

MB3735 20W 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、输出端 DC 短路、过压、负载电源接触、负载短路、热切断等保护电路及电源接通时具有噪声抑制功能, 工作电源电压范围为 8~16V, 在 $V_{CC}=13.2V$, $R_L=4\Omega$, THD=10% 时, 输出功率 $P_O=20W$ 。

极限参数 ($T_A=25^{\circ}\text{C}$)

参 数	额 定 值
电源电压 V_{CC} (V)	18
峰值电源电压 $V_{CC}(\text{Surge})$ (V)	40
输出电流 $I_D(\text{peak})$ (A)	4.5
功 耗 P_D (W)	18
工作温度 T_{opr} ($^{\circ}\text{C}$)	-20~75
贮存温度 T_{stg} ($^{\circ}\text{C}$)	-55~150

电路方框图及应用电路

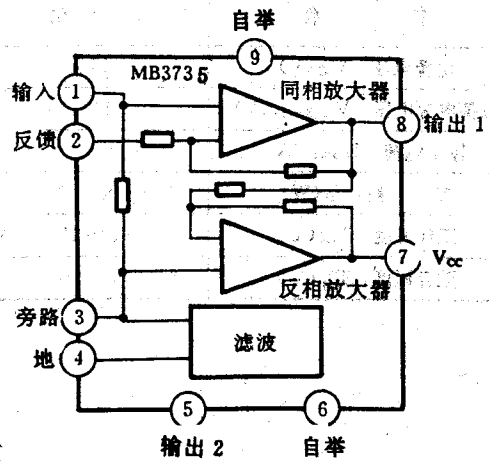


图1 MB3735 的电路方框图

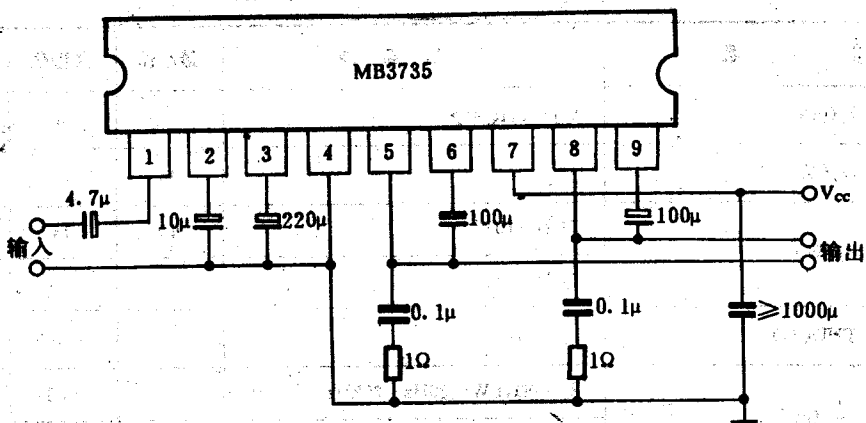


图2 MB3735 的应用电路

电参数 ($V_{CC}=13.2\text{V}$, $R_L=4\Omega$, $f=1\text{kHz}$, $T_A=25^{\circ}\text{C}$)

参 数	测 试 条 件	最小值	典型值	最大值
静态电流 I_b (mA)	$V_{IN}=0, R_L=\infty$		80	160
电压增益 G_V (dB)		45	47	49
输出功率 P_D (W)	THD=10%	16	20	
	THD=1%		14	
谐波失真 THD (%)	$P_D=1\text{W}$		0.07	
输出噪声 V_{NO} (mV)	$R_s=0\Omega, BW=20\text{Hz}\sim 20\text{kHz}$		0.3	
	$R_s=10\text{k}\Omega, BW=20\text{Hz}\sim 20\text{kHz}$		0.5	1.0
输入电阻 R_{IN} (kΩ)		20	30	

续表

参 数	测 试 条 件	最小值	典型值	最大值
输出失调电压 V_{offset} (V)			±0.1	±0.3
静噪电流 I_{MUTE} (mA)	$V_{T3} = 0V$ (DC 静噪时)		15	

MB3735

BTL AUDIO POWER AMPLIFIER

20 WATT BTL AUDIO POWER AMPLIFIER WITH FILTERING CIRCUITRY FOR POWER-ON POP NOISE

The Fujitsu MB3735 is designed for a low-frequency high-power amplifier with internal BTL (Balanced Transformer less) circuitry. The MB3735 is packed in a small plastic 9-pin Single In-Line Package (SIP) which has low thermal resistance, so that a design for heat radiation can be performed with low cost.

