

Data Sheet

aIVR1004 – 10 sec

DIP-8 / SOP-8 / DIP-16 / SOP-16

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● FEATURES :

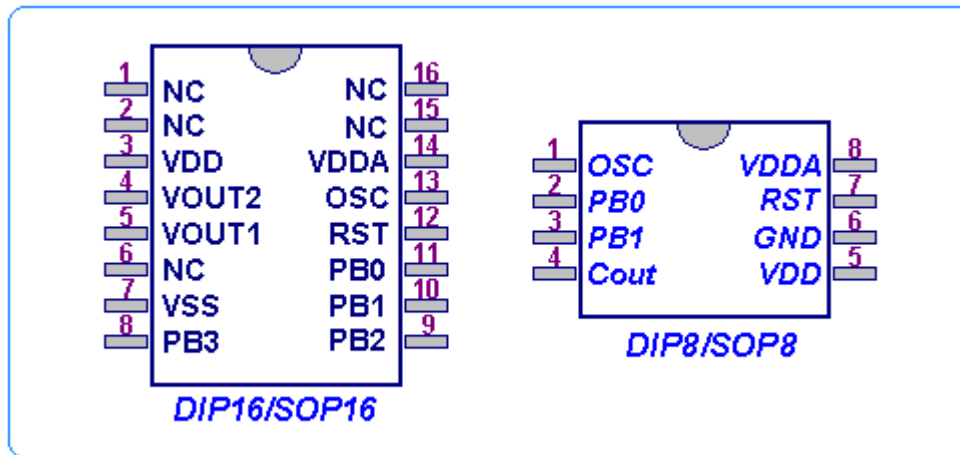
- Standard CMOS process.
- Embedded EPROM.
- Embedded 8-bit MCU.
- 10 sec voice duration at 6 KHz sampling with 4-bit ADPCM compression.
- Combination of voice building blocks to extend playback duration.
- Table entries are available for voice block combinations.
- User selectable PCM or ADPCM data compress.
- Voice Group Trigger Options: Edge / Level; Hold / Un-hold; Retrigger / Non-retrigger.
- Programmable I/Os, Timer Interrupt and Watch Dog Timer.
- Built-in oscillator with fixed R_{osc} , software control sampling frequency
- 2.2V – 3.6V single power supply and < 5uA low stand-by current.
- PWM Vout1 and Vout2 drive speaker directly [only for DIP16/SOP16].
- D/A COUT with ramp-up ramp-down option to drive speaker through an external BJT.

● DESCRIPTION :

Aplus' aIVR is a 8-bit CPU based Voice chip series. It is fabricated with Standard CMOS process with embedded voice storage memory. It can store 10 sec voice message with 4-bit ADPCM compression at 6KHz sampling rate. 8-bit PCM is also available as user selectable option to improve sound quality. Depending on IC body, there are up to twelve programmable I/O pins. Key trigger and Parallel CPU trigger mode can be configured according to different application requirement. User selectable triggering and output signal options provide maximum flexibility to various applications. Built-in resistor controlled oscillator, 8-bit current mode D/A output and PWM direct speaker driving output minimize the number of external components.

Part Number	Duration	Programmable IO	DAC/PWM
aIVR1004-DIP8	10 sec	2	DAC
aIVR1004-SOP8	10 sec	2	DAC
aIVR1004-DIP16	10 sec	4	DAC/PWM
aIVR1004-SOP16	10 sec	4	DAC/PWM
aIVR1004-DIE	10 sec	4	DAC/PWM

