 ℃.
- In case of forced air, ventilation must keep the temperature at point A does not exceed 105 ℃.

Fig.3.1.1
Ambient temperature
Derating
(Reference)

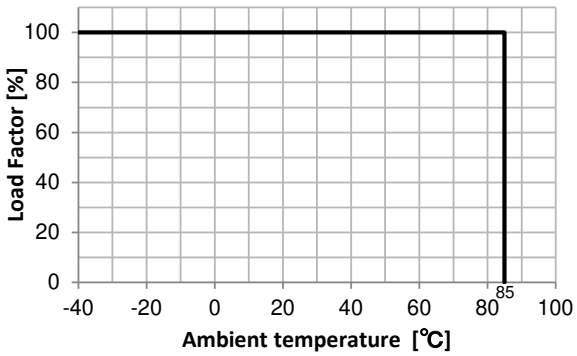


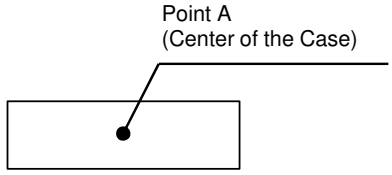


Temperature measuring point (Top view)

In the case of convection cooling (Reference)

Output Voltage[V] / Model name[V]	3.3	5	9	12	15	±12	±15
MHF□312□	B	B	A	A	A	C	C
MHF□324□	A	B	B	B	B	C	C
MHF□348□	A	B	A	A	B	C	C



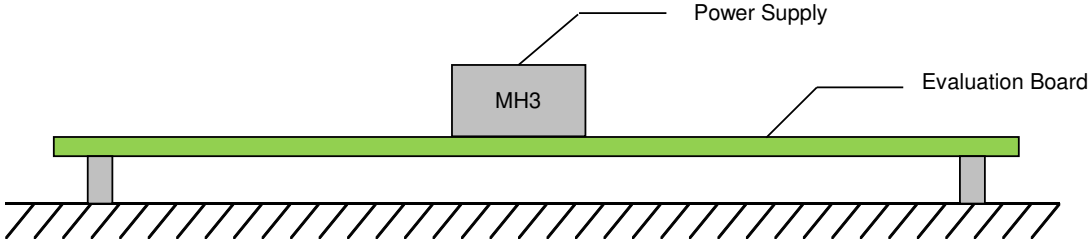


Temperature measuring point (Top view)

In the case of forced air cooling (1.0m/s) (Reference)

- Indicates evaluation board under our temperature measurement environment.
  It depends on the installation environment, so please refer to it.
  Please confirm the case top surface point A temperature with a real machine.

Fig.3.1.2
Evaluation board
(Reference)

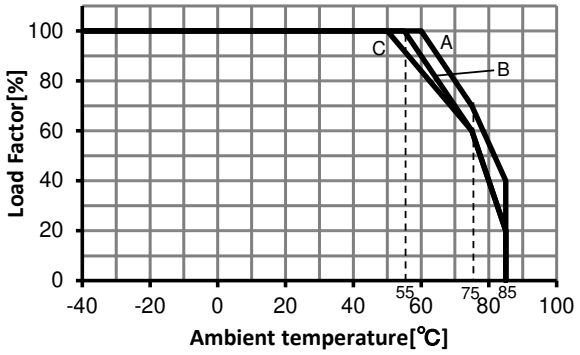


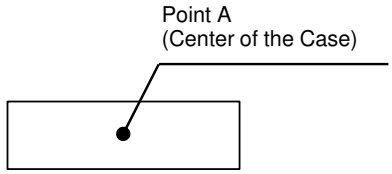
Evaluation board information Size 150 mm x 50 mm , Board thickness t = 1.6 mm
[5.91 inches x 1.97 inches , Board thickness t = 0.06 inches]
FR-4 (double-sided board), Copper foil thickness: 35 μm

3.2 Ambient temperature Derating(MH6)

- Please use it when the ambient temperature of the power supply is less than the derating value shown in Fig. 3.2.1.
- Make sure that the temperature at point A does not exceed 105 ℃.
- In case of forced air, ventilation must keep the temperature at point A does not exceed 105 ℃.

Fig.3.2.1
Ambient temperature
Derating
(Reference)

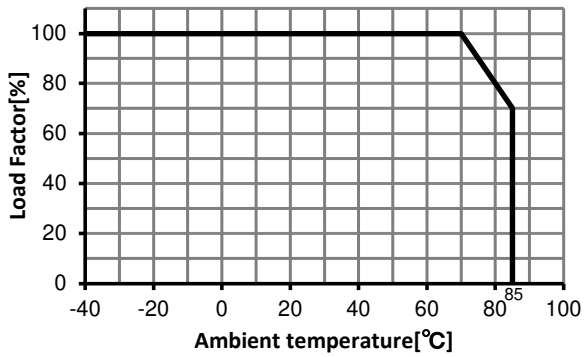


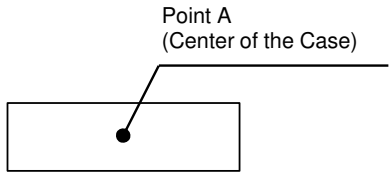


Temperature measuring point (Top view)

In the case of convection cooling (Reference)

Output Voltage[V] / Model name[V]	3.3	5	9	12	15	±12	±15
MHF□612□	C	C	B	B	B	B	B
MHF□624□	C	C	B	B	B	B	B
MHF□648□	B	B	A	A	A	A	A



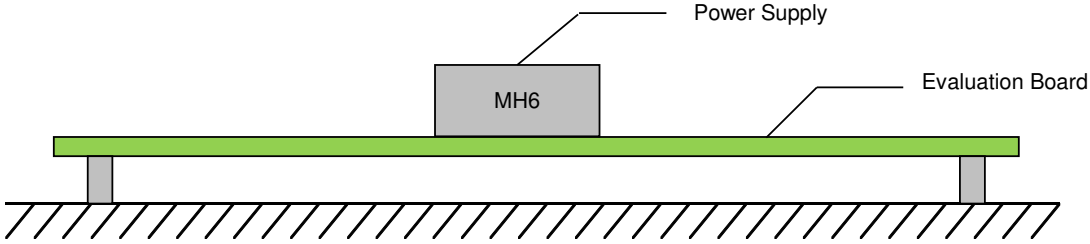


Temperature measuring point (Top view)

In the case of forced air cooling (1.0m/s) (Reference)

- Indicates evaluation board under our temperature measurement environment.
  It depends on the installation environment, so please refer to it.
  Please confirm the case top surface point A temperature with a real machine.

Fig.3.2.2
Evaluation board
(Reference)

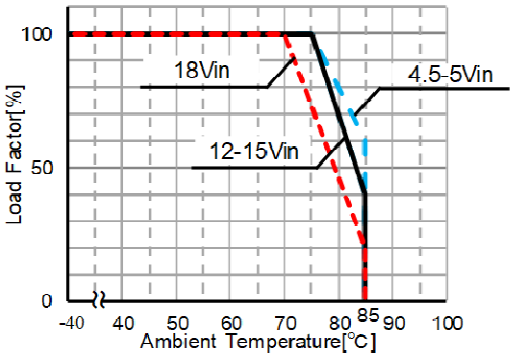


Evaluation board information Size 150 mm x 50 mm , Board thickness t = 1.6 mm
[5.91 inches x 1.97 inches , Board thickness t = 0.06 inches]
FR-4 (double-sided board), Copper foil thickness: 35 μm

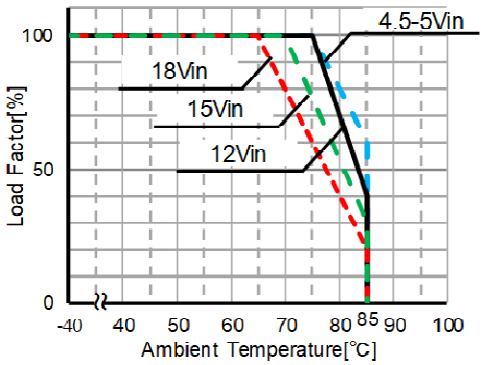
3.3 Ambient temperature derating by input voltage(MH3)

■ Ambient temperature derating by input voltage is shown.

