MLV SERIES DATASHEET

MLV3S MLV5S MLV10S MLV15S MLV30S MLV50S

MLV3 ~ MLV50 SERIES

KEY FEATURES

- Encapsulated Board Mount Module
- Universal AC Input
- Protected against Over Current & Over Voltage faults
- 3 years warranty[1]
- Meets EMI Class B without additional components

Notes:

1. At input AC230Vac, full Load, 8 hours usage per day.

PRODUCT CONFIGURATION:

MLV	XXX	X	-	XXXX	/	X
Series Name	**Output Power**	**No. of Output**		**Output Voltage**		**Options**
MLV	3: 3W 5: 5W 10: 10W 15: 15W 30: 30W 50: 50W	S: Single D: Dual[1]		**Single** 5: 5V 12:12V **Dual**[1] 1212: +12V -12V 1515: +15V -15V		Blank: PCB Mounting (default) T: PCB Mounting with Trim[1] A: Screw Terminal style[2]

SPECIFICATIONS:

MODEL	Notes	MLV3S		MLV5S		MLV10S		MLV15S	
Model		MLV3S-5	MLV3S-12	MLV5S-5	MLV5S-12	MLV10S-5	MLV10S-12	MLV15S-5	MLV15S-12
Output voltage		5V	12V	5V	12V	5V	12V	5V	12V
INPUT									
Input Rated Voltage		100 ~ 240Vac		100 ~ 240Vac		100 ~ 240Vac		100 ~ 240Vac	
Input Voltage Range		85 ~ 265Vac / 120 ~ 375Vdc		85 ~ 265Vac / 120 ~ 375Vdc		90 ~ 265Vac / 120~ 375Vdc		90 ~ 265Vac / 120 ~ 375Vdc	
Input Rated Frequency		50 ~ 60Hz		50 ~ 60Hz		50 ~ 60Hz		50 ~ 60Hz	
Input Frequency Range		47 ~ 63Hz		47 ~ 63Hz		47 ~ 63Hz		47 ~ 63Hz	
Input Current (max)		70mA		140mA		270mA		400mA	
Inrush Current (max)	9	30A at Cold Start 230Vac		40A at Cold Start 230Vac		50A at Cold Start 230Vac		50A at Cold Start 230Vac	
No Load Input Power (max)		0.3W		0.3W		0.5W		0.5W	
Efficiency		72%	73%	73%	75%	80%	83%	83%	86%
OUTPUT									
Output Rated Voltage		5V	12V	5V	12V	5V	12V	5V	12V
Output Voltage Range		±2.5%	±2.5%	±2.5%	±2.5%	±5%	±5%	±5%	±5%
Output Rated Current		600mA	250mA	1A	425mA	2A	850mA	3A	1.25A
Output Min Current		0A		0A		0A		0A	
Output Rated Power		3W	3W	5W	5.1W	10W	10.2W	15W	15W
Output Ripple & Noise p-p	2,3	100mV	100mV	100mV	100mV	200mV	200mV	250mV	250mV
Load Regulation	4	0.5%		2%		4%		4%	
Line Regulation	5	0.5%		0.5%		1%		1%	
Rise-up Delay (max)	6	2s/1s 115/230Vac		2s/1s 115/230Vac		2s/1s 115/230Vac		2s/1s 115/230Vac	
Hold up Time (min)	7	8ms/40ms 115/230Vac		8ms/40ms 115/230Vac		8ms/40ms 115/230Vac		8ms/40ms 115/230Vac	
OCP (trigger range)	10	>105% of Output Rated Current							
OVP (trigger range)	11	>110% of Output Rated Voltage							
OUTLINE									
Size (L x W x H) max		38.5 x 25.5 x 22.5 mm		38.5 x 25.5 x 22.5 mm		38.5 x 25.5 x 22.5 mm		46 X 25.5 X 21.5 mm	
STANDARDS									
Safety Standards		Built to meet per IEC62368, CE LVD							
Insulation Strength		Withstand between INPUT-OUTPUT: 3kVac 1min							
EMC Emissions Comply to	8	Meeting EN55032							
EMC Immune to	8	Meeting EN55035							
ENVIRONMENT									
Storage Environment		-40 ~ 85°C; 10 ~ 95% RH							
Operating Environment		-30°C ~ 70°C (see Derating Curve); 20% ~ 90% RH							
Vibration		10Hz ~ 55Hz, 5G 1min/cycle, 1hr each X, Y, Z axis							
Operating Altitude	12	2000m max							
Lead Temperature		260°C, 10s max							
Temperature Coefficient		0.03%/°C							

