



No.3227A

LA4630N

9V/12V 3-Dimension Power IC for Radio Cassette Recorders

Features

- Stereo section 9V/3Ω 3W×2, 12V/3Ω 5W×2: noise filter capacitorless power
- Super bus section 9V/3Ω 6W, 12V/3Ω 10W: output capacitor, B-S capacitorless power
This chip employs technology for eliminating pins and external connections to realize 3-dimensional power on a single chip. This IC is a single package power IC for making sound systems with punch.
- On-chip pop noise suppressor
- On-chip power switch circuit
- External and mute functions on chip
- Protection functions on chip (thermal protection circuit and BTL section R_L short protection circuit)

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

			unit
Maximum Supply Voltage	V_{CC} max	*1 no signal	20 V
Thermal Resistance	θ_{j-c}		2 $^\circ\text{C}/\text{W}$
Maximum Output Current	I_o peak		3 A
Allowable Power Dissipation	P_d max	With infinite heat sink	37.5 W
Operating Temperature	T_{opr}		-20 to +75 $^\circ\text{C}$
Storage Temperature	T_{stg}		-40 to +150 $^\circ\text{C}$

Operating Conditions at $T_a = 25^\circ\text{C}$

			unit
Recommended Supply Voltage	V_{CC}		9 V 12 V
Recommended Load Resistance	R_L		3 to 8 Ω
Operating Voltage Range	V_{CC} op	*2	5 to 18 V

*1: Operational notes on the maximum supply voltage

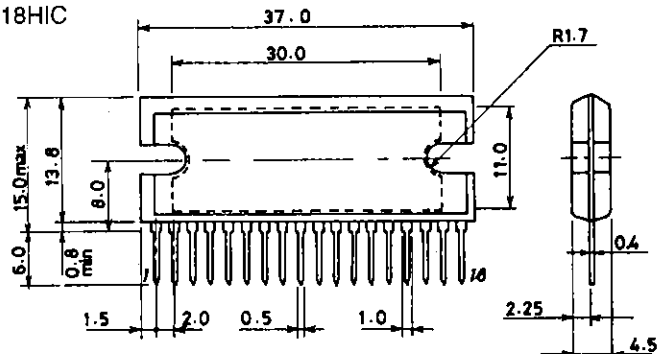
FRONT L/R	BTL	V_{CC} max	Conditions
$R_L \cong 3\Omega$	$R_L \cong 3\Omega$	20V	No signal [Front L/R input with capacitor $R_g=0$ BTL L/R input without capacitor $R_g=0$]
$R_L \cong 3\Omega$	$R_L \cong 4\Omega$	21V	
$R_L \cong 3\Omega$	$R_L \cong 5\Omega$	22V	
$R_L \cong 3\Omega$	$R_L \cong 6\Omega$	23V	
$R_L \cong 3\Omega$	$R_L \cong 7\Omega$	24V	
$R_L \cong 3\Omega$	$R_L \cong 8\Omega$	24V	

For power supply transistor regulation, the equivalent power supply line resistance is 3Ω or greater.

*2: The upper limit for V_{CCop} is $V_{CCmax} - 2V$.

Package Dimensions (unit: mm)

3109-S18HC



SANYO: SEP18H

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LA4630N

[Precaution concerning the metal]

Select P_0 with a goal of a rated load/rated supply voltage of $R_L=3$ to 8Ω and $V_{CC}=5$ to $18V$ and design to avoid exceeding the package P_{dmax} of $37.5 W$. For heavy loads or high V_{CC} , the drive design is involved and the power effect deteriorates, so pay attention to these factors.

