Dual 2.2W Audio Amplifier Plus Stereo Headphone Function

Features

- Stereo headphone amplifier mode
- Unity-gain stable
- Power output at 5.0V, 1% THD+N, 3Ω 2.50 W (typ.)
- Power output at 5.0V, 1% THD+N, 4Ω 2.20 W (typ.)
- Power output at 5.0V, 1% THD+N, 8Ω 1.25 W (typ.)
- Single-ended mode TND+N at 75mW into 32 Ω load 0.5% (max)
- Ultra-low shutdown current 0.1 uA (typ.)
- 2.0V – 5.5V power operation range
- Improved circuitry eliminates pop-click noise during turn-on and turn-off transitions
- Thermal shutdown protection circuitry
- External gain configuration capability
- Exposed-DAP TSSOP20 package , DIP16 package SOP16 package

General Description

The BL4863 is a dual BTL connected Class-AB audio power amplifier designed for multimedia monitors and other portable applications. It is capable of delivering 2.5 watts of continuous average power to a 3Ω BTL load or 2.2 watts to a 4Ω BTL load with less than 1% distortion (THD+N) from a $5V_{DC}$ power supply. In addition, the HP-IN input pin allows the BL4863 to operate in single-ended mode and drive stereo headphones.

The BL4863 was designed specifically to provide high quality output power with a minimal amount of external components. With dual bridge speaker amplifiers and stereo headphone amplifiers on one chip, it simplifies audio system design.

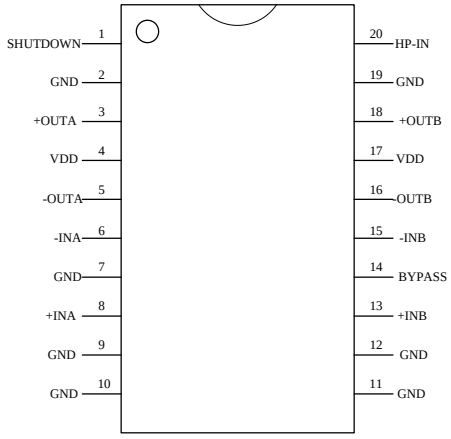
The BL4863 features an externally controlled shutdown mode, a stereo headphone driver mode, and thermal shutdown protection. With special pop-click eliminating circuit, the BL4863 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The BL4863 is unity-gain stable and can be configured by external gain-setting resistors.

