AC/DC 2700W CRPS SERVER POWER SUPPLY

LMS2700-T12B

MORNSUN®

RoHS

FEATURES

- Input voltage range: 90 - 264VAC and supports AC & HVDC wide voltage range input
- Operating ambient temperature range: -5℃ to +55℃
- 80 PLUS Titanium efficiency
- N+M Intelligent redundancy N+M≤4 (N=3 max, M=2 max)
- Active current sharing function
- PMBus/I2C communication function
- Black box function
- Over-current alarm, over-current/short-circuit/over-voltage /under-voltage protection, over-temperature protection, fan-fault protection
- 5 years warranty
- Safety according to UL/EN/IEC62368、GB4943

LMS2700-T12B product is a titanium energy-efficient server module power supply provided by for customers. It supports AC & HVDC wide voltage range input, hot-plug available and parallel using requirements. It features high efficiency, intelligent backup function, anti-backflow, remote compensation. With PMBus/I2C communication function, it can support online monitoring of input/output voltage/ current/power, with fault warning, black box and other functions. The power supply is equipped with a fan for heat dissipation,with a suction heat dissipation mode,and the fan adopts an automatic speed regulation design. EMC and safety specifications meet the standards of UL/EN/IEC62368 and GB4943.

Selection Guide

Part No.*	Rated input voltage	Fan Operation Type	Output Power (W)*	nominal Output Voltage(VDC)		Main Load(A)		Auxiliary Load(A)	Max. Capacitive Load (μF)	
				Main Circuit	Auxiliary Circuit	Min.	Max.	Typ.	Main Circuit	Auxiliary Circuit
LMS2700-T12B	100-127VAC	Forward airflow, from DC to AC	1200	12.2	12.0	1	98	2.5	50000	3100
	200-220VAC		2400			1	196	2.5		
	220-240VAC 240VDC		2700			1	221	2.5		

Note: 1.*The maximum power of high-voltage input shall not exceed 2700W, and the maximum power of low-voltage input shall not exceed 1200W;
2.*The product picture is for reference only.For details, please refer to the actual product.

Input Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Input Voltage Range	Low voltage ac input			90	115	132	VAC
	High voltage ac input			180	230	264	
	DC input			180	240	310	VDC
Input Voltage Frequency	AC input			47	50/60	63	Hz
Efficiency	TA=25℃, without Fan	Vin: 230VAC/50Hz	10% load	--	90	--	%
			20% load	--	94	--	
			50% load	--	96	--	
			100% load	--	91	--	
Input Current	Vin=230Vac/50Hz Pout=2700W			--	--	15	A
	Vin=240Vdc Pout=2700W			--	--	15	
Inrush Current	Vin=240Vac/50Hz Pout=2700W		Cold start	--	--	35	
Leakage Current	Earth leakage current	Vin=264Vac/60Hz		--	--	0.875	mA
Power Factor	Io=10%Imax @ Vin=230Vac/50Hz			0.90	--	--	--
	Io=20%Imax @ Vin=230Vac/50Hz			0.96	--	--	
	Io=50%Imax @ Vin=230Vac/50Hz			0.98	--	--	
	Io=100%Imax @ Vin=230Vac/50Hz			0.99	--	--	
ITHD	5%Imax≤Io≤10%Imax @ Vin=230Vac/50Hz			--	--	20	%

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	10%Imax<Io≤20%Imax @ Vin=230Vac/50Hz	--	--	15	
	20%Imax<Io≤40%Imax @ Vin=230Vac/50Hz	--	--	10	
	40%Imax<Io≤50%Imax @ Vin=230Vac/50Hz	--	--	8	
	50%Imax<Io≤100%Imax @ Vin=230Vac/50Hz	--	--	5	

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Rated Output Voltage	+12V	12.1	12.2	12.3	V
Steady State Output Voltage Range		11.8	12.2	12.6	
Dynamic Output Voltage Range		11.6	--	12.8	
Output Ripple & Noise*		--	--	120	mV
Output Current		1	--	221	A
Current Sharing Accuracy (@270W<Pout<540W)		--	--	10	%
Current Sharing Accuracy (@540W≤Pout≤2700W)		--	--	5	
Hold-up Time*		11	--	--	ms
60% load jump; 2.5A/us; Main load parallel 2200uF capacitor with 5A minimum load, auxiliary load parallel 100uF capacitor, Frequency 50Hz~10kHz.		11.6	--	12.8	V
Rated Output Voltage	+12VSB	11.4	12	12.6	V
Steady State Output Voltage Range		11.4	12	12.6	
Dynamic Output Voltage Range		11.4	--	12.8	
Output Ripple & Noise*		--	--	120	mV
Output Current		0.1	--	2.5	A
Hold-up Time*		70	--	--	ms
2A load jump; 2.5A/us; Main load parallel 2200uF capacitor with 0.1A minimum load, auxiliary load parallel 1000uF capacitor,Frequency 50Hz~10kHz.		11.4	--	12.6	V