Operating Characteristics at $T_a=25^\circ C$, $V_{CC}=9V$, $R_L=3\Omega$, $f=1kHz$

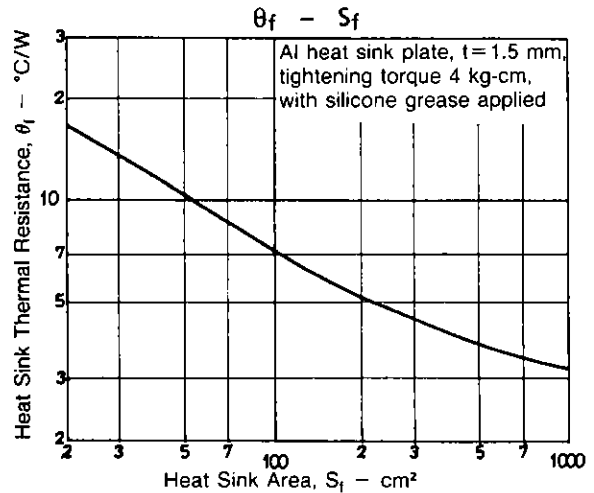
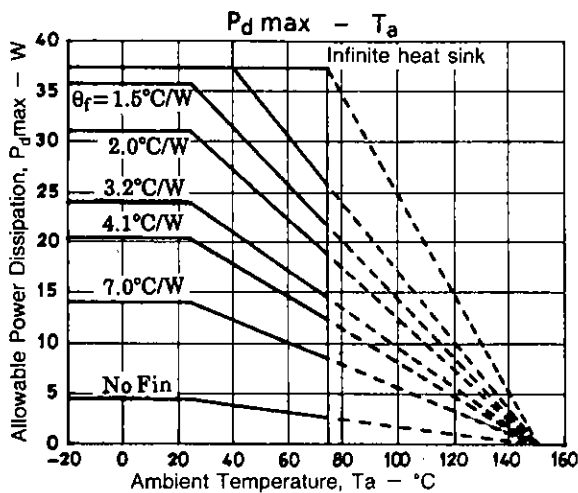
		min	typ	max	unit
Quiescent Flow-in Current	I_{CC0}	35	70	140	mA
Standby Current	I_{st}		1.0	10.0	μA
Power Switch Pin Flow-in Current	I_{sw}		10.0		mA
Mute Supply Flow-in Current	I_{CCm}		35.0	70.0	mA

[Stereo Section]

			min	typ	max	unit
Output Power	P_{o1}	$V_{CC}=9V, THD=10\%$	2.2	3.0		W
	P_{o2}	$V_{CC}=12V, THD=10\%$	4.2	5.0		W
Total Harmonic Distortion	THD	$V_0=1V$		0.20	1.0	%
Input Resistance	R_i			50		$k\Omega$
Voltage Gain	VG		43	45	47	dB
Output Noise Voltage	V_{NO}	$R_g=0, BPF=20Hz$ to $20kHz$		0.15	0.40	mV
Ripple Rejection	SVR	$f_R=100Hz, V_R=0dBm$	45	55		dB
Channel Separation	ch sep	$R_g=10k\Omega, V_0=0dBm$	45	50		dB
Muting Attenuation	A_{tt}	$V_0=0dBm$		80		dB
Low-Region Roll Off Frequency	f_L	At $VG=-3dB$		50		Hz
High-Region Roll Off Frequency	f_H	At $VG=-3dB$		50		kHz

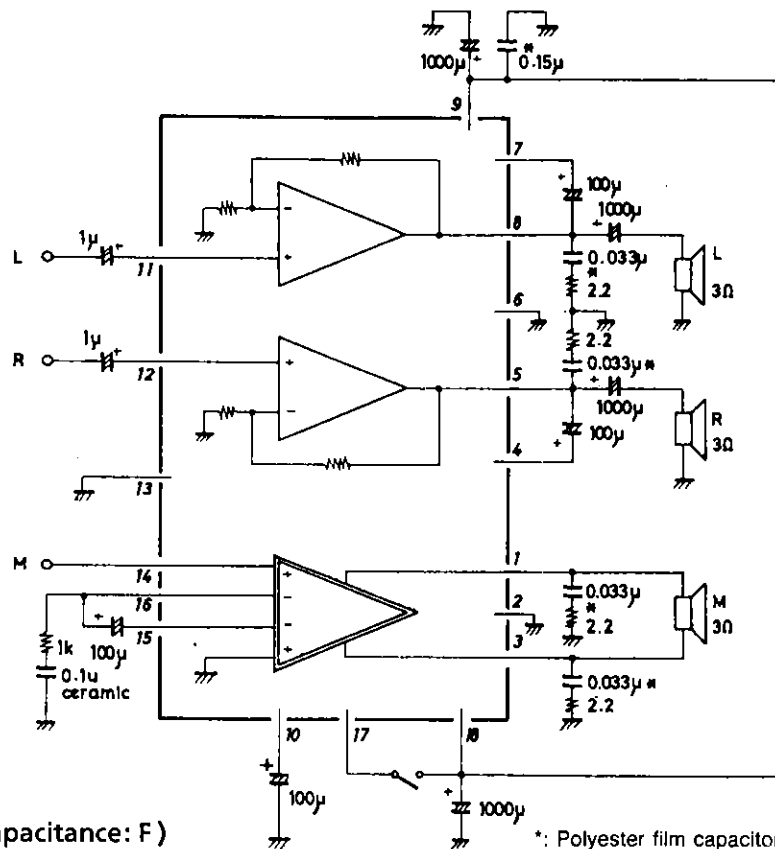
[Super Bus Section]