● **PIN CONFIGURATIONS :**



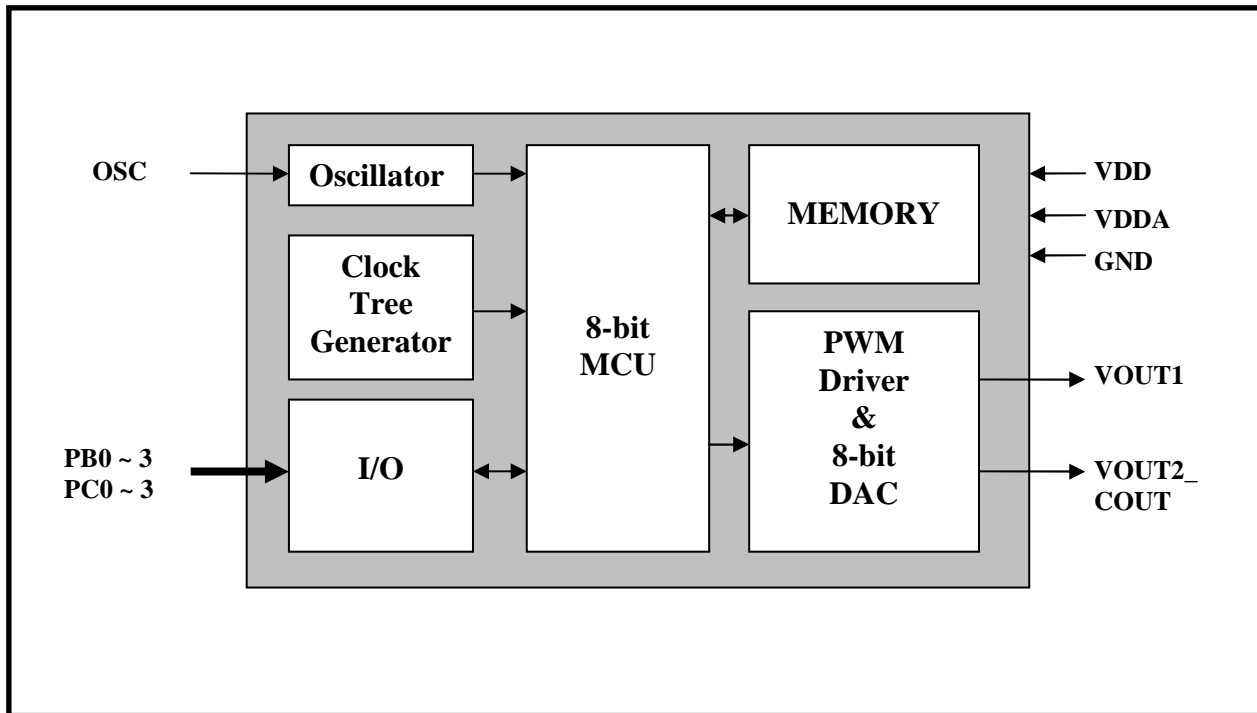
● **PIN DESCRIPTIONS :**

Pin Names	Description
VOUT1	PWM output to drive speaker directly
VOUT2_COUT	PWM output or COUT DAC output select by programmable option
VSS	Power Ground
OSC	Oscillator input
VDDA	Positive Power Supply
VDD	Positive Power Supply
PBn	Programmable I/O pins (n: 0 to 3)
RSTB	Reset pin, Low active

Note:

PBn and PCn are software programmable I/O pins that can be set to different configurations such as pure input, input with pull-up, input with pull-down and output. The programmable I/O pins set up will take effect immediately after chip RESET is applied.