Note: 1.*The test methods for ripple and noise adopt the measurement method. A 8*270uF solid-state filter capacitor is added at the main output terminal, and a 100uF solid-state filter capacitor is added at the auxiliary output terminal. The current passes through the filter capacitor before being connected to the test probe, coaxial cable in parallel with 10uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to Server Power Test Specifications for specific information;
2. *The power-off retention time is based on 70% load.

Protective Characteristics

	Item	Min.	Typ.	Max.	Unit	Note
+12V Output	Over-current Alarm	110	115	120	%	alarm delay ≥ 20s, no protection
	Over-current Protection 1	120	130	140		Slow warning, alarm delay ≥ 10s, OCP action delay ≥ 2 ms, lockout*, +12VSB output is normal
	Over-current Protection 2	140	145	150		Fast warning, alarm delay ≥ 50ms, OCP action delay ≥ 2 ms, lockout*, +12VSB output is normal
	Over-current Protection 3	150	155	160		Fast warning, alarm delay ≥ 50ms, OCP action delay ≥ 2 ms, lockout*, +12VSB output is normal
	Over-current Protection 4	170	--	--		OCP , lockout*, +12VSB output is normal
	Short-circuit Protection	+12.2V output short circuit does not affect the normal operation of +12VSB, Short-circuit protection lockout for +12.2V output, The short-circuit protection mode is latching, reset by PSON or AC power off and restart for recovery				
	Over-voltage Protection	13.5	--	14.5	V	Latching, reset by PSON#, AC power off and restart for recovery
	Under-voltage Protection	10	--	10.9		Self-recover
	Over-temperature Protection point	--	70	--	℃	Over-temperature protection hysteresis is greater than 5℃ and self-recovery is available.
	Over-temperature Protection Release point	--	65	--		
	Fan-fault Protection	When the fan is faulty, the output is turned off. After the fault is rectified, the output automatically recovers				
+12VSB	Item	Min.	Typ.	Max.	Unit	Note

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Output	Over-current Protection	3.0	--	4.5	A	Self-recovery (main output will be protected/self-recovery together)
	Short-circuit Protection	Self-recovery(main output will be protected/self-recovery together)				
	Under-voltage protection	13.5	--	15	V	Self-recovery (main output will be protected/self-recovery together)
Note:1.*Unlocking method after locking: Reset through PSON, or power on after AC power-off for 25 seconds, or receive an unlock command from t he upper computer.						

LED Indicator Light

Power Status	Light Status
Input is normal, the 12V main output and 12VsB output are also normal.	Green
All power supplies no AC input	Light off
The AC power supply is normal, there is only 12Vsb output or the power has entered the cold standby state.	The green light flashes at a frequency of 1Hz
A severe alarm on a single power supply causes the power supply to shut down the main power output, if any of the following failures occur: failure of protection against over-current, over-voltage, failure of the fan, etc.	Orange
The power supply is working but there are alarms, such as high temperature, high power, high current, and slow fan speed.	The orange light flashes at a frequency of 1Hz
During the online upgrade process (Note: The amber light will be illuminated 10 minutes after the upgrade fails)	The green light flashes at a frequency of 2Hz

Data Online Reading and Monitoring

Item	Accuracy Range		
Output Load	<10%	10%-20%	20%-100%
Input Voltage	±5%	±5%	±2%
Input Current	±10%/±0.2A	±5%	±2%
Input Power	±10%/±10W	±5%	±2%
Output Voltage	±5%	±5%	±2%
Output Current	±10%	±5%	±2%
Output Power	±10%	±5%	±2%

