Descriptions

DC/DC Enclosed Power Supply



RoHS

Features

- Ultra-wide input voltage range: 40-160VDC
- High efficiency up to 91.9%
- Reinforced insulation, I/O isolation test voltage 3k VAC
- Operating ambient temperature range: -40℃ to +80℃
- Input under-voltage protection, output short- circuit, over-current, over-voltage protection

Applications

- railway systems and associated equipment

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
--	DRWM60-F1D12	110 (40-160)	180	12	5000/0	89.5/91.9	3300
	DRWM60-F1D24			24	2500/0	88/90.6	3300

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load;
③Product images are for reference only. Please refer to the actual product for details.

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Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load)	Nominal input voltage	12V Output	--	594/10	609/30	mA
			24V Output	--	602/10	620/30	
	Reflected Ripple Current	Nominal input voltage		--	50	--	
	Surge Current			--	20	--	A
	Surge Voltage (1sec. max.)			-0.7	--	200	VDC
	Start-up Voltage			--	--	40	
	Input Under-voltage Protection			30	--	--	
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy	Nominal input voltage, 0%-100% load		--	±1	±2	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.3	±0.5	
	Load Regulation①	Nominal input voltage, 10%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation			--	±2	±3	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	Twisted pair method, 20MHz bandwidth, 10%-100% load		--	80	150	mVp-p
	Over-voltage Protection	Input voltage range		110	--	160	%Vo
	Over-current Protection			105	--	145	%Io
	Short-circuit Protection③			Constant current restricted mode, recovered after abnormal conditions are removed			
General Specifications	Isolation	Input-output	Electric Strength Test for 1 minute with a leakage current of 10mA max.	3000	--	--	VAC
		Input-case		3000	--	--	
		Output-case		3000	--	--	
	Insulation Resistance	Input-output resistance at 500VDC		100	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 10kHz/0.1V		--	4700	--	pF
	Switching Frequency	PWM Mode		--	170	--	kHz
	MTBF	MIL-HDBK-217F@25℃		500	--	--	k hours
Environment Specifications	Operating Temperature	See Fig.1		-40	--	+80	℃
	Storage Humidity	Non-condensing		5	--	95	%RH
	Storage Temperature			-40	--	+85	℃
	Cooling Test			EN60068-2-1			
	Dry Heat			EN60068-2-2			
	Damp Heat			EN60068-2-30			
	Vibration			IEC/EN 61373 - Category 1, Grade B			
Mechanical Specifications	Case Material	Aluminum alloy					
	Dimensions	128.0 × 60.0 × 25.0mm（L*W*H）					
	Weight	230.0g(Typ.)					
	Cooling Methods	Free air convection					

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Note:

①Load regulation for 0% -100% load increases to ±2%;

②Under 0%-10% load conditions, ripple & noise does not exceed 350 mVp-p. The ripple and noise measurement method uses a 12 "twisted pair wire, while the terminal is connected in parallel with 1uF and 10uF capacitors and is measured at 20MHz bandwidth;

③When the ambient temperature is above 70℃ for a long period of short circuit, ensure that the shell temperature is below 83℃.

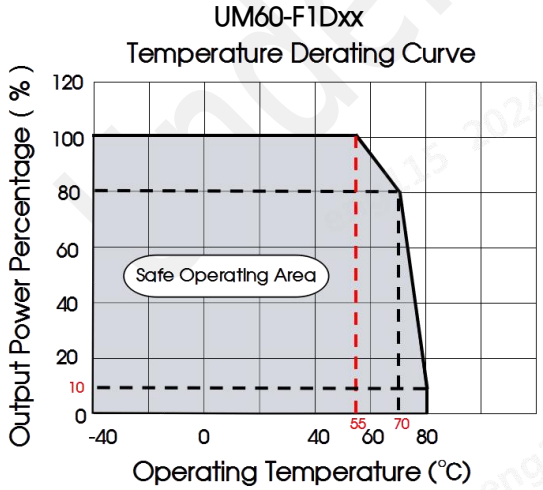
Electromagnetic Compatibility (EMC)