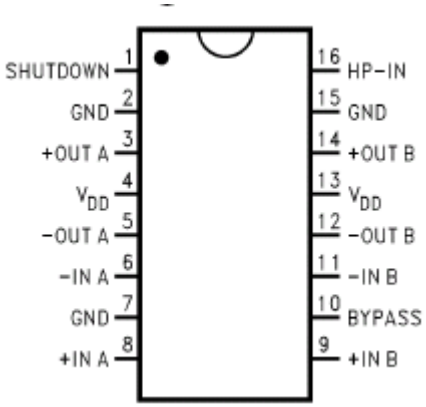
Applications

- Multimedia monitors
- Portable and desktop computers
- Portable televisions

Pin Diagrams



Exposed-DAP TSSOP20



DIP16/SOP16

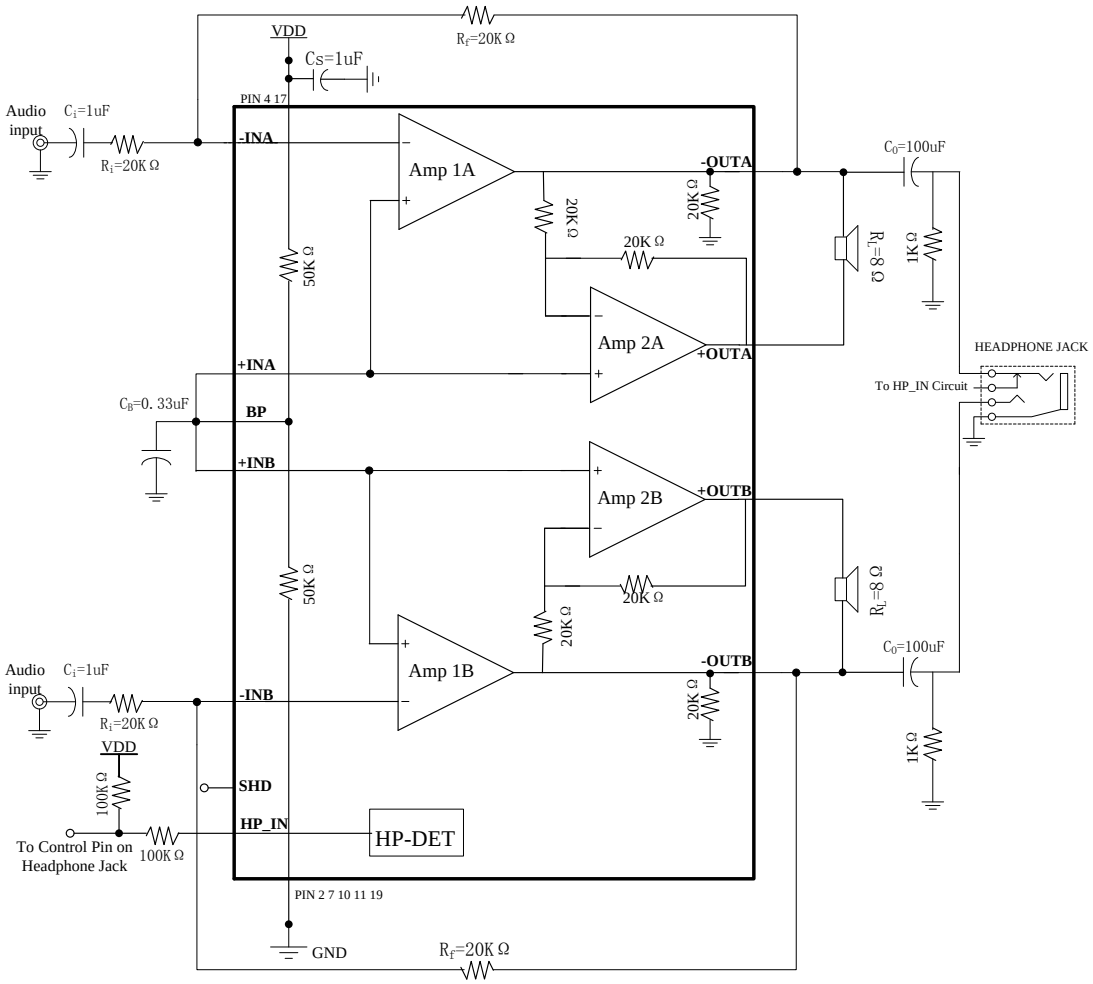
Pin Description

No.	Pin Name	I/O	Description
1	SHD	I	Shout-down Logical Control, '1' is active.
2,7,10,11,19	GND	I/O	Ground
3	+OUTA	O	Positive Output (Channel A)
4,17	VDD1	I/O	Power
5	-OUTA	O	Negative Output (Channel A)
6	-INA	I	Negative Signal Input (Channel A)
8	+INA	I	Positive Signal Input (Channel A)
9,12	NC	/	Not Connected
13	+INB	I	Positive Signal Input (Channel B)
14	BP	I/O	Internal DC reference, Connected with Bypass Capacitor.
15	-INB	I	Negative Signal Input (Channel B)
16	-OUTB	O	Negative Output (Channel B)
18	+OUTB	O	Positive Output (Channel B)
20	HP-IN	I	HP-IN Function Control, '1' is active.

Order Information

Part Number	Package	Shipping
BL4863TS	TSSOP20	4000 pcs / Tape & Reel
BL4863PD	DIP16	Tube
BL4863SO	SOP16	Tube

Typical Application Circuit



**** SHD and HP-IN Operation Logic Level truth table**

SHD	HP-IN	OPERATION MODE
Low	Low	Bridged amplifiers
Low	High	Single-Ended amplifiers
High	Low	Shutdown
High	High	Shutdown

Absolute Maximum Ratings

Supply Voltage -0.3V to 6V
Input Voltage -0.3V to VDD+0.3V
ESD Susceptibility (Human body model) 2000V
Junction Temperature -40℃ to +150℃
Storage Temperature -65℃ to +150℃
Thermal Resistance
θ_{JC}(TSSOP20) 41℃/W

Operating Ratings

Temperature Range -40℃≦T_A≦85℃
Supply Voltage 2.0V≦V_{DD}≦5.5V

NOTE: Absolute Maximum Ratings indicate limits beond which damage to the device may occur. Operating Rating indicate conditions for which the device is functional, but do not guarantee specific performance limits.

Electrical Characteristics for Entire IC (V_{DD} = 5V, T_A = 25℃)

Symbol	Parameter	Conditions	Spec			Units
			Min.	Typ.	Max.	
V_{DD}	Power Supply Voltage		2.0		5.5	V
I_{DD}	Quiescent Power Supply Current	V_{IN} = 0V, HP-IN = 0V, No Load		4.0	15	mA
		V_{IN} = 0V, HP-IN = 5V, No Load		3.0	6	mA
I_{SD}	Shutdown Current	V_{SHD} = V_{DD}		0.1	2	uA
V_{HPIH}	Headphone Voltage Input High		4.0			V
V_{HPIL}	Headphone Voltage Input Low				0.8	V

Electrical Characteristics for Bridge-Mode Operation (V_{DD} = 5V, T_A = 25℃)