Timing Definition

Item	Description	Min.	Max.	Unit
Tvout_rise	The time it takes to increase from 10% to the output voltage of 12VOUT.	10	70	ms
	The time it takes to increase from 10% to the output voltage of 12Vsb.	5	70	
Tsb_on_delay	The time from AC input to the output voltage of 12Vsb (rated 230Vac/50Hz).	--	1500	
Tac_on_delay	The time from AC input to when all output voltages are in a stable voltage state.	--	3000	
Tvout_holdup	The time for the 12VOUT output voltage to remain stable after the AC power is cut off (70% load).	11	--	
Tpwok_holdup	The time for PWOK to remain active, from the time AC power is cut off to the time the PWOK signal becomes low (70% load).	10	--	
Tpson_on_delay	The time from the PSON# signal becoming low to the 12VOUT being in a stable voltage state.	5	400	
Tpson_pwok	The time from the PSON# signal becoming high to the PWOK signal becoming low.	--	5	
Tpwok_on	The time when the PWOK signal takes effect (from the 12V output to the PWOK signal becoming high).	100	500	
Tpwok_off	The time when the PWOK signal fails (from the PWOK signal being set low to the 12V dropping to 11.4V).	1	--	
Tpwok_low	The duration that PWOK is at a low level during the on/off cycle using AC or PSON signals.	100	--	
Tsb_vout	The time from when 12Vsb is in a stable voltage state to when 12VOUT is in a stable voltage state (in the case of AC input).	50	1000	
T12VSB_holdup	The time from the AC power cut off to when the 12Vsb output voltage stabilizes and then remains stable after the PWOK signal becomes low.	70	--	

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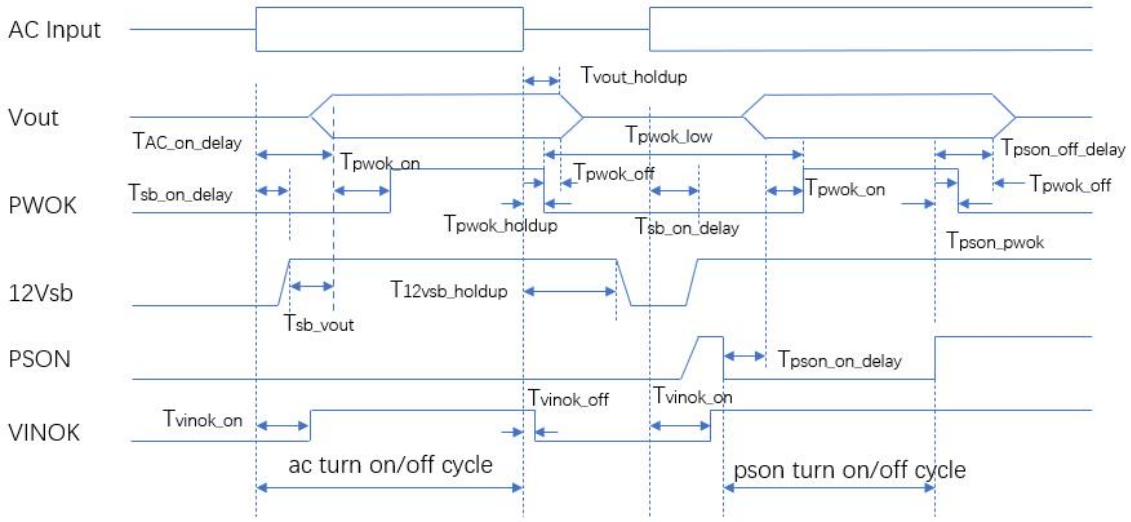
General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Test	Input - ⏚	Electric strength test for 1min., leakage current <10mA		2500	--	--	VDC
	Input - Output*	Electric strength test for 1min., leakage current <10mA		4000	--	--	
Insulation Resistance	Input - ⏚	Ambient temperature: 25 ± 5℃ Relative humidity: < 95%RH, no condensation Test voltage: 500VDC		10	--	--	MΩ
	Input - Output						
Operating Temperature		The power supply can be started at -10℃ without any performance requirements; it can operate reliably for a long time at 60℃ with half load.		-5	25	55	℃
Storage Temperature				-40	25	70	
Relative temperature		Non-condensing, and the power module can operate normally.		5	--	95	%RH
Working altitude							
Operating Altitude				-60	--	5000	m
Storage Ambient Height				--	--	15000	
Hot-plug		1. 0.5m/s ⩽ speed ⩽ 1m/s, the backplane voltage cannot exceed the dynamic specification of the power module during hot-plug process; 2. Add 2200uF capacitive load at the output.	+12V	11.2	--	13.0	V
			+12VSB	11.6	--	12.8	
MTBF		25℃, rated input, full-load output, according to Telcordia SR-332 standard method 1	>200,000 h				
Safety Standards			Design refer to UL/EN/IEC62368, GB4943				
Communication Method		PMBus/I2C					
Warranty		5 years					
Note: 1.*Input-Output isolation voltage refer to PCBA only.							