● **BLOCK DIAGRAM :**



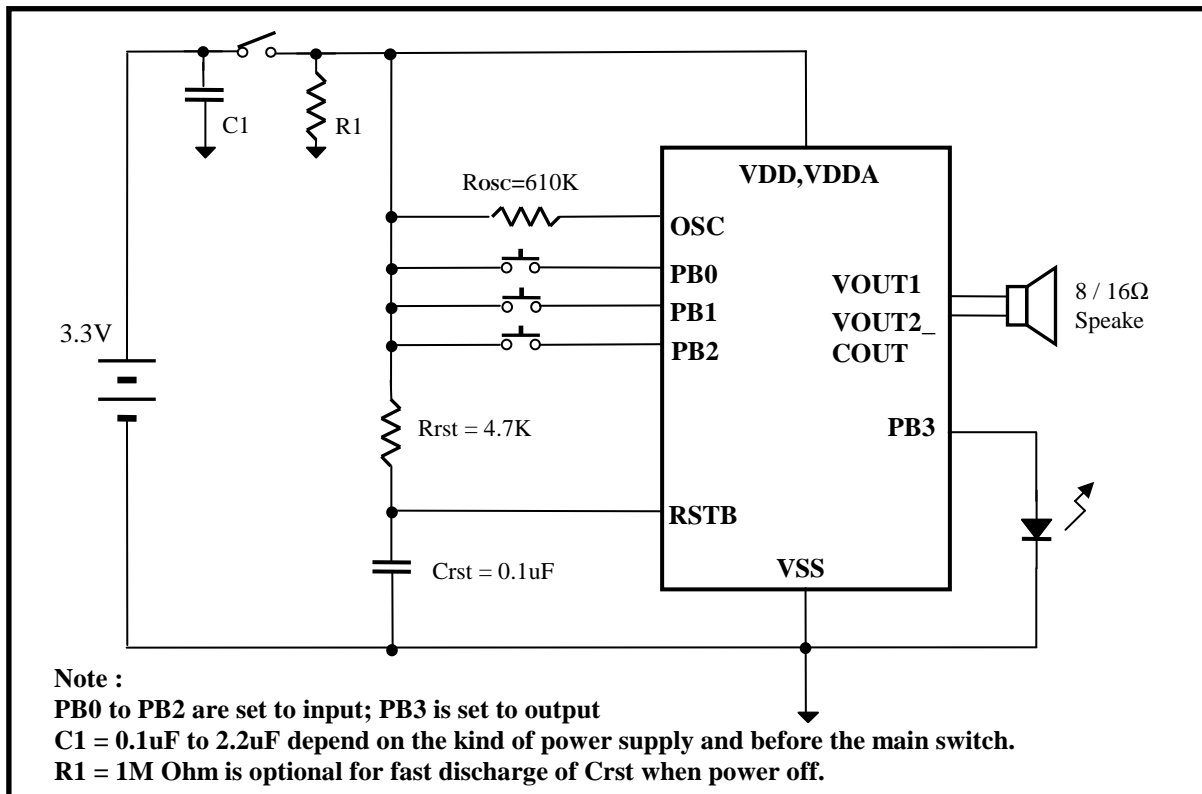
● **ABSOLUTE MAXIMUM RATINGS :**

Symbol	Rating	Unit
$V_{DD} - V_{SS}$	-0.5 ~ +4.0	V
V_{IN}	$V_{SS} - 0.3 < V_{IN} < V_{DD} + 0.3$	V
V_{OUT}	$V_{SS} < V_{OUT} < V_{DD}$	V
T (Operating):	-40 ~ +85	°C
T (Junction)	-40 ~ +125	°C
T (Storage)	-55 ~ +125	°C

