

**LPM600-72-13R8 : Isolated DC/DC Converters**  
50 – 100V Input Range, Maximum Power : 600WData Sheet  
May. 31, 2011**LPM600-72-13R8 : Isolated DC/DC converters****Features**

- Screw type pin
- High efficiency, typ. 92% at full load
- 1500Vdc input to output isolation
- Output over voltage protection
- Input over voltage protection
- Input under voltage protection
- Over temperature protection
- Over current protection
- Short circuit protection
- Remote control
- RoHS directive

**Applications**

- Server, storage, network, and communications infrastructure
- Instrumentation / Equipments
- Electric vehicle

LPM600 series are a high efficiency, isolated dc-dc power modules providing up to 600W, which makes it an ideal choice for high current and high power applications. The series feature a cc/cv control, battery can be connected at the output of the module. Also this module has a very low input current at no load condition.

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**YPM600-72-12 Absolute Maximum Ratings**

Parameter	Min.	Typ.	Max.	Unit	Notes
Input voltage continuous	0	-	100	Vdc	
Operating temp. (Baseplate temp.)	-40	-	95	°C	
Storage temperature	-40	-	125	°C	
I/O isolation voltage	-	1500	-	VDC	

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device.

**YPM600-72-12 Electrical Specifications**

Ta=25°C, Vin=72Vdc unless otherwise noted.

**Input Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating voltage range	Vin	50	72	100	Vdc
Input under voltage lockout					
Turn-on threshold		-	45.5	-	Vdc
Turn-off threshold		-	43.5	-	Vdc
Input over-voltage protection					
Turn-on threshold		-	97	-	Vdc
Turn-off threshold		-	104	-	Vdc
Disabled input current (Remote on/off control, module disabled)		-	4	-	mA
No load input current (Io = 0, Module enabled)			20		mA
Maximum Input current (Vin = Vin,min, Io = Io,max)	Iin	-	13.2	-	A
Input reflected ripple current (Io = Io,max)		-	0.6	-	A

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**Output Characteristics**

Parameter	Symbol	Min	Typ	Max	Unit
Output voltage set point	$V_o$	-	13.8	-	V
Output regulation; - Line regulation( $V_{in}=V_{in,min}$ to $V_{in,max}$ ) - Load regulation( $I_o=I_{o,min}$ to $I_{o,max}$ )		-	-	$\pm 0.5$	%
Output current	$I_o$	0	-	43.5	A
Output current limit(Automatic recovery)		105	-	-	%
Output ripple and noise, ( $I_o = I_{o,max}$ , 1 $\mu$ F ceramic + 15 $\mu$ F tantalum, Bandwidth : 20MHz)		-	-	120	mV
Efficiency ( $V_{in} = 72V$ , 100% Load)		-	92.1	-	%
Dynamic load response (Load change from $I_o = 50\%$ to 75% , 75% to 50% of $I_{o,max}$ , Slew rate = 0.1A/ $\mu$ s)		-	537	-	mV
Recovery time(within 1% of $V_{o,nom}$ ) (Load change from $I_o = 50\%$ to 75% , 75% to 50% of $I_{o,max}$ , Slew rate = 0.1A/ $\mu$ s)		-	156		$\mu$ s
Output Over-voltage Protection		-	125	-	%
Start-up time ( $I_o=I_{o,max}$ , $V_{in}$ : on)		-	50	-	ms
Turn-on overshoot		-		1	%

