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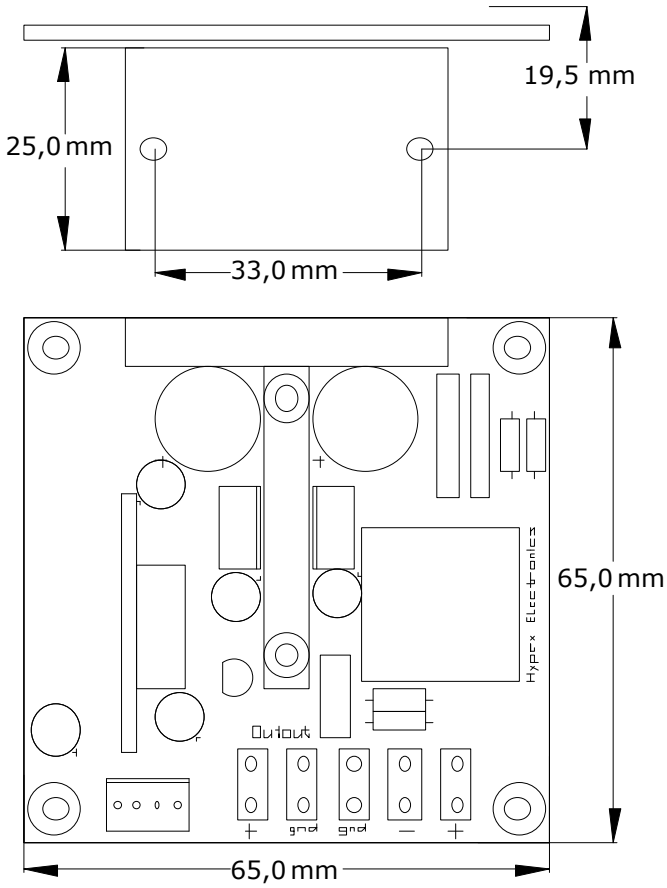
UcD180™

High Efficiency Power Amplifier Module



Highlights

- Flat, fully load-independent frequency response
- Low output impedance
- Very low, frequency-independent THD
- Very low noise
- Fully passive loop control
- Consistent top performer in listening trials

Features

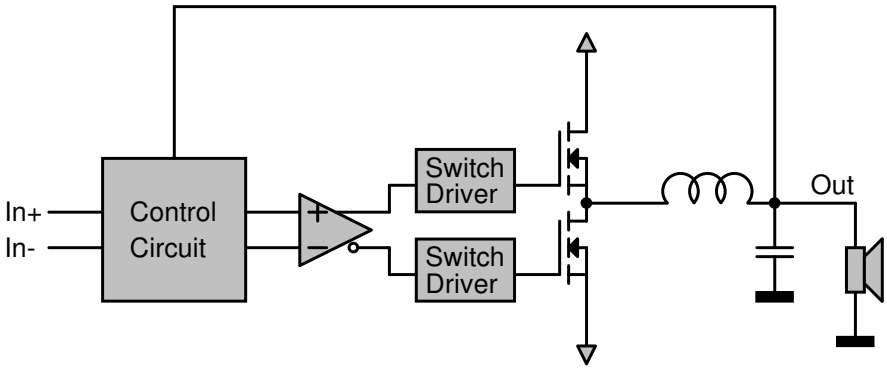
- Runs on unregulated +/- rails
- Pop-free start and stop control
- Differential audio input
- Overcurrent and overvoltage protection
- Weight: 90gms (3.1oz.)

Applications

- Monitor loudspeakers for recording and mastering studios
- Audiophile power amplifiers for professional and consumer use
- Public Address systems
- Home theatre systems
- Active loudspeakers

Description

The UcD180™ amplifier module is a self-contained high-performance class D amplifier intended for a wide range of audio applications, ranging from Public Address systems to ultrahigh-fidelity replay systems for studio and home use. Chief distinguishing features are flat frequency response irrespective of load impedance, nearly frequency-independent distortion behaviour and very low radiated and conducted EMI. Control is based on a phase-shift controlled self-oscillating loop taking feedback only at the speaker output.