			min	typ	max	unit
Output Power	P_{o1}	$V_{CC}=9V, THD=10\%$	5.0	6.0		W
	P_{o2}	$V_{CC}=12V, THD=10\%$	8.0	10.0		W
Total Harmonic Distortion	THD	$V_0=1V$		0.20	1.0	%
Input Resistance	R_i			30		$k\Omega$
Voltage Gain	VG		43	45	47	dB
Output Noise Voltage	V_{NO}	$R_g=0, BPF=20Hz$ to $20kHz$		0.3	0.6	mV
Ripple Rejection	SVR	$f_R=100Hz, V_R=0dBm$	50	60		dB
Muting Attenuation	A_{tt}	$V_0=0dBm$		80		dB
Low-Region Roll Off Frequency	f_L	$VG:-3dB$		5		Hz
High-Region Roll Off Frequency	f_H	$VG:-3dB$		40		kHz
Output Offset Voltage	V_{OFF}	$R_g=0$	-150		+150	mV



LA4630N

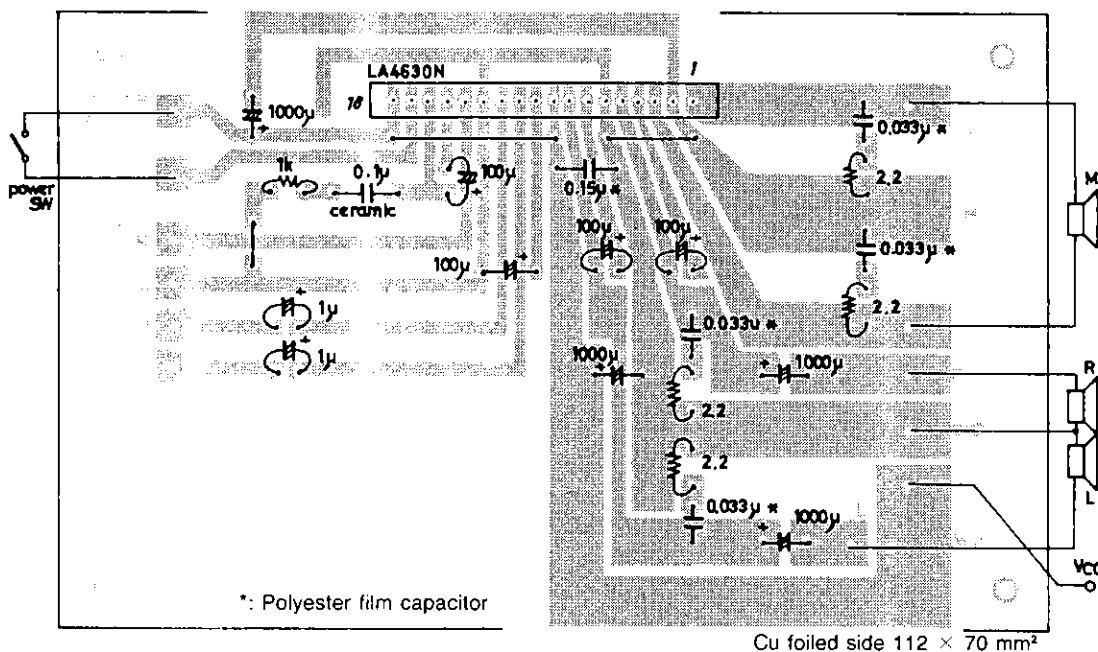
Block Diagram



Note 1: The motor should not be connected to the power switch pin, since transient noise may appear on the amplifier outputs when the motor is started or stopped.

