



# LA4145

## 0.6 to 0.9 W AF Power Amplifier for Radio Cassette Recorders

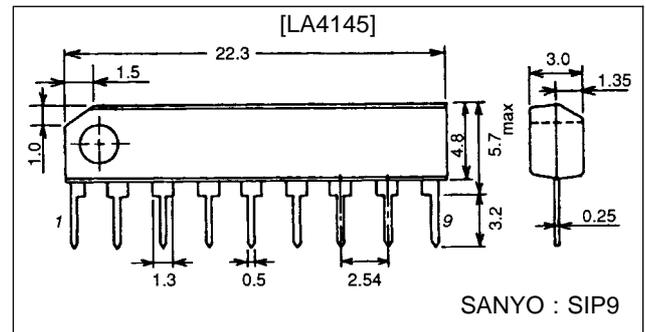
### Features

- The LA4145 is especially suited for use in cassette tape recorder, radio-cassette, recorder, stereo cassette player applications.
- 0.6 W typ/ $V_{CC} = 6.0$  V,  $R_L = 8 \Omega$ , THD = 10%
- 0.9 W typ/ $V_{CC} = 6.0$  V,  $R_L = 4 \Omega$ , THD = 10%
- Minimum number of external parts required
- Soft clip
- Small pop noise at  $V_{CC}$  ON/OFF mode
- Voltage gain fixed at 50 dB.  
An external resistor can be connected to reduce this value.

### Package Dimensions

unit : mm

#### 3017C-SIP9



### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}$ max	Quiescent mode	9	V
		Operating mode $R_L = 8 \Omega$	8	V
Maximum output current	$I_O$ peak		500	mA
Allowable power dissipation	$P_d$ max	$50 \times 50 \text{ mm}^2$ with PCB	0.9	W
Operating temperature	$T_{opr}$		-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$		6	V
Recommended load resistance	$R_L$		4 to 8	$\Omega$
Operating voltage range	$V_{CC}$		3.6 to 8	V

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## LA4145

### Operating Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 6.0\text{ V}$ , $R_L = 8\ \Omega$ , $R_g = 600\ \Omega$ , $f = 1\text{ kHz}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Quiescent current	$I_{CCO}$	LA4145		10	20	mA
Voltage gain	VG		48	50	52	dB
Output power	$P_O$	THD = 10%, $R_L = 4\ \Omega$		0.9		W
		THD = 10%, $R_L = 8\ \Omega$	0.45	0.6		W
Total harmonic distortion	THD	$P_O = 0.1\text{ W}$		0.2	1.0	%
Input resistance	$r_i$			30		k $\Omega$
Output noise voltage	$V_{NO}$	$R_g = 10\text{ k}\Omega$ , B.P.F. = 20 Hz to 20 kHz		0.6	1.2	mV
Ripple rejection ratio	SVRR	$R_g = 0$ , $f_R = 100\text{ Hz}$ , $V_R = 150\text{ mV}$	-35	-40		dB

### Proper care in changing voltage gain

An external resistor can be connected in series with the feedback capacitor at pin 2 to reduce the voltage gain. (See RNF-VG characteristic.)

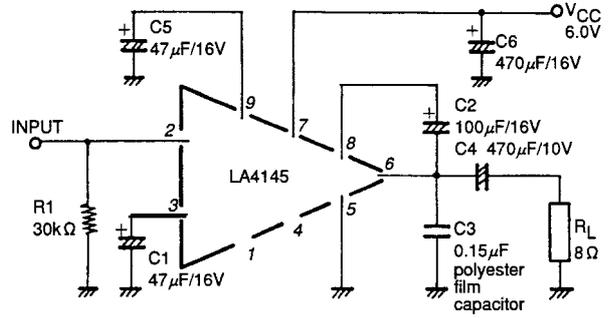
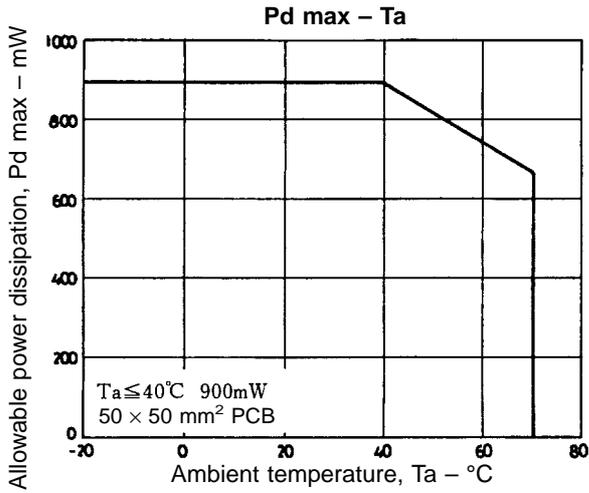
### IC usage notes