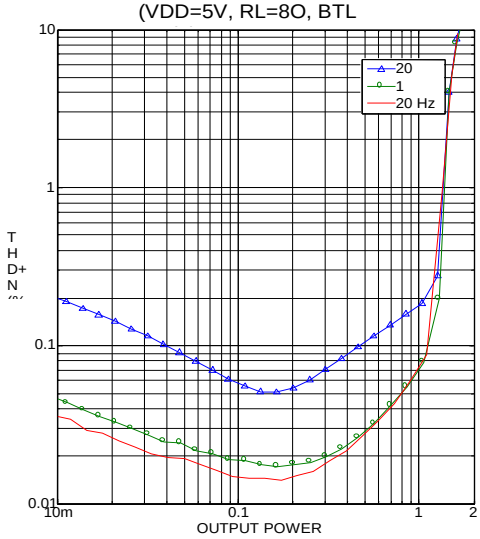
Symbol	Parameter	Conditions		Spec			Units
				Min.	Typ.	Max.	
V_{OS}	Output Offset Voltage	V_{IN} = 0V		-50	5	50	mV
P_O	Output Power	THD+N<=1%, f=1KHz	3Ω Load		2.5		W
			4Ω Load		2.2		
			8Ω Load	1.0	1.25		
			32Ω Load		0.34		
		THD+N<=10%, f=1KHz	3Ω Load		3.2		
			4Ω Load		2.7		
			8Ω Load		1.5		
THD+N	Total Harmonic Distortion + Noise	20Hz≤f≤20kHz, A_{VD} = 2	P_O = 2W, R_L = 4Ω		0.3		%
			P_O = 1W, R_L = 8Ω		0.3		
PSRR	Power Supply Rejection Ratio	$V_{DDRIPPLE}$=0.2V_{RMS} , f=1KHz, C_B=1μF			73		dB
X_{TALK}	Channel Separation	f=1KHz, C_B=1μF			90		dB
SNR	Signal to Noise Ratio	P_O = 1.1W, R_L = 8Ω			98		dB

Electrical Characteristics for Single-Ended Operation (V_{DD} = 5V, T_A = 25℃)

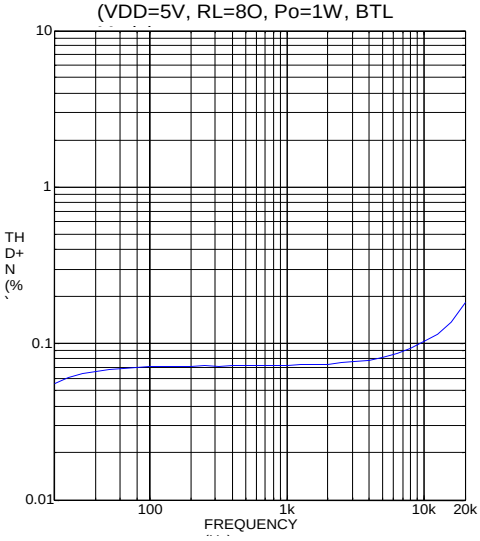
Symbol	Parameter	Conditions	Spec			Units
			Min.	Typ.	Max.	
V_{OS}	Output Offset Voltage	V_{IN} = 0V	-50	5	50	mV
P_O	Output Power	THD+N<=0.5%, f=1KHz, 32Ω Load	75	92		mW
		THD+N<=1%, f=1KHz, 8Ω Load		350		
		THD+N<=10%, f=1KHz, 8ΩLoad		450		
THD+N	Total Harmonic Distortion + Noise	20Hz≤f≤20kHz, A_{VD} = -1, P_O = 75mW, R_L =32Ω		0.1		%
PSRR	Power Supply Rejection Ratio	$V_{DDRIPPLE}$=0.2V_{RMS} , f=1KHz, C_B=1μ F		70		dB
X_{TALK}	Channel Separation	f=1KHz, C_B=1μ F		80		dB
SNR	Signal to Noise Ratio	P_O =340mW, R_L = 8Ω		97		dB

Typical Performance Characteristics

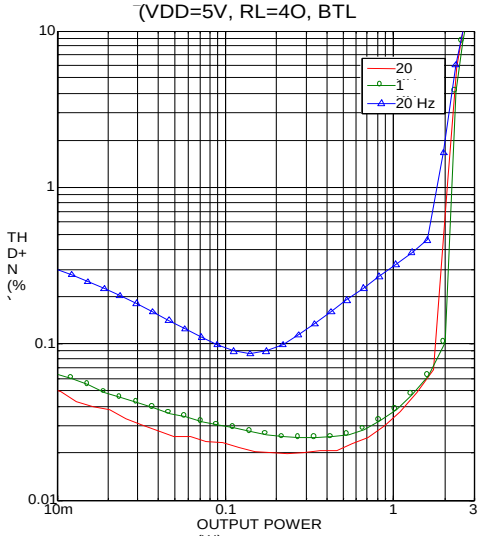
BL4863 THD+N vs Outpt
(VDD=5V, RL=8O, BTL



