

SDV1042-600: 600W RMS, CLASS D, AUDIO AMPLIFIER EVALUATION BOARD

FEATURES

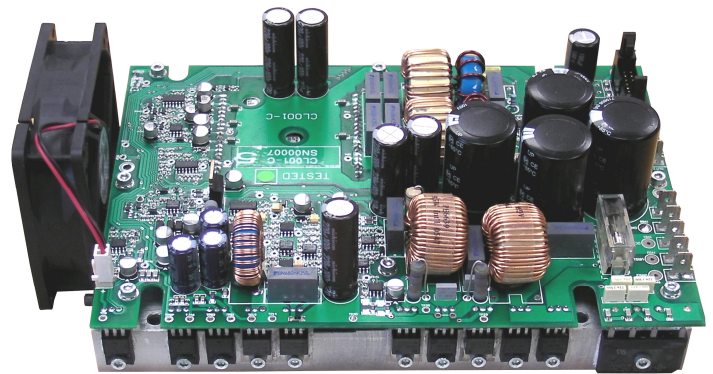
- **HIGH POWER:** up to 600W RMS (FTC Rating)¹
- **HIGH EFFICIENCY:** typically 90%
- **HIGH SWITCHING FREQUENCY:** 340KHz.
- **BOOST CONVERTER LOCKED TO AMPLIFIER SWITCHING FREQUENCY**
- **LOW DISTORTION:** c. 0.5% THD OPEN LOOP³
- **SIMPLE POWER SUPPLY REQUIREMENT** 42V to 80V AC or DC (Single supply)²
- **AUXILLARY SUPPLY FOR PRE-AMP CIRCUITRY AVAILABLE** (18V @ 1A)
- **FULL SHORT-CIRCUIT PROTECTION**
- **THERMAL PROTECTION**
- **START-UP, SHUTDOWN SYNCHRONISATION**
- **ONBOARD TEMPERATURE MONITOR**
- **FAN CIRCUITRY INCLUDED**
- **DRIVES 16Ω, 8Ω, 4Ω and 2Ω SPEAKERS**
- **COMPACT and LIGHTWEIGHT**
- **LOW COST**
- **ALTERNATIVE CONFIGURATIONS AVAILABLE**⁴

NOTES

- 1) Other power options include 300W and 150W. Alternately, custom power levels can be produced.
- 2) Companion switch-mode PSU unit available
- 3) Assumes minimisation of external noise coupling and measured in audio band only.
- 4) Contact Ecotec Systems Ltd. for more details of these options

APPLICATIONS

- **AUDIO POWER AMPLIFIER**
- **ACTIVE SPEAKER SYSTEMS**
- **ACTIVE SONAR SYSTEMS**
- **NOISE CANCELLATION SYSTEMS**
- **MOTOR / MAGNET DRIVE MODULES**
- **POWER CONVERSION**
- **UPS - SINE WAVE INVERTER**

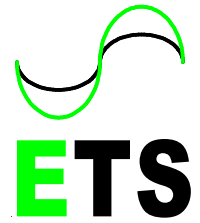


DESCRIPTION

The SDV1042-600 is a class D amplifier evaluation board, which contains the SDV1025-600 class D amplifier module. The board contains an input pre-amplifier, a sophisticated output filter; full short-circuit protection and turn-on/off synchronisation to prevent inadvertent outputs at start-up/shutdown. This interface board is designed to give a simple, user friendly introduction to the SDV1025-600 class D amplifier module. Apart from the interface PCB only a suitable power supply with a single positive output is required to complete a single channel amplifier design. The interface PCB is shown above. Details of the various interface board functions are described below.

Please contact EcoTec Systems Ltd. for a confidential discussion of your requirements and further application information.

SPECIFICATIONS



Absolute maximum ratings

Rail voltage, V_{RS}	100 V
Operating free air temperature, T_A	-10°C to 40°C
Storage temperature range, T_{stg}	-40°C to 70°C

Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated “recommended operating conditions” is not implied.

Recommended operating conditions

	MIN	TYP	MAX	UNIT
RAIL VOLTAGE, V_{RS}	42	48	80	V
AUDIO INPUT LEVEL	0		1	V _{rms}
OPERATING FREE AIR TEMPERATURE, T_A	-10		40	°C

