MB3736　15W BTL 音频功率放大电路

MB3735 集成电路适用于汽车立体声音响及汽车收音机，内部设有浪涌电压、过压、过热、负载短路、天络/地络等保护电路外，还有电源等待开关、电源接通时具有抑噪功能等。工作电源电压范围为 9～16V，在 V_{CC}=13.2V，R_L=4Ω，THD=10%时，输出功率 P_O=15W。该电路有两种封装形式。

极限参数（T_A=25℃）

参　　数	额　定　值
电源电压　V_{CC} (V)	18
峰值电源电压　$V_{CC(Surge)}$ (V)	50
输出电流　$I_{O(peak)}$ (A)	4.5
功　　耗　P_D (W)	30
工作温度　T_{opr} (℃)	−20～75
贮存温度　T_{stg} (℃)	−55～150

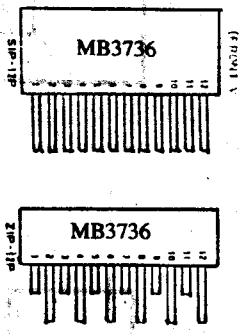


图 1　MB3736 的外形图

电参数（V_{CC}=13.2V，R_L=4Ω，f=1kHz，T_A=25℃）

参　　数	测　试　条　件	最小值	典型值	最大值
静态电流　I_D (mA)	V_{IN}=0，R_L=∞		100	200
电压增益　G_V (dB)		43	45	47
输出功率　P_D (W)	R_L=4Ω，THD=10%	12	15	
	R_L=2Ω，THD=10%	12	23	
谐波失真　THD(%)	P_D=5W		0.04	0.4
输入电阻　R_{IN} (kΩ)		20	30	
输出失调电压　V_{offset} (V)			±0.1	±0.3
纹波抑制比　RR(dB)		40	50	
输出噪声　V_{NO} (mV)	R_g=10kΩ，BW=20Hz～20kHz		0.4	1.0
等待状态电流　I_{STB} (μA)			1.0	50
等待端输入电压　V_{STB} (V)	工作时	2.4		V_{CC}
	等待时	0		0.4

电路方框图及应用电路

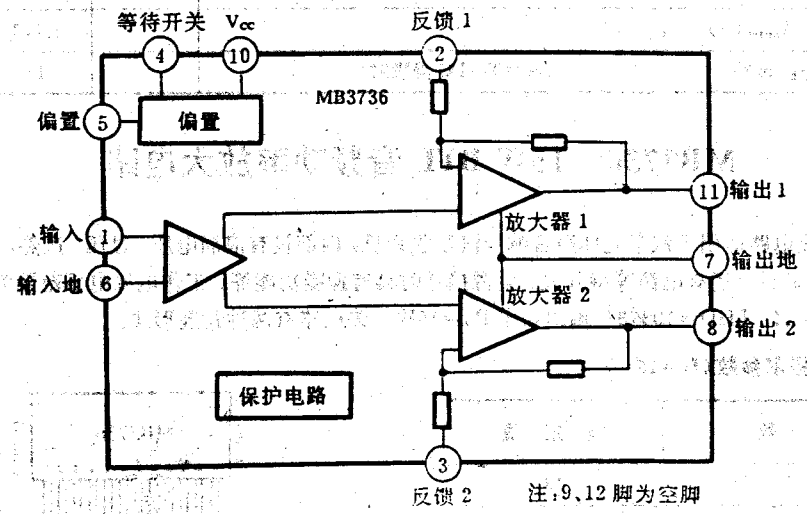


图 2　MB3736 的电路方框图

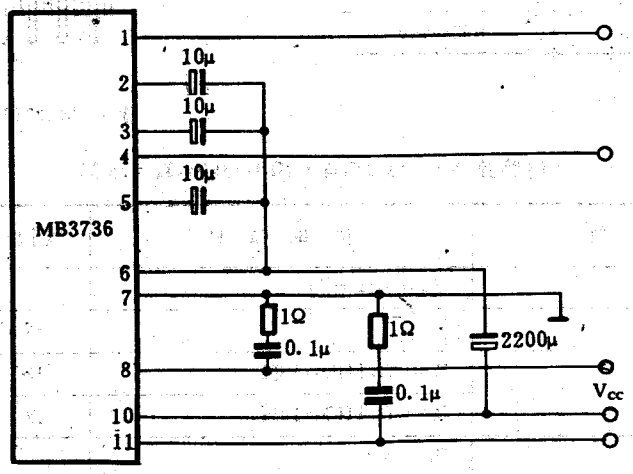


图 3　MB3736 的应用电路

October 1989
Edition 1.0

FUJITSU

DATA SHEET

MB3736
15W BTL AUDIO AMPLIFIER

15W BTL AUDIO AMPLIFIER WITH INTERNAL STAND BY FUNCTION

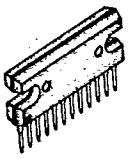
The Fujitsu MB3736 is designed for a low-frequency high-power amplifier with internal BTL (Balanced Transformer Less) circuitry.