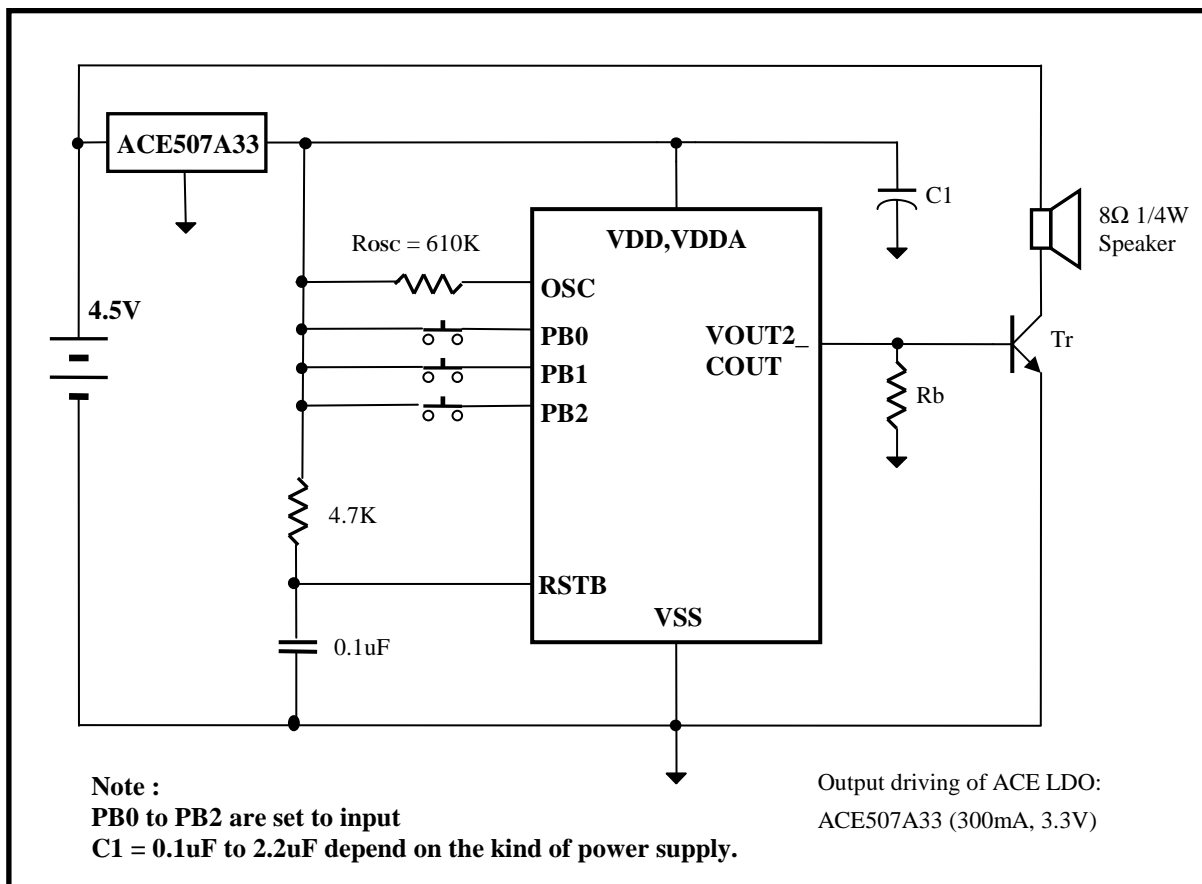
● DC CHARACTERISTICS ($T_A = 0$ to 70°C , $V_{DD} = 3.0\text{V}$, $V_{SS} = 0\text{V}$)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
V_{DD}	Operating Voltage	2.2	3.0	3.6	V	
I_{SB}	Standby current	—	1	5	μA	I/O properly terminated
I_{OP}	Operating current	—	—	15	mA	I/O properly terminated
V_{IH}	"H" Input Voltage	2.5	3.0	3.5	V	$V_{DD}=3.0\text{V}$
V_{IL}	"L" Input Voltage	-0.3	0	0.5	V	$V_{DD}=3.0\text{V}$
I_{VOUTL}	V_{OUT} low O/P Current	—	130	—	mA	$V_{out}=1.0\text{V}$
I_{VOUTH}	V_{OUT} high O/P Current	—	-130	—	mA	$V_{out}=2.0\text{V}$
I_{CO}	C_{OUT} O/P Current	—	-2	—	mA	Data = 80h
I_{OH}	O/P High Current	—	-8	—	mA	$V_{OH}=2.5\text{V}$
I_{OL}	O/P Low Current	—	8	—	mA	$V_{OL}=0.3\text{V}$
R_{NVOUT}	VOUT pull-down resistance	—	100K	—	Ω	VOUT pin set to internal pull-down
R_{NPIO}	Programmable IO pin pull-down resistance	—	1M	—	Ω	PBx, PCx, PDx set to internal pull-down
R_{UPIO}	Programmable IO pin pull-up resistance	3.3K	4.7K	—	Ω	PBx, PCx, PDx set to internal pull-up
$\Delta F_s/F_s$	Frequency stability	-3	—	+3	%	$V_{DD} = 3\text{V} \pm 0.4\text{V}$
$\Delta F_c/F_c$	Chip to chip Frequency Variation	-5	—	+5	%	Also apply to lot to lot variation

