MLD060-□□ Series

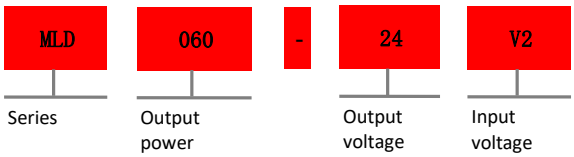
▲ Specification

ultra-thin width 52.5mm(3SU)
Protection: Over Voltage/Over load/
Short circuit/reverse polarity protection · input undervoltage protection
-40～+85℃ wide range working temperature
capable of natural air cooling
Output voltage (DC) adjustable (±10%)
4:1wide range input
rail installation: TS-35/7.5 or 15
no minimum load requirement
4KVdc · input/output isolation · enhanced isolation ·
3 years warranty

▲ Application

Industrial automation control system
Telecommunication and data communication systems
Electonic instruments and devices
Factory automation
semiconductor manufacturing equipment

▲ Model encoding



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Specification

Input				
Input voltage note1	9～36Vdc			
Input Current (Typ.)	3A/24Vdc			
Surge current (Typ.)	20A/24Vdc			
Output				
Model	MLD060-05V2	MLD060-12V2	MLD060-15V2	MLD060-24V2
DC voltage (V)	5V	12V	15V	24V
Efficiency (Typ.)	87.5%	91%	91%	91%
Voltage adjustment range	4.5～5.5V	9～13.2V	13.5～16.5V	21.6～28V
Rated current	10.8A	5A	4A	2.5A
Current range	0～10.8A	0～5A	0～4A	0～2.5A
Rated power	54W	60W	60W	60W
Ripple & noise (max MVP-P)note2	60mVp-p	75mVp-p	75mVp-p	100mVp-p
Voltage tolerance note3	±2.0%	±2.0%	±2.0%	±2.0%
Line regulation	±0.5%	±0.5%	±0.5%	±0.5%
Load regulation	±1.5%	±0.5%	±0.5%	±0.5%
Setup, rise time	120ms, 85ms(at full load)			
Hold up time (Typ.)	Type:5ms@24Vdc input			
External capacitive load (m	6800uF	4700uF	3300uF	2200uF
Status indicator	Green LED			
Protection				
Over load	105%-135% of the rated output power			
	Protection mode: constant current mode, recover automatically after fault condition is removed			
Over voltage (V)	5.75～7V	13.8～16.2V	17.25～20.25V	28.8～34V
	Protection mode: Output shutdown, recoverable after power reset			
Reverse polarity	Automatically recovers through MOSFET after abnormal condition is removed, without damage			
Undervoltage lockout	Power ON≥9V , OFF≤8.5V			
Safety and EMC				
Withstand voltage	I/P-O/P:4KVdc			
Insulation resistance	I/P-O/P>100M Ohms/500Vdc/25℃/70% RH			
Safety standard	Reference UL 62368-1,IEC 62368-1,AS/NZS 62368.1			
EMC emission	**Parameter**	**Standard**	**Test Level/Note**	
	Conducted	BS EN/EN55032	Class A	
	Radiated	BS EN/EN55032	Class A for 1m I/O cable , Class B for 30cm I/O cable	
	Voltage Flicker	BS EN/EN61000-3-3	.....	
EMC immunity	BS EN/EN55024 , BS EN/EN61000-6-2(BS EN/EN50082-2)			
	Parameter	**Standard**	**Test Level/Note**	
	ESD	BS EN/EN61000-4-2	Level 3,8KV air;Level 3,6KV contact;criteria A	
	Radiated	BS EN/EN61000-4-3	Level 3,10V/m;criteria A	
	EFT/Burst	BS EN/EN61000-4-4	Level 3,2KV;criteria A	
	Surge	BS EN/EN61000-4-5	Level 3,1KV/Line-Line;criteria A	
	Conducted	BS EN/EN61000-4-6	Level 3,10V;criteria A	
	Magnetic Field	BS EN/EN61000-4-8	Level 4,30A/m;criteria A	
Environment				
Working temperature	-40～+85℃(Please refer to the "derating curve"")			
Working humidity	5～95% RH, No condensation			
Storage temp./humidity	-40～+85℃, 5～95% RH, No condensation			
Temperature coefficient	±0.03%/℃ (0～60℃)			
Vibration resistance	Component: 10～500Hz, 2G 10Min/Circle 60min in each X,Y,Z direction			
Altitude	5000m			
Others				
MTBF	≥612K hrs,MIL-HDBK-217F(25℃)			
Weight	216g			
Dimension	52.5*90*54.5mm			

