

# LA4140



.3017B

Monolithic Linear IC

## 0.5W AF Power Amplifier

©528D

### Features

- Output power 0.5W typ ( $V_{CC}=6V$ ,  $R_L=8\text{ohms}$ , THD=10%).
- Low quiescent current.
- Wide operating voltage range:  $V_{CC}=3.5$  to 12V.
- 9-pin SEP permitting sets to be small-sized and eliminating the need to use a heat sink.

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

Parameter	Symbol	Value	unit
Maximum Supply Voltage	$V_{CCmax}$ Quiescent mode	14	V
	Operating mode $R_L=16\text{ohms}$	14	V
	$R_L=8\text{ohms}$	12	V
Maximum Output Current	$I_O$	500	mA
Allowable Power Dissipation	$P_{dmax}$ *	*750	mW
Operating Temperature	$T_{opg}$	-20 to +70	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to +150	$^\circ\text{C}$

\* $P_{dmax}$ : Installed on 50x50mm<sup>2</sup> PCB, See figure of  $P_{dmax}$  -  $T_a$ .

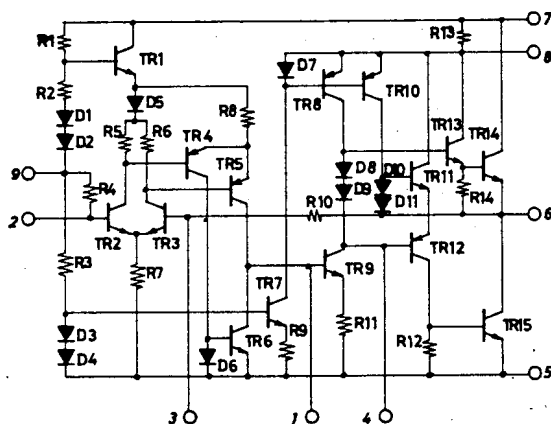
### Recommended Operating Conditions at $T_a=25^\circ\text{C}$

Parameter	Symbol	Value	unit
Supply Voltage	$V_{CC}$	6	V
Load Resistance	$R_L$	8	ohm

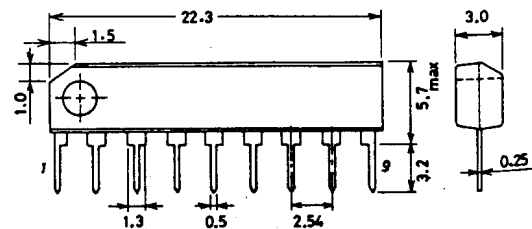
### Operating Characteristics at $T_a=25^\circ\text{C}$ , $V_{CC}=6V$ , $R_L=8\text{ohms}$ , $R_g=600\text{ohms}$ , $R_f=47\text{ohms}$ , $f=1\text{kHz}$

Parameter	Symbol	THD=10%	min	typ	max	unit
Quiescent Current	$I_{CCO}$			11		mA
Voltage Gain	$V_G$		47	50	52	dB
Output Power	$P_o$	THD=10%	0.45	0.5		W
Total Harmonic Distortion	THD	$P_o=100\text{mW}$		0.3	1.0	%
Input Resistance	$r_i$			15k		ohm
Output Noise Voltage	$V_{NO}$	$R_g=10\text{kohms}$ , via filter of 50Hz to 20kHz		0.4	1.0	mV

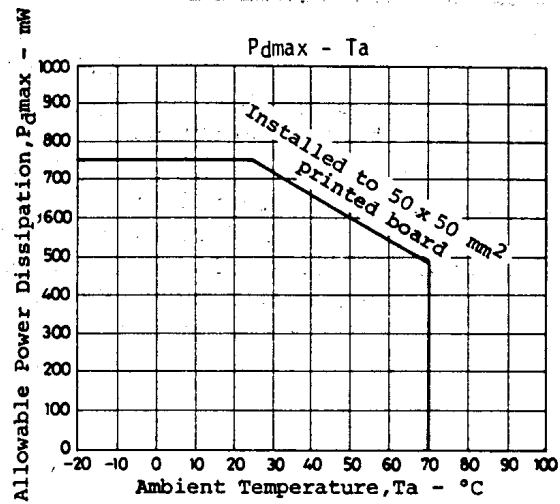
### Equivalent Circuit



### Case Outline 3017B-S9IC (unit:mm)



SANYO: SEP9



### Notice for Using IC

#### (1) Maximum Ratings

Enough margin covering supply voltage drifting should be prepared and designing over maximum ratings should be absolutely avoided because operation near these ratings causes going across the ratings and leading to destruction.