Performance data

Power supply = +/-45V, Load=4Ù, MBW=40kHz, unless otherwise noted

Item	Symbol	Min	Typ	Max	Unit	Notes
Output Power	P_R	180	-	-	W	THD=1%
Distortion	THD+N	-	0.1	0.15	%	20Hz<f<20kHz Pout<P_R/2
		-	0.008	0.01	%	20Hz<f<20kHz Pout=1W
Output noise	U_N	-	30µ	35µ	V	Unwtd, 20Hz-20kHz
Output Impedance	Z_{OUT}	-	-	20m	Ω	f<1kHz
		-	-	150m	Ω	f<20kHz
Power Bandwidth	PBW		20-35k		Hz	
Frequency Response		10	-	50k	Hz	+0/-3dB. All loads
Voltage Gain	A_V	25.5	26	26.5	dB	
Supply Ripple Rejection	PSRR		65		dB	Either rail, all frequencies
Efficiency	η		92		%	Full power
Idle Losses	P_0		4		W	
Standby Current	I_{STBY}		10m		A	
Current Limit			10		A	Stop mode. Limit mode also available.

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
Power supply voltage	V_B	+/-50	V	Unit shuts down when either rail exceeds 52V
Peak output current	$I_{OUT,P}$	10	A	Unit current-limits at 10A
Input voltage	V_{IN}	+/-12	V	Either input referred to ground
Air Temperature	T_{AMB}	65	ºC	
Heat-sink temperature	T_{SINK}	90	ºC	User to select heat sink to insure this condition under most adverse use case

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_B	30	45	50	V	
Load impedance	Z_{LOAD}	1			Ù	
Source impedance	Z_{SRC}			7k	Ù	Differential. Corresponds to 3dB noise increase.
Effective power supply storage capacitance	C_{SUP}	4700µ			F	Per rail, per attached amplifier. 4Ω load presumed.

Connections

J4: Input and ON/OFF control

Connector type: 4-pin MOLEX® KK® series.

Pin	Function
1	Noninverting Audio Input
2	GND
3	Inverting Audio Input
4	ON/OFF control

Input Characteristics

Item	Symbol	Min	Typ	Max	Unit	Notes
Input Impedance	Z_{IN}		100k		Ω	Either input to ground
Common Mode Rejection Ratio	CMRR		45		dB	All frequencies
Control voltage on pin 4, amplifier ON				3	V	
Control voltage on pin 4, amplifier OFF		12			V	Internally pulled up to 12V

Note: It is recommended to use an open collector output to control the on/off pin.

J5: Loudspeaker output (hot)

Connector type: ¼" FASTON® tab.

J6: Loudspeaker output (cold)

Connector type: ¼" FASTON® tab.
Internally connected to GND. Note: This is the feedback reference. For best performance, do not use another ground connection for the loudspeaker.

J3: Positive power supply connection, +VB

Connector type: ¼" FASTON® tab.

J2: Negative power supply connection, -VB

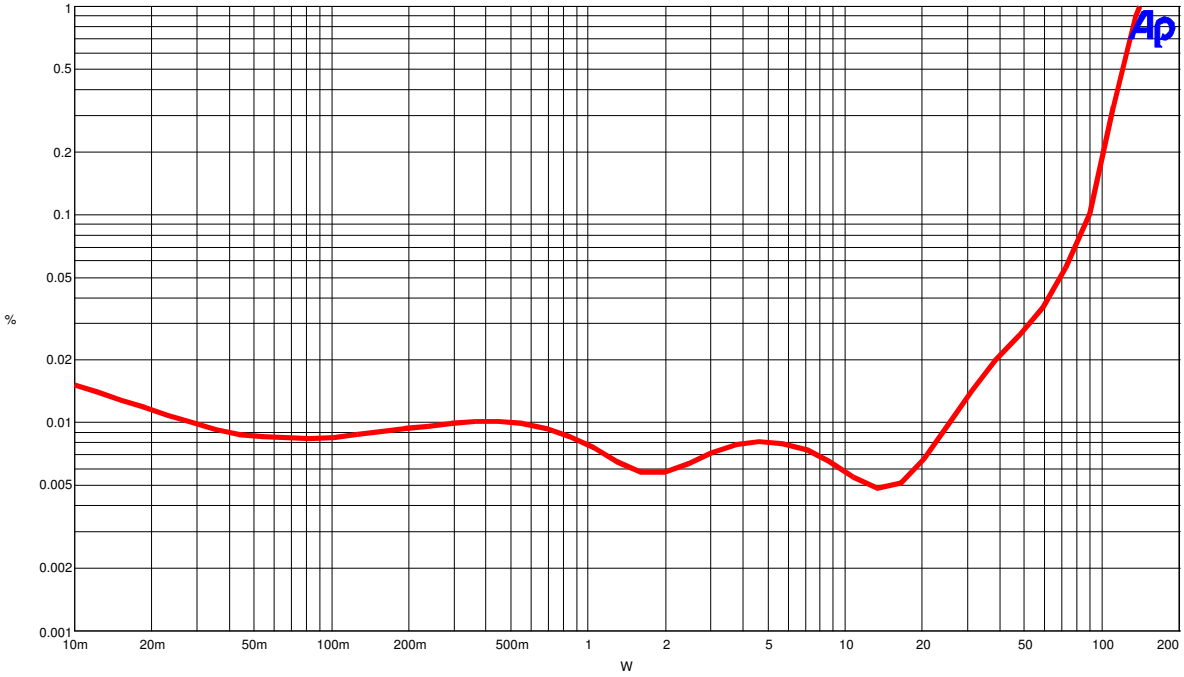
Connector type: ¼" FASTON® tab.