Also, the MB3735 requires such a few external components and, the MB3735 can be mounted on printed circuit board with high density.

The MB3735 contains a filtering circuitry for power-on pop noise and various protection circuits. The MB3735 is suitable for car stereo applications.

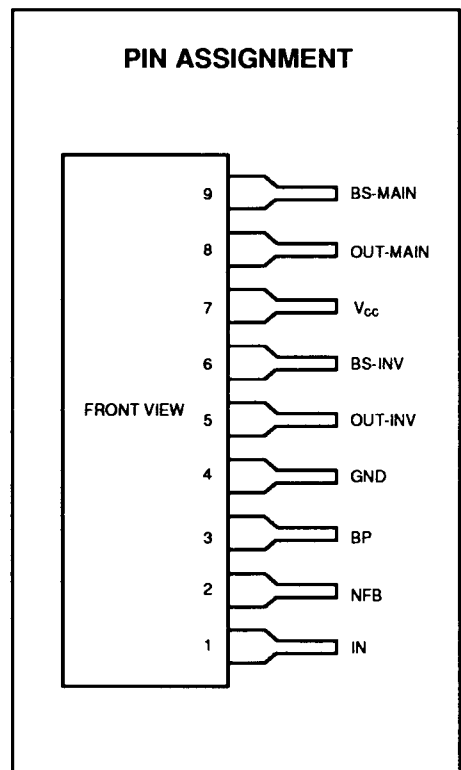
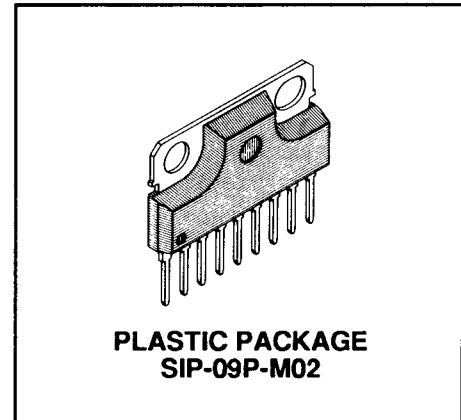
- High Power Output: 20W typ. with $R_L = 4\Omega$
- Minimum External Components (OCL, 8 capacitors)
- Small Plastic 9-pin Single In-Line Package
- Low Thermal Resistance
- Various Protection Circuitries:
 - Power Supply Surge Protection
 - Excess Voltage Protection
 - Load Short Protection
 - DC Short Protection for Outputs, Power Supply pin, and Ground pin
 - Thermal Protection
- Low Power-on Pop Noise
- THD = 0.07% Typ. ($P_O = 1\text{ W}$, $R_L = 4\Omega$)
- Designed against breakdown by load short and Supply Voltage Surge.

ABSOLUTE MAXIMUM RATINGS (see NOTE)