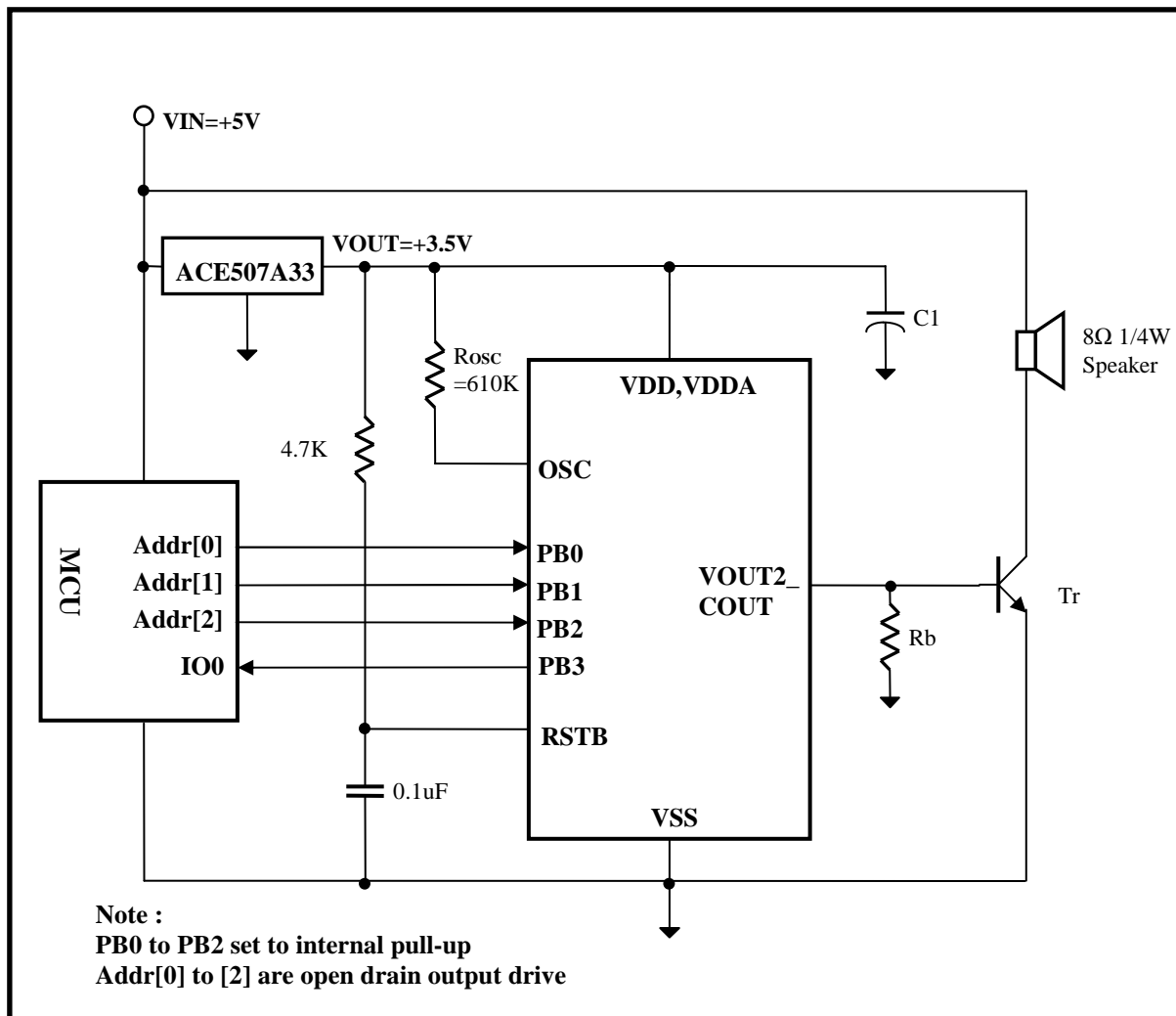
● **TYPICAL APPLICATIONS :**



Using 3.3V Battery



Using 4.5V Battery

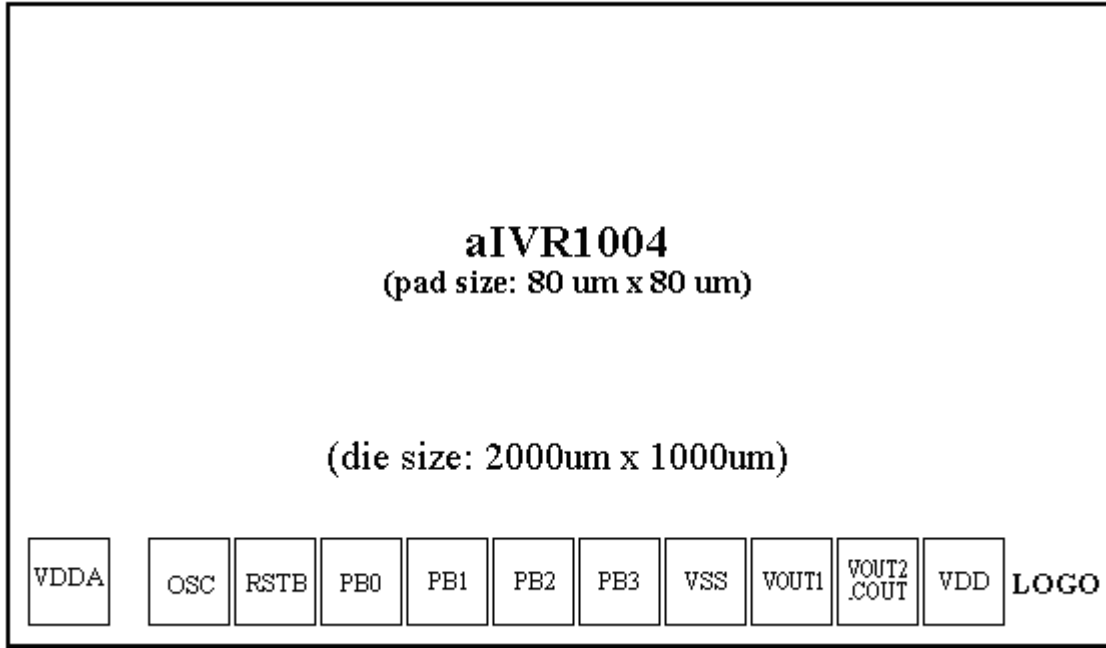


5V CPU Control with COUT

Note:

1. C1 is capacitor from 0.1uF to 2.2uF depends on the kind of Vdd source and sound loudness.
E.g. If COUT is used, C1 can be 0.1uF. However, if PWM direct drive speaker is used, C1 should be at least 2.2uF
2. Rb is base resistor from 120 Ohm to 390 Ohm depends on Vdd value and transistor gain.
3. Tr is an NPN transistor with beta larger than 150, e.g. 8050D.
4. Rosc = 610K Ohm with Vdd=3.0V and support sampling rate up to 14KHz
5. For sampling rate higher than 14KHz, smaller value of Rosc should be used.

● **Bonding Diagrams :**



- **WRITE the aIVR1004 DIP-8 :**
PC WRITER : AIVR20W + adapter [pcb no. : 8006]