Data	Model	Rated output power	Output voltage current	Efficiency	maximum capacitive load at ambient temperature
	MLD060-05V2	54W	5V/10.8A	87.5%	6800uF
	MLD060-12V2	60W	12V/5A	91%	4700uF
	MLD060-15V2	60W	15V/4A	91%	3300uF
	MLD060-24V2	60W	24V/2.5A	91%	2200uF
Accessory	Description		Model		

Electrical specifications

Input parameters				
Input voltage note1	18～75Vdc			
Input current (Typ.)	1.5A/48Vdc			
Surge current (Typ.)	20A/48Vdc			
Output parameters				
Model	MLD060-05V3	MLD060-12V3	MLD060-15V3	MLD060-24V3
DC voltage	5V	12V	15V	24V
Efficiency(Typ.)	87.5%	91%	92%	92%
Voltage adjustment range	4.5～5.5V	9～13.2V	13.5～16.5V	21.6～28V
Rated current	12A	5A	4A	2.5A
Current range	0～12A	0～5A	0～4A	0～2.5A
Rated power	60W	60W	60W	60W
Ripple & noise(max MVP-P) note2	60mVp-p	75mVp-p	75mVp-p	100mVp-p
Voltage tolerance note3	±2.0%	±2.0%	±2.0%	±2.0%
Line regulation	±0.5%	±0.5%	±0.5%	±0.5%
Load regulation	±1.5%	±0.5%	±0.5%	±0.5%
Setup, rise time	120ms, 85ms(at full load)			
Hold up time (Typ.)	Type:10ms@48Vdc input			
External capacitive load (n	6800uF	4700uF	3300uF	2200uF
Status indicator	Green LED			
Protection				
Over load	105%-135% of the rated output power			
	Protection mode: constant current mode, recover automatically after fault condition is removed			
Over voltage	5.75～7V	13.8～16.2V	17.25～20.25V	28.8～34V
	Protection mode: Output shutdown, recoverable after power reset			
Reverse polarity	Automatically recovers through MOSFET after abnormal condition is removed, without damage			
Undervoltage lockout	Power ON≥18V , OFF≤17V			
Safety and EMC				
Withstand voltage	I/P-O/P:4KVdc			
Insulation resistance	I/P-O/P>100M Ohms/500Vdc/25℃/70% RH			
Safety standard	Reference UL 62368-1,IEC 62368-1,AS/NZS 62368.1			

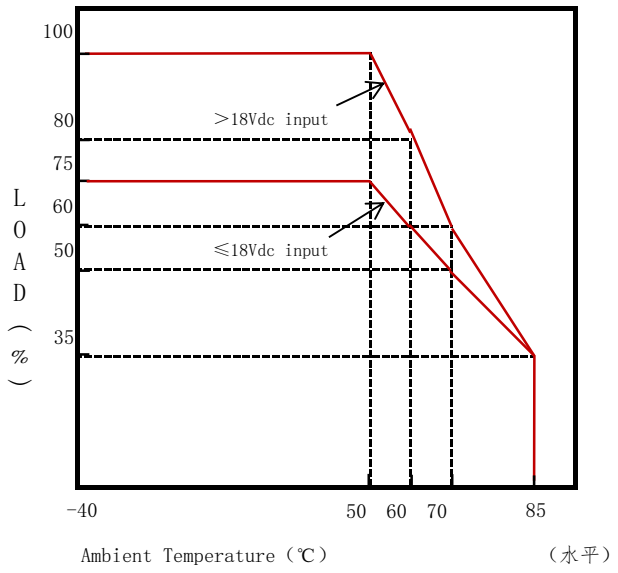
	Parameter	Standard	Test Level/Note
EMC emission	Conducted	BS EN/EN55032	Class B
	Radiated	BS EN/EN55032	Class A for 1m I/O cable , Class B for 30cm I/O cable
	Voltage Flicker	BS EN/EN61000-3-3	.....
EMC immunity	BS EN/EN55024 , BS EN/EN61000-6-2(BS EN/EN50082-2)		
	Parameter	**Standard**	**Test Level/Note**
	ESD	BS EN/EN61000-4-2	Level 3,8KV air;Level 3,6KV contact;criteria A
	Radiated	BS EN/EN61000-4-3	Level 3,10V/m;criteria A
	EFT/Burst	BS EN/EN61000-4-4	Level 3,2KV;criteria A
	Surge	BS EN/EN61000-4-5	Level 3,1KV/Line-Line;criteria A
	Conducted	BS EN/EN61000-4-6	Level 3,10V;criteria A
	Magnetic Field	BS EN/EN61000-4-8	Level 4,30A/m;criteria A

