

GENERAL DESCRIPTION

The CM8685/G is a single channel monolithic Class D Plus™ Audio Amplifier IC that using Champion's unique close loop and feed forward compensation techniques to achieve better THD+N. The CM8685/G integrated four power MOSFETs to drive bridge tight load output. They are guaranteed no shot through, adaptively control break before make. The CM8685/G can deliver peak output power of up to 5 watts at 2Ω load in the high fidelity range (20 Hz to 20kHz). The CM8685/G incorporated a green mode function to ensure high efficiency at light load and full load. The CM8685/G has the optimal high efficiency of up to 90% and no heat sink required. The efficient Class D Plus™ enables the CM8685/G to operate at full power into 4Ω loads at an ambient temperature of 40 °C.

Low supply current of 3mA makes the device ideal for battery-powered applications.

CM8685/G is packaged in a 8-pin PSOP and PDIP package saves the system space.

FEATURES

- ◆ Patent Filed #6,452,366
- ◆ Wide input range of 2.0V to 5.0V
- ◆ 8 pin PSOP & PDIP package
- ◆ Integrated power MOSFETs
- ◆ Reduce system cost with no heat sink
- ◆ Close Loop and Feed Forward compensation
- ◆ Efficiency of up to 90%
- ◆ Dramatically improves efficiency versus Class-AB
- ◆ Excellent bass frequency without big bypass DC blocking capacitor
- ◆ Ultra low shut down current (1uA)
- ◆ Ultra low operation current without load (3mA)
- ◆ Internal Thermal Protection

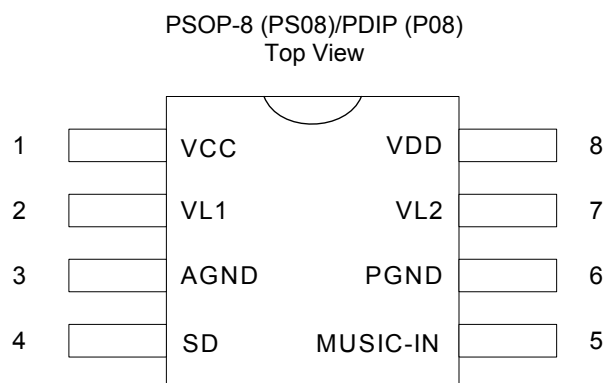
24 Hours Technical Support---WebSIM

Champion provides customers an online circuit simulation tool called WebSIM. You could simply logon our website at www.champion-micro.com for details.

APPLICATIONS

- ◆ Desktop & Laptop Computers
- ◆ PDAs
- ◆ Speakers (Multimedia speakers, USB speakers,...)
- ◆ Multi-media Monitors (CRT monitors, LCD monitors,...)
- ◆ Telephony Accessories (Feature phones, Web phones, & cell phones,...)
- ◆ MP3 Players
- ◆ DVD Players
- ◆ TVs (HDTV, LCD TV, Plasma TV,...)
- ◆ Portable Radio Cassettes