Note 2: Audio mute is enabled by connecting a 300 Ω resistance between the DC pin and ground. DC bias control of both the stereo (L ch, R ch) and BTL (super bass) channels is enabled, and all audio output signals can be muted by controlling the MUTE pin.

Sample Printed Circuit Pattern



※: Insert 0.15 µF between power supply and ground at the root of the pins.

Unit (resistance: Ω, capacitance: F)

LA4630N

Pin Voltages

Pin No.	1	2	3	4	5	6	7	8	9
Name	OUT No	PWR GND 2	OUT Inv	BS R	OUT R	PWR GND 1	BS L	OUT L	V _{CC} 1
Pin voltage (V)	4.0	0	4.0	8.1	4.5	0	8.1	4.0	9.0

Pin No.	10	11	12	13	14	15	16	17	18
Name	DC	IN L	IN R	PRE GND	IN No	NF Inv	NF No	PWR SW	V _{CC} 2
Pin voltage (V)	4.5	1.4	1.4	0	21 [mV]	1.4	1.4	9.0	9.0

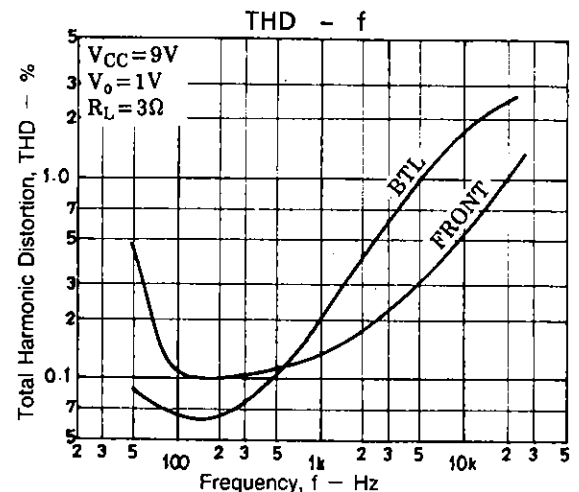
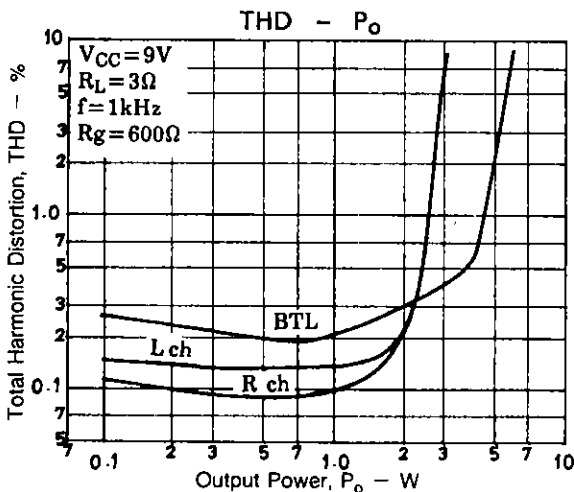
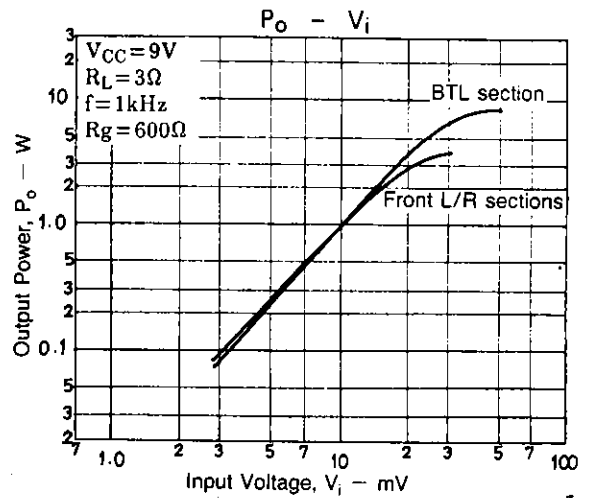
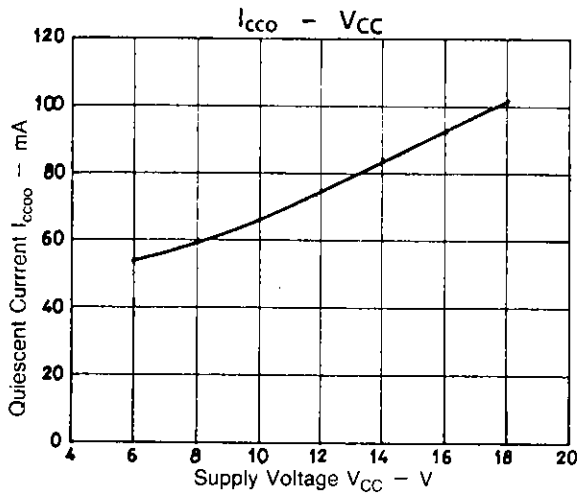
P_o Chart