Suitable for car stereos, the MB3736 is packed in 12 pin plastic Single in line small packaage or 12 pin plastic Zigzag in line small package which has low thermal resistance (SIP: 3°C/W, ZIP: 4°C/W). Design for heat radiation can be executed easily.

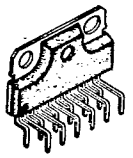
The MB3736 requires few external components, so high density mounting is optimized.

The MB3736 contains a power-on pop noise protection circuitry and various protection circuitry.

- High Output Power : 15W typ at 4Ω
- Minimum External Components (OCL, 5 capacitors, 2 resistors)
- Stand-by Function (TTL Drive)
- Various Protection Circuitry
  Power Supply Surge Protection
  Output pin-to DC Short Protection
  Over Voltage Protection
  Load Short Protection
  Thermal Protection
- Low Power-on Pop Noise
- Package
  12 pin Plastic SIP package (Suffix: -PS)
  12 pin Plastic SIP package (Suffix: -PSZ)

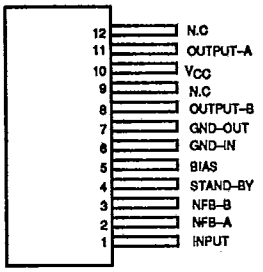


PLASTIC PACKAGE
SIP-12P-M01



PLASTIC PACKAGE
ZIP-12P-M01

PIN ASSIGNMENT
(Front View)



(SIP-12P-M01)
ZIP pin assignment:
Please see page 7

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

ABSOLUTE MAXIMUM RATINGS (see NOTE) (T_C = 25°C)

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	18	V
Power Supply Voltage (Surge)	V_{CCS}	50*	V
Output Current (Peak)	I_{OPEAK}	4.5	A
Power Dissipation	P_D	30	W
Operating Temperature (Case)	T_C	-20 to + 75	°C
Storage Temperature	T_{STG}	-55 to + 150	°C

*$T_S \leq$ 0.2 sec, $T_r \leq$ 1 msec

NOTE: Permanent device damage may occur if the above **Absolute Maximum Ratings** are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Fig. 1 — MB3736 BLOCK DIAGRAM

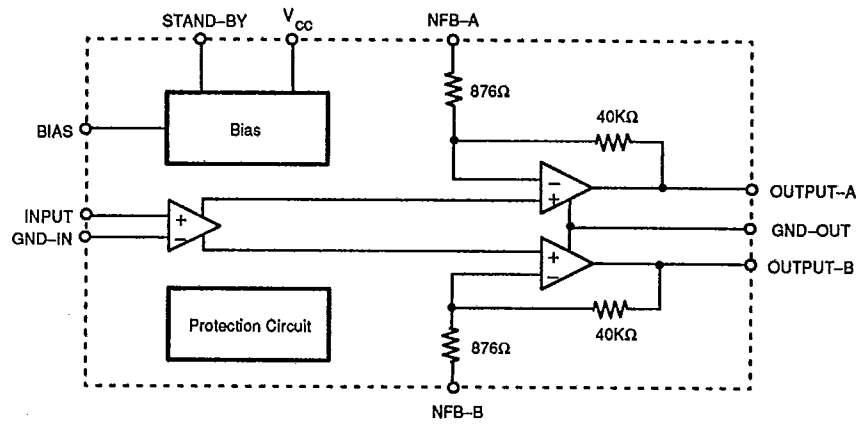
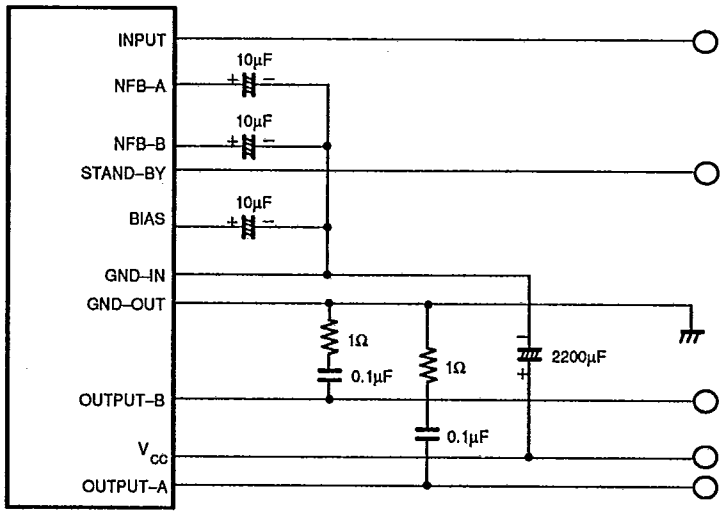