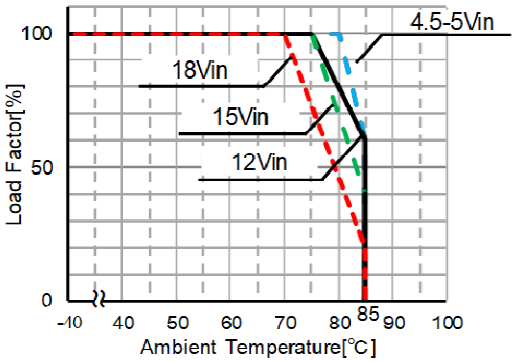
Fig.3.3.1 Derating of MHFS312□ (Reference)



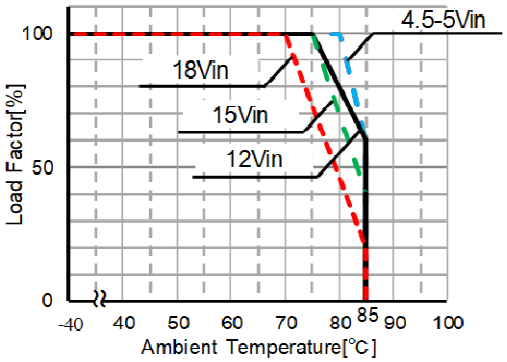
(1) MHFS3123R3



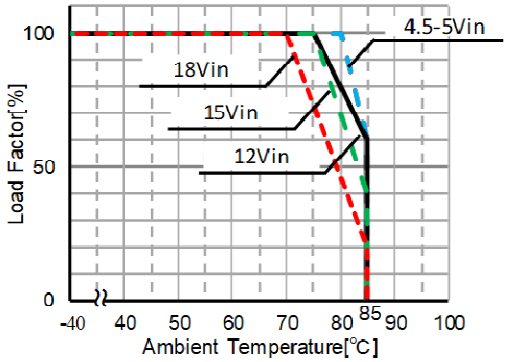
(2) MHFS31205



(3) MHFS31209

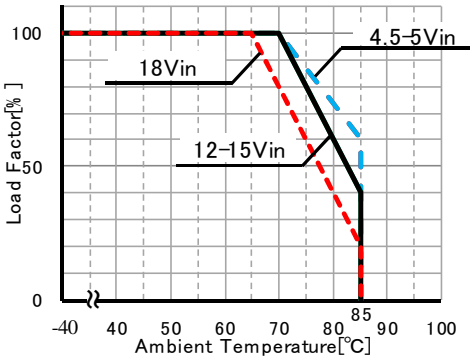


(4) MHFS31212

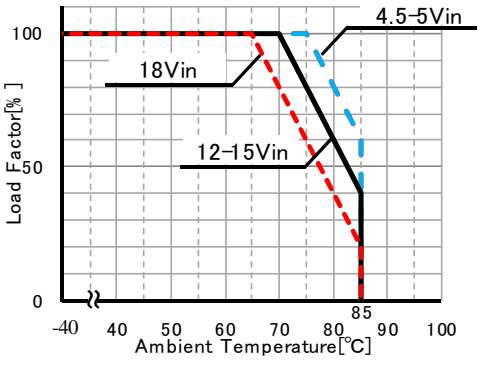


(5) MHFS31215

Fig.3.3.2 Derating of MHFW312□ (Reference)



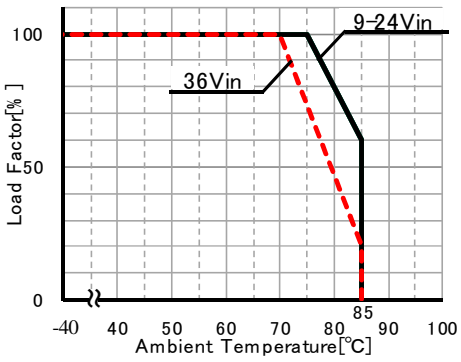
(1) MHFW31212



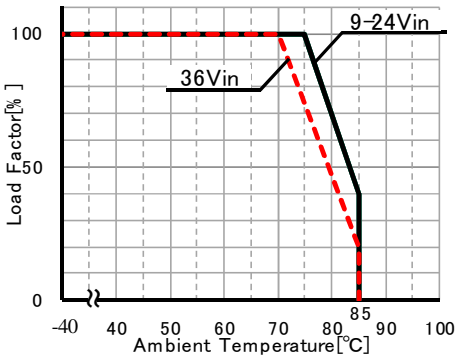
(2) MHFW31215

■ Ambient temperature derating by input voltage is shown.

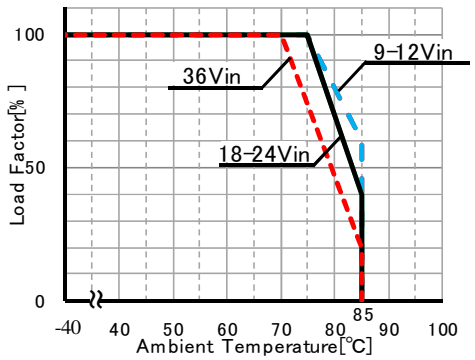
Fig.3.3.3
Derating of
MHFS324□
(Reference)



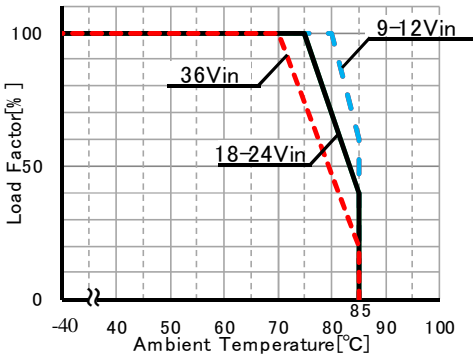
(1) MHFS3243R3



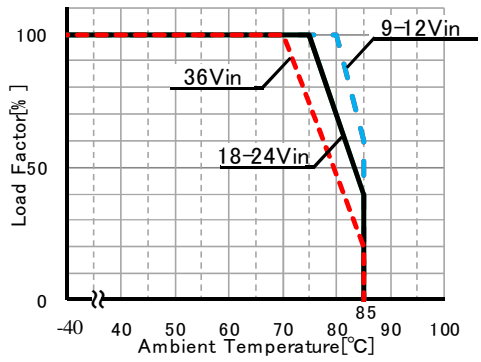
(2) MHFS32405



(3) MHFS32409

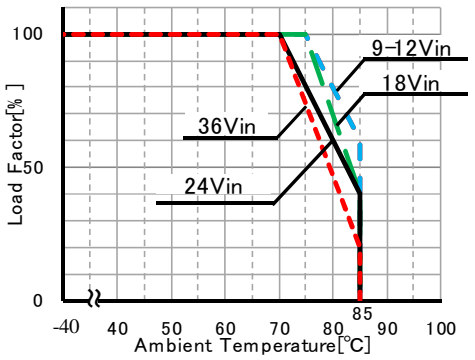


(4) MHFS32412

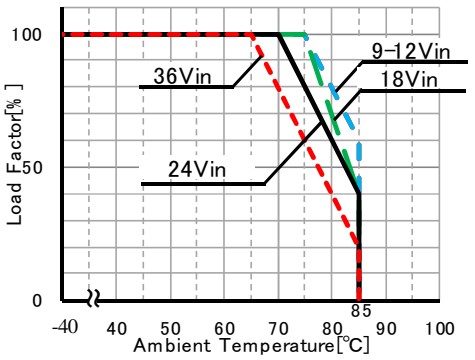


(5) MHFS32415

Fig.3.3.4
Derating of
MHFW324□
(Reference)