- Maximum ratings**  
 If the IC is used in the vicinity of the maximum ratings, even a slight variation in conditions may cause the maximum ratings to be exceeded, thereby leading to breakdown. Allow an ample margin of variation for supply voltage, etc. and use the IC in the range where the maximum ratings are not exceeded.
- Pin-to-pin short**  
 If power is applied when the space between pins is shorted, breakdown or deterioration may occur. When mounting the IC on the board or applying power, make sure that the space between pins is not shorted with solder, etc.
- Radio applications**  
 For use in radio applications, keep a good distance between IC and bar antenna.
- Printed circuit pattern**  
 When designing the printed circuit pattern, make the power supply, output, and ground lines thicker and shorter and determine the pattern and parts placement so that no feedback loop is formed between input and output. Place power capacitor  $C_6$ , oscillation blocking capacitor  $C_3$  as close to the IC pin as possible to prevent oscillation from occurring. (See the sample printed circuit pattern.)

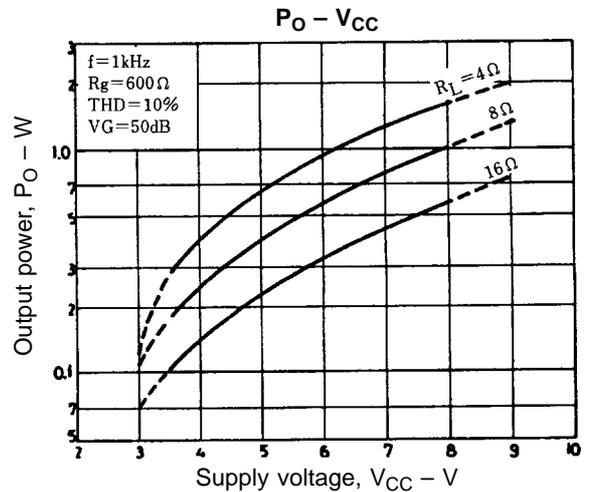
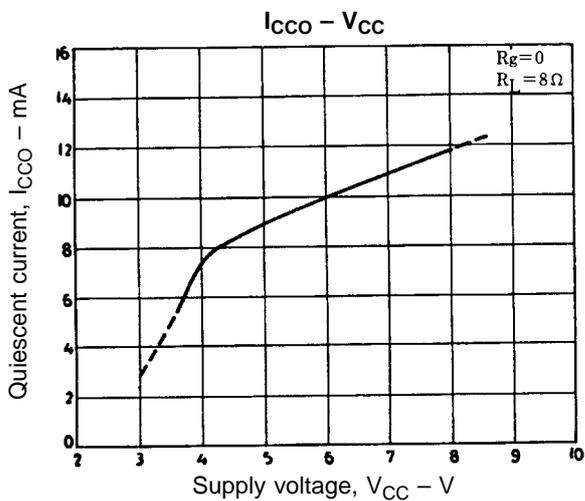
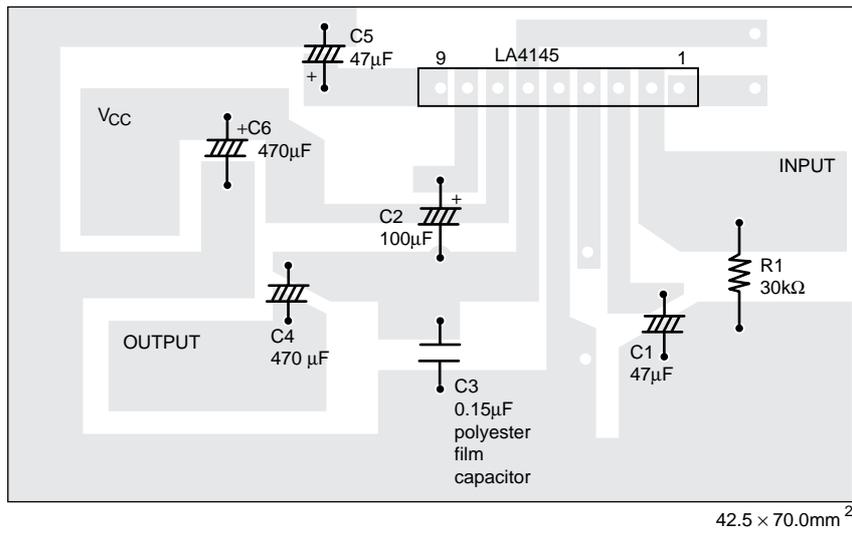
### Description of external parts