Notes & Conditions

1. All specifications are measured at input voltage of 230Vac, Ta at 25°C & loaded within output rated current, unless otherwise specified.
2. Noise & Ripple is measured at 25mm away from the power supply on PCB tracks, between the output terminals & load. Connected across the terminals are 1x 220µF electrolytic capacitor and 1x 0.1µF ceramic capacitor in parallel. The oscilloscope's bandwidth is set to 20MHz.
3. Noise & Ripple at Ta<-10°C will exceed specification, but not exceeding the specification limits by more than 100mV.
4. Load regulation is being measured while varying the load from minimum to the rated current, and while input voltage is fixed within the rated input voltage range.
5. Line regulation is being measured while varying the input voltage from minimum to maximum input voltage range, and while load is fixed at the rated load.
6. Rise-up delay is the time taken for power supply output voltage to reach 95% of output rated voltage after the power supply is cold started.
7. Hold up time is the time taken for power supply to maintain its output voltage within 95% after input is turned off.
8. Compliance to EMI limits were done with resistive load. Customer will need to retest EMI compliance after power supplies are assembled in their equipment.
9. Inrush Current is being measured when the power supply is cold started at 230Vac input.
10. After OCP is triggered, the power supply will go into hiccup mode and will recover after the removal of overload fault.
11. After OVP is triggered, unit will go into hiccup mode until removal of overvoltage fault. MLV3S & MLV5S are zener clamped OVP.
12. When operating at altitude above 2000m, derating of 5°C/1000m is required.

SPECIFICATIONS:

MODEL	Notes	MLV30S				MLV30D			
Model		MLV30S-5	MLV30S-12	MLV30S-24	MLV30S-30	MLD30D-1212		MLD30D-1515	
Output voltage		5V	12V	24V	30V	CH1: +12V	CH2: -12V	CH1: +15V	CH2: -15V
INPUT									
Input Rated Voltage		100 ~ 240Vac				100 ~ 240Vac		100 ~ 240Vac	
Input Voltage Range		90 ~ 265Vac / 120 ~ 375Vdc				90 ~ 265Vac / 120 ~ 375Vdc		90 ~ 265Vac / 120 ~ 375Vdc	
Input Rated Frequency		50 ~ 60Hz				50 ~ 60Hz		50 ~ 60Hz	
Input Frequency Range		47 ~ 63Hz				47 ~ 63Hz		47 ~63Hz	
Input Current (max)		800mA				800mA		800mA	
Inrush Current (max)	9	60A at Cold Start 230Vac				60A at Cold Start 230Vac		60A at Cold Start 230Vac	
No Load Input Power (max)		0.5W				Not Applicable		Not Applicable	
Efficiency		85%	87%	86%	86%	86%		86%	
OUTPUT									
Output Rated Voltage		5V	12V	24V	30V	CH1: +12V	CH2: -12V	CH1: +15V	CH2: -15V
Output Voltage Range		±5%	±5%	±5%	±5%	±5%	±5%	±5%	±5%
Output Rated Current		6.0A	2.5A	1.25A	1.0A	1.2A	1.2A	0.95A	0.95A
Output Min Current		0A				0.1A		0.1A	
Output Rated Power		30W	30W	30W	30W	14.4W	14.4W	14.25W	14.25W
Output Ripple & Noise p-p	2,3	300mV	300mV	400mV	400mV	300mV	300mV	300mV	300mV
Load Regulation	4	2%				10%	10%	10%	10%
Line Regulation	5	0.5%				0.5%			
Rise-up Delay (max)	6	2s/1s 115/230Vac				2s/1s 115/230Vac			
Hold up Time (min)	7	8ms/40ms 115/230Vac				8ms/40ms 115/230Vac			
OCP (trigger range)	10	>105% of Output Rated Current				Combined Load >105% of Output Rated Current			
OVP (trigger range)	11	>110% of Output Rated Voltage							
OUTLINE									
Size (L x W x H) max		55.5 x 45.5 x 21.5 mm							
STANDARDS									
Safety Standards		Built to meet per IEC62368, CE LVD							
Insulation Strength		Withstand between INPUT-OUTPUT: 3kVac 1min							
EMC Emissions Comply to	8	Meeting EN55032							
EMC Immunity Comply to	8	Meeting EN55035							
ENVIRONMENT									
Storage Environment		-40°C ~ 85°C, 10% ~ 95% RH							
Operating Environment		-30°C ~ 85°C (see Derating Curve); 20% ~ 90% RH							
Vibration		10Hz ~ 55Hz, 5G 1min/cycle, 1hr each X, Y, Z axis							
Operating Altitude	12	2000m max							
Lead Temperature		260°C, 10s max							
Temperature Coefficient		0.03%/°C							

Notes & Conditions

1. All specifications are measured at input voltage of 230Vac, Ta at 25°C & loaded within output rated current, unless otherwise specified.
2. Noise & Ripple is measured at 25mm away from the power supply on PCB tracks, between the output terminals & load. Connected across the terminals are 1x 220µF electrolytic capacitor and 1x 0.1µF ceramic capacitor in parallel. The oscilloscope's bandwidth is set to 20MHz.
3. Noise & Ripple at Ta<-10°C will exceed specification, but not exceeding the specification limits by more than 100mV.
4. Load regulation is being measured while varying the load from minimum to the rated current, and while input voltage is fixed within the rated input voltage range. For MLV30D, load regulation of one channel is being measured while the other channel is at the rated load.
5. Line regulation is being measured while varying the input voltage from minimum to maximum input voltage range, and while load is fixed at the rated load.
6. Rise-up delay is the time taken for power supply output voltage to reach 95% of output rated voltage after the power supply is cold started.
7. Hold up time is the time taken for power supply to maintain its output voltage within 95% after input is turned off.
8. Compliance to EMI limits were done with resistive load. Customer will need to retest EMI compliance after power supplies are assembled in their equipment.
9. Inrush Current is being measured when the power supply is cold started at 230Vac input.
10. After OCP is triggered, the power supply will go into hiccup mode and will recover after the removal of overload fault.
11. After OVP is triggered, unit will go into hiccup mode until removal of overvoltage fault.
12. When operating at altitude above 2000m, derating of 5°C/1000m is required.

