

### DESCRIPTION

The EV1720DQ-009-00A is the evaluation board for the MP1720DQ-009, a low-power mono BTL class-D audio amplifier. MP1720DQ-009 is one of MPS' products, which is low EMI, high efficiency, and full bridge output.

The EV board can also be used to evaluate the MP1720DQ-003, MP1720DQ-006, MP1720DQ-012, and MP1720DQ-216 (with IC replacement).

### ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Supply Voltage	VIN	2.5 – 5.5	V
Gain	Av	9	dB
Maximum input signal (SE input)		2.72	Vpp
Maximum input signal (Differential input)		5.44	Vpp

### FEATURES

- Pass FCC-Radiated Emissions Standards with 24inch Cable without output filter
- 2.7W Into 4Ω with 5 V VIN @ 10% THD+N
- Up to 90% Efficiency
- Flexible Switching Frequency setting
- 2.5V~5.5V Operation from a Single Supply
- Low Noise (53μV Typical) with 3.3 V VIN
- Low Quiescent Current (4mA @3.3 V)

### APPLICATIONS

- Cellular Phones
- PDAs
- MP3 Players
- Portable Audio

## EV1720DQ-009-00A EVALUATION BOARD

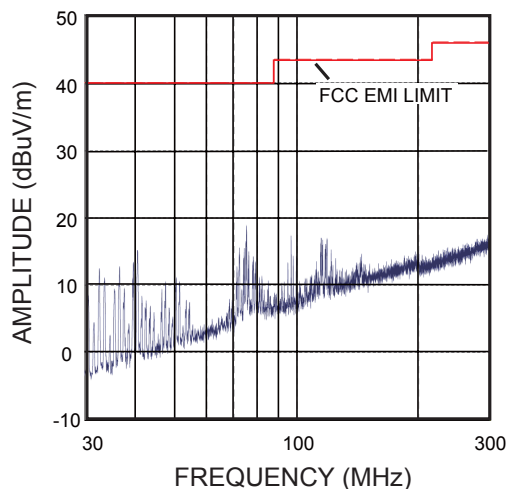


(L x W x H) 1.97" x 1.97" x 0.3"  
(5.0cm x 5.0cm x 0.7cm)

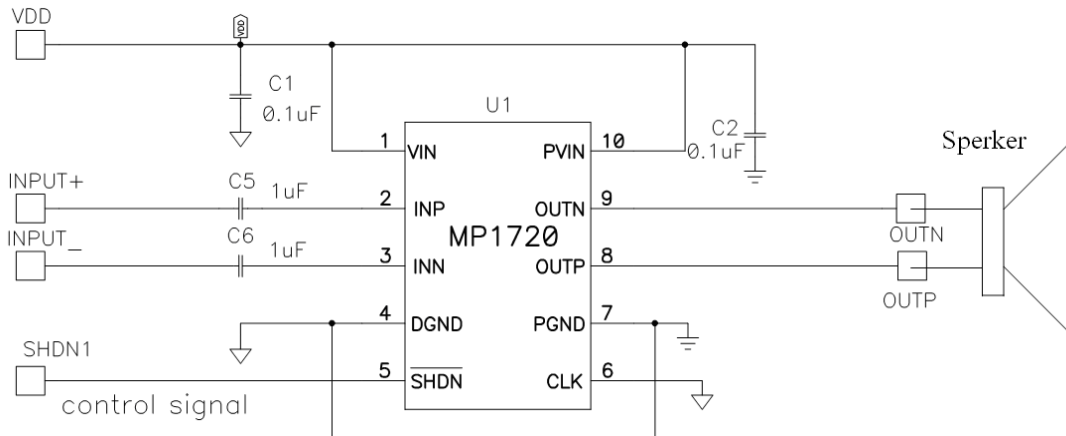
Board Number	IC Number
EV1720DQ-009-00A	MP1720DQ-009

### EMI Spectrum Diagram

VIN=3.3V, R<sub>LOAD</sub>=8Ω, no output filter,  
CLK=GND, Near field,  
6 inch unshielded twisted-pair-speaker cable