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

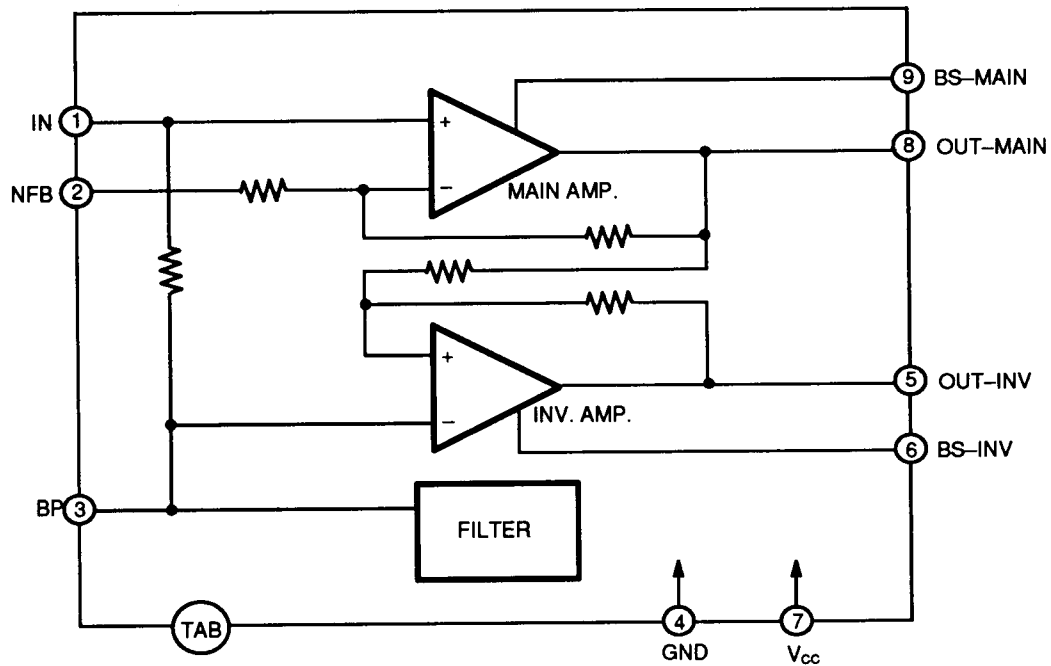
NOTE: $t_s \leq 0.2$ (s), $t_r \geq 1$ (ms)

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.



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.

Fig. 1 — BLOCK DIAGRAM OF MB3735



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{cc}	8 to 16	V
Case Temperature	T_c	-20 to +75	°C