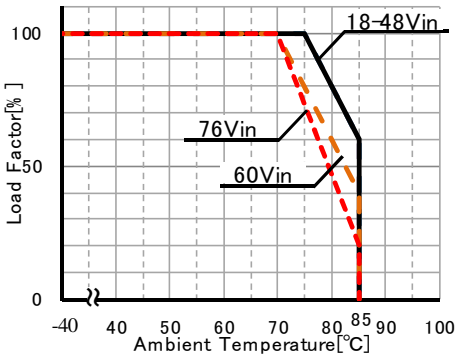
(1) MHFW32412



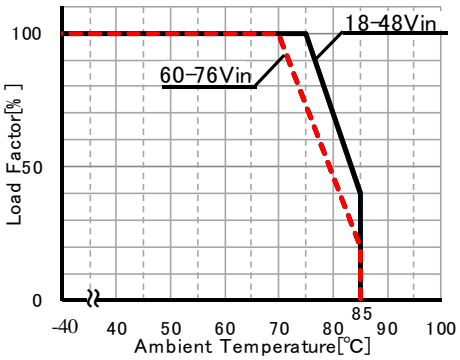
(2) MHFW32415

■ Ambient temperature derating by input voltage is shown.

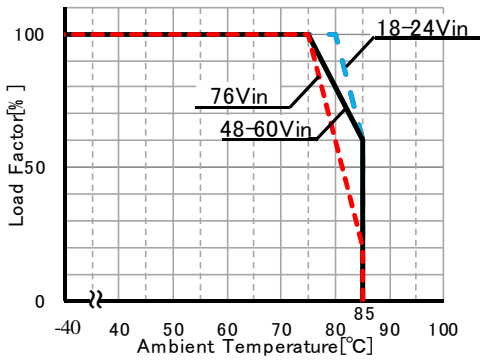
Fig.3.3.5
Derating of
MHFS348□
(Reference)



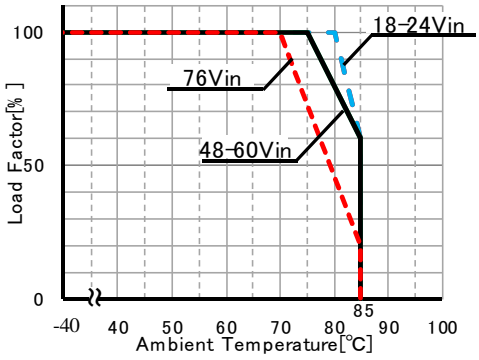
(1) MHFS3483R3



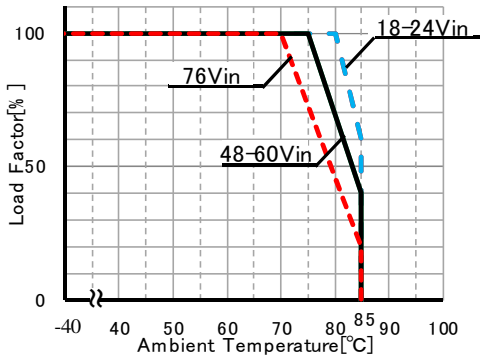
(2) MHFS34805



(3) MHFS34809

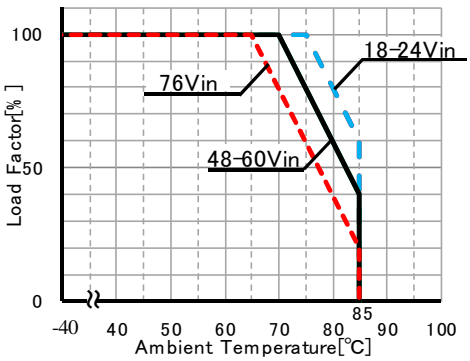


(4) MHFS34812

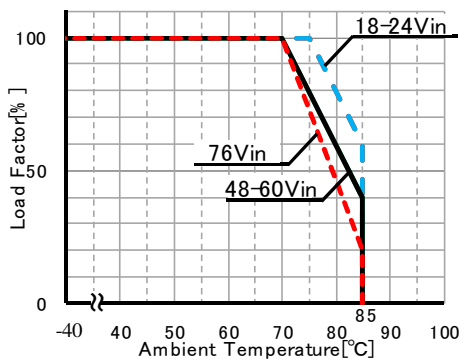


(5) MHFS34815

Fig.3.3.6
Derating of
MHFW348□
(Reference)



(1) MHFW34812

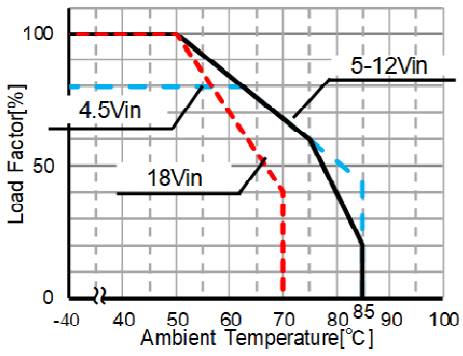


(2) MHFW34815

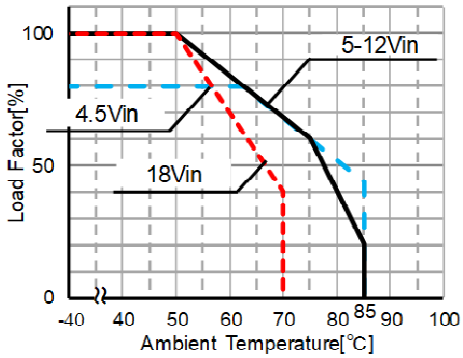
3.4 Ambient temperature derating by input voltage(MH6)

■ Ambient temperature derating by input voltage is shown.

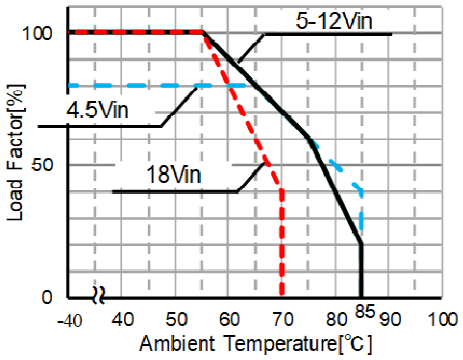
Fig.3.4.1 Derating of MHFS612□ (Reference)