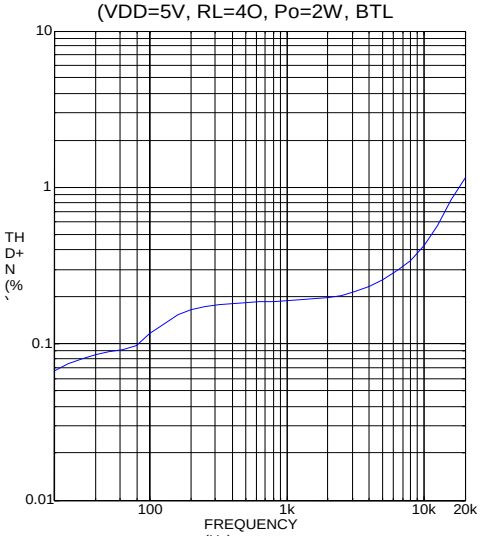
BL4863 THD+N vs
(VDD=5V, RL=8O, Po=1W, BTL



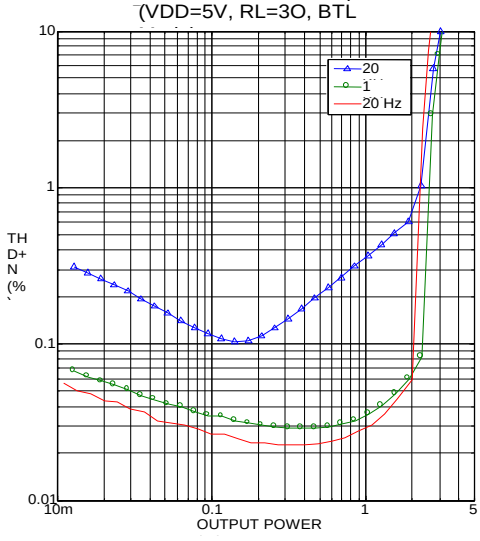
BL4863 THD+N vs Outpt
(VDD=5V, RL=4O, BTL



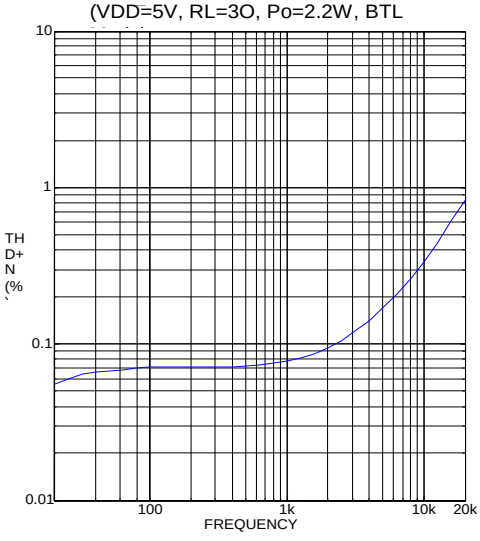
BL4863 THD+N vs
(VDD=5V, RL=4O, Po=2W, BTL



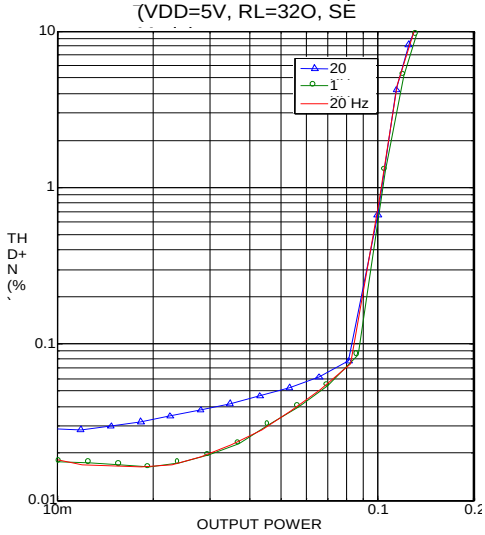
BL4863 THD+N vs Outpt
(VDD=5V, RL=3O, BTL



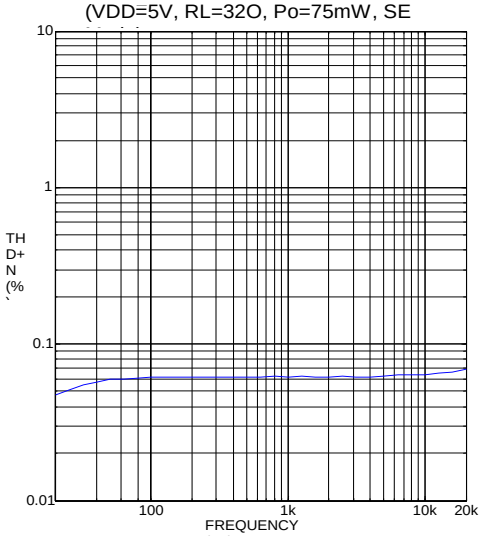
BL4863 THD+N vs
(VDD=5V, RL=3O, Po=2.2W, BTL