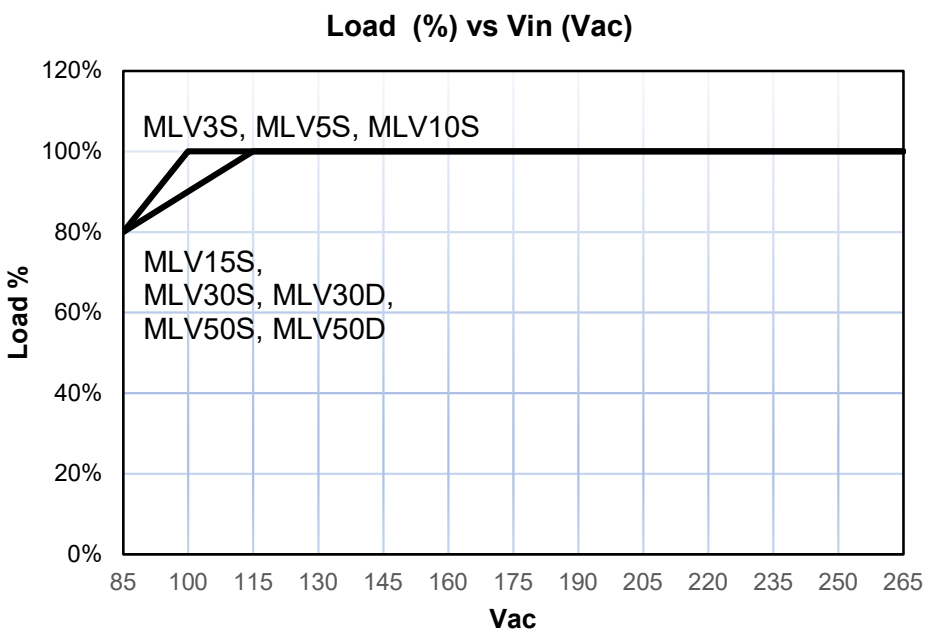
SPECIFICATIONS:

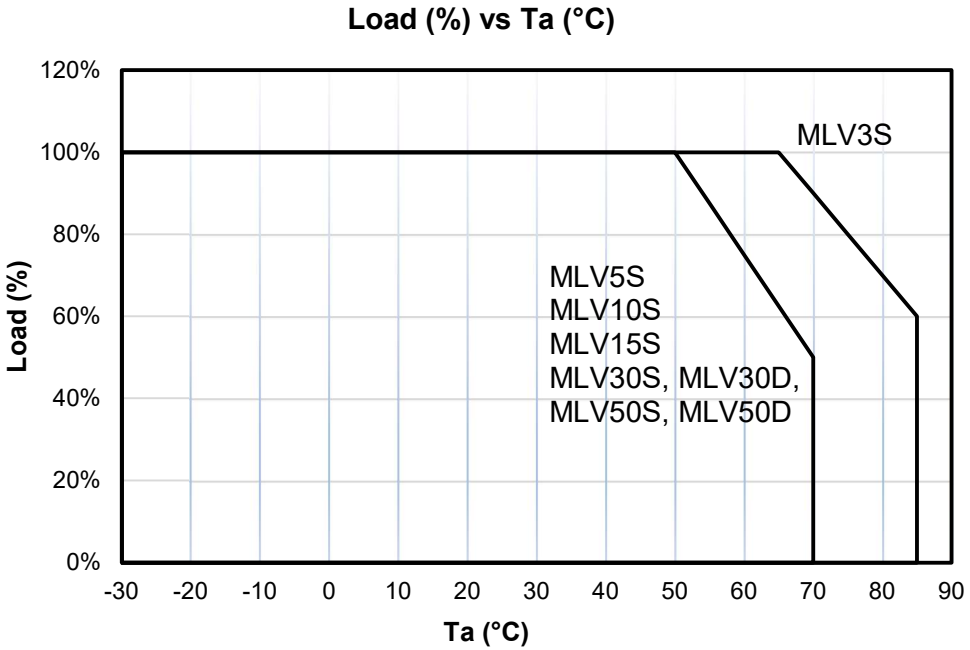
MODEL	Notes	MLV50S				MLV50D			
Model		MLV50S-5	MLV50S-12	MLV50S-24	MLV50S-30	MLD50D-1212		MLD50D-1515	
Output voltage		5V	12V	24V	30V	CH1: +12V	CH2: -12V	CH1: +15V	CH2: -15V
INPUT									
Input Rated Voltage		100 ~ 240Vac				100 ~ 240Vac		100 ~ 240Vac	
Input Voltage Range		90 ~ 265Vac / 120 ~ 375Vdc				90 ~ 265Vac / 120 ~ 375Vdc		90 ~ 265Vac / 120 ~ 375Vdc	
Input Rated Frequency		50 ~ 60Hz				50 ~ 60Hz		50 ~ 60Hz	
Input Frequency Range		47 ~ 63Hz				47 ~ 63Hz		47 ~63Hz	
Input Current (max)		1.30A				1.30A		1.30A	
Inrush Current (max)	9	60A at Cold Start 230Vac				60A at Cold Start 230Vac		60A at Cold Start 230Vac	
No Load Input Power (max)		0.5W				Not Applicable		Not Applicable	
Efficiency		85%	87%	86%	86%	86%		86%	
OUTPUT									
Output Rated Voltage		5V	12V	24V	30V	CH1: +12V	CH2: -12V	CH1: +15V	CH2: -15V
Output Voltage Range		±5%	±5%	±5%	±5%	±5%	±5%	±5%	±5%
Output Rated Current		8.0A	4.2A	2.1A	1.7A	2.0A	2.0A	1.6A	1.6A
Output Min Current		0A				0.1A		0.1A	
Output Rated Power		40W	50.4W	50.4W	51W	24 W	24W	24W	24W
Output Ripple & Noise p-p	2,3	300mV	300mV	400mV	400mV	300mV	300mV	300mV	300mV
Load Regulation	4	2%				10%	10%	10%	10%
Line Regulation	5	0.5%				0.5%			
Rise-up Delay (max)	6	2s/1s 115/230Vac				2s/1s 115/230Vac			
Hold up Time (min)	7	8ms/40ms 115/230Vac				8ms/40ms 115/230Vac			
OCP (trigger range)	10	>105% of Output Rated Current				Combined Load >105% of Output Rated Current			
OVP (trigger range)	11	>110% of Output Rated Voltage							
OUTLINE									
Size (L x W x H) max		70.5 x 48.5 x 24.5 mm							
STANDARDS									
Safety Standards		Built to meet per IEC62368, CE LVD							
Insulation Strength		Withstand between INPUT-OUTPUT: 3kVac 1min							
EMC Emissions Comply to	8	Meeting EN55032							
EMC Immunity Comply to	8	Meeting EN55035							
ENVIRONMENT									
Storage Environment		-40°C ~ 85°C, 10% ~ 95% RH							
Operating Environment		-30°C ~ 85°C (see Derating Curve); 20% ~ 90% RH							
Vibration		10Hz ~ 55Hz, 5G 1min/cycle, 1hr each X, Y, Z axis							
Operating Altitude	12	2000m max							
Lead Temperature		260°C, 10s max							
Temperature Coefficient		0.03%/°C							