**General Specifications**

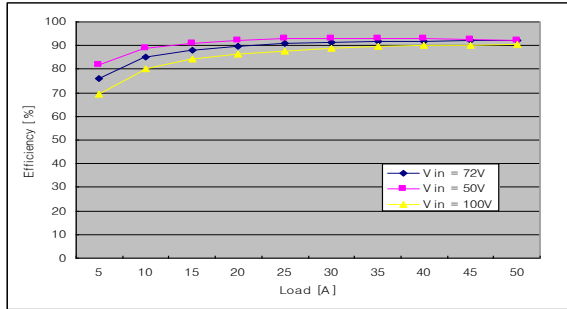
Parameter	Symbol	Min	Typ	Max	Unit
Switching Frequency		-	165	-	KHz
Remote control pin voltage On Off		Short $V_{in-}$ or 0 to 0.5Vdc Open or 4.5 to 15Vdc			Vdc Vdc
Over-temperature protection (Baseplate)		-	100	-	$^{\circ}$ C
Over-temperature accuracy		-	$\pm 3$	-	$^{\circ}$ C
Dimensions		186.5 x 75 x 18.75			mm
Weight		-	-	-	g

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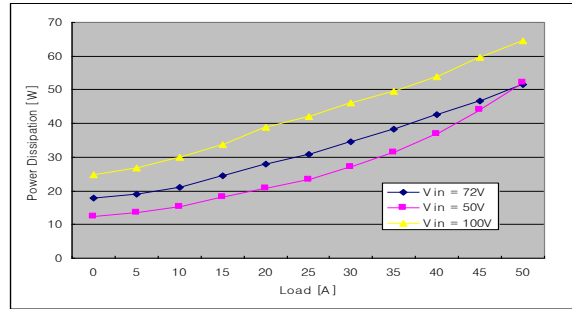
**Characteristic Curves**

**Efficiency**



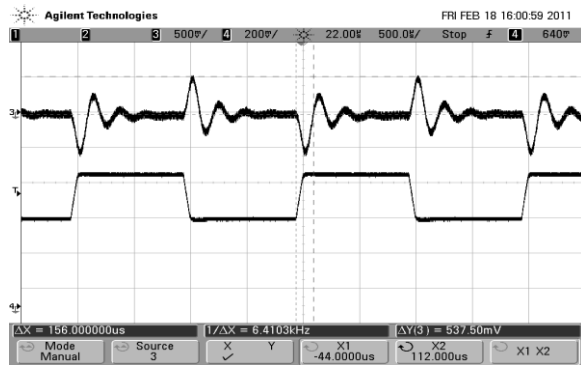
[Fig.7] Efficiency curve vs Output Load (25 °C)

**Power Dissipation**



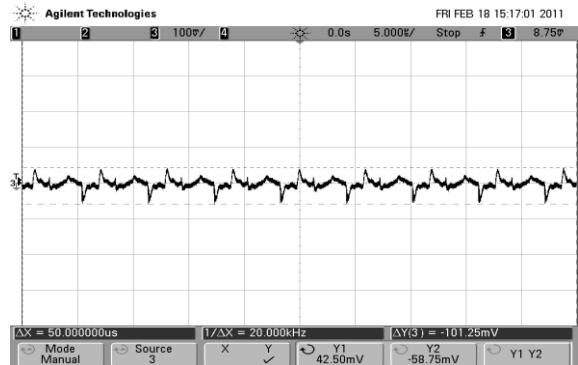
[Fig.8] Power dissipation vs Output Load (25 °C)

**Output Load Transient Response**



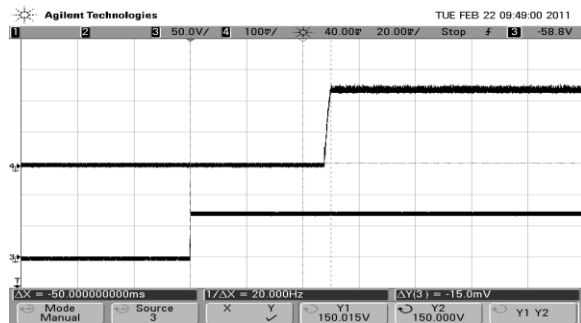
[Fig. 9] Load step: 50%-75-50% of Io, di/dt= 0.2A/us (CH3: 500mV/div, CH4: 10A/div, 0.5ms/div)

