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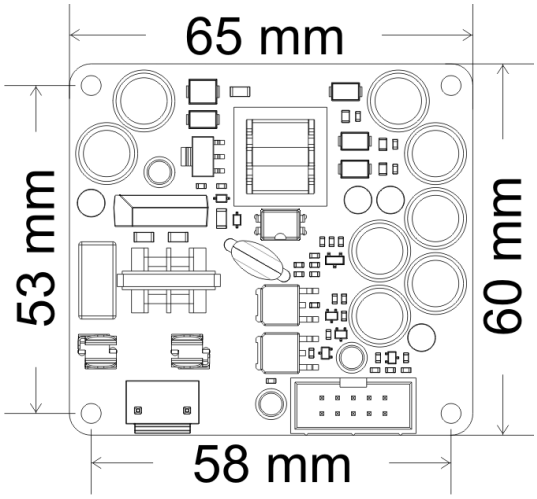
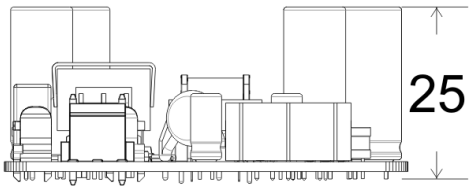
SMPSDLCP

High Efficiency SMPS





Highlights

- High efficiency
- Universal Mains Input (100V-240VAC/50-60Hz)
- Extremely small form factor
- Class II construction
- Very low EMI
- Low AC leakage current
- Low standby power consumption
- Low noise output voltages

Features

- Remote controlled operation
- Low weight: 55gr.
- Compact: 65 x 60 x 25mm

Applications

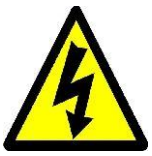
- Dedicated supply for DLCP (including Add-on set)

Description

This switch mode power supply is specially designed to be used in mixed signal applications such as DSP and audio applications requiring a single low voltage output for powering the digital parts of the circuit and both a positive and negative output rail for powering the analogue circuitry. These last outputs are remotely ON/OFF controllable enabling the user to power off the analogue circuitry and achieving a low power standby state. Special attention has been paid right from the start of the design to guaranty the lowest possible EMI signature, the lowest leakage current, the best noise filtering of the output voltages and highest reliability.

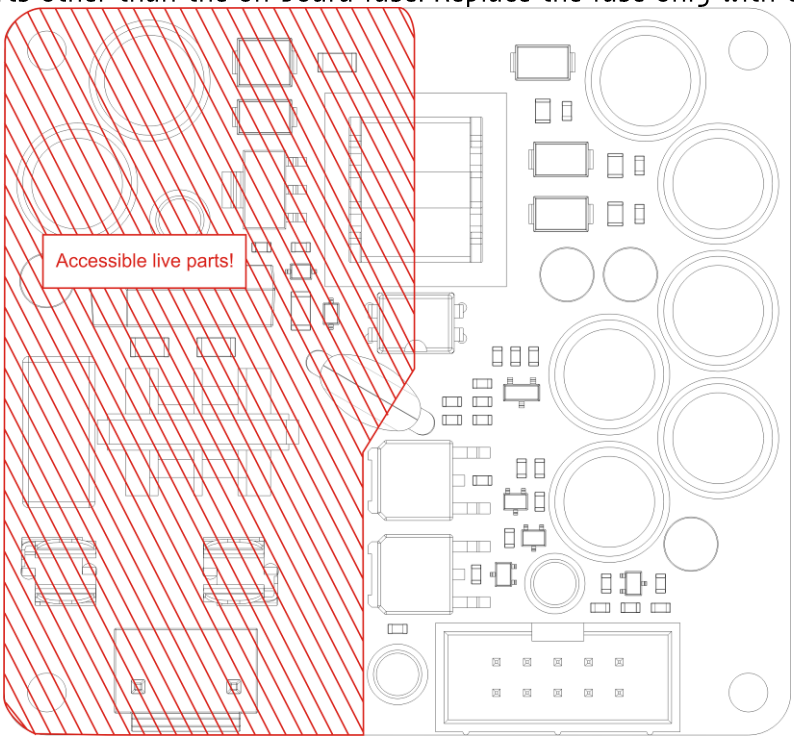
Contents

1 Safety precautions



The SMPSDLCP operates at mains voltage and carries hazardous voltages at accessible parts. These parts may never be exposed to inadvertent touch. Observe extreme care during installation and never touch any part of the unit while it is connected to the mains. Disconnect the unit from the mains and allow all capacitors to discharge for 2 minutes before handling it.

