PT5305

1.4W Filter-free Class D Audio Power Amplifier

GENERAL DESCRIPTION

The PT5305 is a filter-free class D audio power amplifier designed for portable communication device applications. It is capable of delivering 1.4 watt to an 8Ω load with less than 10% distortion (THD+N) from a 5V power supply.

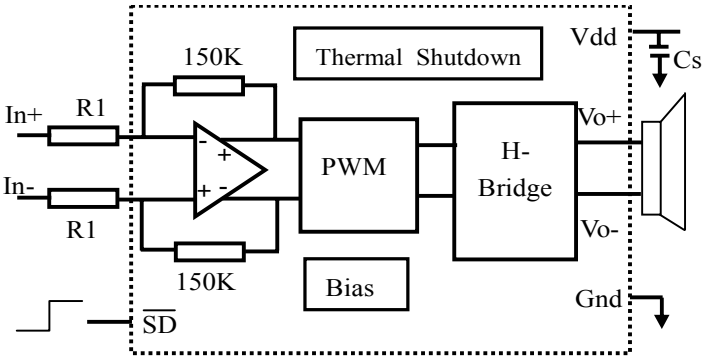
FEATURES

- 1.4W Into 8 Ω from a 5V supply at THD=10% (Typ)
- High Efficiency: 84% at 400mW, 5V power supply and 8Ω speaker
- 75dB PSRR at 217Hz
- 2mA Quiescent Current
- 0.5uA Shutdown Current
- advanced pop & click circuitry
- over current limiter
- thermal overload protection
- low power shutdown mode
- Only Three External Components
- Wide Supply Voltage (2.5V to 5.5V)
- Space Saving Packages 3mm*3mm QFN package and 8-pin MSOP package

APPLICATIONS

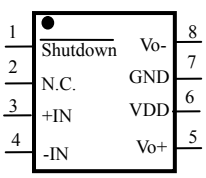
- Cell Phones
- Handheld Computers and PDAs
- Portable electronic device

TYPICAL APPLICATIONS

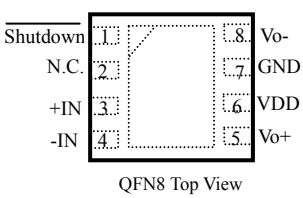


PT5305

PIN ASSIGNMENT



MSOP8 Top View



QFN8 Top View

PIN DESCRIPTIONS

Pin Names			Description
MSOP	QFN		
1	1	$\overline{ShoutDown}$	Shutdown terminal
2	2	NC	No internal connection
3	3	IN+	Positive differential input
4	4	IN-	Negative differential input
5	5	V_O+	Positive BTL output
6	6	Vdd	Power supply
7	7	Gnd	Ground
8	8	V_O-	Negative BTL output

ABSOLUTE MAXIMUM RATINGS

SYMBOL	ITEMS	VALUE	UNIT
V_{dd}	Supply Voltage	-0.3～6	V
V_{in}	Input Voltage	-0.3～Vdd+0.3	V
T_A	Operating free-air temperature	-40 to 85	℃
T_J	Operating junction temperature	-40 to 150	℃
Tstg	Storage Temperature	-55 to 150	℃
Tsolder	Package Lead Soldering Temperature	260℃, 10s	

OPERATING RANGE

Symbol	items		Unit
Vdd	Supply voltage	2.5 ~ 5.5	V
V_{IH}	$\overline{ShoutDown}$	2 ~ Vdd	V
V_{IL}	$\overline{ShoutDown}$	0 ~ 0.8	V
R_I	Input resistor	15	KΩ
V_{IC}	Common mode input voltage rang	0.5 ~ Vdd-0.8	V
T_A	Operating free-air temperature	-40 to 85	℃