J1: Power supply ground connection, GND

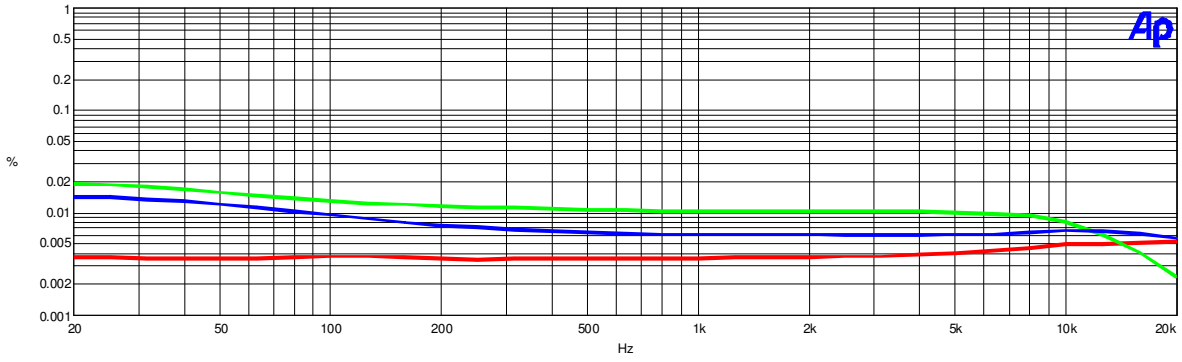
Connector type: ¼" FASTON® tab.

Typical Performance Graphs

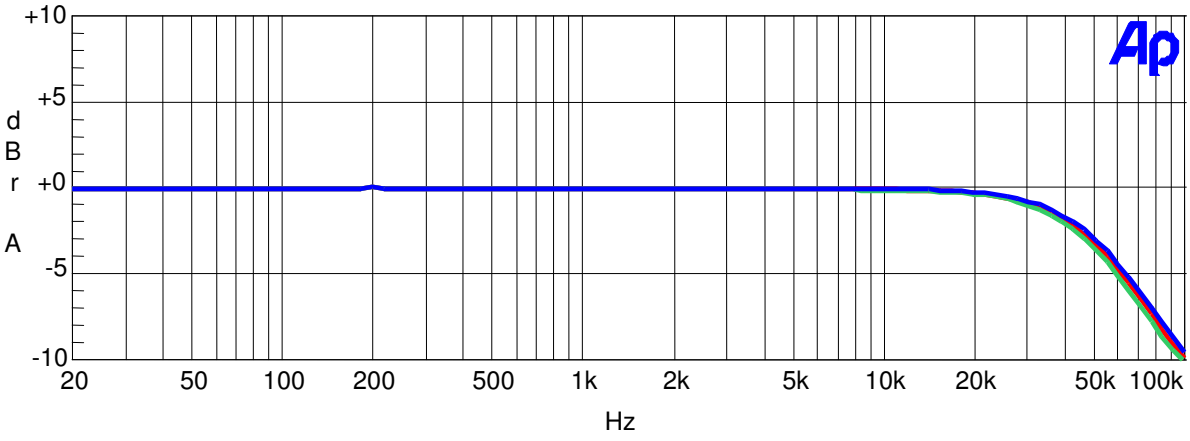
THD vs. Power (1kHz, 4Ω)



THD vs. Frequency (8Ω)