Electrical characteristics at a free air temperature of 25°C

PARAMETER	NOTES/TEST CONDITIONS	VALUE			UNIT	
		$V_{RS} = 55\text{ V}$				
		MIN	TYP	MAX		
R_{IN}	AUDIO INPUT IMPEDANCE (Other input options available)		22		K Ω	
F	FREQUENCY RESPONSE	35		20,000	Hz	
P_{out}	OUTPUT POWER		600		W _{rms}	
I_{RS}	POWER RAIL CURRENT	$R_L = 4\Omega$	12		A _{rms}	
P_{RR}	ALLOWABLE POWER RAIL RIPPLE	SEPARATE POWER SUPPLY MODULE AVAILABLE	20		%	
r_o	OUTPUT RESISTANCE	$R_L = 4\Omega$		100	m Ω	
SNR	SIGNAL TO NOISE RATIO	$R_L = 4\Omega$ (in audio band)	-90		dB	
f_{sw}	SWITCHING FREQUENCY		300	340	380	KHz
t_{PD}	PROPAGATION DELAY (POWER OUTPUT STAGE)	$R_L = 4\Omega$	100		ns	

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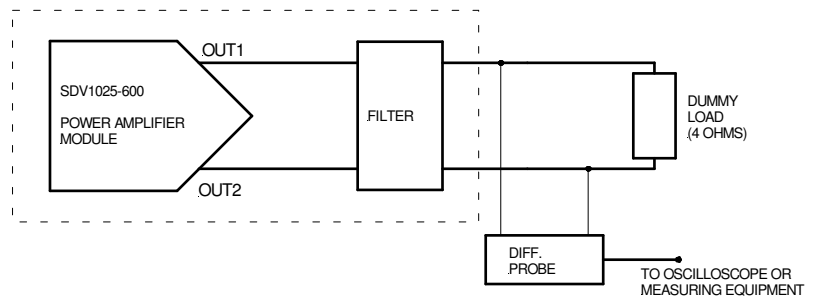
OUTPUT POWER



When considering the output power of a class D power amplifier an important distinction must be made between the power levels when the amplifier is run into clip or if the output is to be operated clean (un-distorted). The SDV1042-600 with a 48V supply rail will give 600Wrms clean into a 4 Ohm load.

The output power from the SDV1042-600 evaluation board must be measured differentially across both of the amplifier outputs (see layout and connection details later). Failure to measure differentially will produce erroneous power level readings. A typical measurement scenario is shown opposite.

Best results are achieved using a battery powered differential probe, which can then be connected directly to an oscilloscope. A single ended probe connected to one output and the earth lead connected to the other output will trigger the protection circuitry of the unit which will shutdown the amplifier operation. Connecting a probe to one output and the earth lead to the amplifier ground will give erroneous readings, such that the measured power will be 25% of the actual power. The load shown in the measurements is a resistive 4 Ohm load rated at the power level for the amplifier.



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The output power from the amplifier to the load is determined by

$$P_{out} = \frac{(V_p)^2}{2R_{load}}$$

Where V_p is the peak output voltage

R_{load} is the output load

There is one final distinction which needs to be considered when measuring the power of the amplifier module. The power rating of the SDV1042-600 is based on a continuous 5 minute power test with a sine wave input into a resistive 4 ohm load. Dependent upon the ambient temperature the SDV1042-600 will run continuously for much longer than 5 minutes. For exact power ratings at ambient temperatures other than 25C, please contact Ecotec Systems.

THERMAL EFFICIENCY



The SDV1042-600 evaluation board is designed to be a compact power module for audio applications. Using a fan mounted onto the amplifier module heatsink it will run continuously for several minutes at full power at ambient temperatures. If longer periods of operation at full power are required then alternative heatsinking methods must be used. If you wish to explore these alternatives, please contact Ecotec Systems for a confidential discussion of your application.

INPUT CHARACTERISTICS

The input impedance of the standard amplifier module is 22K Ω . The input pre-amplifier is a differential configuration, although it can also directly accept single ended input signals.

POWER SUPPLIES

The SDV1042-600 evaluation board requires a suitable power supply for correct operation. The evaluation board generates all of the necessary control voltage supplies from the main power supply. In addition, the evaluation board circuitry controls the sequencing of these supplies at turn-on and turn-off to avoid inadvertent signals from the amplifier; which would be manifested as clicks and other undesirable noises in any speaker connected to the amplifier. When using the evaluation board the user only needs to supply a single positive power DC supply which can be in the range 42 to 80V. Alternatively, an AC supply from for example the secondary of a transformer can be used. The AC supply range is 30Vrms to 60Vrms. The module also provides an auxiliary power supply which can be used to power other ancillary circuitry such as pre-amplifiers.

INDICATORS

The SDV1042-600 has a number of indicators available to the user which show the status of the amplifier module. These indicators include:

Name of Indicator	Function	State
CLIP	Indicates input signal too high	TTL high if clipped
PROTECT	Indicates the module is in Protect mode due to short-circuit or temperature of amplifier module above 80C.	TTL high if in PROTECT mode
OVERLOAD	Output current too large – if current continues to increase PROTECT will be triggered	TTL high
CURRENT MONITOR	Voltage proportional to output current	0.1V/A
SUPPLY GOOD	Main amplifier supply after boost is within range	TTL high if supply GOOD