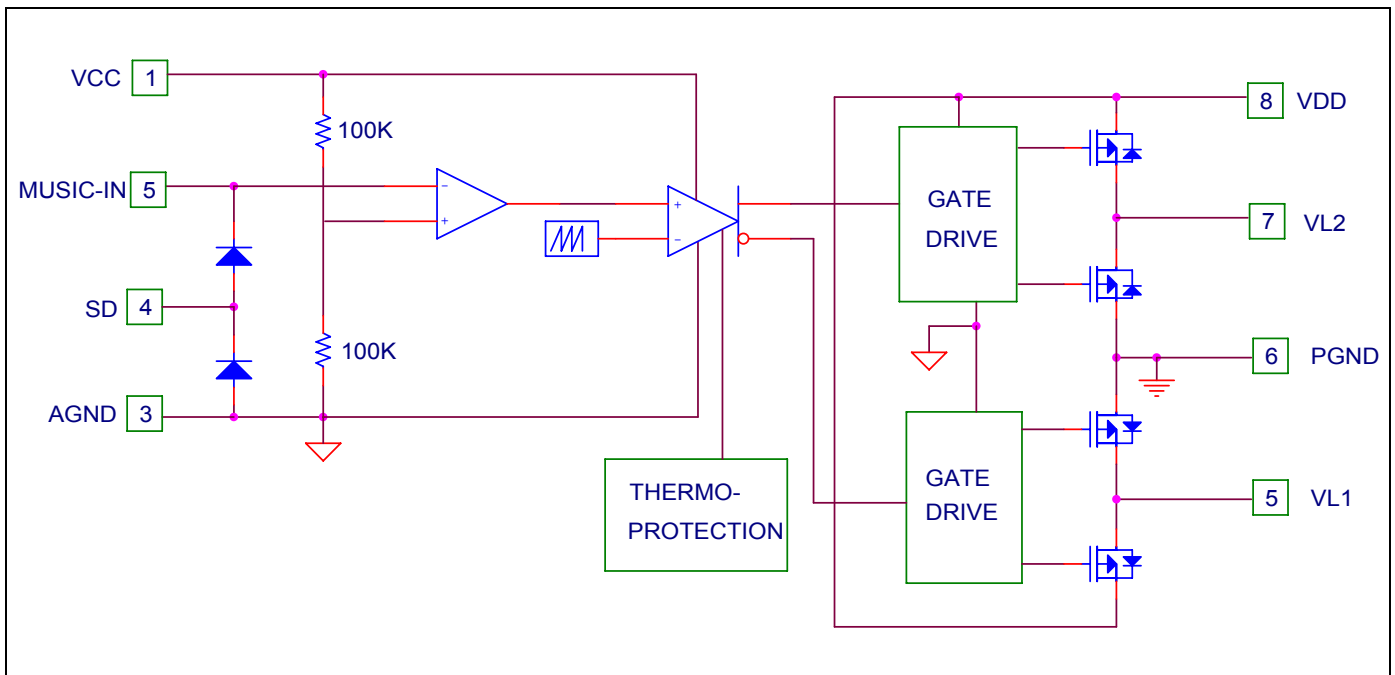
PIN CONFIGURATION



PIN DESCRIPTION

Pin No.	Symbol	Description
1	VCC	Voltage supply for internal circuits
2,7	VL1, VL2	Output / Inductor connection (IDD1, IDD2)
3	AGND	Analog ground
4	SD	Shutdown active HIGH. CMOS input level
5	MUSIC-IN	Audio input
6	PGND	Power ground for output power switcher
8	VDD	Power supply for output power switcher

BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Temperature Range	Package
CM8685EP	-40°C to +85°C	8-Pin PDIP (P08)
CM8685ES	-40°C to +85°C	8-Pin PSOP (PS08)
CM8685GEP	-40°C to +85°C	8-Pin PDIP (P08)
CM8685GES	-40°C to +85°C	8-Pin PSOP (PS08)



Patent

5W MONO CLASS D PLUS™ AUDIO AMPLIFIER

CM8685

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum ratings are those values beyond which the device could be permanently damaged.

Supply Voltage	-0.3 to 5.5V	Junction Temperature (Note 3)	150 °C
Input Voltage	-0.3V to V _{CC} +0.3V	Storage Temperature	-65°C ≤ T _A ≤ 150°C
Power Dissipation (Note 1)	Internally Limited	Lead Temperature	
ESD Susceptibility (Note 2)	2KV	(soldering 10 sec)	260°C

RECOMMENDED OPERATING CONDITIONS

	MIN	TYP	MAX	UNIT
Operating Free-air Temperature, T _A	-40		85	°C
Supply Voltage, V _{CC} , V _{DD}	3	4.5	5.5	V
High-level Input Voltage, V _{IH}	SD	2		V
Low-level Input Voltage, V _{IL}	SD		0.8	V

ELECTRICAL CHARACTERISTICS (Unless otherwise stated, these specifications apply T_A=25°C; V_{CC}=+5V and V_{DD}=+5V) maximum ratings are stress ratings only and functional device operation is not implied.