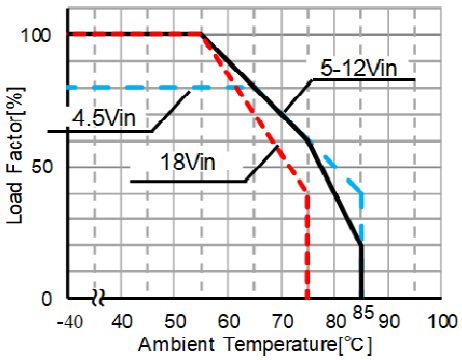
(1) MHFS6123R3



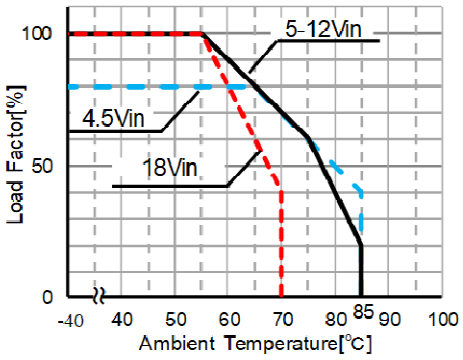
(2) MHFS61205



(3) MHFS61209

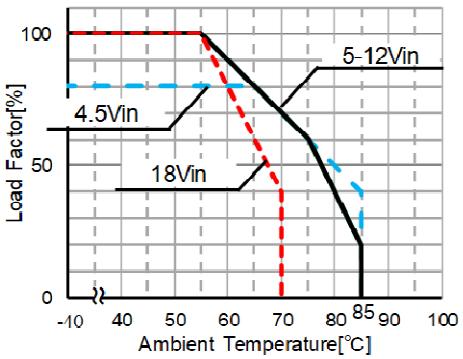


(4) MHFS61212

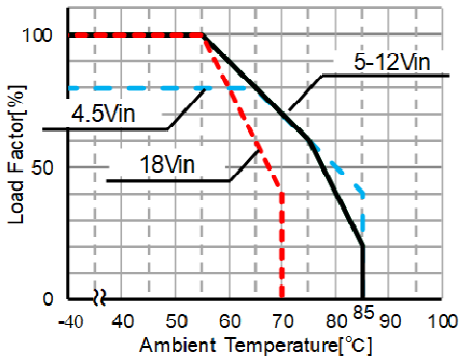


(5) MHFS61215

Fig.3.4.2 Derating of MHFW612□ (Reference)



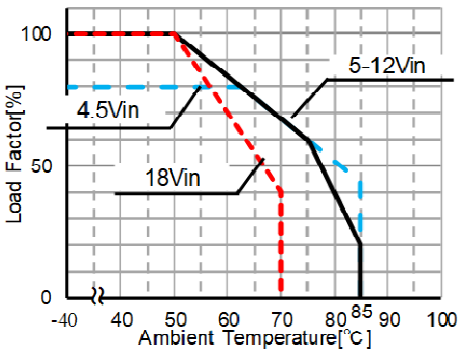
(1) MHFW61212



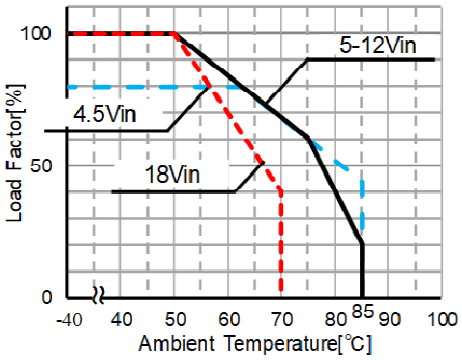
(2) MHFW61215

■ Ambient temperature derating by input voltage is shown.

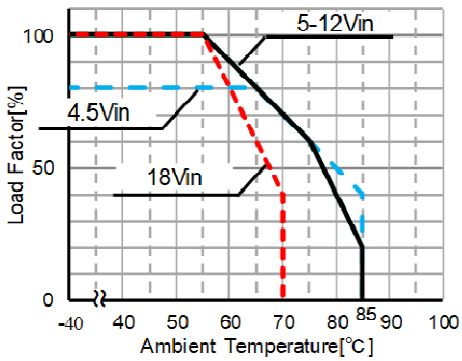
Fig.3.4.3
Derating of
MHFS624□
(Reference)



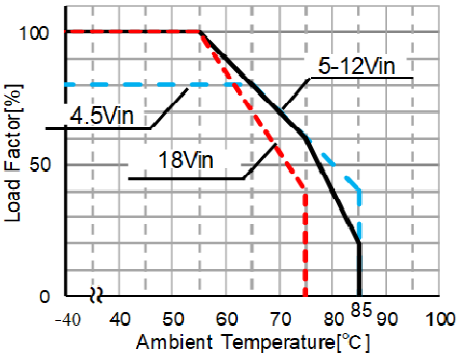
(1) MHFS6243R3



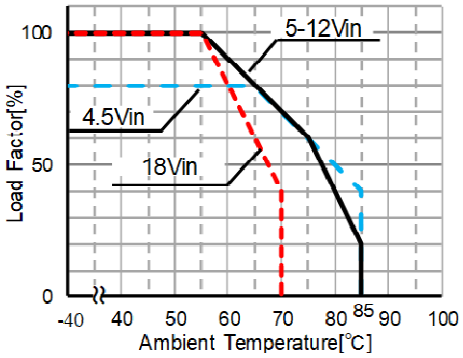
(2) MHFS62405



(3) MHFS62409

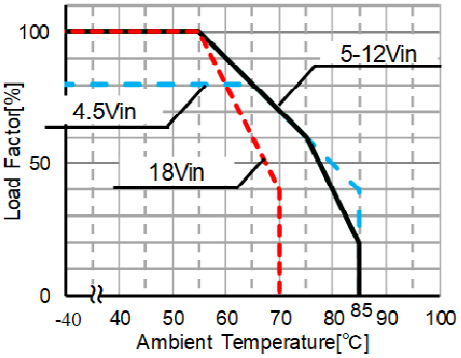


(4) MHFS62412

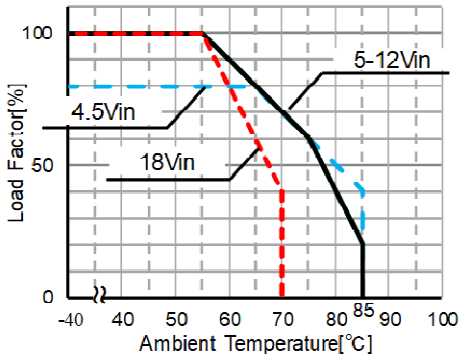


(5) MHFS62415

Fig.3.4.4
Derating of
MHFW624□
(Reference)



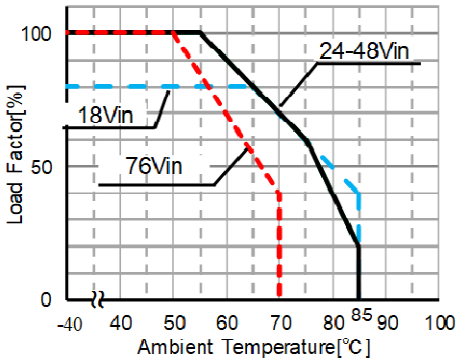
(1) MHFW62412



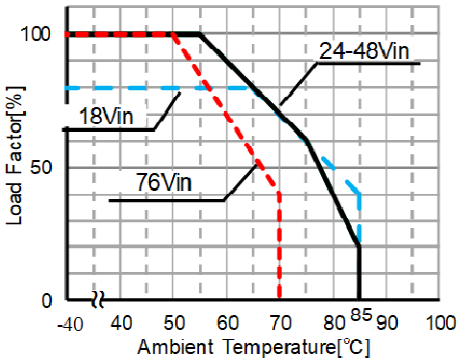
(2) MHFW62415

■ Ambient temperature derating by input voltage is shown.