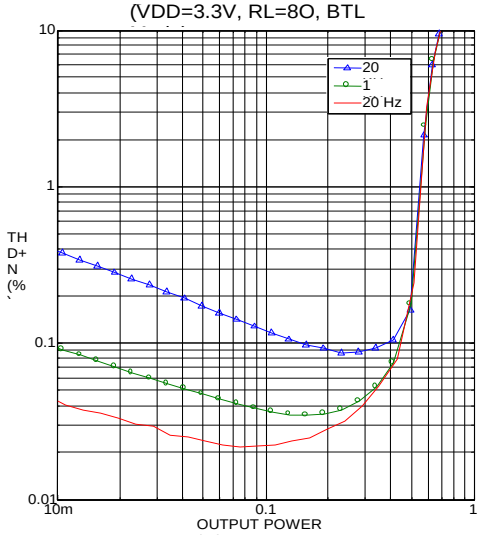
BL4863 THD+N vs Outpt
(VDD=5V, RL=32O, SE



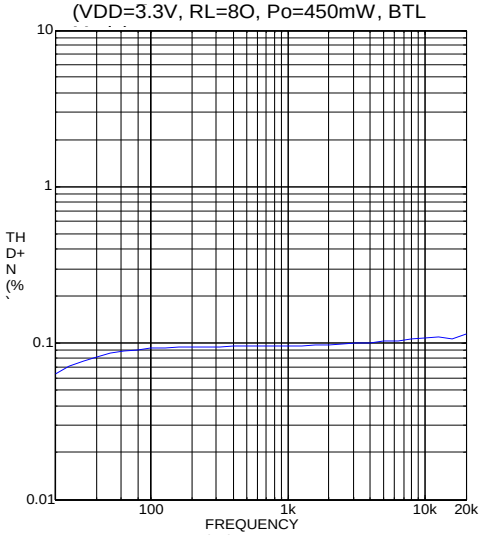
BL4863 THD+N vs
(VDD=5V, RL=32O, Po=75mW, SE



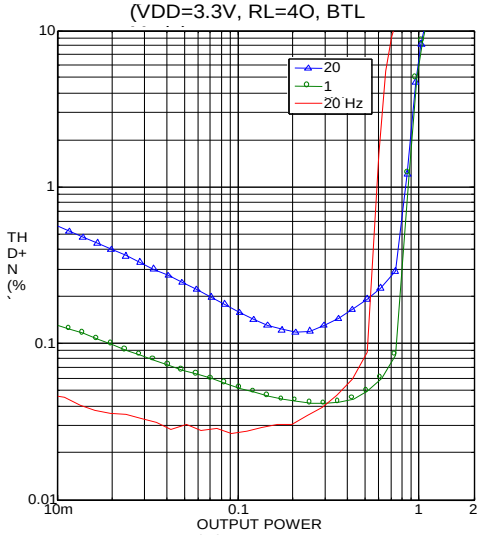
BL4863 THD+N vs Outpt
(VDD=3.3V, RL=8O, BTL



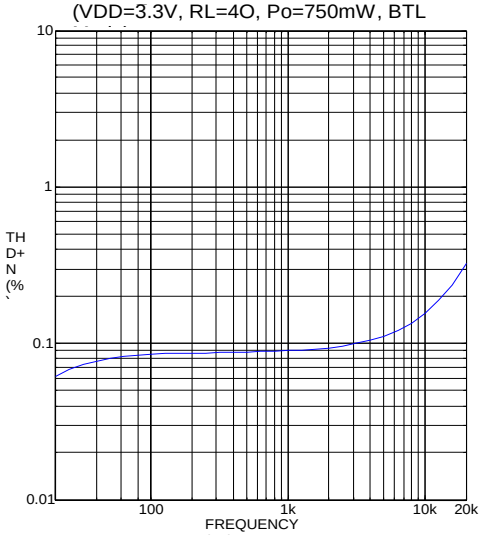
BL4863 THD+N vs
(VDD=3.3V, RL=8O, Po=450mW, BTL