ELECTRICAL CHARACTERISTICS

T_A=25℃ unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS	Min.	Typ.	Max.	UNIT
$\lvert V_{OS} \rvert$	Output offset voltage	V_I=0, Vdd=2.5 to 5.5V			25	mV
PSRR	Power supply rejection ratio	Vdd=2.5 to 5.5V		-75	-55	dB
CMRR	Common mode rejection ratio	Vdd=2.5 to 5.5V, V_{IC}=0.5 to Vdd-0.8V		-68	-49	dB
$\lvert I_{IH} \rvert$	High-level input current	Vdd=5.5V, V_I=5.8V			50	uA
$\lvert I_{IL} \rvert$	Low-level input current	Vdd=5.5V, V_I=0.3V			50	uA
I(Q)	Quiescent current	Vdd=5.5V, no load			1.6	mA
		Vdd=3.6V, no load			1.4	mA
		Vdd=2.5V, no load			1.2	mA
$I_{(SD)}$	Shutdown currrent	V($\overline{ShoutDown}$)=0.8V, Vdd=2.5 to 5.5V		0.2	1	uA
Rout	Output impedance in $\overline{ShoutDown}$	V($\overline{ShoutDown}$)=0.8V		>1		KΩ
$f_{(SW)}$	Switching frequency	Vdd=2.5 to 5.5V	200	250	300	KHz
Gain	Gain		$2\times\frac{142\,K\Omega}{R_I}$	$2\times\frac{150K\Omega}{R_I}$	$2\times\frac{158\,K\Omega}{R_I}$	V/V

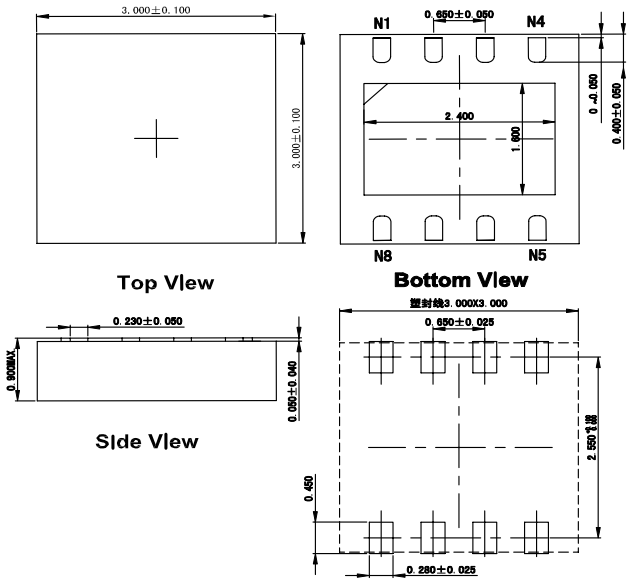
OPERATING CHARACTERISTICS

T_A=25℃ unless specified otherwise.

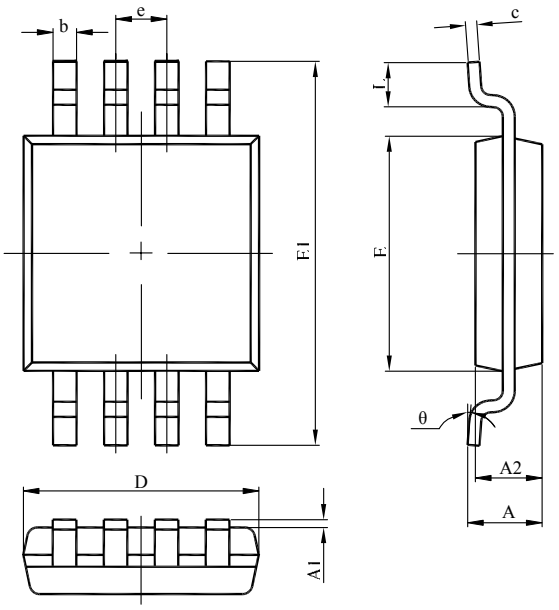
SYMBOL	ITEMS	CONDITIONS		Min.	Typ.	Max.	UNIT
Po	Output power	THD+N=10%, f=1KHz, R_L=8Ω	Vdd=5V		1.40		W
			Vdd=3.6V		0.65		
			Vdd=2.5V		0.50		
		THD+N=1%, f=1KHz, R_L=8Ω	Vdd=5V		1.16		
			Vdd=3.6V		0.60		
			Vdd=2.5V		0.27		
THD+N	Total harmonic distortion plus noise	P_O=1W, f=1KHz, R_L=8Ω	Vdd=5V		0.15%		
		P_O=0.5W, f=1KHz, R_L=8Ω	Vdd=3.6V		0.23%		
		P_O=0.2W, f=1KHz, R_L=8Ω	Vdd=2.5V		0.34%		
PSRR	Power supply rejection ratio	Vdd=2.5 to 5.5V			-75	-55	dB
CMRR	Common mode rejection ratio	Vdd=2.5 to 5.5V, V_{IC}=0.5 to Vdd-0.8V			-68	-49	dB
	Start-up time from shutdown				4		ms

PACKAGE INFORMATION

QFN8 Package



MSOP8 Package



Symbol	Millimeters		Inches	
	Min	Max	Min	Min
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°