Environment	
Working temperature	-40～+85℃ (Please refer to the "derating curve)
Working humidity	5～95% RH, No condensation
Storage temp./humidity	-40～+85℃, 5～95% RH, No condensation
Temperature coefficient	±0.03%/℃ (0～60℃)
Vibration resistance	Component: 10～500Hz, 2G 10Min/Circle 60min in each X,Y,Z direction;
Altitude	5000m

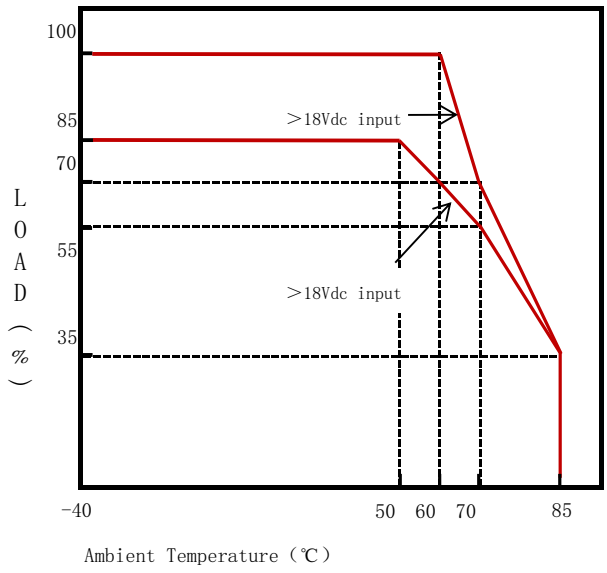
Others					
MTBF	≥612K hrs,MIL-HDBK-217F(25℃)				
Weight	216g				
Dimension	52.5*90*54.5mm				
Data	**Model**	**Rated output power**	**Output voltage current**	**Efficiency**	**maximum capacitive load at ambient temperature**
	MLD060-05V3	60W	5V/12A	87.5%	6800uF
	MLD060-12V3	60W	12V/5A	91%	4700uF
	MLD060-15V3	60W	15V/4A	92%	3300uF
	MLD060-24V3	60W	24V/2.5A	92%	2200uF
Accessory	**Description**		**Model**		

Installation instruction

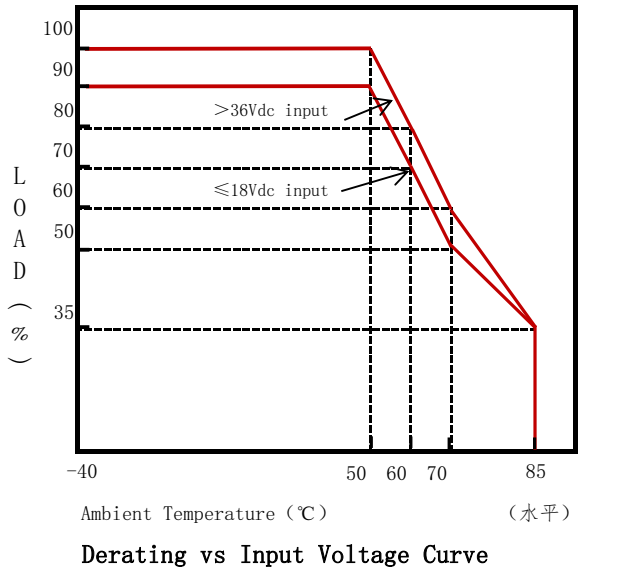
Input voltage:V2 Derating Curve(5V)



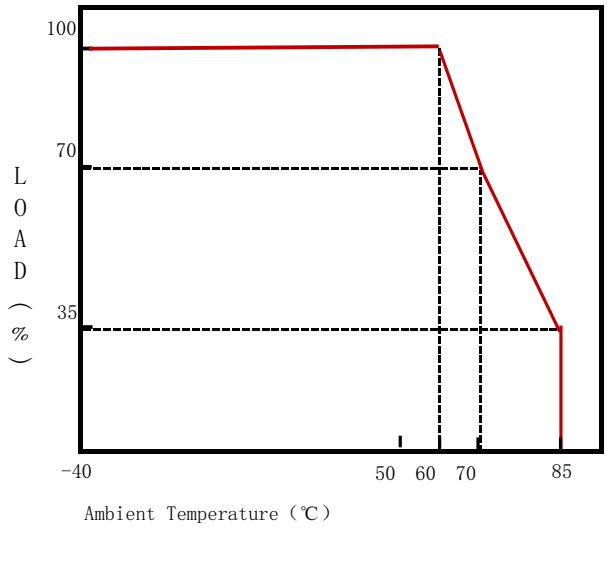
Input voltage:V2 Derating Curve(12V/15V/24V)