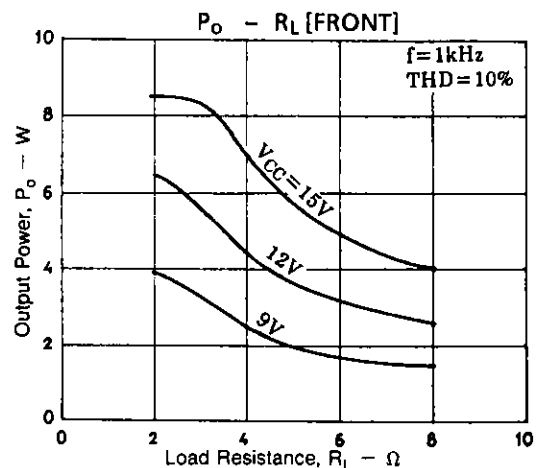
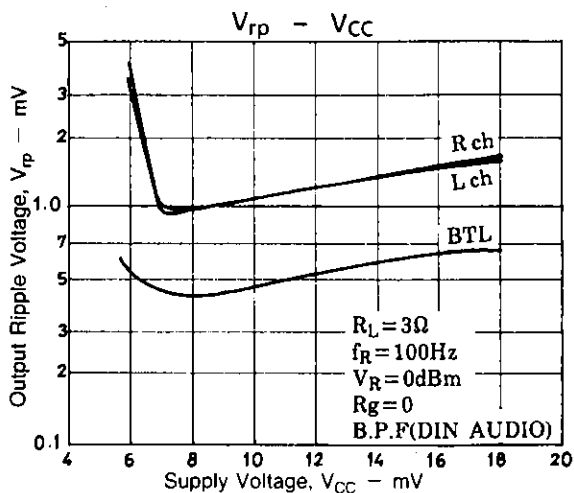
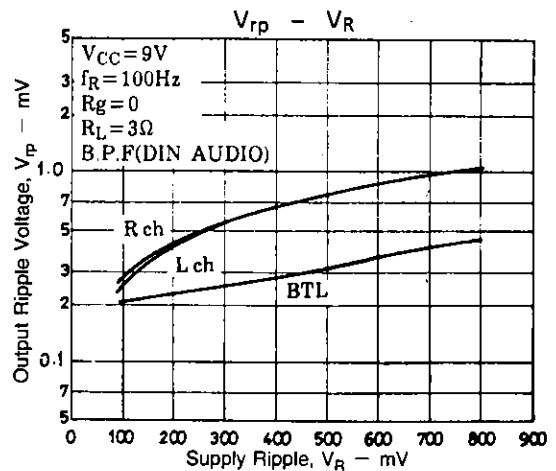
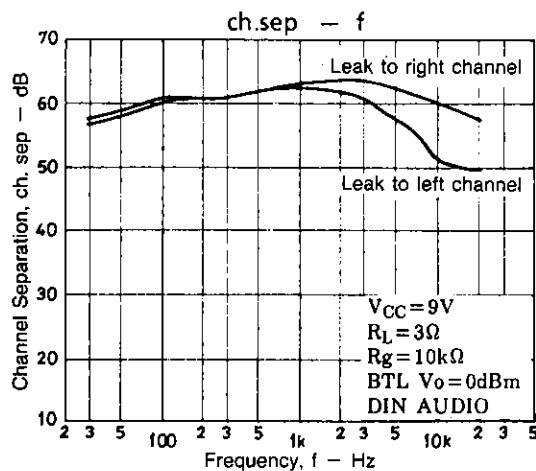