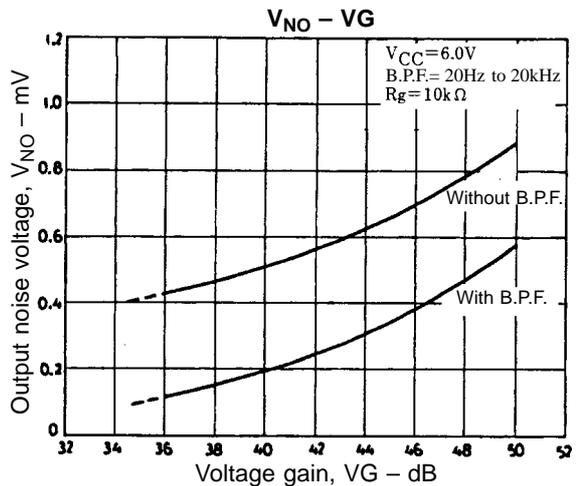
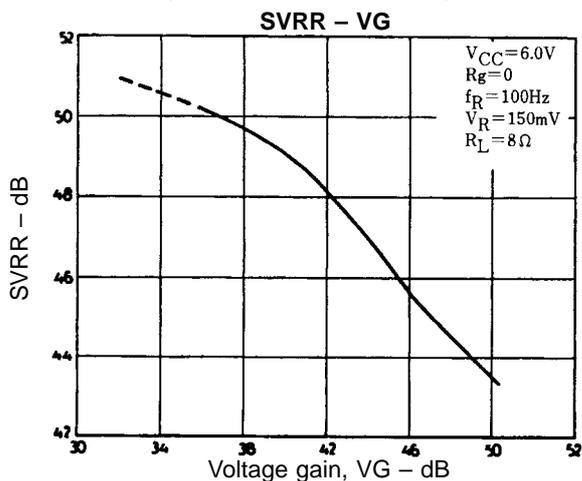
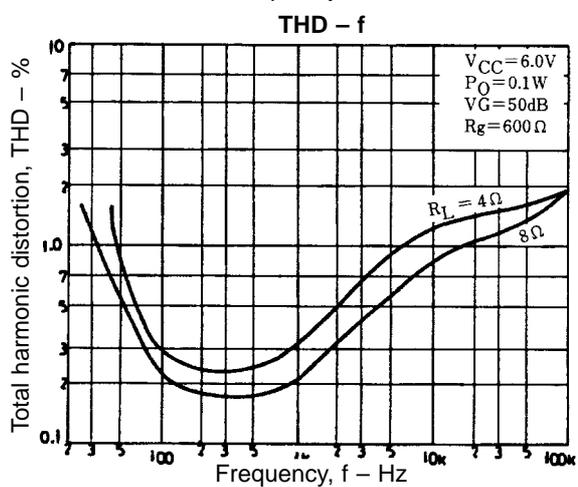
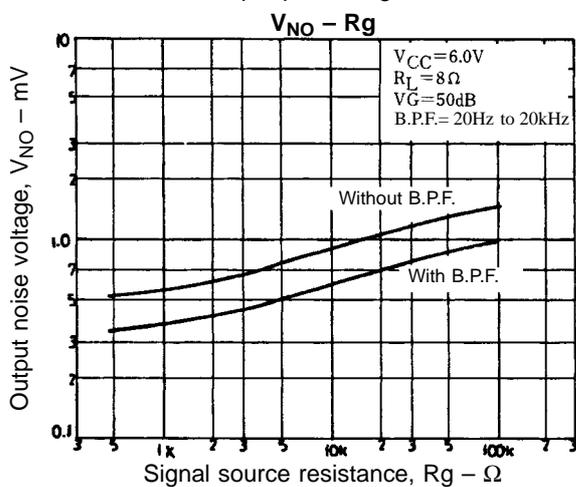
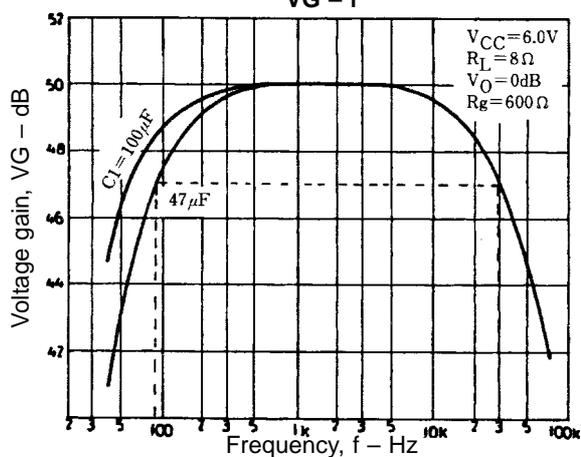
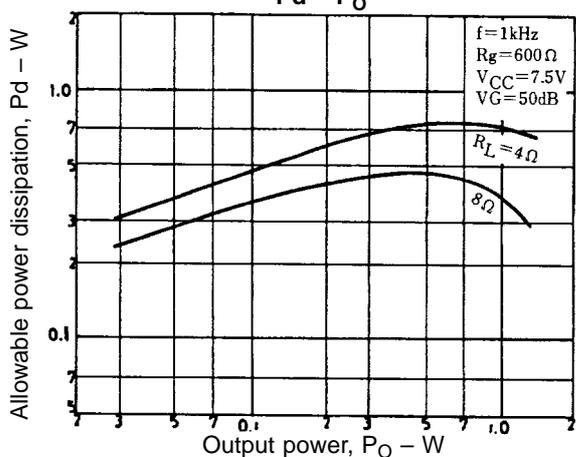
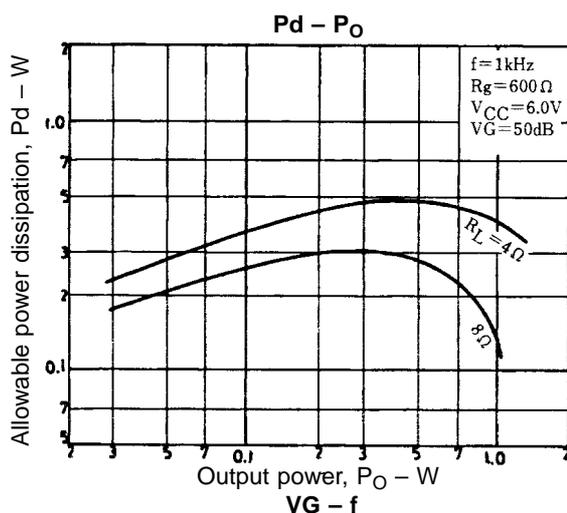
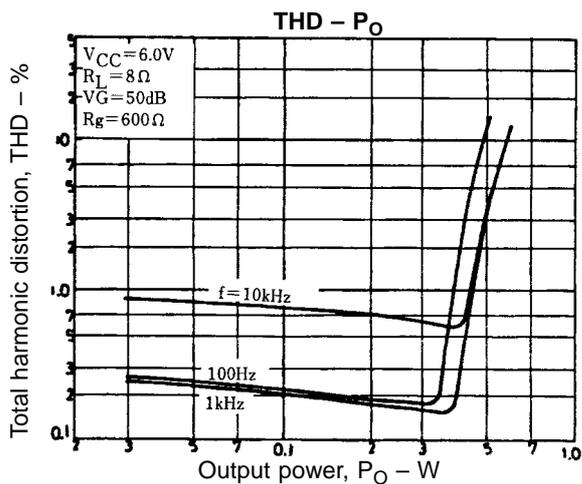
$C_1$ (47 $\mu\text{F}$ )	Feedback capacitor (NF capacitor)	Low cutoff frequency $f_L$ depends on this capacitor. $f_L = 90\text{ Hz}$ for $C_1 = 47\ \mu\text{F}$ . Decreasing the capacitor value makes the starting time earlier.
$C_2$ (100 $\mu\text{F}$ )	Bootstrap capacitor	
$C_3$ (0.15 $\mu\text{F}$ )	Oscillation blocking capacitor	It is recommended to use a polyester film capacitor being good in temperature characteristic, high frequency characteristic.
$C_4$ (470 $\mu\text{F}$ )	Output capacitor	
$C_5$ (47 $\mu\text{F}$ )	Decoupling capacitor	Serves to reject ripple. The starting time depends on this capacitor. Increasing the capacitor value makes the starting time later.
$C_6$ (470 $\mu\text{F}$ )	Power capacitor	Place as close to the power pin of the IC as possible.
$R_1$ (30 k $\Omega$ )	Input bias resistor	Serves to apply input bias. The input impedance almost entirely depends on this resistor value. If a variable resistor also serves for this purpose, this resistor can be omitted. In this case, it is recommended to use a resistor of 30 k $\Omega$ .