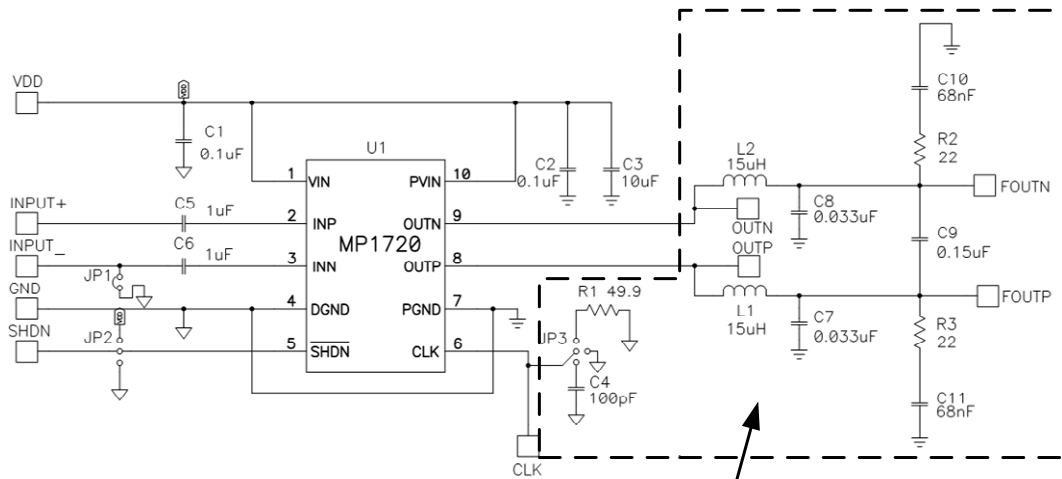
## SCHEMATICS FOR ACTUAL APPLICATION



## BILL OF MATERIALS FOR ACTUAL APPLICATION

Qty	Ref	Value	Description	Package	Manufacture	Part Number
2	C1,C2	0.1µF	Ceramic capacitor, X7R, 25V	0603	muRata	GRM188R71E104KA01
2	C5,C6	1µF	Ceramic capacitor, X5R, 6.3V	0603	muRata	GRM188R60J105KA01D
1	U1		Amplifier	QFN10	MPS	MP1720DQ-009

## SCHEMATICS FOR TEST



NOT NEEDED FOR ACTUAL APPLICATION

## BILL OF MATERIALS FOR TEST

Qty	Ref	Value	Description	Package	Manufacture	Part Number
2	C1,C2	0.1 $\mu$ F	Ceramic capacitor, X7R, 25V	0603	muRata	GRM188R71E104KA01
1	C3 <sup>(1)</sup>	10 $\mu$ F	Ceramic capacitor, X5R, 10V	0805	muRata	GRM21BR61A106KE19L
1	C4	100pF	Ceramic capacitor, C0G, 50V	0603	muRata	GRM1885C1H101JA01D
2	C5,C6	1 $\mu$ F	Ceramic capacitor, X5R, 6.3V	0603	muRata	GRM188R60J105KA01D
2	C7,C8 <sup>(2)</sup>	33nF	Ceramic capacitor, X7R, 50V	0603	muRata	GRM188R71H333KA61D
1	C9 <sup>(2)</sup>	0.15 $\mu$ F	Ceramic capacitor, X7R, 50V	0805	TDK	C2012X7R1H154K
2	C10,C11 <sup>(2)</sup>	68nF	Ceramic capacitor, X7R, 50V	0603	muRata	GRM188R71H683KA93D
2	L1,L2 <sup>(2)</sup>	15 $\mu$ H	Inductor, 1.9A	DS75LC	TOKO	DS75LC-B1047AS-150M
1	R1	49.9 $\Omega$	Ceramic Resistor, 1%	0603	Yageo	RC0603FR-0749R9L
2	R2,R3 <sup>(2)</sup>	22 $\Omega$	Ceramic Resistor, 1%	0603	Yageo	RC0603FR-0722RL
1	U1		Amplifier	QFN10	MPS	MP1720DQ-009
1	JP1		JUMPER/2PIN/0.1		any	
1	JP2		JUMPER/3PIN/0.1		any	
1	JP3		JUNPER/3PIN&3PIN/0.1		any	

Note:

- 1) It is required in system design.
- 2) These external components are used for performance test. For audio performance test, a LC low-pass filter (33nF, 15 $\mu$ H, 0.15 $\mu$ F) is required even if the analyzer has a low-pass filter. They are optional for normal operation.