This product has no serviceable parts other than the on-board fuse. Replace the fuse only with the same type and rating (250V T2AH).



This is a Safety Class 2 device. It is very important to maintain a 6mm clearance with all possible conducting parts (housing etc.) and cables. All parts enclosed by the dotted line below carry hazardous voltages. This includes parts on the top and the bottom of the board. When the SMPSDLCP is mounted in a tight space there needs to be at least 6mm clearance or a layer of insulation with a minimum thickness of 0.5mm between the top of the primary capacitors and the housing. Only use insulated spacers in the dotted area.

10mm spacers are mounted, this creates the mandatory 6mm clearance from the bottom side of the PCB to the chassis without the need for additional insulating material. However, If the enclosure is limited in height, one shall need to use smaller spacers and provide a layer of insulation both above and below the SMPS with a minimum thickness of 0.5mm in order to comply with the Class 2 Safety Directive. If these measures are taken into account, the maximum overall height can be reduced to 26mm.

2 Instructions For Installation

Warning: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

Warning: Disconnect the unit from the mains and allow all capacitors to discharge for 2 minutes before handling it.

This symbol indicates the presence of hazardous voltages at accessible conductive terminals on the board.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the application.
7. Only use attachments/accessories specified or approved by the manufacturer.
8. Unplug this apparatus during lightning storms or when unused for long periods of time.
9. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.
10. This product is to be used with Hypex amplifier modules only.
11. Only the ready-made cable sets provided by Hypex may be used for external wiring of the SMPSDLCP.
12. Don't run any cables across the top or the bottom of the SMPSDLCP. Apply fixtures to cables to ensure that this is not compromised.
13. Observe a minimum distance of 6mm maintain clearance with all possible conducting parts (housing etc.). All parts enclosed by the dotted line below carry hazardous voltages. This includes parts on the top and the bottom of the board. When the SMPSDLCP is mounted in a tight space there needs to be at least 6mm clearance or a layer of insulation with a minimum thickness of 0.5mm between the top of the primary capacitors and the housing.
14. Natural convection should not be impeded by covering the SMPSDLCP (apart from the end applications housing).

3 Absolute maximum ratings

Correct operation at these limits is not guaranteed. Operation beyond these limits may result in irreversible damage

Item	Symbol	Rating	Unit	Notes
Input voltage	V_{LINE}	270	Vac	
Air Temperature	T_{AMB}	50	°C	

4 Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Notes
Input Voltage	V_B	100	230	264	Vac	
Line Input Frequency	f	50		60	Hz	

5 General Performance data

Item	Symbol	Min	Typ	Max	Unit	Notes
Aux output voltage	$V_{OUT,AUX}$	2x15.8	2x16	2x17	V	
Standby output voltage	$V_{OUT,Standby}$	6.5	8	9	V	
Max Output Current Aux	$I_{OUT,AUX}$		500m	-	A	per rail
Max Output Current Standby	$I_{OUT,Standby}$		1.5		A	
Max Output ripple Voltage	Vripple		50m		V	1Hz-20MHz
Max Output Power	P_R	10	-	-	W	[1)]
Efficiency	η		TBD		%	full power
Standby Power/ Idle losses	$P_{standby}$		<0,15		W	
Switching frequency	F_{SW}		100		kHz	

Note 1: This SMPS is capable of delivering 10W continuously over the entire specified input voltage and operational temperature range. The total output power is the total sum of all 3 voltages times their load current. How these loads are spread over the outputs does not matter.

6 Connector Pinout

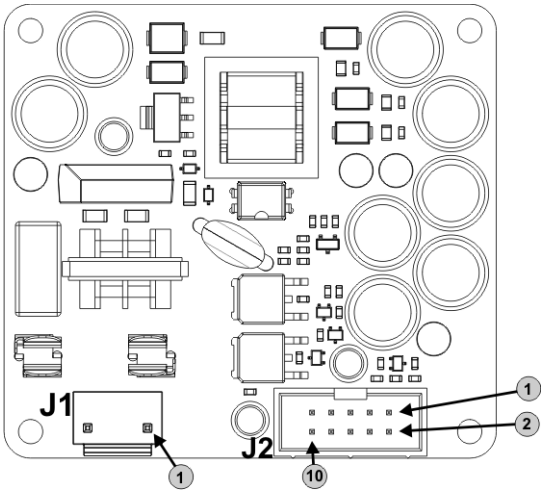


Figure 1: Connector pinning SMPSDLCP.