#### (2) Terminating Pins

Turning the circuit on leaving pin to pin of IC shorted causes destruction or failure. Turn on ascertaining that solder has never shorted pins when setting IC to printed board.

#### (3) Location

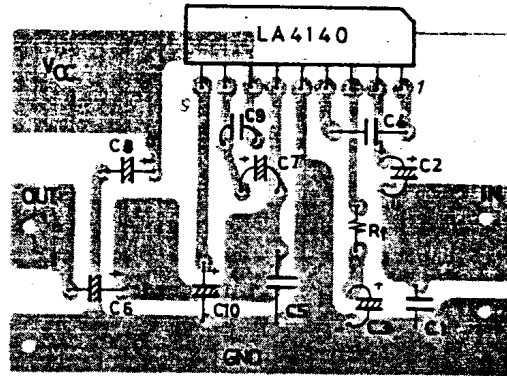
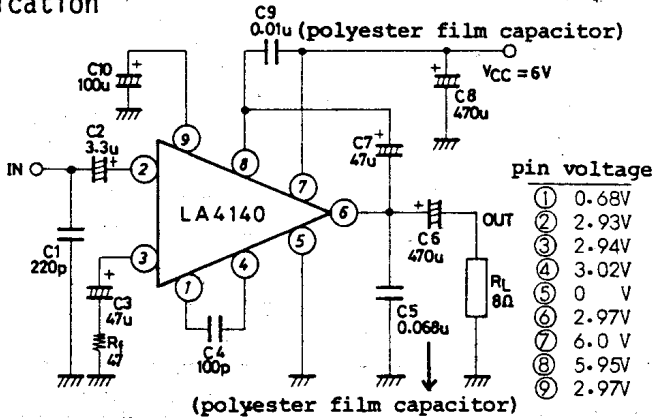
When used in a radio receiver, IC is designed to locate apart from a bar antenna enough.

#### (4) Printed Pattern Designing

As designing a printed pattern, lines of power supply, output and ground are to be widely short and pattern and peripheral parts are considerably set not to feedback from output to input.

Also, a capacitor C8 at power line, C5 and C9 of anti-oscillator are to be arranged near to pins of IC.

### Application



An Example of Printed Pattern  
(bottom view, 35 x 50 mm<sup>2</sup>)

#### [Peripheral Parts]

C1, 220pF: Anti-noise capacitor.

C2, 3.3uF: Coupling capacitor. Large C2 makes operating noise of variable resistor large. Small one makes frequency response of low frequency range narrow.

C3, 47uF: Feedback capacitor. Small C3 makes the starting time short, but frequency response of low range narrow.

C4, 100pF: For frequency response adjusting of high range, but excessive small one is apt to oscillate.

C5, 0.068uF: For anti-oscillation. Polyester film capacitor is available which has good thermal and high frequency characteristics.

C6, 470uF: Output capacitor. It decides power of low frequency.

- C7, 47 $\mu$ F: Bootstrap capacitor. Excessive small C7 causes wave form clipping point to be unbalanced at low frequency range.
- C8, 470 $\mu$ F: Filter capacitor.
- C9, 0.01 $\mu$ F: Anti-oscillation. Polyester film capacitor is available.
- C10, 100 $\mu$ F: Filter capacitor. Rejects power line hum. Small C10 decreases ripple rejection ratio.
- R<sub>f</sub>, 47ohm: Decides voltage gain. Closed loop voltage gain is nearly calculated as follows. But about  $\pm 3$ dB tolerance should be prepared owing to scatter of internal resistance of IC.

$$VG = 20 \log (15000/R_f[\text{ohm}]) \quad [\text{dB}]$$