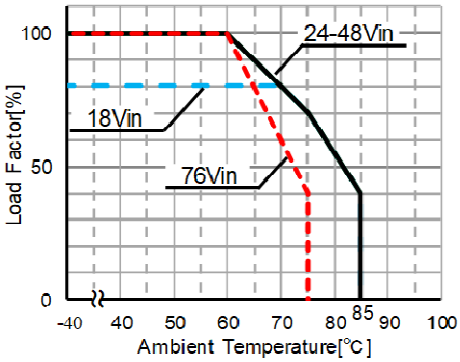
Fig.3.4.5
Derating of
MHFS648□
(Reference)



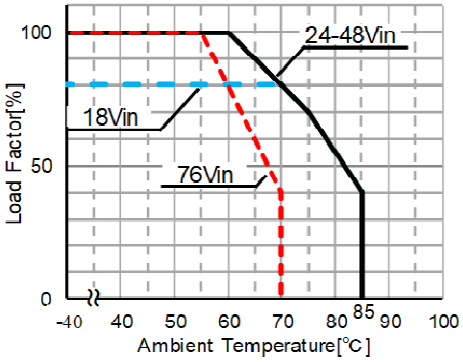
(1) MHFS6483R3



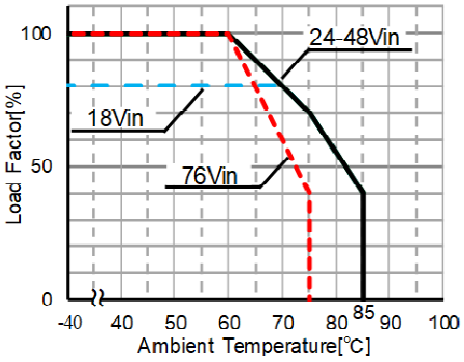
(2) MHFS64805



(3) MHFS64809

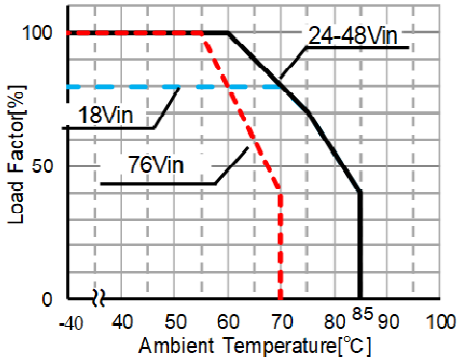


(4) MHFS64812

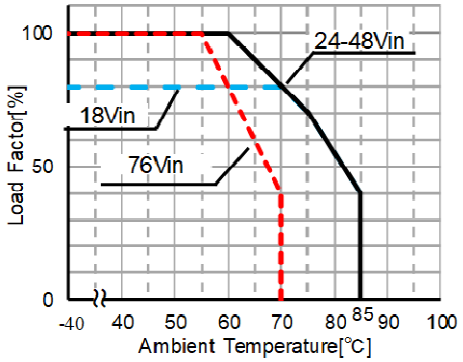


(5) MHFS64815

Fig.3.4.6
Derating of
MHFW648□
(Reference)



(1) MHFW64812



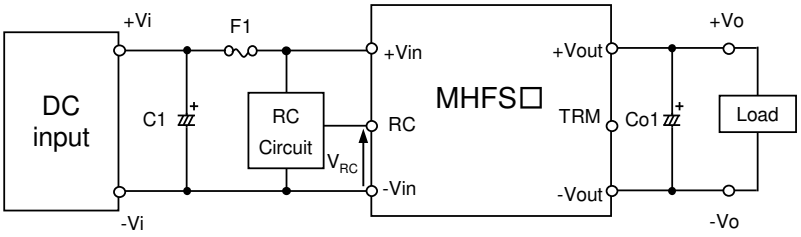
(2) MHFW64815

4. Remote ON/OFF

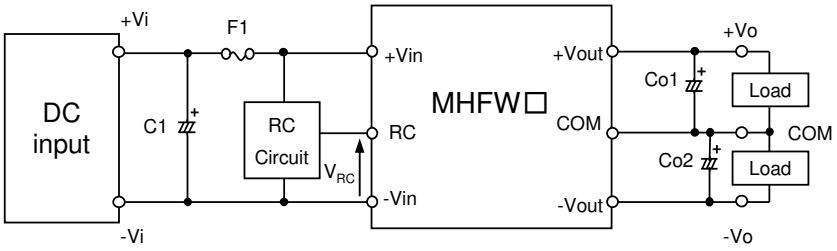
■ You can turn the power supply ON or OFF without turning input power ON or OFF through the pin terminal RC.

4.1 RC response time

Fig.4.1.1
Measurement circuit

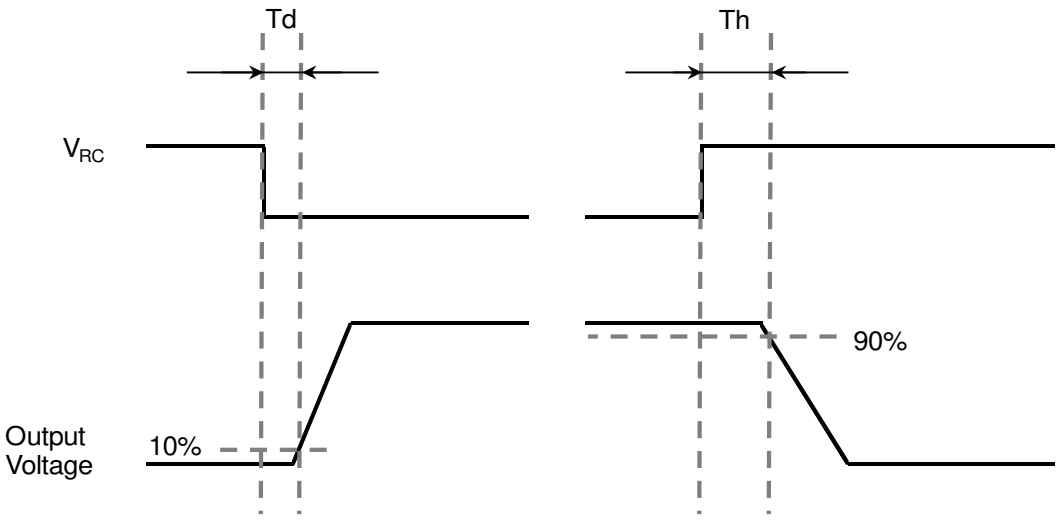


Input Voltage : Rated Input　　Load Current : Rated Load



Input Voltage : Rated Input　　Load Current : Rated Load

Fig.4.1.2
RC response time
(Reference)