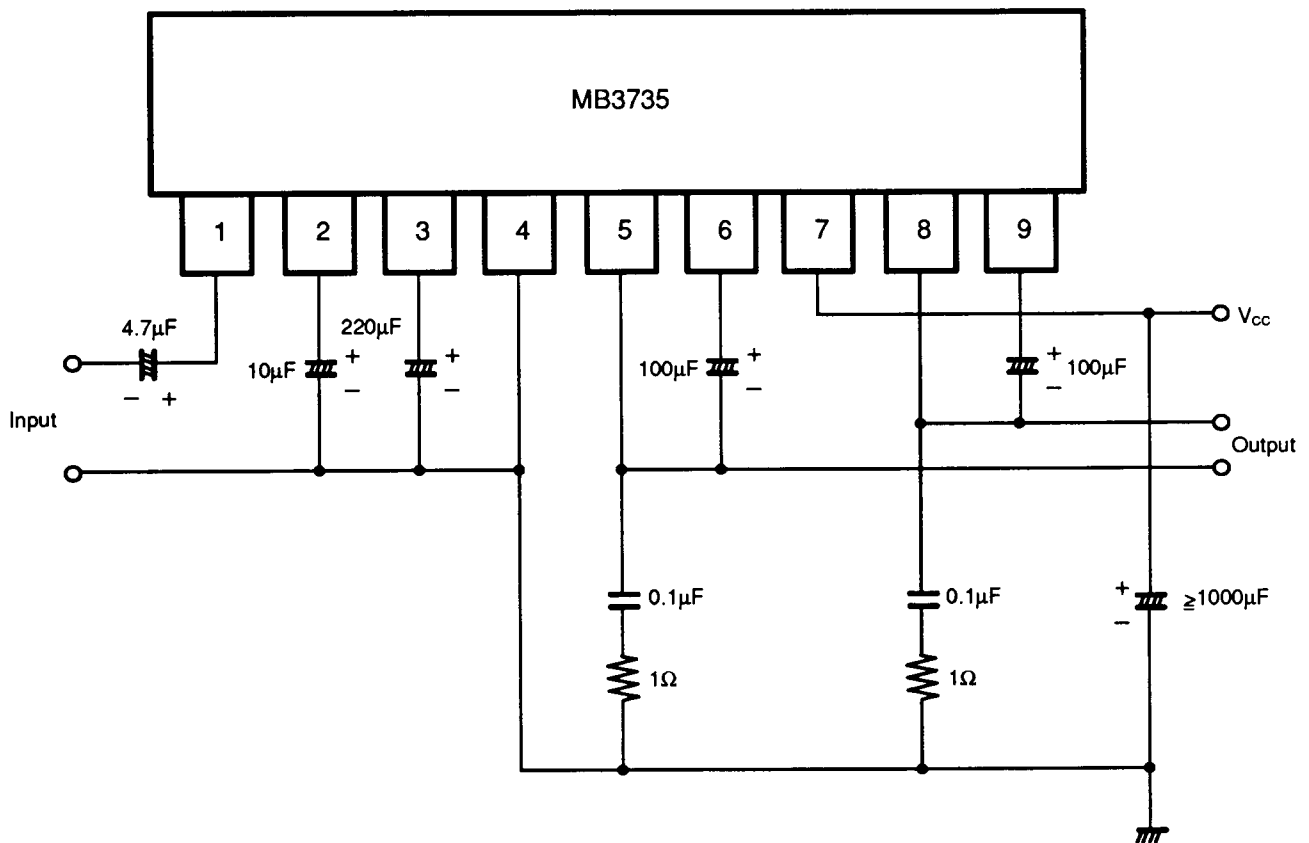
ELECTRICAL CHARACTERISTICS

($T_C = 25^\circ\text{C}$, $V_{CC} = 13.2\text{V}$, $R_L = 4\Omega$, $f = 1\text{kHz}$)

Parameter	Condition	Symbol	Value			Unit
			Min	Typ	Max	
Quiescent Power Supply Current	$V_{IN} = 0\text{V}$, $R_L = \infty$	I_O		80	160	mA
Voltage Gain		A_V	45	47	49	dB
Output Power	THD = 10%	P_{O1}	16	20		W
	THD = 1%	P_{O2}		14		W
Total Harmonic Distortion	$P_O = 1\text{W}$	THD		0.07	0.5	%
Output Noise Voltage	$R_g = 0\Omega$ BW = 20 Hz to 20 kHz	V_{NO1}		0.3		mV
	$R_g = 10\text{k}\Omega$ BW = 20 Hz to 20 kHz	V_{NO2}		0.5	1.0	mV
Input Resistance		R_{IN}	20	30		$\text{k}\Omega$
Output Offset Voltage		V_{OFFSET}		± 0.1	± 0.3	V
Supply Current in DC MUTE mode	BP = 0V	I_{CCO}		15		mA

ELECTRICAL CHARACTERISTICS (Continued)

Fig. 2 – MEASUREMENT CIRCUIT



Note: When BP (Pin 3) is grounded, DC Muting can be used.
 The capacitor ($0.1\mu\text{F}$) between V_{CC} and GND can be controlled the unstable operating conditions of board level.