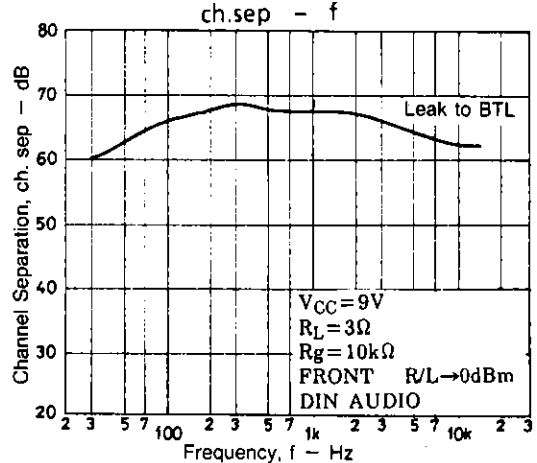
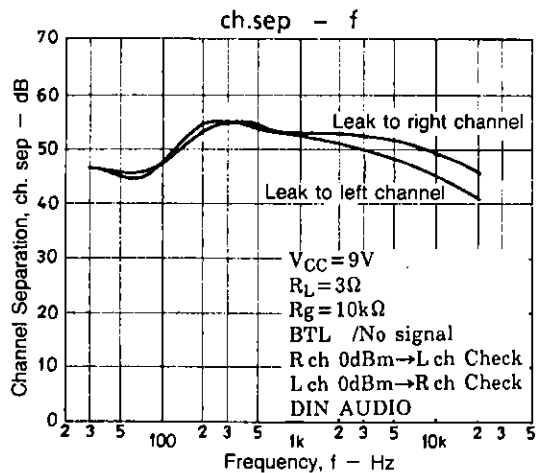
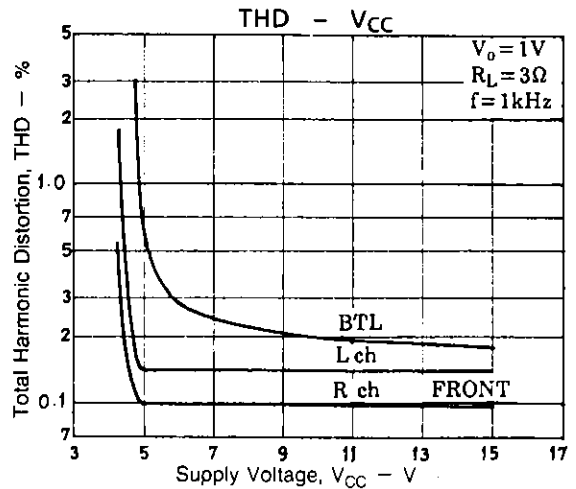
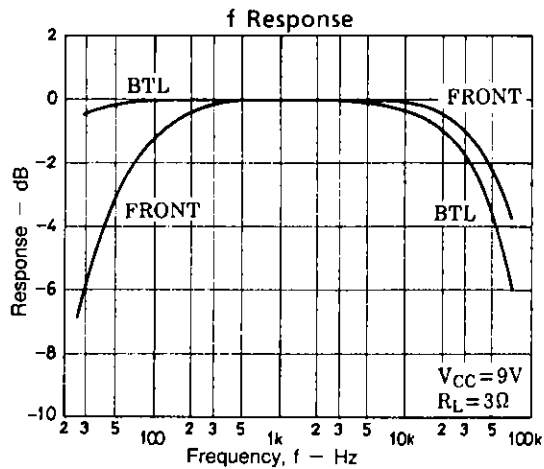
(THD=10%)