Notes & Conditions

1. All specifications are measured at input voltage of 230Vac, Ta at 25°C & loaded within output rated current, unless otherwise specified.
2. Noise & Ripple is measured at 25mm away from the power supply on PCB tracks, between the output terminals & load. Connected across the terminals are 1x 220μF electrolytic capacitor and 1x 0.1μF ceramic capacitor in parallel. The oscilloscope's bandwidth is set to 20MHz.
3. Noise & Ripple at Ta<-10°C will exceed specification, but not exceeding the specification limits by more than 100mV.
4. Load regulation is being measured while varying the load from minimum to the rated current, and while input voltage is fixed within the rated input voltage range. For MLV50D, load regulation of one channel is being measured while the other channel is at the rated load.
5. Line regulation is being measured while varying the input voltage from minimum to maximum input voltage range, and while load is fixed at the rated load.
6. Rise-up delay is the time taken for power supply output voltage to reach 95% of output rated voltage after the power supply is cold started.
7. Hold up time is the time taken for power supply to maintain its output voltage within 95% after input is turned off.
8. Compliance to EMI limits were done with resistive load. Customer will need to retest EMI compliance after power supplies are assembled in their equipment.
9. Inrush Current is being measured when the power supply is cold started at 230Vac input.
10. After OCP is triggered, the power supply will go into hiccup mode and will recover after the removal of overload fault.
11. After OVP is triggered, unit will go into hiccup mode until removal of overvoltage fault.
12. When operating at altitude above 2000m, derating of 5°C/1000m is required.