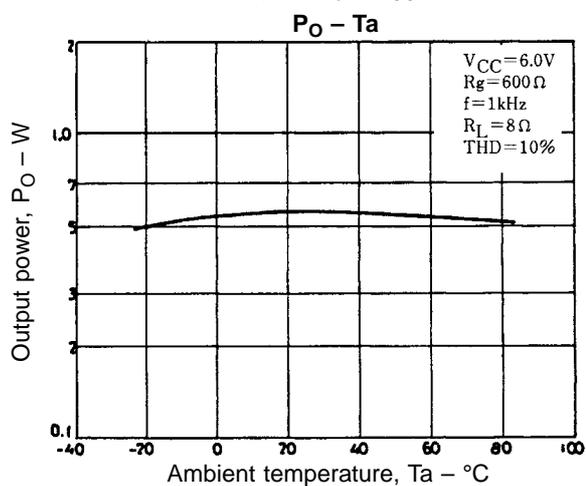
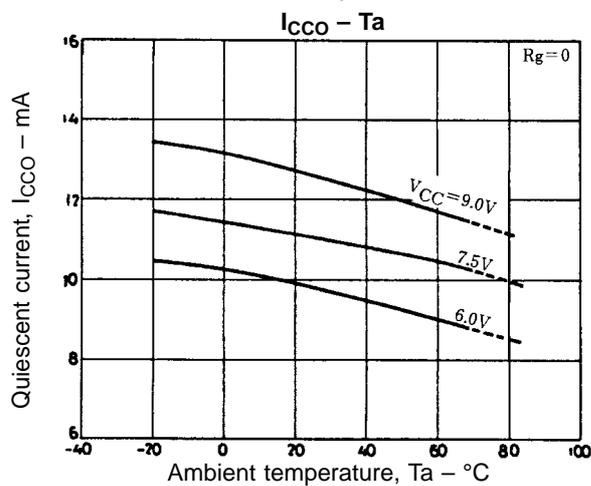
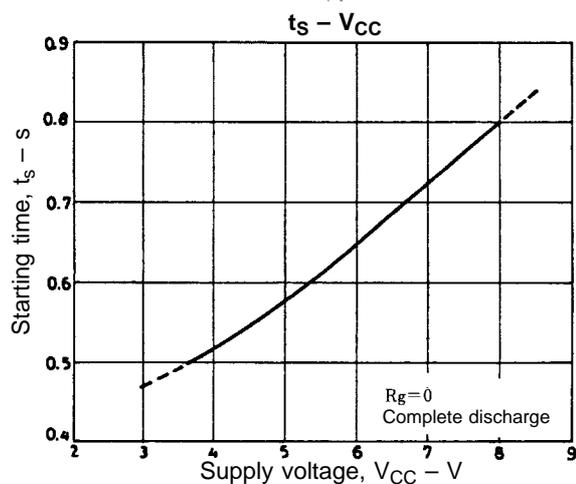
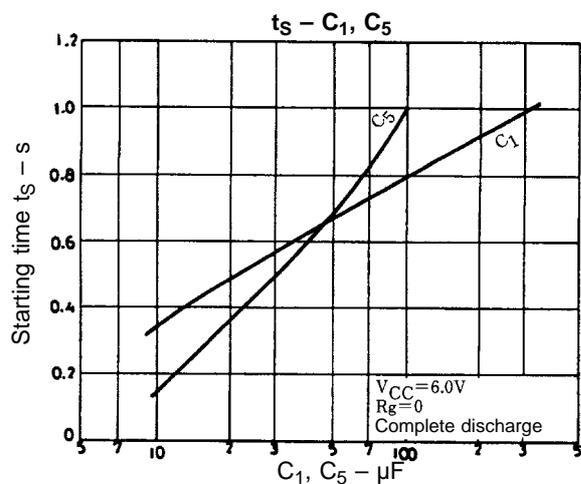
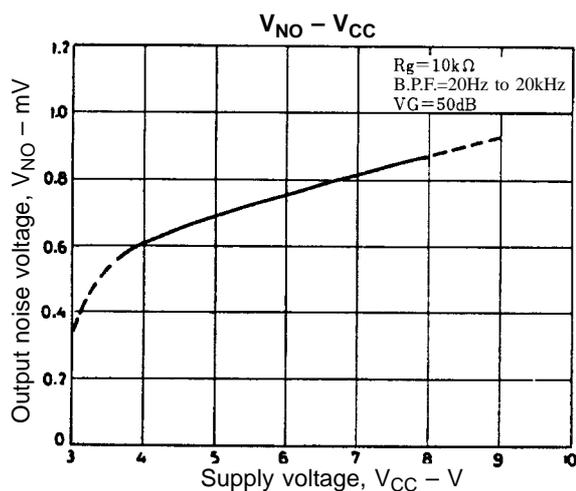
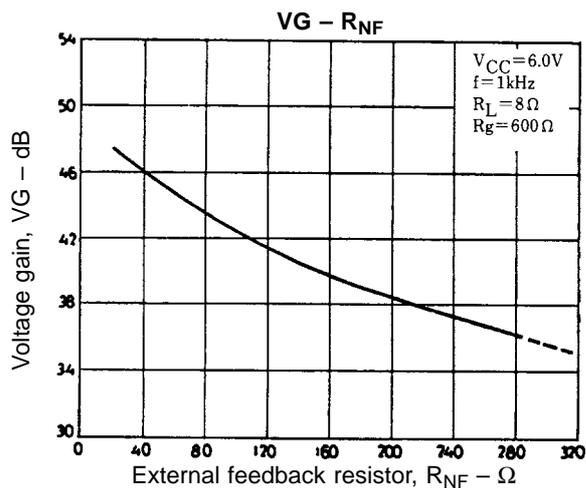
Sample Application Circuit:  
AF power amplifier



Sample Printed Circuit Pattern (Cu-foiled area)







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