MH3/MH6

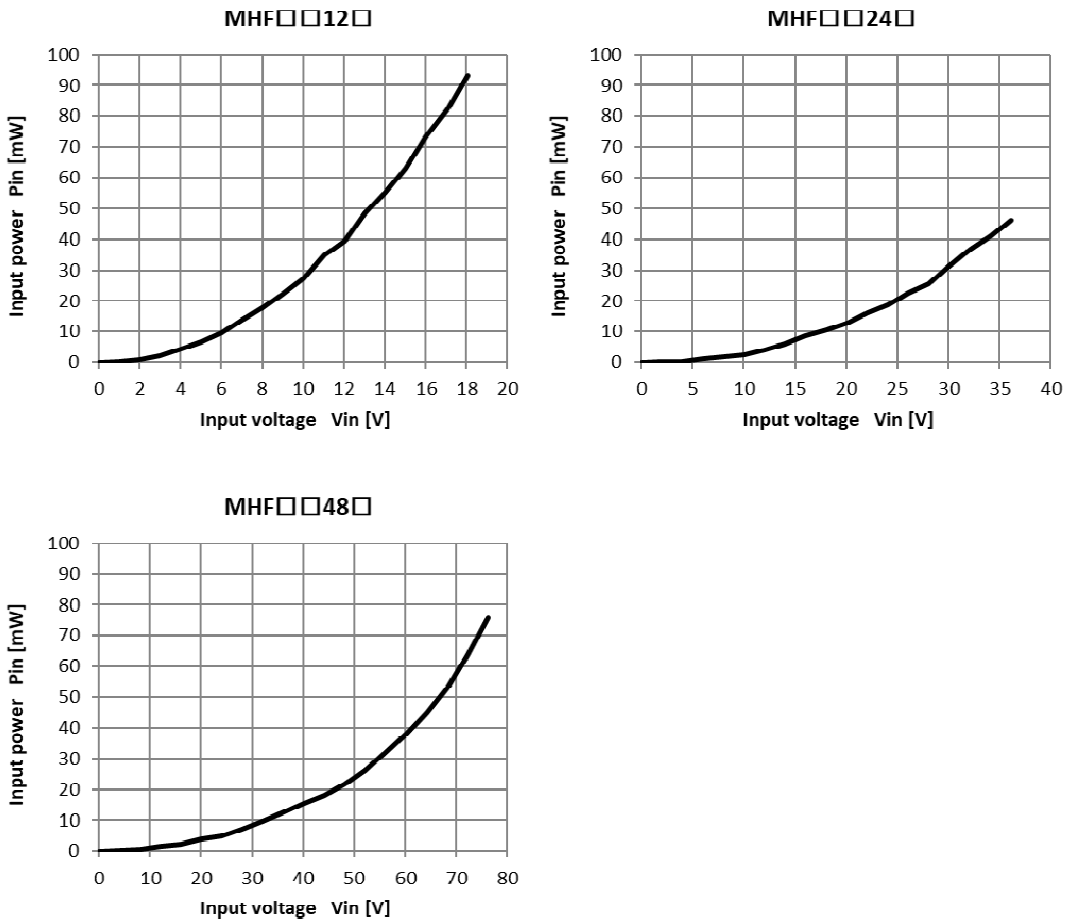
Td	Th
0.5 ms	0.8 ms

Reference data

4.2 RC-OFF standby power

■ Indicates the standby power when the output is stopped by remote control.

Fig.4.2.1
RC-OFF standby power
(Reference)

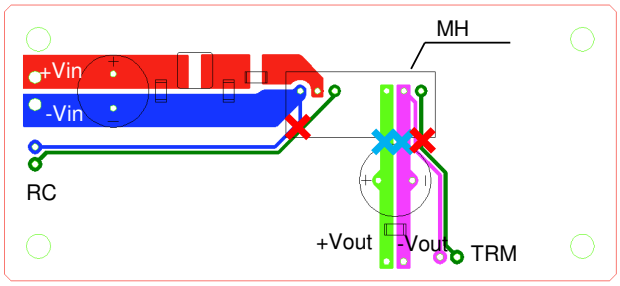


5.Board layout

5.1 Notes for measurement board layout

- When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation.
  Ambient temperature around each power supply should not exceed the temperature range shown in Derating.
- Avoid placing the DC input line pattern layout underneath the unit. It will increase the line conducted noise.
  Make sure to leave an ample distance between the line pattern layout and the unit.
  Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise.
  Lay out the pattern away from the unit.
- Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable.
  Lay out the pattern away from the unit.
- Please check the actual product when using it.

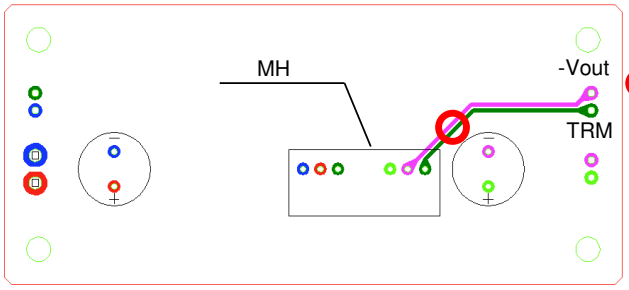
Fig.5.1.1
Example:
Not recommended
layout



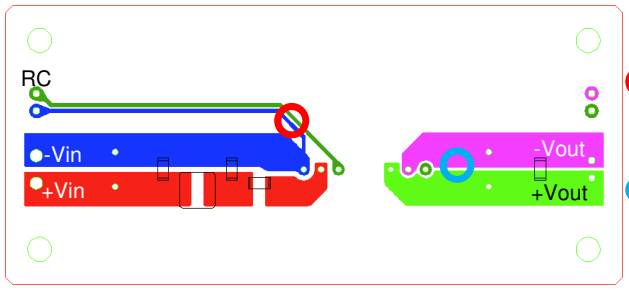
ex. Not recommended board layout for MHFS3 (Front side)

ex. Not recommended board layout for MHFS3 (Back side)

Fig.5.1.2
Example:
Recommended
layout



ex. Recommended boad layout for MHFS3 (Front side)

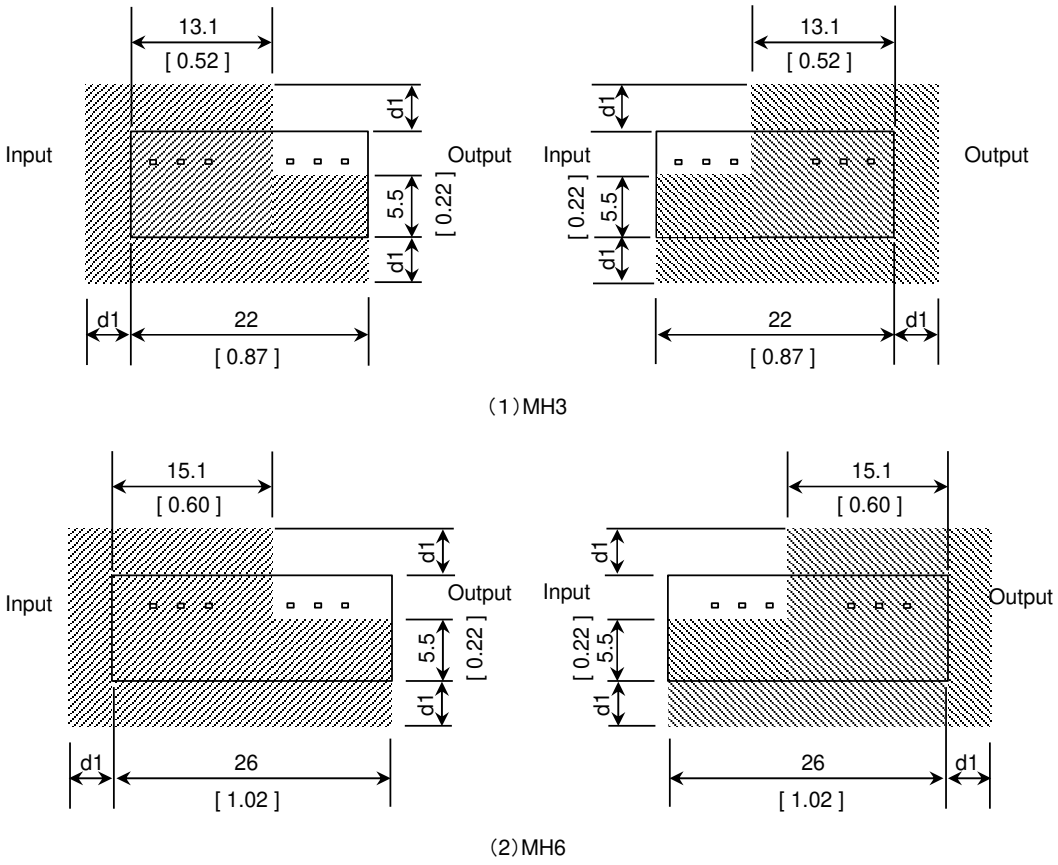


ex. Recommended boad layout for MHFS3 (Back side)

■ If the withstand voltage specification of this product is required, consider the input-output isolation distance when designing. Avoid pattern wiring to the shaded area in Fig. 5.1.3, as the surface on which the power supply of the mounting board is mounted may cause isolation failure between the input and output.
When wiring the pattern on the back side of the mounting board, keep the distance between the input and output 5 mm or more to ensure the isolation distance between input and output (see Fig. 5.1.4).