6.1 J1: Mains Input

Connector type: JST (www.jst.com) B2P3-VH. Matching cable part: VHR-3N

Pin	Function
1,3	Mains Input
2	NC

Note : As per Class 2 ground is NC and so unavailable for safety ground. You must follow Class 2 safety standards in implementing the SMPSDLCP. Also read www.hypex.nl/.../earth_appnote.pdf

6.2 J2: Output

Connector type: 2.54mm pitch dual row 10 pin box header
This connector is pin compatible with the DLCP J4 header, please remove any supply connected to DLCP header J16.

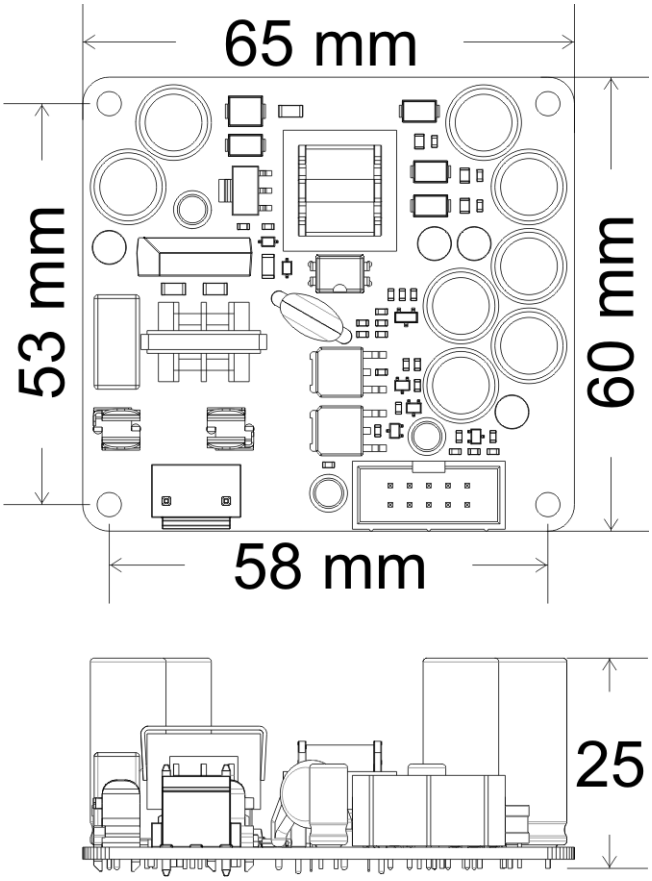
Pin	Type	Function
1	Input	On/Off control
2	-	NC
3	Output	Positive Auxiliary Output Voltage
4	Output	Positive Auxiliary Output Voltage
5	Output	Ground
6	Output	Standby Output voltage
7	Output	Negative Auxiliary Output Voltage
8	Output	Negative Auxiliary Output Voltage
9	-	NC
10	-	NC

6.3 SMPS Standby Input Characteristics

The standby output and auxiliary outputs are always present from the moment the SMPS is connected to the mains. So in the default state, with the ON/OFF control line (J2-1) unconnected or tied to ground, outputs +VAUX and –VAUX are active.
To disable outputs +VAUX and –VAUX the ON/OFF control line needs to be pulled high to a voltage of at least 2V. The impedance of this line is 10kOhm so it can be directly controlled by any microcontroller or low power circuit. In this state the module is in its low power standby mode. Featuring a no-load standby power of <150mW, capable of delivering 30mA on the standby output and still comply to the 0.5W standby regulation.

Item	Type	Min	Typ	Max	Unit	Notes
DC voltage on J2:1	input	2		10	Vdc	

7 Dimensions



Note: Mounting spacers are included in the package. The total height with 10mm spacers is 33mm

DISCLAIMER: This product is designed for use in sound reproduction equipment in conjunction with Hypex amplifier modules. No representations are made as to fitness for use in other applications. Except where noted otherwise any specifications given pertain to this subassembly only. Responsibility for verifying the performance, safety, reliability and compliance with legal standards of end products using this subassembly falls to the manufacturer of said end product.

LIFE SUPPORT POLICY: Use of Hypex products in life support equipment or equipment whose failure can reasonably be expected to result in injury or death is not permitted except by explicit written consent from Hypex Electronics BV.

Document Revision	PCB Version	Description	Date
R1	SMPS DLCP V0.0	Initial Draft.	08.09.2014
R2	SMPS DLCP V0.0	Section 6.3 changed	22.09.2014