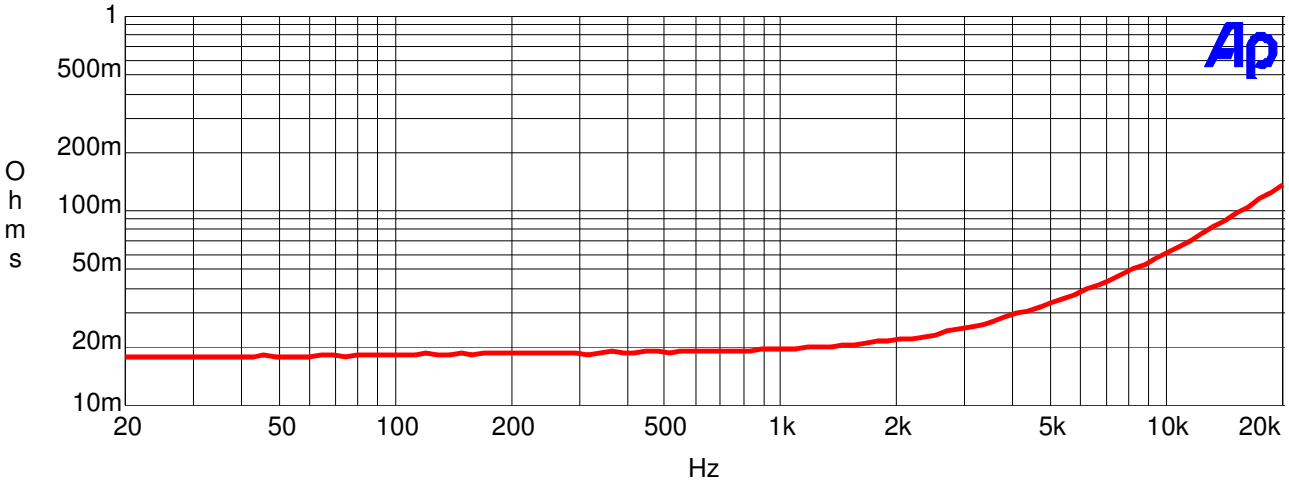


From top to bottom: 40W, 10W, 1WFrequency Response (4Ω, 8Ω and open circuit)

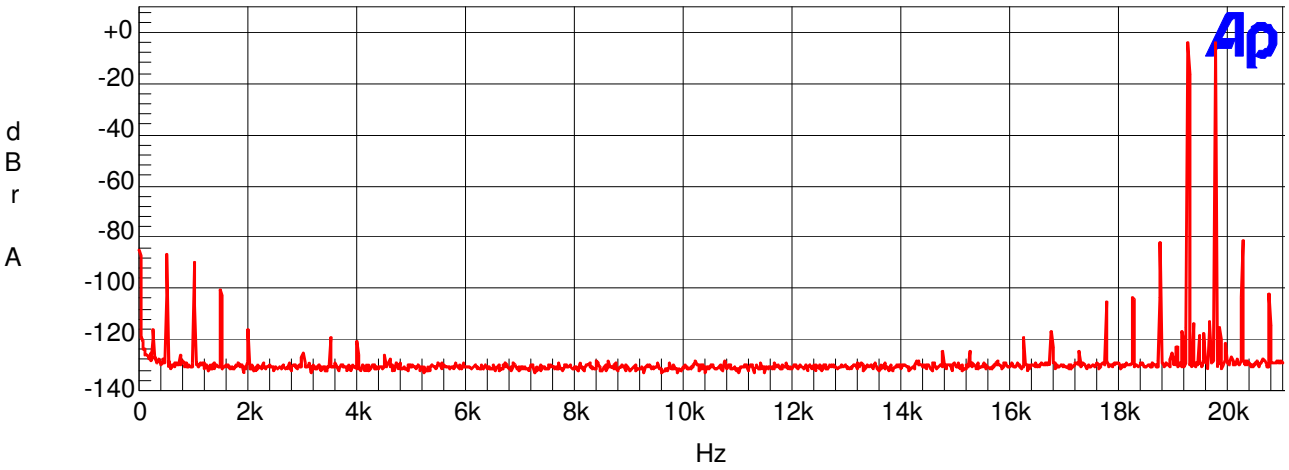


From top to bottom: open circuit, 8Ω, 4Ω

Output Impedance



19+20kHz IMD (10W, 4 ohms)



Document Revision	PCB Version	Description	Date
R1	UcD180STV1	Initial draft.	
R2	UcD180STV7	Pin numbers changed	09.08.2011