■ Please check the actual product when using it.

Fig.5.1.3
Notice
Isolation distance



(1) MH3

(2) MH6

Top view (Front side of circuit board)

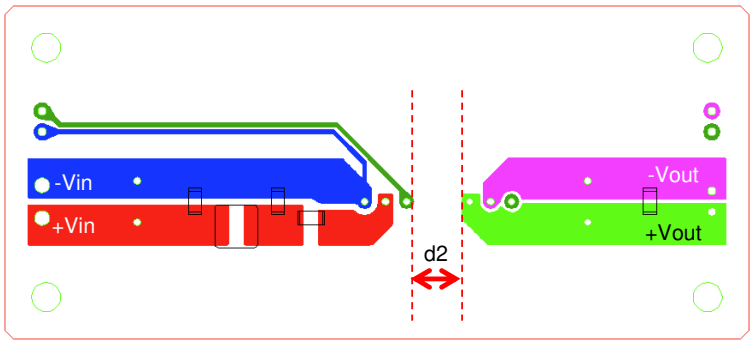
Output side pattern prohibited area

Input side pattern prohibited area

d1 = 4 mm min.
[0.16 inches]

Dimensions in mm.
[ ] = inches

Fig.5.1.4
Notice
Isolation distance



d2 = 5mm min.

[0.20 inches min.]

If isolation is required, ensure an isolation distance between input (+Vin,-Vin,RC) side and output (+Vout,-Vout,TRM,COM) side.

Back side of circuit board (ex. MHFS)

5.2 Measurement board layout (Example)

Fig.5.2.1
Recommended
circuit of connect
for MHFS□

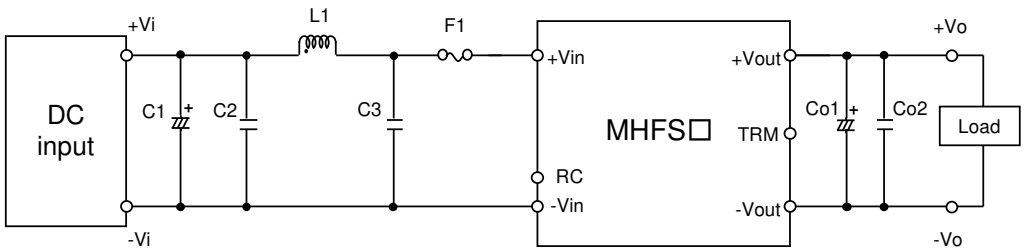
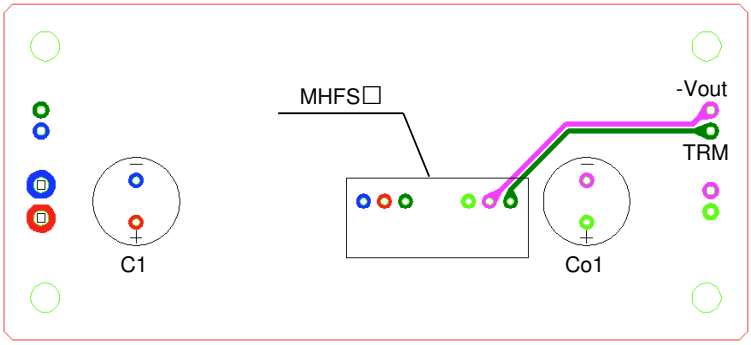
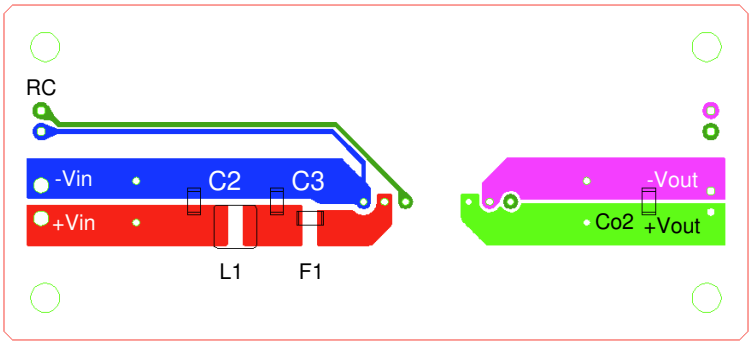


Fig.5.2.2
Measurement
board layout
for MHFS□



Front side（The model uses MH3）



Back side

Table 5.2.1
Parts name

No.	Symbol	Model name	MHFS3		MHFS6	
			Rating	Part name	Rating	Part name
1	F1	MHFS□12□	3.15A	KMS32	5.0A	KMS50
		MHFS□24□	2.0A	KMS20	2.5A	KMS25
		MHFS□48□	1.6A	KMS16	2.0A	KMS20
2	C1	MHFS□12□	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
		MHFS□24□	63V 68μF	ELXZ630E□□680MH12D	63V 68μF	ELXZ630E□□680MH12D
		MHFS□48□	100V 33μF	UPW2A330MPD □	100V 33μF	UPW2A330MPD □
3	C2,C3	MHFS□12□	25V 10μF	GRM31CR71E106K	25V 10μF	GRM31CR71E106K
		MHFS□24□	50V 4.7μF	GRM31CR71H475K	50V 4.7μF	GRM31CR71H475K
		MHFS□48□	100V 2.2μF	HMK316AC7225KL	100V 2.2μF	HMK316AC7225KL
4	L1	MHFS□12□	1200mA 4.7μH	LQH32PN4R7NN0	2600mA 2.2μH	LQH5BPN2R2NT0
		MHFS□24□	900mA 10μH	LQH32PN100MN0	1600mA 10μH	LQH5BPN100MT0
		MHFS□48□	550mA 22μH	LQH32PN220MN0	1050mA 22μH	LQH5BPN220MT0
8	Co1	MHFS□□3R3	25V 220μF	ELXZ250E□□221MH12D	25V 220μF	ELXZ250E□□221MH12D
		MHFS□□05	25V 220μF	ELXZ250E□□221MH12D	25V 220μF	ELXZ250E□□221MH12D
		MHFS□□09	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
		MHFS□□12	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
		MHFS□□15	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
7	Co2	ALL	25V 22μF	GRM32ER71E226K	25V 22μF	GRM32ER71E226K