Fig. 2 – MB3736 CONNECTION EXAMPLE



RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	9 to 16	V
Operating Temperature (Case)	T_C	−20 to + 75	°C

3

ERECTRICAL CHARACTERISTICS

(T_C = 25°C, V_{CC} = 13.2V, f = 1 kHz, R_L = 4Ω)

Parameter	Symbol	Condition		Value			Unit
				Min	Typ	Max	
Quiescent Power Supply Current	I_{CCQ}	V_{IN} = 0V, R_L = ∞			100	200	mA
Voltage Gain	A_V			43	45	47	dB
Output Power	P_O	THD = 10%	R_L = 4Ω	12	15		W
			R_L = 2Ω	12	23		
Total Harmonic Distortion	THD	P_O = 5W			0.04	0.4	%
Output Noise Voltage	V_{NO}	R_g = 10 kΩ, BW = 20Hz to 20kHz			0.4	1.0	mV
Input Resistance	R_{IN}			20	30		KΩ
Output Offset Voltage	V_{OFF}				± 0.1	± 0.3	V
Power Supply Current at Stand by mode	I_{CCS}				1	50	μA
Input Voltage, Stand-by Pin	V_{SBH}	Operating mode		2.4		V_{CC}	V
	V_{SBL}	Stand-by mode		0		0.4	V
Ripple Rejection Ratio	RR	Vrip = 1Vrms, f = 1kHz (1 μF is connected between V_{CC} and GND)		40	50		dB