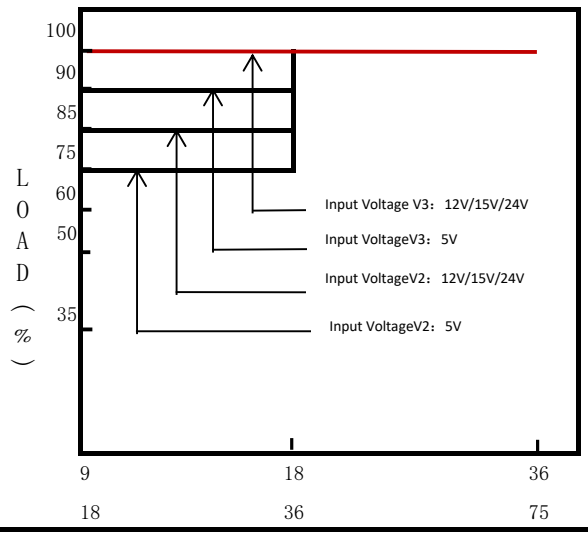
Input voltage:V3 Derating Curve(5V)



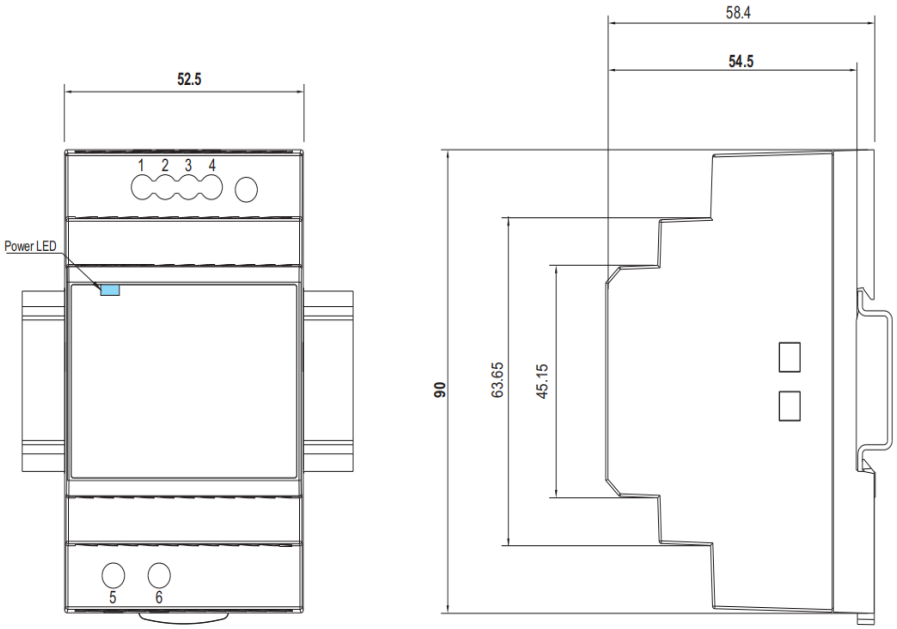
Input voltage:V3 Derating Curve(5V)

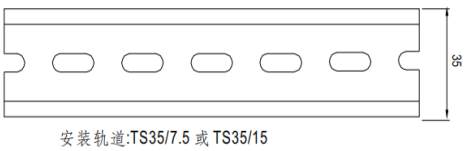


Derating vs Input Voltage Curve



Installation instruction





Terminal Pin Numbering

Pin Numbering	Function
1	DC Output +Vo
2	DC Output -Vo
3	DC Input -Vin
4	DC Input +Vin

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Note: 1:Under low input voltage conditions, output derating is required. Please refer to the derating curve for specifics. 2:Unless otherwise specified, all specifications are tested at an input of V2: 24Vdc; V3: 48Vdc, rated load, and 25° C ambient temperature.
3:Ripple & noise are measured at 20MHZ of bandwidth by using a 12" twisted pair-wire teminated with a 0.1uf & 47uf parallel capacitor
4:Tolerance: includes set up tolerance, line regulation and load regulation.
5:When operating at an altitude higher than 2000 meters (6500 feet), the ambient temperature for fanless models decreases by 3.5° C per 1000 meters, and for models with fans, it decreases by 5° C per 1000 meters.