TYPICAL CHARACTERISTICS CURVES

Fig. 3 – TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

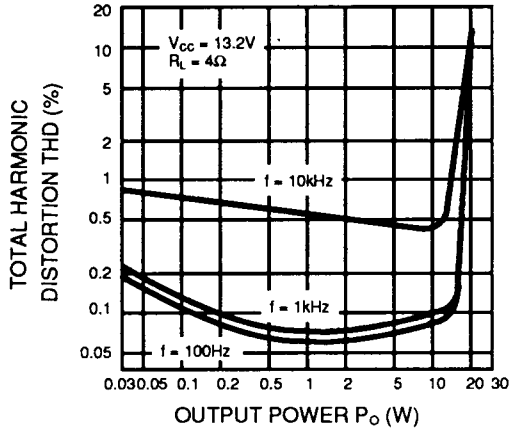


Fig. 4 – TOTAL HARMONIC DISTORTION vs. FREQUENCY

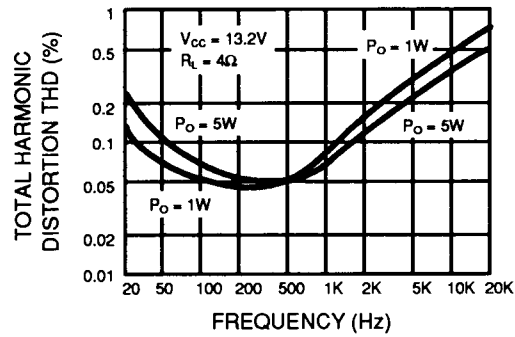


Fig. 5 – GAIN vs. FREQUENCY

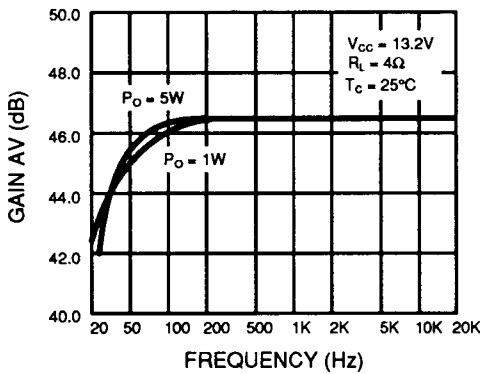


Fig. 6 – POWER BAND WIDTH vs. FREQUENCY

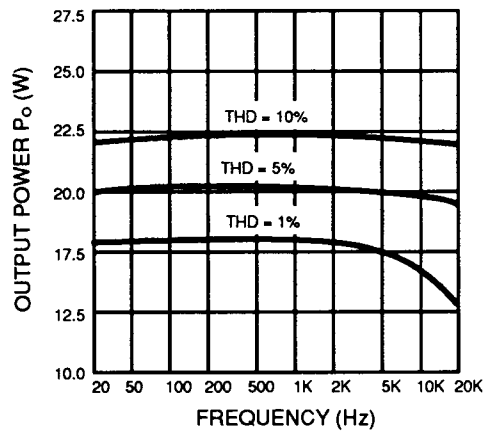
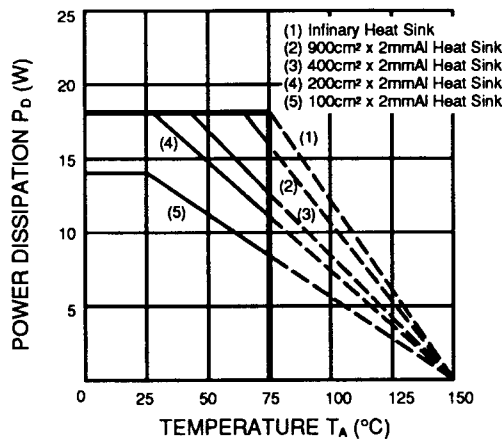
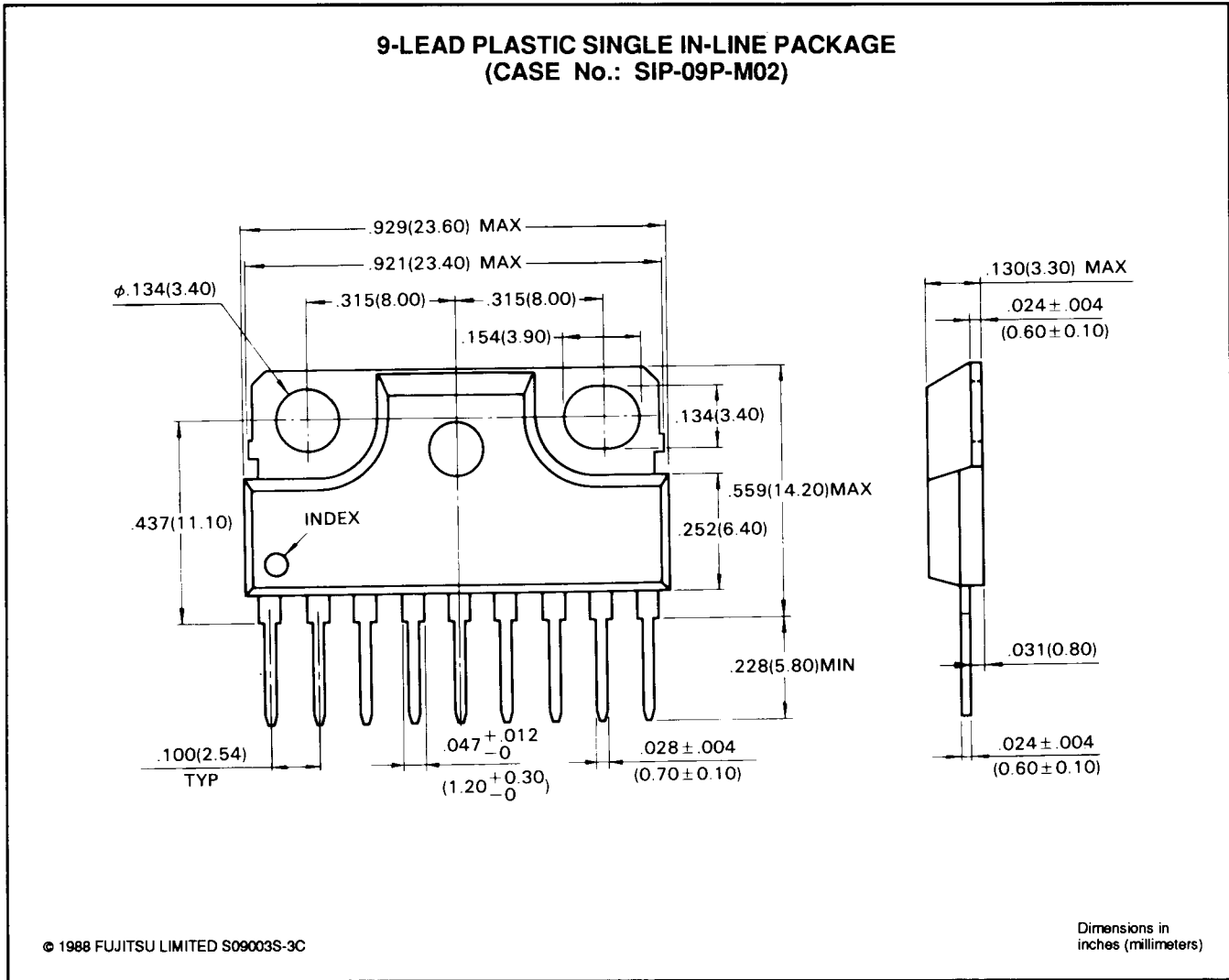