Item	R _L	9V	12V	15V
FRONT L/R	8Ω	1.4W	2.5W	3.9W
	6Ω	1.75W	3.2W	5.0W
	4Ω	2.4W	4.3W	6.4W
	3Ω	3.2W	5.6W	—
BTL	8Ω	3.2W	6.4W	11.0W
	6Ω	4.0W	8.1W	13.5W
	4Ω	5.3W	10.4W	—
	3Ω	6.4W	12.4W	—

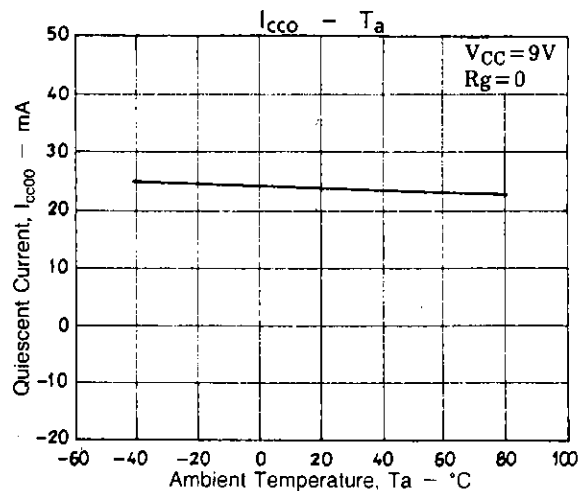
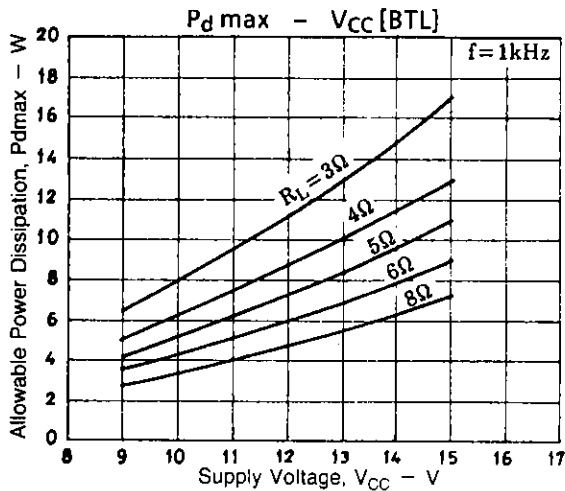
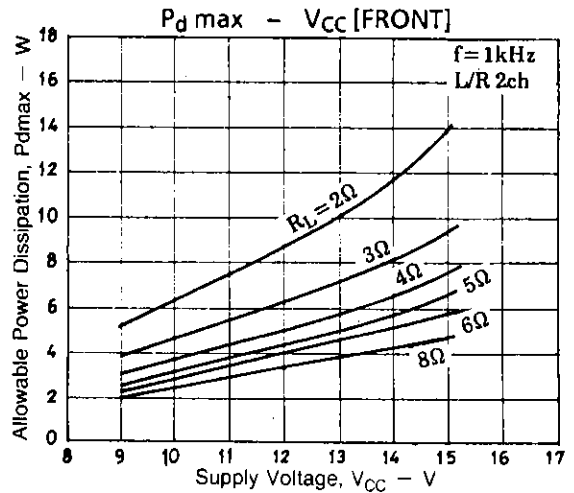
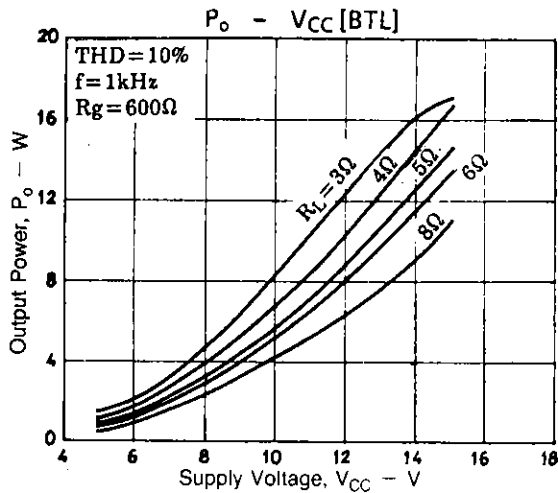
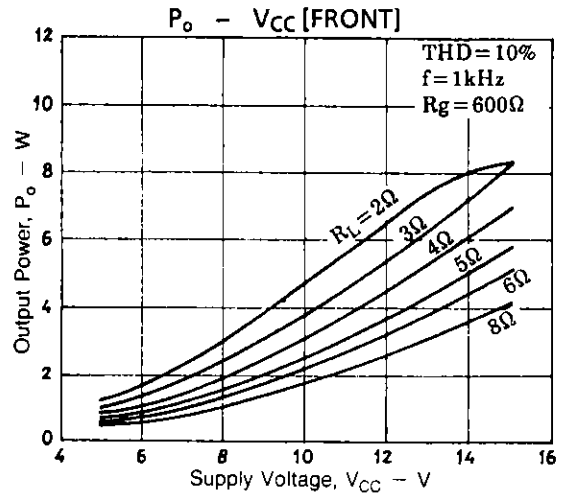
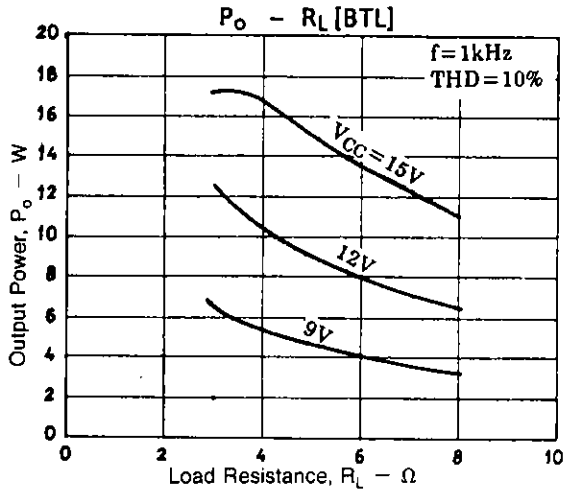
Pdmax Chart