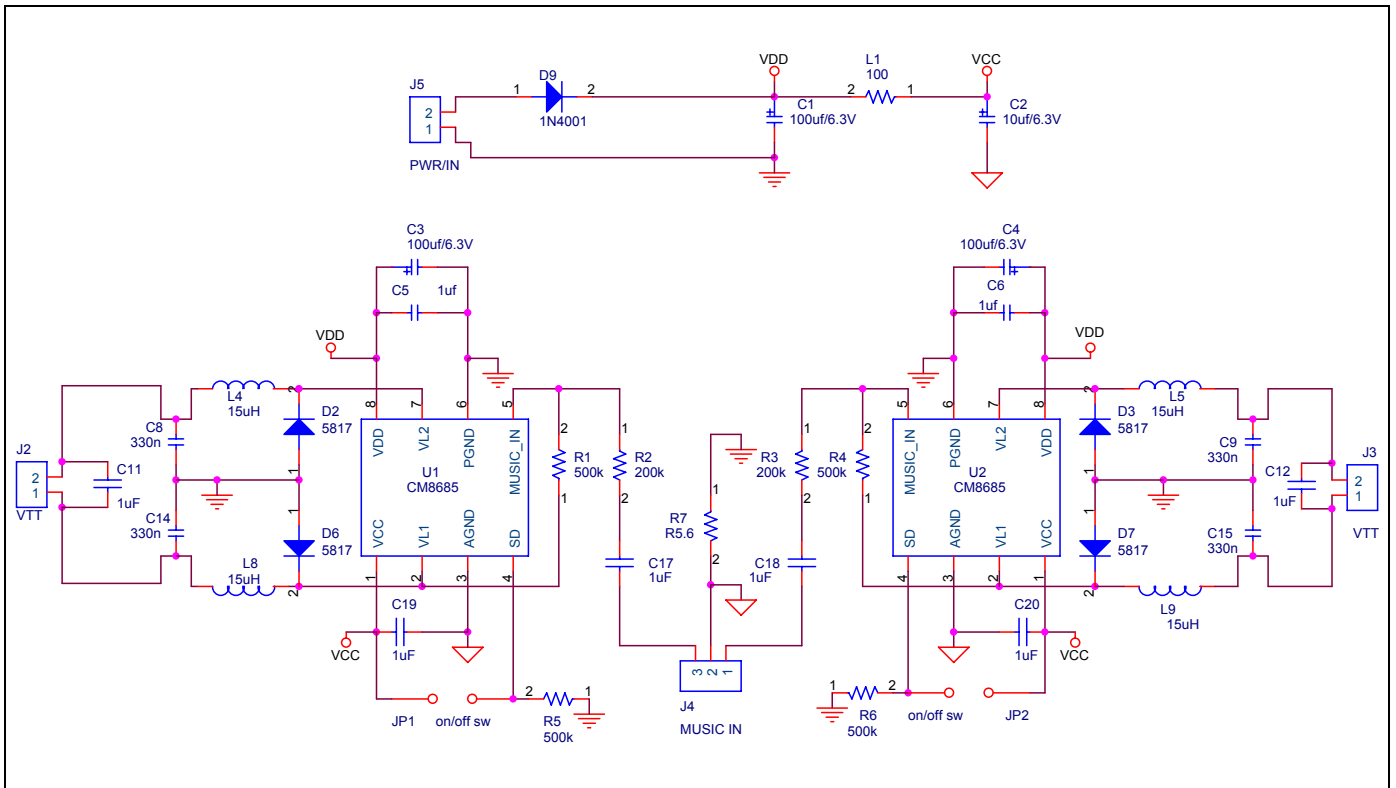
Symbol	Parameter	Test Conditions	CM8685/G			Unit
			Min.	Typ.	Max.	
REFERENCE SECTION						
ISD	Supply Current, Shutdown Mode	VSD=5V		1	5	μA
IDD	Supply Current	Without load		3	10	mA
f	Switching Frequency		510	600	690	KHz
V _{OS}	Output Offset Voltage Between VL1 and VL2 with 8 ohm Load				50	mV
PSRR	Power Supply Rejection Ratio	VCC=VDD=3.3V to 5.5V		55		dB
THD+N	Total Harmonic Distortion plus Noise	Po=1W, 4 ohm load, f=1kHz ,		<0.6		%
R _{ds(ON)}	Drain to Source on-State Resistance	IDD=0.5A, VDD=5V		200	220	mΩ
D	Duty Cycle		5			%

Note 1: For operating at case temperatures above 25°C, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of $\theta_{JA}=80^{\circ}\text{C}/\text{W}$ (junction to ambient).