Mechanical Specifications

Case Material	Anti-rust treatment, hot-dip galvanized steel sheet (SGCC), surface requirement: No zinc granules.
Dimensions*	73.50mm x 185.00mm x 40.00mm (W x D x H)
Weight	960g (Typ.)
Cooling Method	Forced-air cooling
Fan Noise	25℃, 50%load, the overall noise ⩽ 80dB (Sound pressure level, measure at 1m)
Note: 1.*The height of the product's outer shell is 39mm, and the height of the fan is 40mm.	

Timing Diagram



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Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A
	RE	CISPR32/EN55032	CLASS A
	Harmonic current	IEC/EN61000-3-2	CLASS A
Immunity	ESD	IEC/EN61000-4-2 Contact±6KV/Air±8KV(Test based on actual usage scenarios)	perf. Criteria A
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 Input port: ±2KV	perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line ±2KV 2Ω/line to ground ±2KV 12Ω	perf. Criteria A
	CS	IEC/EN61000-4-6 10Vrms	perf. Criteria A
	Voltage dips, interruption	IEC/EN61000-4-11 >95% dip 10ms,60%load	perf. Criteria A

Functional requirements of black box

General requirements of black box	1. It is necessary to record the alarm when the output is turned off and the input power is down, the alarm status and the time of the fault occur are stored, and the important physical quantities at the fault site are saved and queried, including not limited to input voltage, output voltage, output current, temperature, fan speed, etc. Use the circular storage method (the black box information is written on the current index number +1 in case of failure, and when the index number is "record 9", the next line is written to "record 0"). 2. Support the host to query fault records one by one. Support the host to query the latest input power failure time. 3. Support host timing. The host needs to send the system time (time according to the Unix standard) to the power module, and the send it again every 10 minutes for the time synchronization of the power module. If the host is not timed, the time in the power supply is equivalent to the entire cumulative time of power supply work.
Storage and reading mechanism of black box records	Described from the time dimension, it is divided into the following stages: 1. Power-up initialization stage After powering on, read the historical fault of the EEPROM record into the cache, and the time is initialized to the last fault record plus 3 seconds. 2. Fault site storage stage The upper computer timings the power time (10min/time), when the output is turned off, the enabling fault record mark writes all the fault scene data to the EEPROM to generate a fault record. 3. Fault data reporting stage When the upper computer queries the alarm log, each time a single query is made, the lower computer takes the corresponding data from the EEPROM storage area and uploads it all to the upper computer.

Black box reading protocol

Command	Name of the command	Data reading type	Data bytes	Description of the order
D2h	MFR_READ_BLACK_BOX	Block Read	237	Power supply black box query, Reading: multi-byte (fault record information, you need to write the fault index before reading, 0-9, 0 is the latest record. 9 is the earliest record)
D3h	MFR_READ_BLACK_BOX_INDEX	Write Byte	1	Write: single byte (request to read the index of the fault record)

System timing mechanism in the black box	The power module needs to be time synchronized through host: 1) Product: -- Synchronization -- Time to send the power module every 10 minutes -- The time to send is in seconds 2) Power supply: -- The initialization time of one power on is equal to the last failure time +3 seconds -- Time synchronization of accepting products -- Interrupt timing, every 1second, the counter is increased by 1, and the time unit is seconds The timing time (time according to the Unix standard) is the number of seconds relative to the base time. The delivery time under the host will be sent to the power supply from the number of seconds from the base time to the current time. The time read in the alarm log is the number of seconds from the base time of the alarm. If the host is not given time, the running time of the power supply will increase by seconds, and the power drop needs to be saved.
Black box data content	The black box records the real-time physical quantity and state data of the scene. The storage content is divided into two parts: the head and the data department. Each record contains 38 bytes of data.