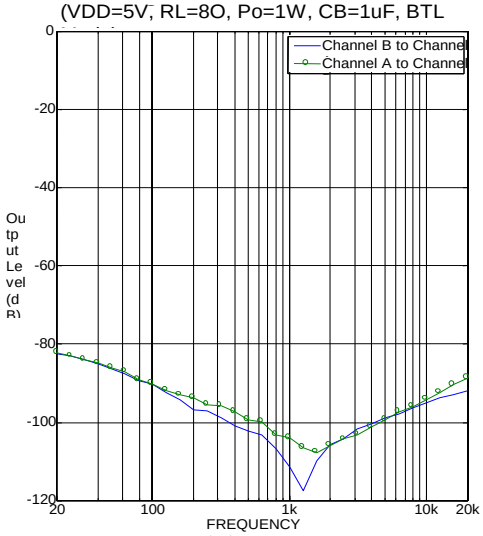
BL4863 THD+N vs Outpt
(VDD=3.3V, RL=4O, BTL



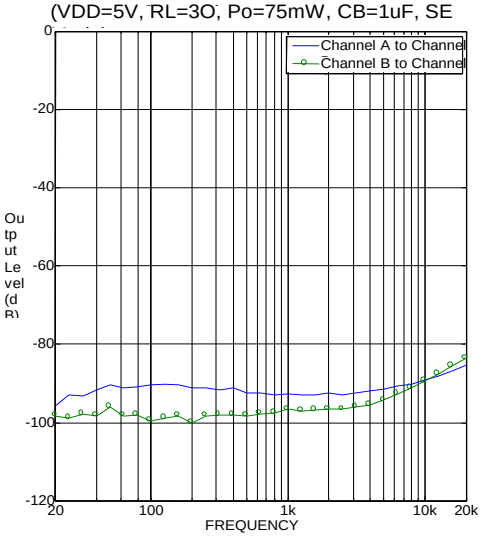
BL4863 THD+N vs
(VDD=3.3V, RL=4O, Po=750mW, BTL



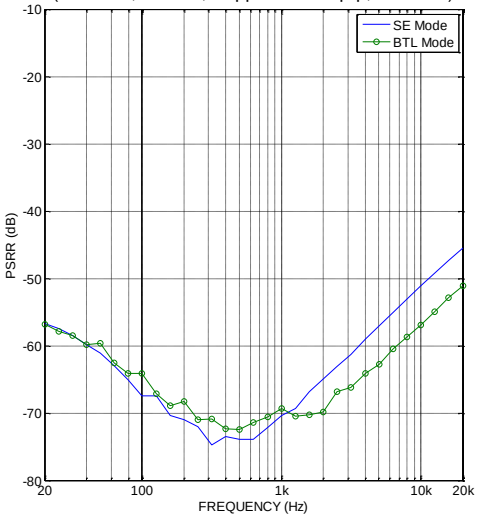
BL4863 Channel
(VDD=5V, RL=8O, Po=1W, CB=1uF, BTL



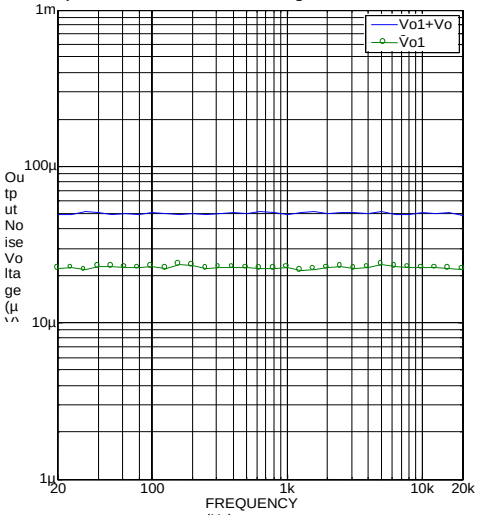
BL4863 Channel
(VDD=5V, RL=3O, Po=75mW, CB=1uF, SE



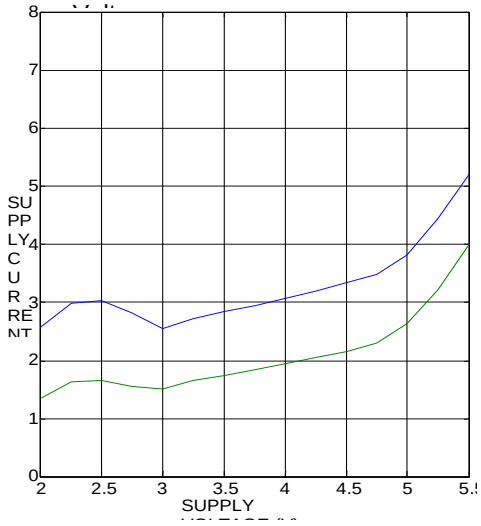
Power Supply Rejection Ratio
(VDD=5V, RL=8Ω, Vripple=200mVp-p, CB=1uF)