Note 2: Human body model, 100pF discharged through a 1.5KΩ resistor.

Note 3: The operating junction temperature maximum is 150°C.

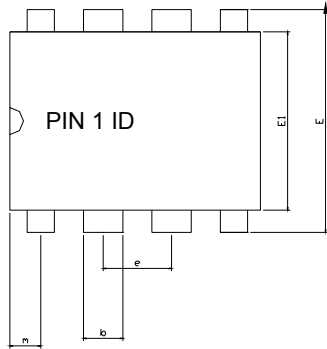
APPLICATION CIRCUIT



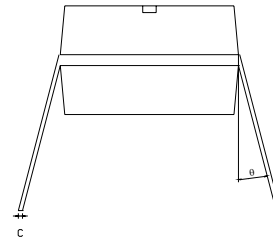
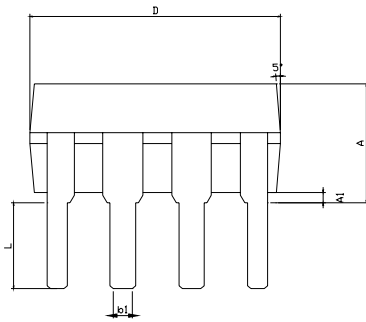
Typical Application Circuits

PACKAGE DIMENSION

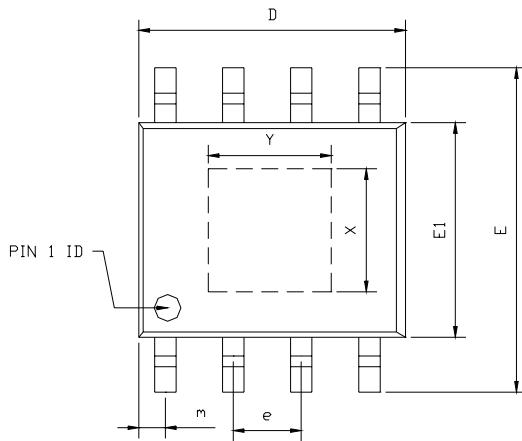
8-PIN PDIP (P08)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	4.32	---	---	0.170
A1	0.38	---	---	0.015	---	---
b	1.40	---	1.65	0.055	---	0.065
b1	0.40	---	0.58	0.016	---	0.022
C	0.20	---	0.31	0.008	---	0.012
D	9.27	---	9.77	0.365	---	0.385
E	7.49	---	8.26	0.295	---	0.325
E1	6.09	---	6.61	0.240	---	0.260
e	---	2.54	---	---	0.100	---
L	3.18	---	---	0.125	---	---
m	0.50	---	---	0.02	---	---
θ	0	---	15	0	---	15

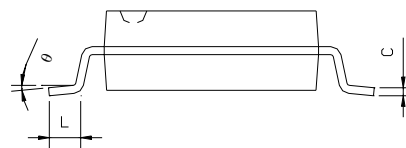
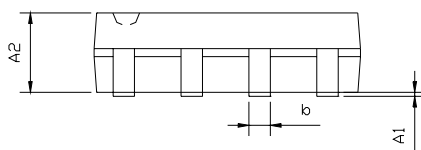


8-PIN PSOP (PS08)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	0.10	---	0.25	0.004	---	0.010
A2	1.40	---	1.55	0.055	---	0.061
b	0.30	---	0.51	0.012	---	0.020
c	0.15	---	0.26	0.006	---	0.010
D	4.60	---	5.06	0.169	---	0.199
E	5.79	---	6.20	0.228	---	0.244
E1	3.76	---	4.01	0.148	---	0.158
e	---	1.27	---	---	0.050	---
L	0.38	---	0.69	0.015	---	0.035
m	0.43	---	0.69	0.017	---	0.027
θ	0°	---	8°	0°	---	8°

EXPOSED PAD DIMENSION : (mm)
PAD SIZE: X=2.3 ; Y=2.3





IMPORTANT NOTICE

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