Fig. 7 – POWER DISSIPATION vs. TEMPERATURE



PACKAGE DIMENSIONS



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NOTE

FUJITSU LIMITED

For further information please contact:

Japan

FUJITSU LIMITED

Integrated Circuits and Semiconductor Marketing
Furukawa Sogo Bldg., 6-1, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100, Japan

Tel: (03) 216-3211

Telex: 781-2224361

FAX: (03) 216-9771

North and South America

FUJITSU MICROELECTRONICS, INC.

Integrated Circuits Division
3545 North First Street
San Jose, CA 95134-1804 USA

Tel: 408-922-9000

Telex: 910-338-0190

FAX: 408-432-9044

Europe

FUJITSU MIKROELEKTRONIK GmbH

Arabella Centre 9. OG
Lyoner Strasse 44-48
D-6000 Frankfurt 71

F.R. Germany

Tel: (069) 66320

Telex: 411963

FAX: (069) 6632122

Asia

FUJITSU MICROELECTRONICS ASIA PTE LIMITED

#06-04 to #06-07
Plaza By The Park
No. 51 Bras Basah Road
Singapore 0719

Tel: 336-1600

Telex: 55573

FAX: 336-1609

OCT 17 1990

低周波電力増幅器 (デュアル, BTL)

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°C)

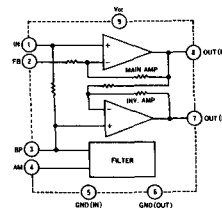
記号	最大定格	単位
V _{CCSU}	50	V
V _{CCOP}	18	V
I _{OPK}	4.5	A
P _D	18	W
T _{OPJ}	-20/75	°C
T _{STB}	-55/150	°C

■電気的特性 (V_{CC} = 13.2V, R_L = 4Ω, T_c = 25°C)

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 _{TS} = 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°C/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
- 入出力カランドの分離
- 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°C)

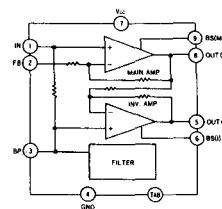
記号	最大定格	単位
V _{CCSU}	40	V
V _{CCOP}	18	V
I _{OPK}	4.5	A
P _D	18	W
T _{OPJ}	-20/75	°C
T _{STB}	-55/150	°C

■電気的特性 (V_{CC} = 13.2V, R_L = 4Ω, T_c = 25°C)

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 _{TS} = 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°C)

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 _{OPJ}	-20/75	°C
T _{STB}	-55/150	°C

■電気的特性 (V_{CC} = 13.2V, R_L = 4Ω, T_c = 25°C)

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	mV
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°C/W)

12ピン プラスチック ZIL (熱抵抗 = 4°C/W)

■ブロック図