BL4863 Noise
(VDD=5V, RL=8O, A-Weighted Filte, BTL

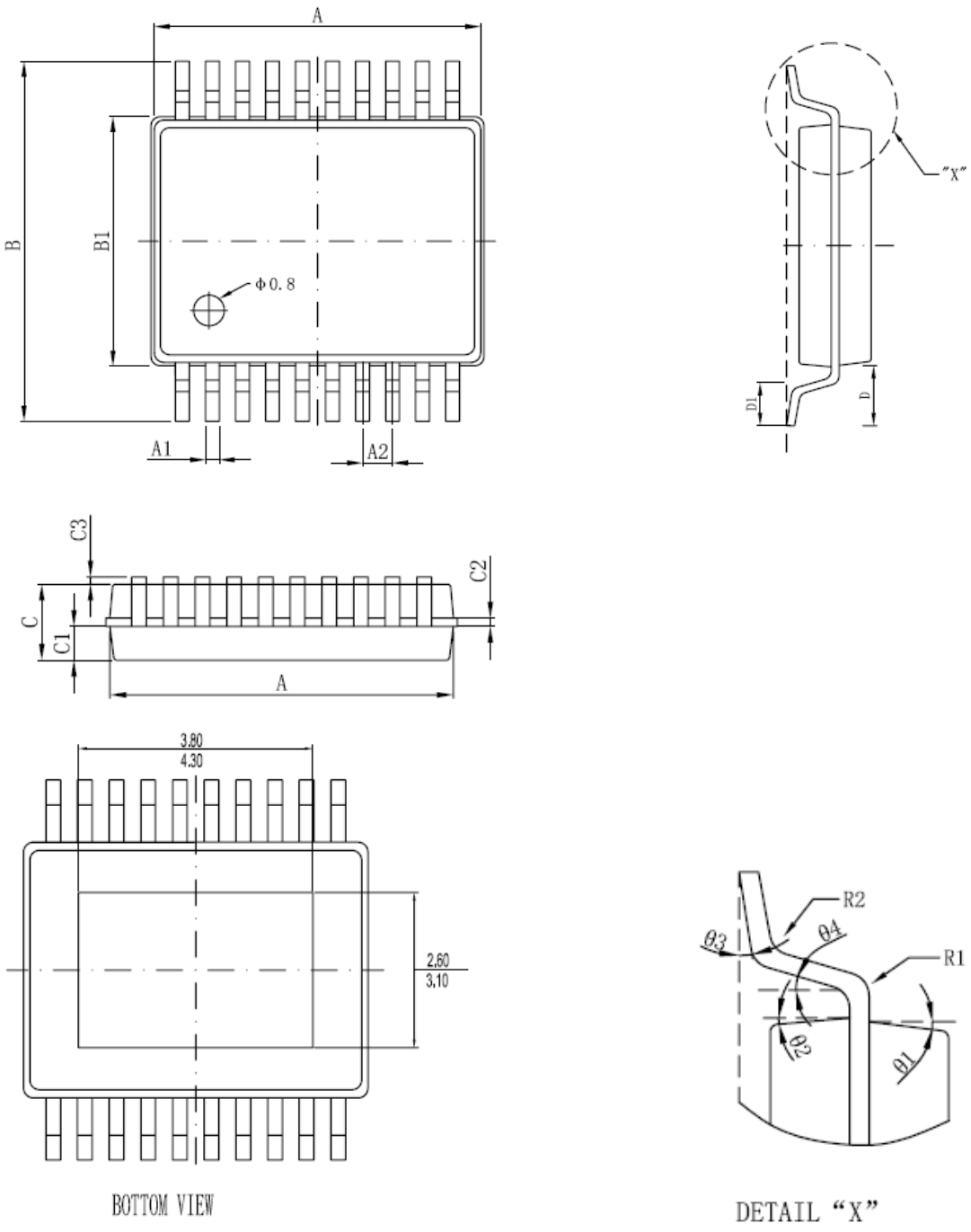


BL4863 Supply Current vs Supply

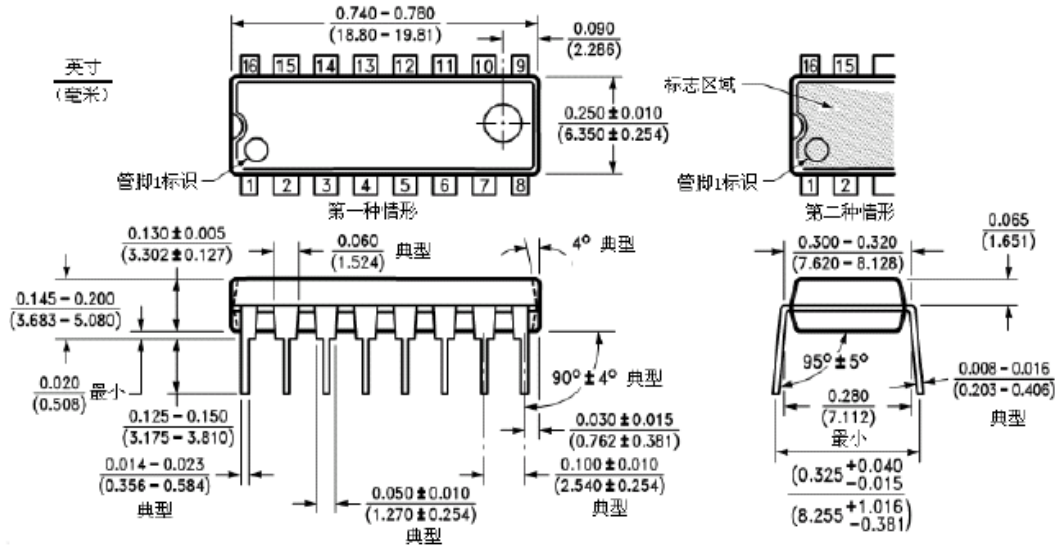


Package Information

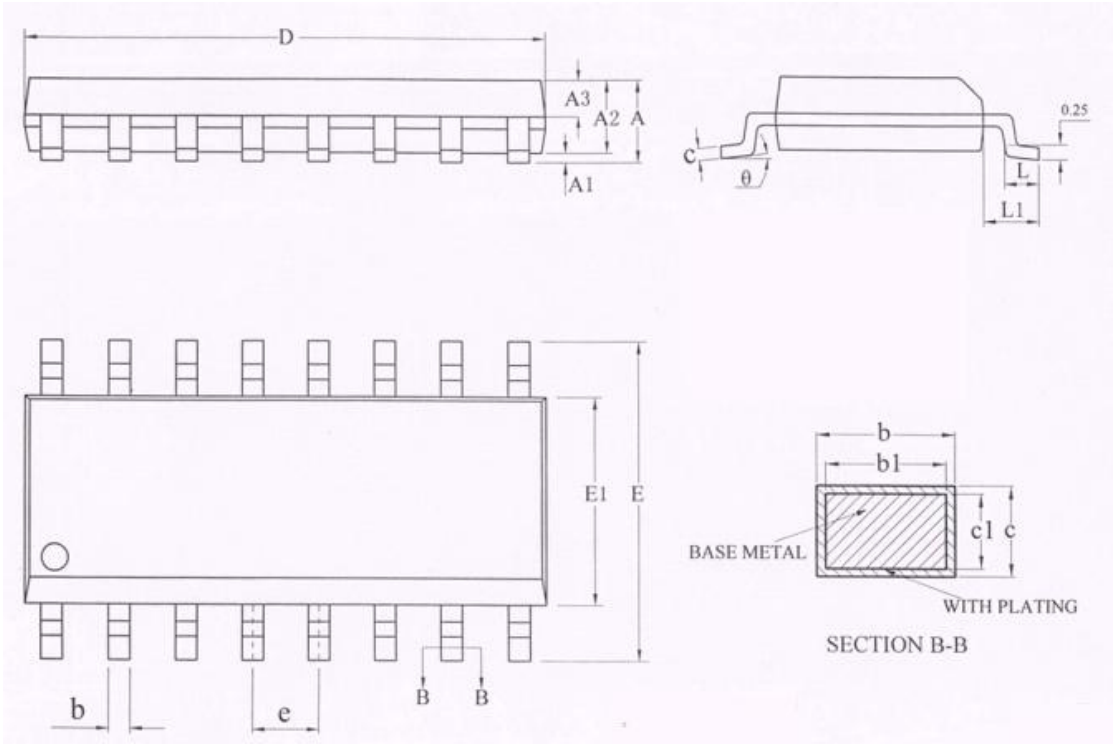
尺寸 / 标注	最小（mm）	最大（mm）	尺寸 / 标注	最小（mm）	最大（mm）
A	6.40	6.60	C3	0.05	0.15
A1	0.20	0.30	D	1.0TYP	
A2	0.65TYP		D1	0.50	0.75
B	6.30	6.50	R1	0.15TYP	
B1	4.30	4.50	R2	0.15TYP	
C	0.90	1.05	θ1	12° TYP	
C1	0.4365TYP		θ2	12° TYP	
C2	0.09	0.2	θ3	0° TYP	8° TYP
			θ4	10° TYP	



20 – 引脚模式的 TSSOP 封装



16- 引脚（宽 0.300"）模式的 DIP 封装



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.77
A1	0.08	0.18	0.28
A2	1.20	1.40	1.60
A3	0.55	0.65	0.75
b	0.39	—	0.48
b1	0.38	0.41	0.43
c	0.21	—	0.26
c1	0.19	0.20	0.21
D	9.70	9.90	10.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
L	0.50	0.65	0.80
L1	1.05BSC		
θ	0	—	8°

16 - 引脚模式的 SOP 封装