**Ripple/Noise**



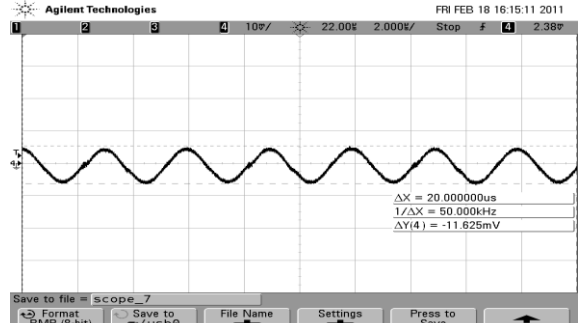
[Fig. 10] Output ripple & noise (100mV/div)

**Start-up from Input Voltage**



[Fig.11] Ch4: Vo, Ch3: Input voltage(20ms/div)

**Input Reflect Ripple Current**



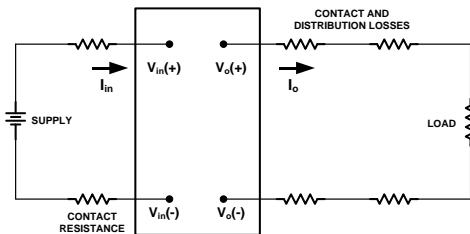
[Fig.12] Input reflect ripple current(0.5A/div)

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**TEST Configurations**

**Output Voltage and Efficiency**



\*All measurements are taken at the module terminals when socketing, place Kelvin connections at module terminals to Avoid measurement errors due to socket contact resistance.

**Efficiency**

$$\eta = \left( \frac{[V_o(+)-V_o(-)] \times I_o}{[V_{in}(+)-V_{in}(-)] \times I_{in}} \right) \times 100\%$$

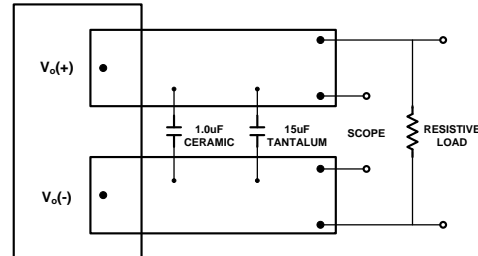
**Thermal Considerations**

This products has wide operating temperature range from -40°C to +95°C at baseplate. However, it should be required an enough air flow for more reliable operation. Output derating curve provide designers with a quantity of a current under the desired ambient temperature and velocity of airflow.

**Output load transient response / ripple & noise Test**

Output load transient response and ripple&noise are measured in figure. And the probe ground should be less than 1/2 inch and oscilloscope is set up 20MHz bandwidth to measure exact data.

**Protection Functions**



**Input under-voltage Lockout (UVLO)**

At input voltages below the input under-voltage lockout limit, the module operation is disabled. The module will begin to operate once the input voltage is raised above the under-voltage lockout turn-on threshold.

**Input Over-Voltage Protection**

At input voltages over the input over-voltage lockout limit, the module operation is disabled. The module will begin to operate once the input voltage is downed under the over-voltage lockout turn-on threshold.

**Output Over Voltage Protection (OVP)**

To provide protection in output over voltage, the Unit is equipped with internal protection circuitry. The module automatically recovers when over voltage condition is removed.

**Over current Protection (OCP)**

To provide protection in output overload condition, the unit is equipped with internal current-limiting circuitry. At the point of current-limit inception, the unit enters hiccup mode. Also the module automatically recovers when over current condition is removed.

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May. 31, 2011**Over Temperature shut down (OTP)**

The converters are equipped with precision thermal-shutdown circuitry. If the internal temperature of the converter rises up to the designed operating temperature, a precision temperature sensor will power down the unit. When the internal temperature decreases below the threshold of the temperature sensor, the unit will automatically restart.