DERATING CURVE





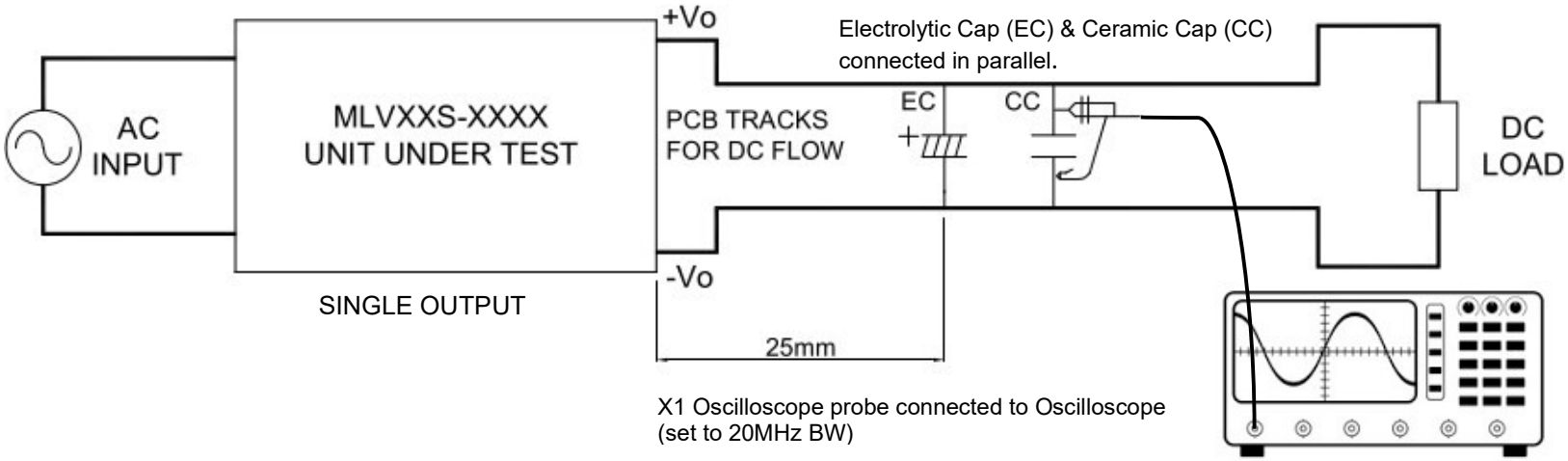
OPTIONS & MOUNTING STYLES

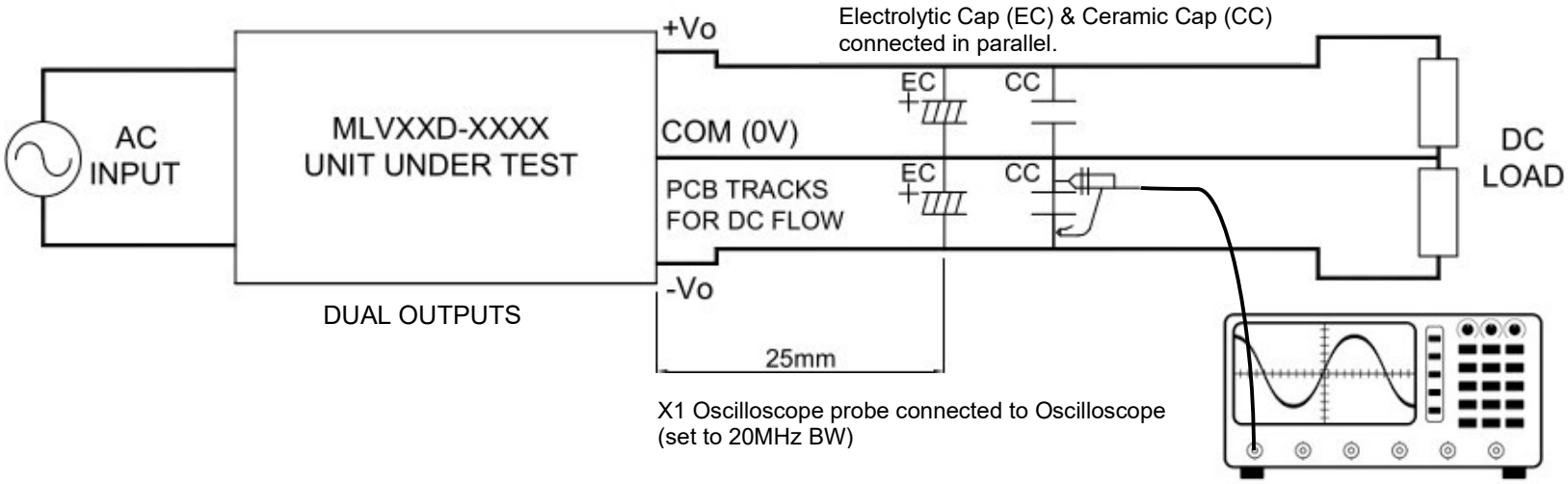
DEFAULT: BLANK
PCB MOUNTING STYLE

OPTION "T"
PCB MOUNTING STYLE
for 50W Output Power only

OPTION "A"
SCREW TERMINAL STYLE
for 30W & 50W Output Power only

TEST MEASUREMENT METHOD FOR NOISE & RIPPLE Vpp

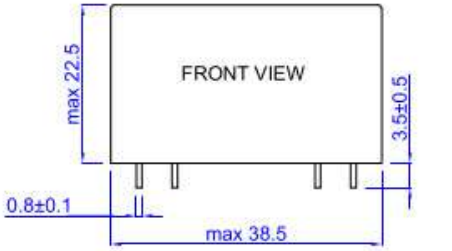


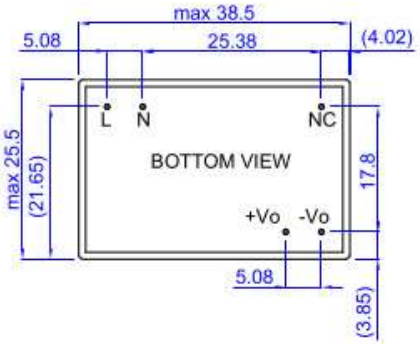


Notes:
EC = 220µF Electrolytic Capacitor
(Select EC voltage rating higher than power supply's output voltage)
CC = 50V 0.1µF Ceramic Capacitor X7R type.