TYPICAL CHARCTERISTICS CURVES

Fig. 3 – TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

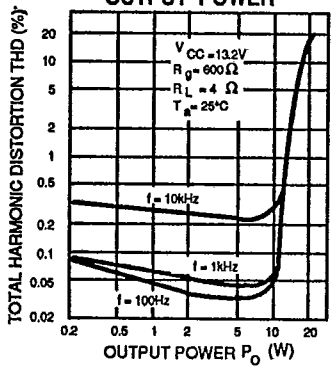


Fig. 4 – TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

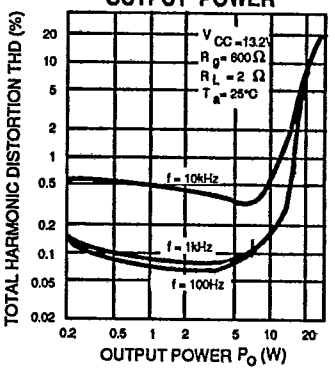


Fig. 5 – TOTAL HARMONIC DISTORTION vs. FREQUENCY

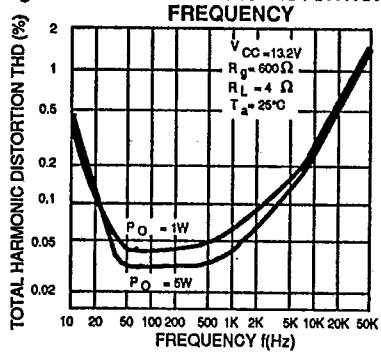


Fig. 6 – VOLTAGE GAIN vs. FREQUENCY

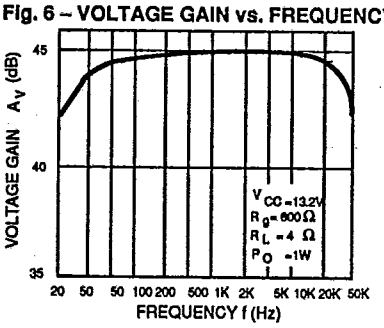


Fig. 7 – OUTPUT POWER vs. FREQUENCY

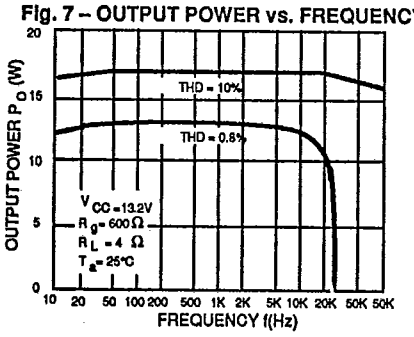


Fig. 8 – TOTAL HARMONIC DISTORTION vs. SIGNAL SOURCE IMPEDANCE

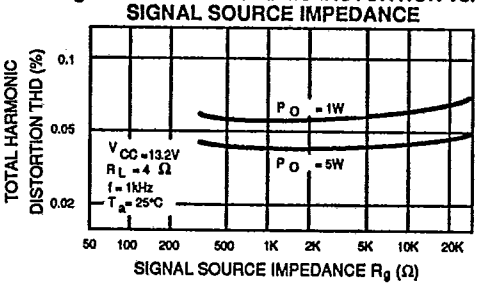


FIG.9 – OUTPUT NOISE VOLTAGE vs. SIGNAL SOURCE IMPEDANCE

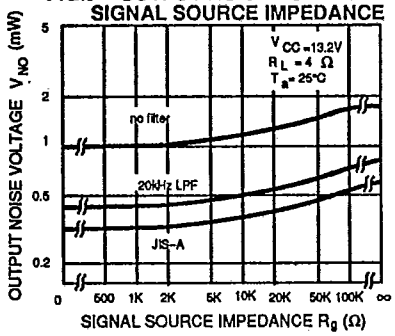