### PRINTED CIRCUIT BOARD LAYOUT

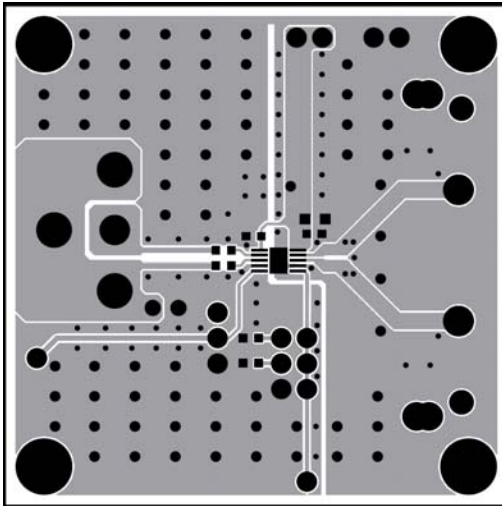


Figure 1—Top Layer

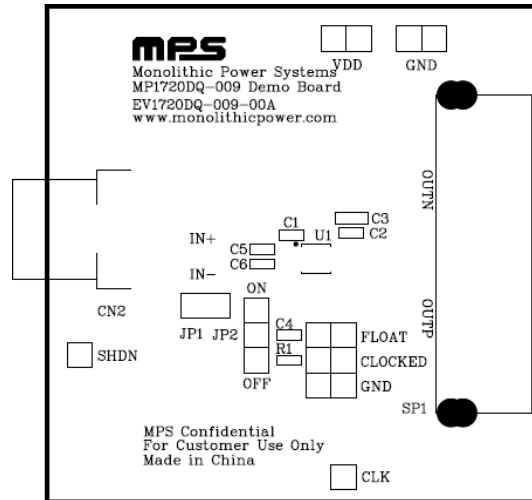


Figure 2—Top silk Layer

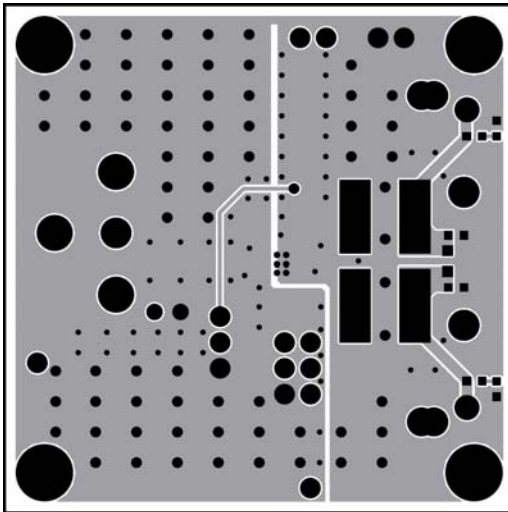


Figure 3—Bottom Layer

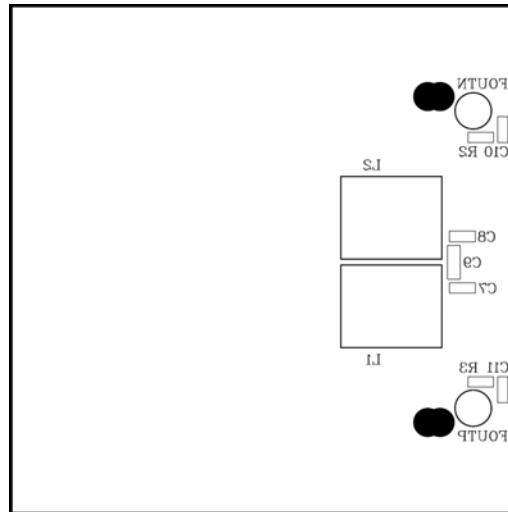


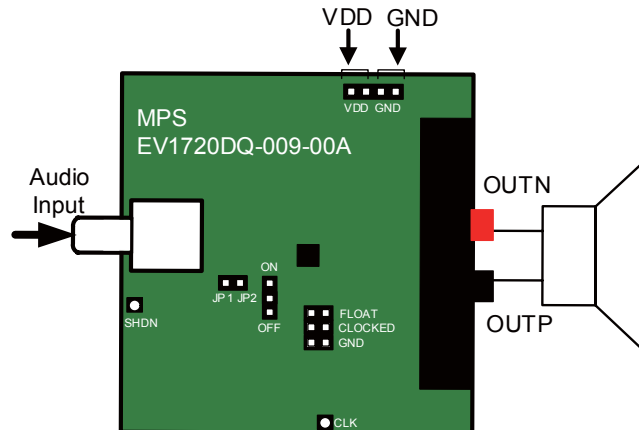
Figure 4—Bottom Silk Layer

## QUICK START GUIDE

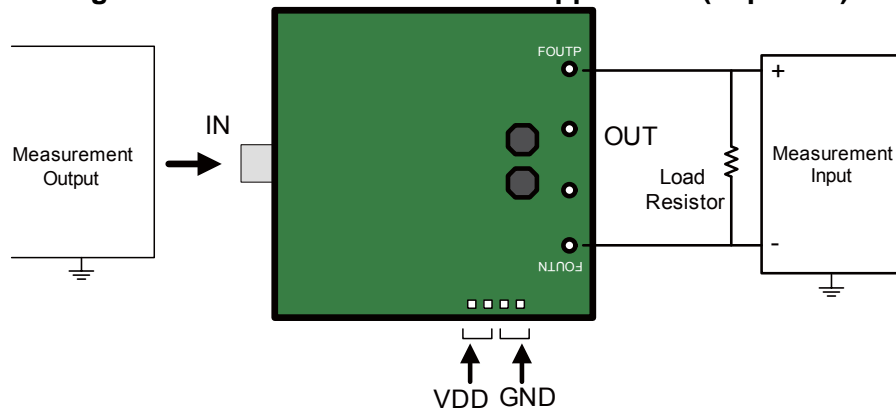
This board is set up from the factory for MP1720DQ-009 evaluation. This EV board can also be used to evaluate the MP1720DQ-003, MP1720DQ-006, MP1720DQ-012, and MP1720DQ-216 (with IC replacement).

For audio performance test, the LC low-pass filter is required even if the analyzer has a low-pass filter. Please use FOUTP and FOUTN as the output terminals (see Figure 6).

For more information, refer to the MP1720 datasheet.



**Figure 5—Connection for Normal Application (Top View)**



**Figure 6—Connection for Audio Performance Test (Bottom View)**

1. Setups for 5V operation
  - a) Connect the external power supply to the VDD terminal, and adjust to 5V (do not turn on).
  - b) Connect the SE input signal to the input terminals. If the input is differential configuration, remove the shunt of jumper JP1.
  - c) Connect the speaker to the output terminals.

- d) Set the amplifier CLK frequency as the table1.

**Table1—CLK Operating Modes**

CLK=GND	$f_{CLK}=1.0\text{MHz}$
CLK=FLOAT	$f_{CLK}=1.3\text{MHz}$
CLK=Clocked	$f_{CLK}=\text{external clock frequency (0.5~1.4MHz)}$

- e) Turn on the power supply.
2. Turn on music
    - a) Set the jumper JP2 to 'ON', or drive /SHDN high.
    - b) Adjust the input signal to expected level.
  3. Turn off music
    - a) Set the jumper JP2 to 'OFF', or drive /SHDN low.
    - b) Turn off the power supply.

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