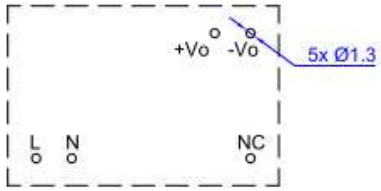
MECHANICAL SPECIFICATIONS: MLV SERIES

MLV3S, MLV5S

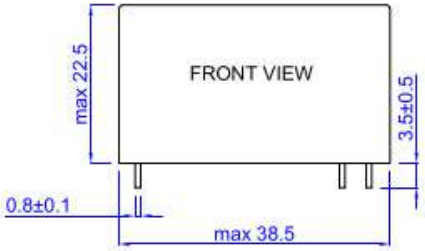


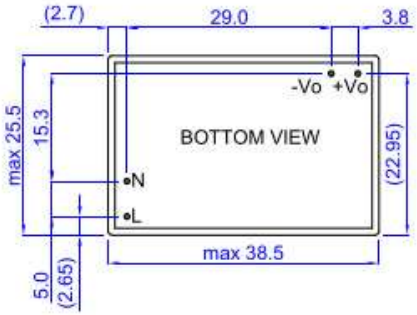


PCB COMPONENT LAYOUT

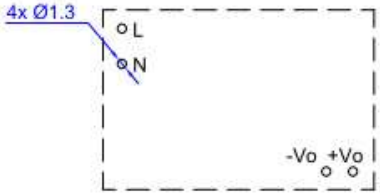


MLV10S

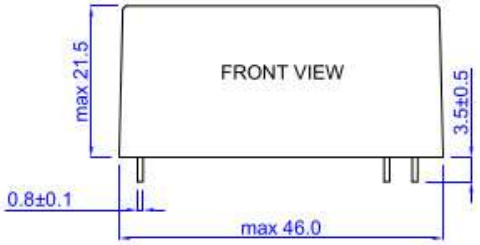


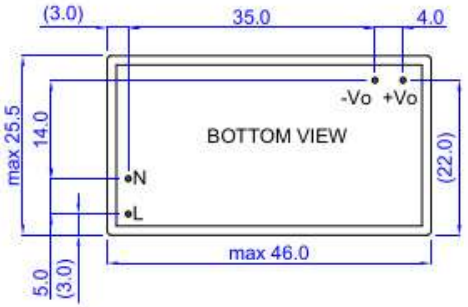


PCB COMPONENT LAYOUT



MLV15S





PCB COMPONENT LAYOUT

Notes:
1. All dimensions in mm.
2. Tolerances unless otherwise specified:
   .x (±0.50)
   .xx (±0.25)

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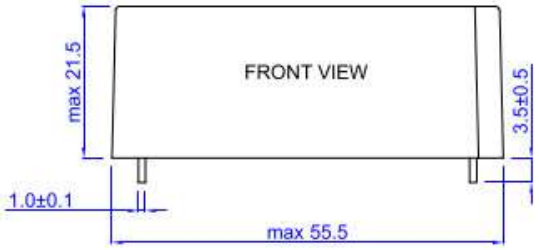
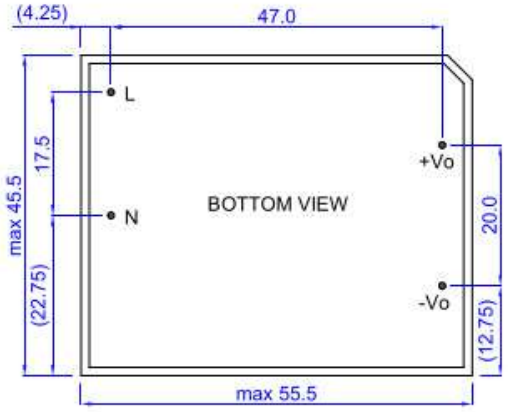
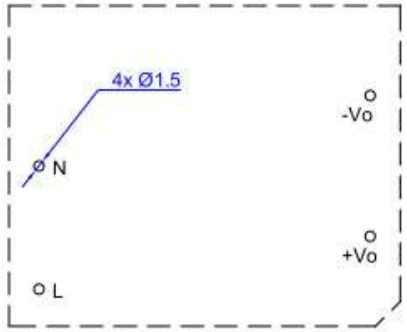
MECHANICAL SPECIFICATIONS: MLV SERIES