Item	R _L	9V	12V	15V
FRONT L/R	8Ω	2.0W	3.2W	4.6W
	6Ω	2.4W	3.8W	5.7W
	4Ω	3.1W	5.0W	5.4W
	3Ω	3.8W	6.2W	—
BTL	8Ω	2.8W	4.8W	7.2W
	6Ω	3.6W	6.0W	9.0W
	4Ω	5.0W	8.8W	—
	3Ω	6.3W	11.2W	—





LA4630N



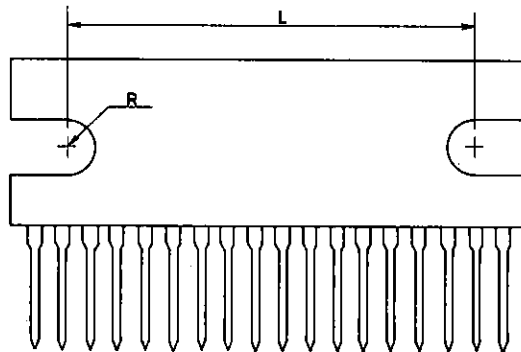
Notes on using this IC

- Always short power supply pins 9 and 16 on the copper foil of the printed circuit pattern and apply the equivalent power supply voltage.
- Pin 17 is designed for the power switch.
It can be switched on and off with a small current capacitance switch, but the point to watch out for is that if the voltage loss between pins 17 and 18 is too large, there may be problems in the biasing and the power may drop.
- When switching with a transistor, the general practice is to insert a PNP transistor between pins 17 and 18.

LA4630N

Notes on Mounting Radiator Fin

1. The tightening torque should be in the range of 4 to 6 kg-cm.
2. The distance between screw holes of the radiator fin must coincide with the distance between screw holes of the IC. With case outline dimensions L and R referred to the screws must be tightened with the distance between them as close to each other as possible.



3. The screws to be used must have a head equivalent to the one of truss machine screw or binder machine screw defined by JIS. Washers must be also used to protect the IC case.
4. No foreign matter such as cutting particles shall exist between heat sink and radiator fin. When applying grease on the junction surface, it must be applied uniformly on the whole surface.
5. IC lead pins are soldered to the printed circuit board after the radiator fin is mounted on the IC.

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