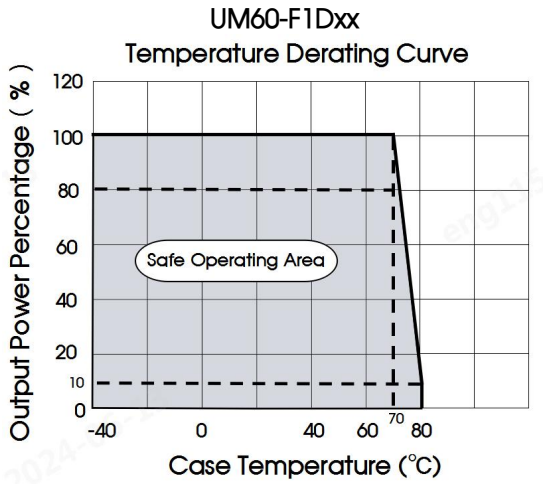
Emissions	CE	CISPR32/EN55032	150kHz-30MHz	Class A	
	RE	CISPR32/EN55032	30MHz-1GHz	Class B	
Immunity	ESD	IEC/EN61000-4-2	GB/T17626.2	Contact ±6kV, Air ±8kV	perf.Criteria B
	RS	IEC/EN61000-4-3	GB/T17626.3	20V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4	GB/T17626.4	±2kV(5kHz)	perf.Criteria A
	Surge	IEC/EN61000-4-5	GB/T17626.5	line to line ± 2kV, line to ground ± 2kV	perf.Criteria A
	CS	IEC/EN61000-4-6	GB/T17626.6	10Vr.m.s	perf.Criteria A

Electromagnetic Compatibility (EMC)（EN50155）

EMI	CE	EN50121-3-2	150kHz-500kHz 99dBuV 500kHz-30MHz 93dBuV	
	RE	EN50121-3-2	30MHz-230MHz 50dBuV/m QP 230MHz-1GHz 57dBuV/m QP	
EMS	ESD	EN50121-3-2	Contact ± 6kV/Air ±8kV	perf. Criteria B
	RS	EN50121-3-2	80 - 800MHz 20V/m 800 - 1000MHz 20V/m 1400 - 2000MHz 10V/m 2000 - 2700MHz 5V/m 5100 - 6000MHz 3V/m	perf. Criteria A
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz	perf. Criteria A
	Surge	EN50121-3-2	line to line ± 2kV (42Ω, 0.5uF) line to ground ± 2kV (42Ω, 0.5uF)	perf. Criteria A
	CS	EN50121-3-2	0.15MHz-80MHz 10 Vr.m.s	perf. Criteria A

Characteristic Curve





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Design Reference

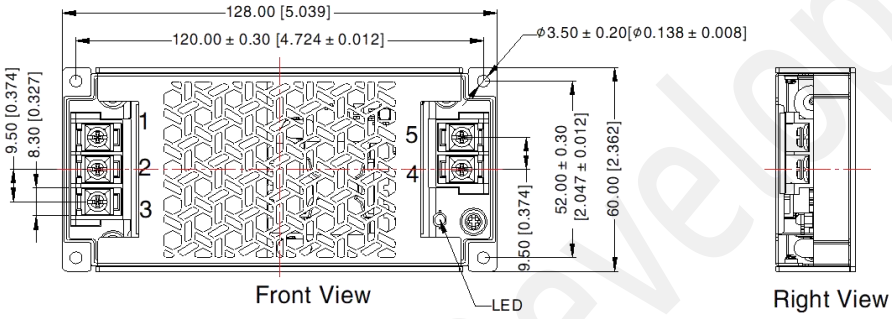
1. Shell temperature reference design point



2. The products do not support parallel connection of their output

Dimensions and Recommended Layout

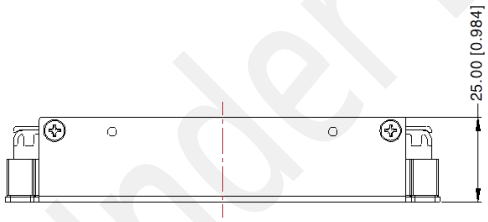
THIRD ANGLE PROJECTION



Front View

Right View

Pin–Out	
Pin	Mark
1	+Vin
2	–Vin
3	⏚
4	+Vo
5	–Vo



Bottom View

Connector wires range		
Pro.No	Input connector	Output connector
3V	20–12AWG	12AWG
5V	20–12AWG	14–12AWG
12V	20–12AWG	18–12AWG
15V	20–12AWG	18–12AWG
24V	20–12AWG	20–12AWG
48V	20–12AWG	20–12AWG

Note:
Unit: mm[inch]
Connector tightening torque: M3.5, Max 0.8N・m
General tolerances: ± 1.00[± 0.039]

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Note:

1. It is recommended to use the product under a load of more than 10%. If the load is less than 10%, the ripple index of the product may exceed the specification, but it will not affect the reliability of the product;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. It is suggested to take the recommended circuits for EMC testing, If needs to meet the surge performance without taking the recommended circuits, please make sure that the residual surge voltage is less than 180V to ensure the reliability of the product;
4. It is recommended that customers use a silicone pad or thermal grease between the heatsink and the enclosed Power Supply to ensure good heat dissipation when using a heatsink;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
6. All index testing methods in this datasheet are based on company corporate standards;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.