Gold-finger Definition)

Output Terminal	Definition	Output Terminal	Definition
A1-A9	SGND	B1-B9	SGND

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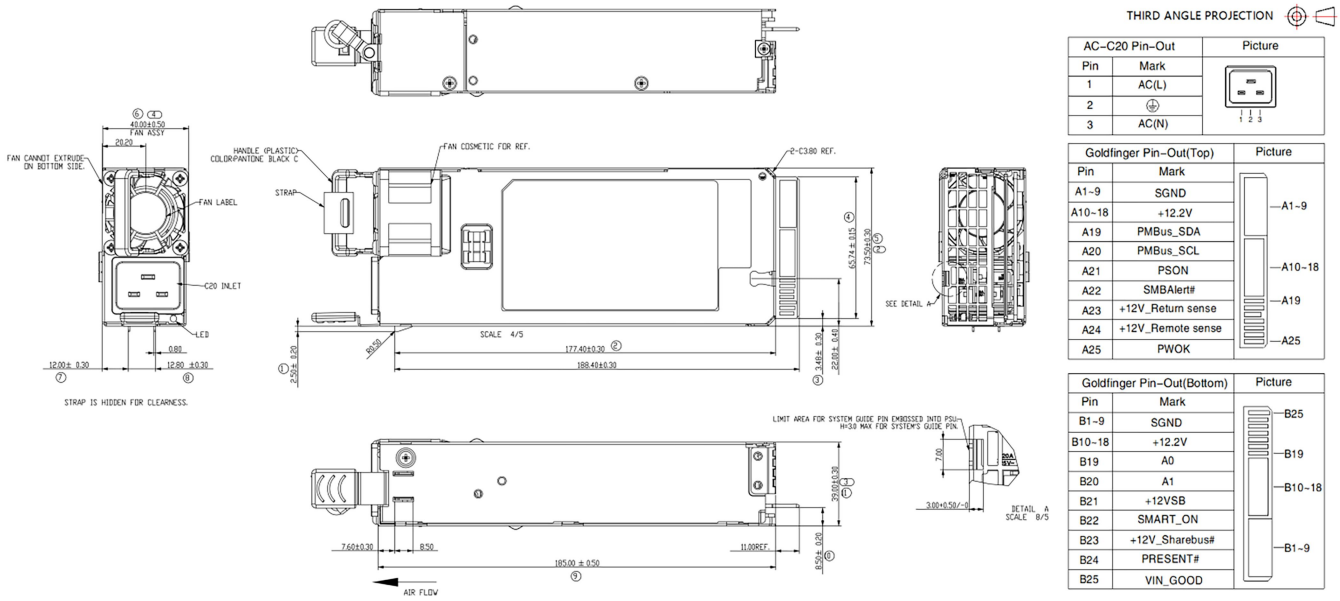
A10-A18	+12.2V	B10-B18	+12.2V
A19	PMBus_SDA	B19	A0
A20	PMBus_SCL	B20	A1
A21	PSON#	B21	+12VSB
A22	SMBAlert#	B22	SMART_ON
A23	+12V_Return sense	B23	+12V_Sharebus#
A24	+12V_Remote sense	B24	PRESENT#
A25	PWOK	B25	VIN_GOOD

Dimensions and Recommended Layout



AC-C20 Pin-Out		Picture
Pin	Mark	
1	AC(L)	
2	⏚	
3	AC(N)	

Goldfinger Pin-Out(Top)		Picture
Pin	Mark	
A1~9	SGND	A1~9
A10~18	+12.2V	A10~18
A19	PMBus_SDA	A19
A20	PMBus_SCL	
A21	PSON	
A22	SMBAlert#	
A23	+12V_Return sense	
A24	+12V_Remote sense	
A25	PWOK	A25

Goldfinger Pin-Out(Bottom)		Picture
Pin	Mark	
B1~9	SGND	B25
B10~18	+12.2V	B19
B19	A0	B10~18
B20	A1	
B21	+12VSB	
B22	SMART_ON	
B23	+12V_Sharebus#	B1~9
B24	PRESENT#	
B25	VIN_GOOD	

Note:

1. 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;
2. The room temperature derating of 1℃/300m is needed for operating altitude greater than 2000m;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. The out case needs to be connected to PE (⏚)of system when the terminal equipment in operating;
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
8. The power supply is considered a component which will be installed into a terminal equipment. All EMC tests should be confirmed with the final equipment.

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