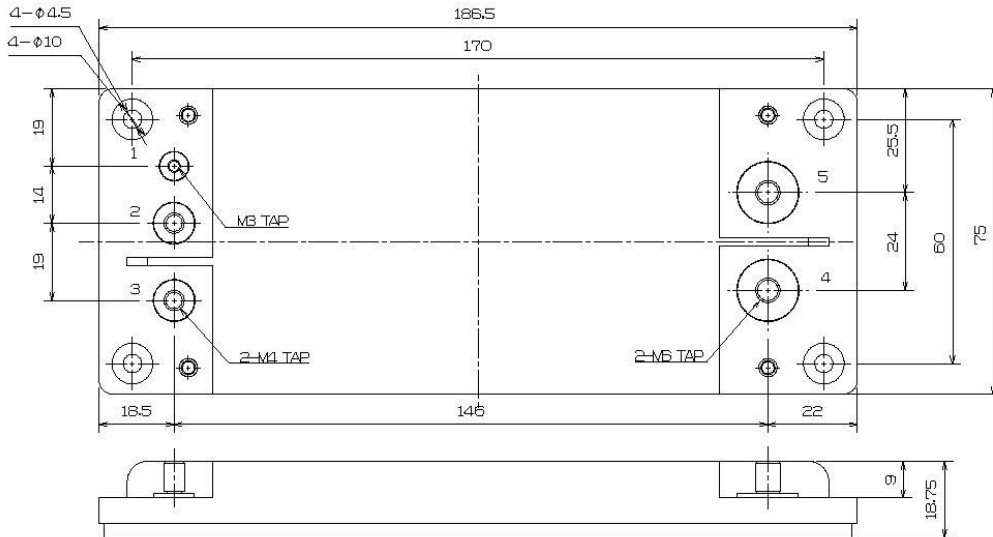
**Pin Functions****Remote On/Off Control (CNT)**

Two remote on/off options are available. Positive logic turns module on during a logic high voltage on the ON/Off pin, and off during a logic low. Our module is set up negative logic with default. If you want positive logic, contact our company.

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**Mechanical Specification**



NOTES

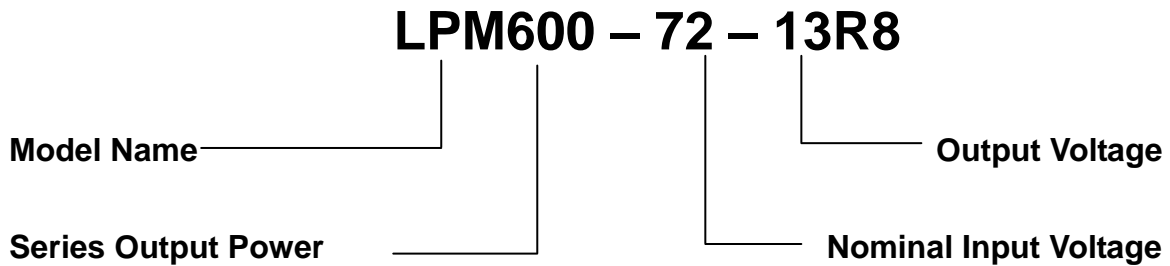
1. Case : Aluminium base plate
2. Screw pin material (1-5) : Phosphor bronze / Gold flash
3. For screw pin attachment , apply mouting torque of max ?Nm
4. Cover material : PBT
5. Weight : Typical ?g
6. All dimensions in [mm]

**Pin Assignments**

PIN	Function
1	CNT
2	-Vin
3	+Vin
4	+Vout
5	-Vout

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May. 31, 2011**Ordering Information**

Input	Output	Maximum Power	Ripple & Noise Max.	Efficiency Typ.	Model Number
36~75V	13.8V@43.5A	600W	120mVp-p	91.2%	LPM600-48-13R8
50~100V	13.8V @43.5A	600W	120mVp-p	92.1%	LPM600-72-13R8
60~120V	13.8V @43.5A	600W	120mVp-p	91.9%	LPM600-96-13R8

**Part Number Structure**

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