Fig. 10 – RIPPLE REJECTION vs. FREQUENCY

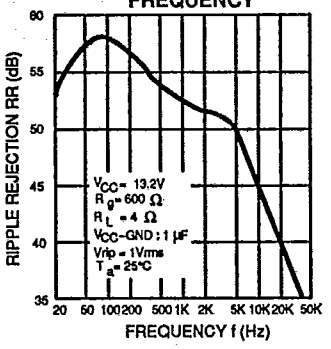


FIG.11 – POWER SUPPLY CURRENT/ POWER DISSIPATION vs. OUTPUT POWER

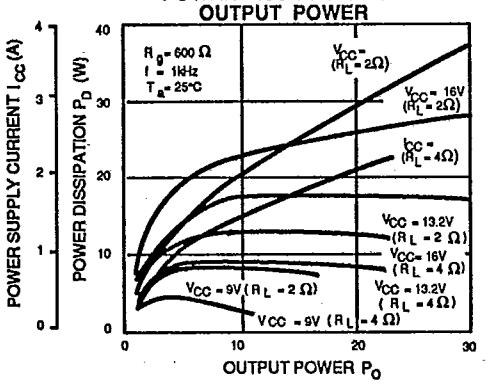


Fig. 12 – OUTPUT POWER vs. LOAD RESISTANCE

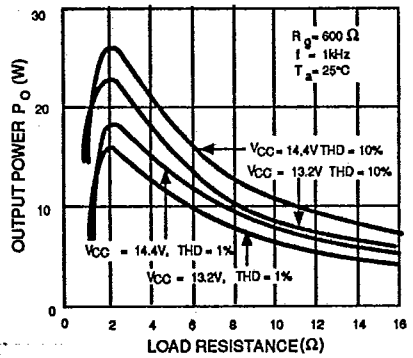


Fig. 13 – OUTPUT POWER vs. FREQUENCY

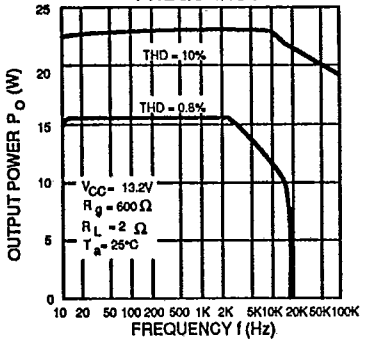
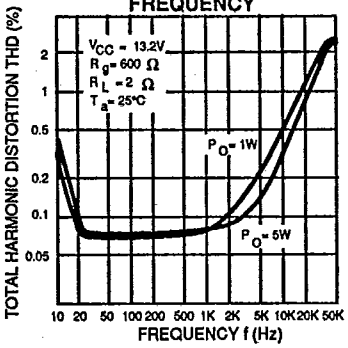
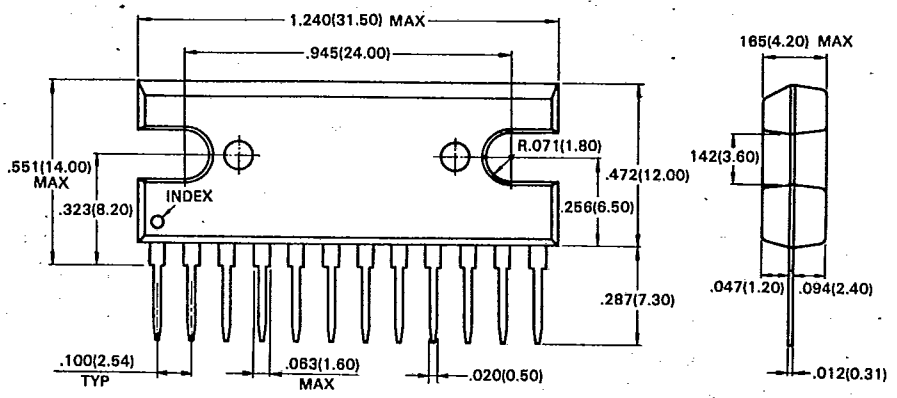


Fig. 14 – TOTAL HARMONIC DISTORTION FREQUENCY



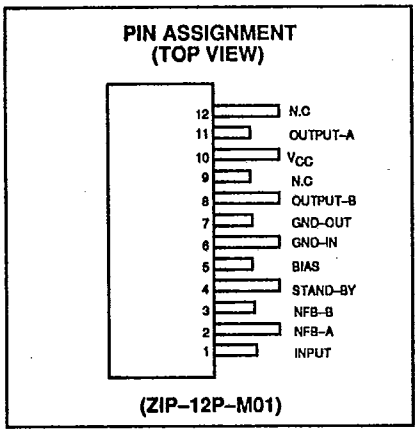
PACKAGE DIMENSIONS

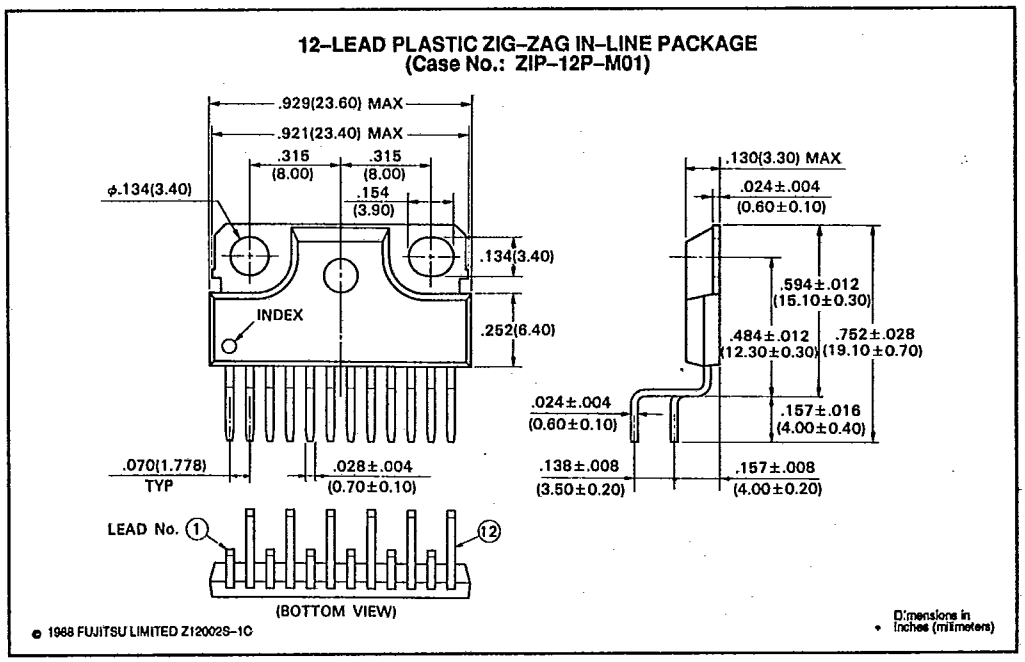
12-LEAD PLASTIC SINGLE IN-LINE PACKAGE
(Case No.: SIP-12P-M01)



Dimensions in Inches (millimeters)

PACKAGE DIMENSIONS (Continued)