Fig.5.2.3
Recommended
circuit of connect
for MHFW□

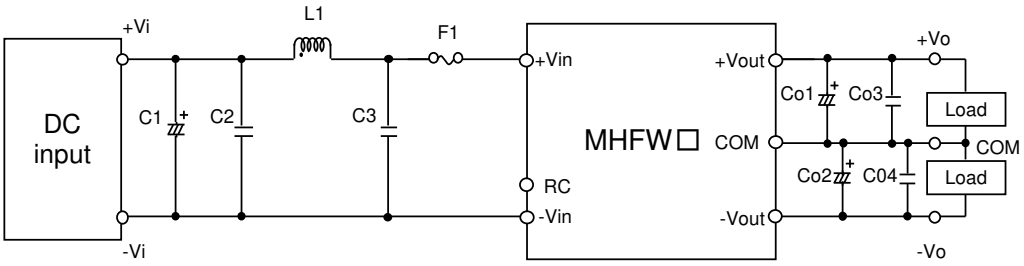
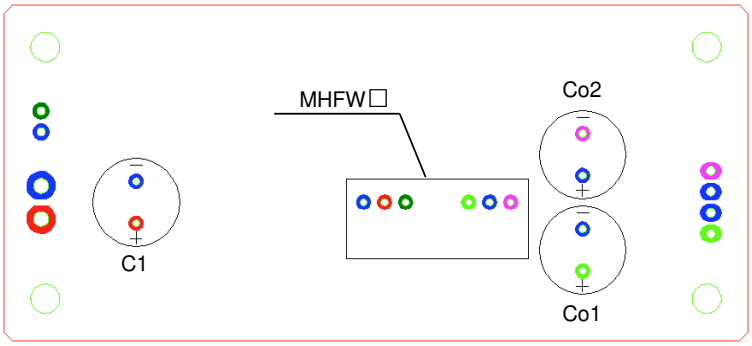
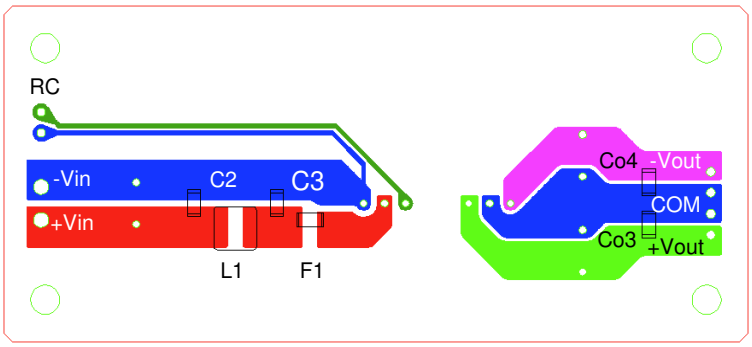


Fig.5.2.4
Measurement
board layout
for MHFW□



Front side（The model uses MH3）



Back side

Table 5.2.2
Parts name

No.	Symbol	Model name	MHFW3		MHFW6	
			Rating	Part name	Rating	Part name
1	F1	MHFW□12□	3.15A	KMS32	5.0A	KMS50
		MHFW□24□	2.0A	KMS20	2.5A	KMS25
		MHFW□48□	1.6A	KMS16	2.0A	KMS20
2	C1	MHFW□12□	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
		MHFW□24□	63V 68μF	ELXZ630E□□680MH12D	63V 68μF	ELXZ630E□□680MH12D
		MHFW□48□	100V 33μF	UPW2A330MPD □	100V 33μF	UPW2A330MPD □
3	C2,C3	MHFW□12□	25V 10μF	GRM31CR71E106K	25V 10μF	GRM31CR71E106K
		MHFW□24□	50V 4.7μF	GRM31CR71H475K	50V 4.7μF	GRM31CR71H475K
		MHFW□48□	100V 2.2μF	HMK316AC7225KL	100V 2.2μF	HMK316AC7225KL
4	L1	MHFW□12□	1200mA 4.7μH	LQH32PN4R7NN0	2600mA 2.2μH	LQH5BPN2R2NT0
		MHFW□24□	900mA 10μH	LQH32PN100MN0	1600mA 10μH	LQH5BPN100MT0
		MHFW□48□	550mA 22μH	LQH32PN220MN0	1050mA 22μH	LQH5BPN220MT0
8	Co1，Co2	ALL	50V 100μF	ELXZ500E□□101MH12D	50V 100μF	ELXZ500E□□101MH12D
7	Co3，Co4	ALL	25V 22μF	GRM32ER71E226K	25V 22μF	GRM32ER71E226K

6. Constant voltage application between input and output

- The safety has been improved by increasing the withstand voltage between input and output.
- It can also be used for applications that require high dielectric strength such as measuring instruments.
- It is also applicable to devices such as drivers where the voltage between phases changes.

6.1 Life expectancy (Constant voltage application)

- Fig.6.1.1 is based on temperature and humidity, and Fig.6.1.2 is based on life expectancy and temperature. (It is a different view and the content is the same.)

Fig.6.1.1
Life expectancy
(Reference)

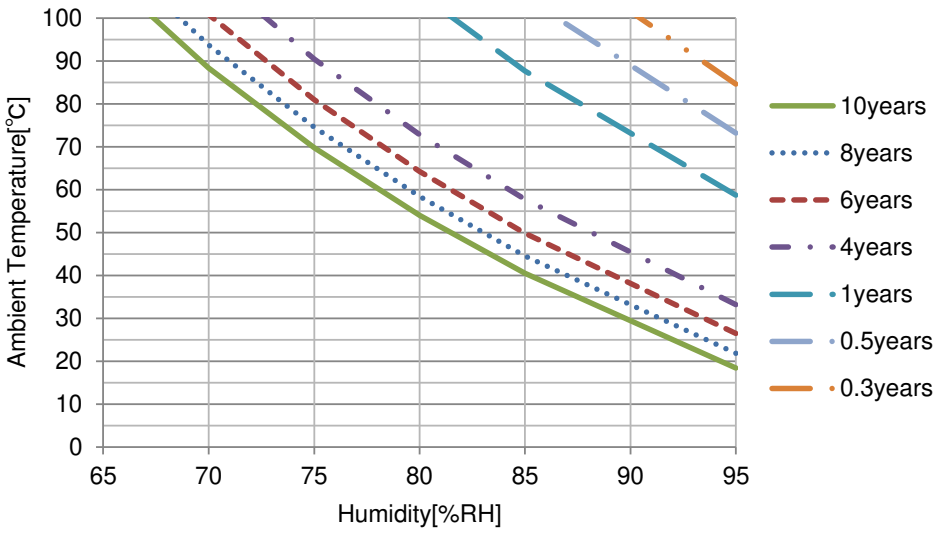
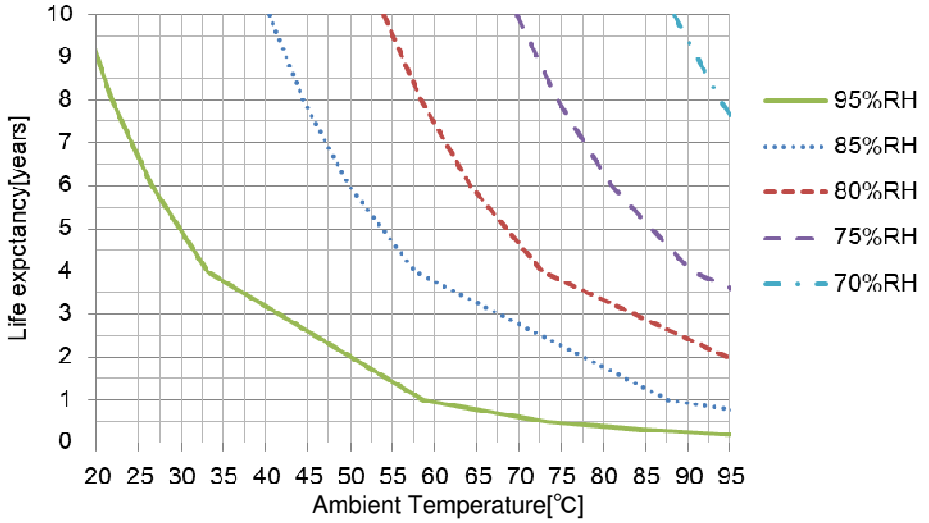


Fig.6.1.2
Life expectancy
(Reference)



Input - Output : DC600V
Use the temperature and humidity within the specified range.
* It will be reference data.

7. Isolation

7.1 Isolation

■ Table 7.1.1 shows reference values for the isolation.
Isolation level for medical standards is 2 MOOP (250VAC), reinforced insulation.

Table 7.1.1 Isolation

Parameter	Condition	Value
Isolation voltage	Input to Output	AC 3,000V 1minute DC 4,200V 1minute
Isolation resistance	Input to Output	1,000MΩ DC 500V
Isolation capacitance	Input to Output	20 pF max
Leakage current	240VAC/60Hz	2.0 μA max
Internal	clearance/creepage	>5mm