MLV30S

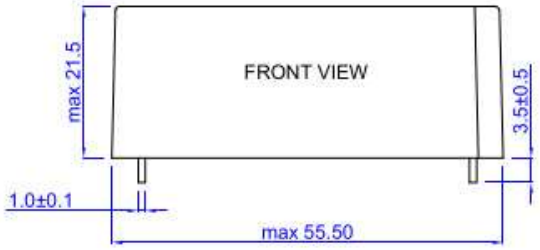


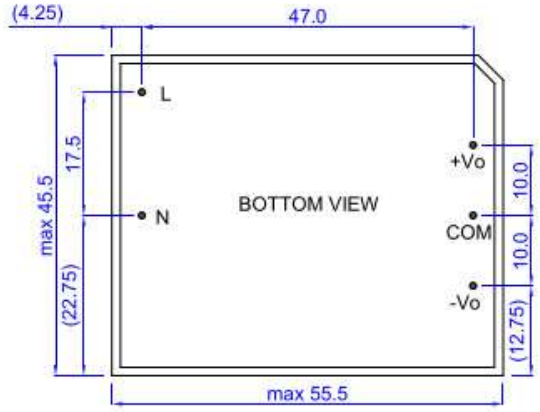


PCB COMPONENT LAYOUT

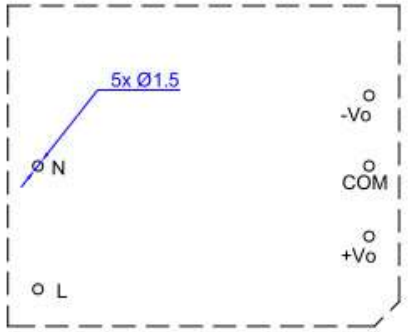


MLV30D





PCB COMPONENT LAYOUT

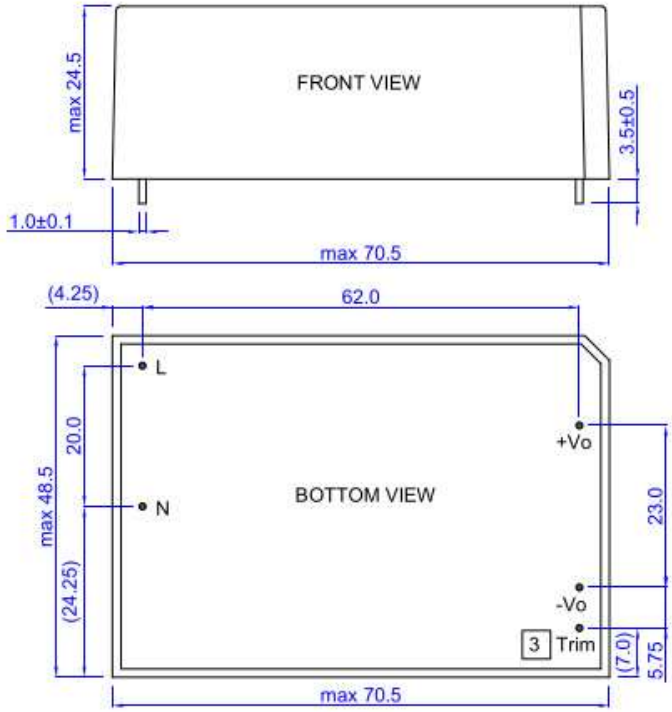


Notes:
1. All dimensions in mm.
2. Tolerances unless otherwise specified:
   .x (±0.50)
   .xx (±0.25)

220822

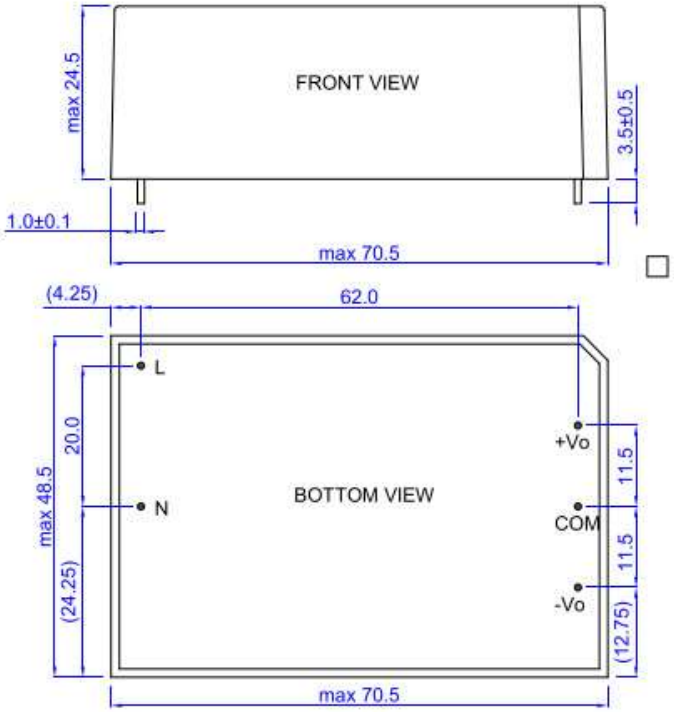
MECHANICAL SPECIFICATIONS: MLV SERIES

MLV50S



PCB COMPONENT LAYOUT

MLV50D



PCB COMPONENT LAYOUT

Notes:
1. All dimensions in mm.
2. Tolerances unless otherwise specified:
   .x (±0.50)
   .xx (±0.25)
3. TRIM pin for Option Trim MLV50S-XXXX/T