低周波電力増幅器（デュアル，BTL）　　富士通

MB3734　（14W，BTL）

動作電源電圧：8～16V（13.2V）
標準負荷　：4Ω

■特徴
- 電源投入時過渡音防止
- 各種保護回路内蔵
  - 電源サージ，過電圧
  - 熱遮断，負荷短絡
  - 出力端子DC短絡
  - 負荷－電源接触

■最大定格（T_c＝25℃）

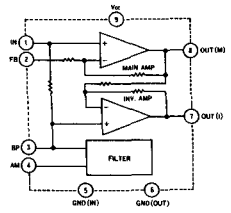
記号	最大定格	単位
V_{CCSU}	50	V
V_{CCOP}	18	V
I_{OPK}	4.5	A
P_D	18	W
T_{opt}	−20/75	℃
T_{stg}	−55/150	℃

■電気的特性（V_{CC}＝13.2V，R_L＝4Ω，T_c＝25℃）

記号	測定条件	最小	標準	最大	単位
I_Q			80	160	mA
ΔV_Q	V_{IN}＝0		±100	±300	mV
G_V	P_{OUT}＝1W	45	47	49	dB
P_{OUT}		10	14		W
THD	P_{OUT}＝1W		0.07	0.5	%
N_{OUT}	R_G＝10kΩ，条件A		0.5	1.0	mV
R_{IN}		20	30		kΩ
I_{CCMT}	V_{T3}＝0		15		mA
MUT			60		dB

■パッケージ：9ピン　プラスチック SIL（熱抵抗＝3℃/W）

■ブロック図



MB3735　（20W，BTL）

動作電源電圧：8～16V（13.2V）
標準負荷　：4Ω

■特徴
- 電源投入時過渡音防止
- 入出力グランドの分離
- 各種保護回路内蔵
  - 電源サージ，過電圧
  - 熱遮断，負荷短絡
  - 出力端子DC短絡
  - 負荷－電源接触

■最大定格（T_c＝25℃）

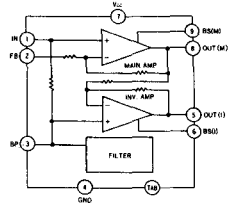
記号	最大定格	単位
V_{CCSU}	40	V
V_{CCOP}	18	V
I_{OPK}	4.5	A
P_D	18	W
T_{opt}	−20/75	℃
T_{stg}	−55/150	℃

■電気的特性（V_{CC}＝13.2V，R_L＝4Ω，T_c＝25℃）

記号	測定条件	最小	標準	最大	単位
I_Q			80	160	mA
ΔV_Q	V_{IN}＝0		±100	±300	mV
G_V	P_{OUT}＝1W	45	47	49	dB
P_{OUT}		16	20		W
THD	P_{OUT}＝1W		0.07		%
N_{OUT}	R_G＝10kΩ，条件A		0.5	1.0	mV
R_{IN}		20	30		kΩ
I_{CCMT}	V_{T3}＝0		15		mA

■パッケージ：9ピン　プラスチック SIL（TAB付）

■ブロック図



MB3736　（15W，BTL）

動作電源電圧：9～16V（13.2V）
標準負荷　：4Ω

■特徴
- 電源投入時過渡音防止
- スタンバイ機能内蔵
- 各種保護回路内蔵
  - 電源サージ，過電圧
  - 熱遮断，負荷短絡
  - 天短保護，地短保護

■最大定格（T_c＝25℃）

記号	最大定格	単位
V_{CCSU}	50	V
V_{CC}	18	V
I_{OPK}	4.5	A
P_D	30	W
T_{opt}	−20/75	℃
T_{stg}	−55/150	℃

■電気的特性（V_{CC}＝13.2V　R_L＝4Ω，T_c＝25℃）

記号	測定条件	最小	標準	最大	単位
I_Q			100	200	mA
ΔV_Q	V_{IN}＝0		±100	±300	V
G_V		43	45	47	dB
P_{OUT}		12	15		W
THD	P_{OUT}＝5W		0.04	0.4	%
N_{OUT}	R_G＝10kΩ，条件A		0.4	1.0	mV
SVR	f＝1kHz，1V	40	50		dB
R_{IN}		20	30		kΩ
I_{STB}			1	50	μA

■パッケージ：12ピン　プラスチック SIL（熱抵抗＝3℃/W）
12ピン　プラスチック ZIL（熱抵抗＝4℃/W）

■ブロック図