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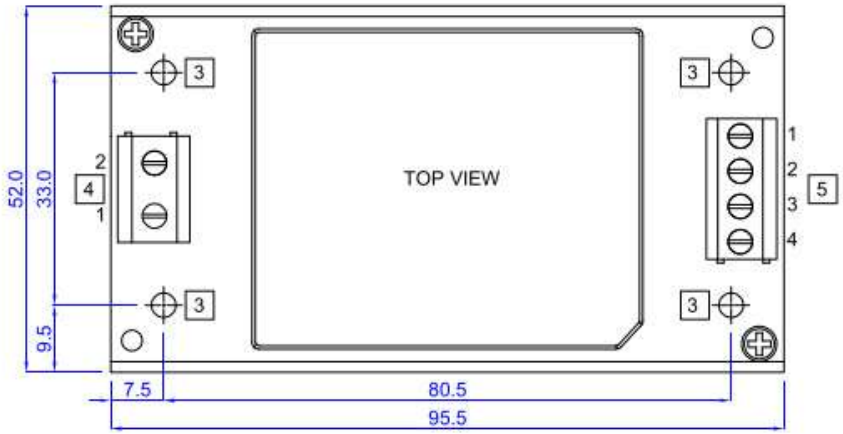
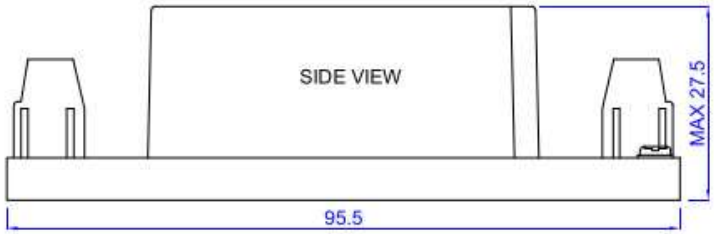
MECHANICAL SPECIFICATIONS: MLV SERIES

MLV30X-XXXX/A





Notes:

1. All dimensions in mm.
2. Tolerances unless otherwise specified:
   .x (±0.50)
   .xx (±0.25)

[3] Customer mounting hole for M3 screw.
Recommended torque: 0.49 N.m (5kgf.cm) max.

[4] Input connector (CNac)

Pin no.	Pin Assignment
1	L
2	N

Min. 18AWG cable (UL approved 300V 85°C)
Recommended torque: 0.49 N.m (5kgf.cm) max.

[5] Output Connector (CNdc)

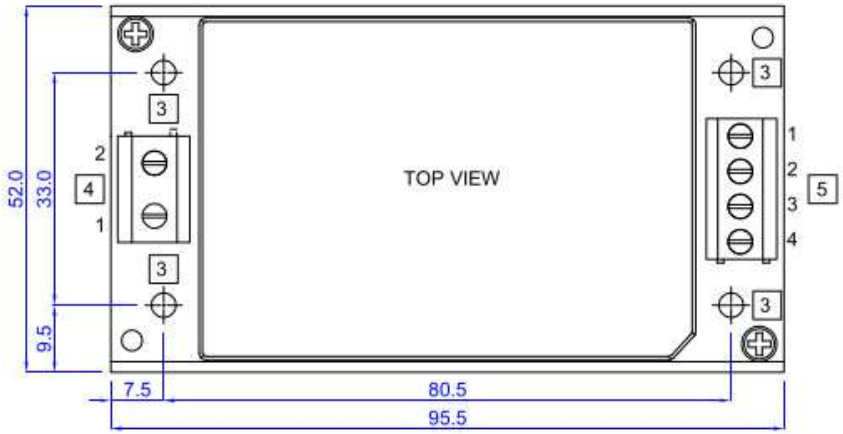
Pin no	Pin Assignment	
	Single Output (S) MLV30S-XXXX/A	Dual Output (D) MLV30D-XXXX/A
1	-V	-V
2	-V	COM
3	+V	COM
4	+V	+V

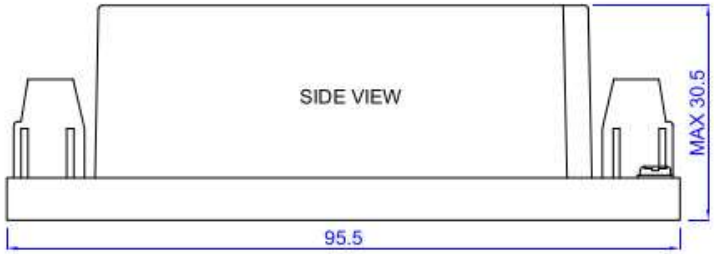
Min. 18AWG cable (UL approved 300V 85°C)
Recommended torque: 0.49 N.m (5kgf.cm) max

220822

MECHANICAL SPECIFICATIONS: MLV SERIES

MLV50X-XXXX/A





Notes:

1. All dimensions in mm.
2. Tolerances unless otherwise specified:
   .x (±0.50)
   .xx (±0.25)

[3] Customer mounting hole for M3 screw.
Recommended torque: 0.49 N.m (5kgf.cm) max.

[4] Input connector (CNac)

Pin no.	Pin Assignment
1	L
2	N

Min. 18AWG cable (UL approved 300V 85°C)
Recommended torque: 0.49 N.m (5kgf.cm) max.

[5] Output Connector (CNdc)

Pin no	Pin Assignment	
	Single Output (S) MLV50S-XXXX/A	Dual Output (D) MLV50D-XXXX/A
1	-V	-V
2	-V	COM
3	+V	COM
4	+V	+V

Min. 18AWG cable (UL approved 300V 85°C)
Recommended torque: 0.49 N.m (5kgf.cm) max

220822