

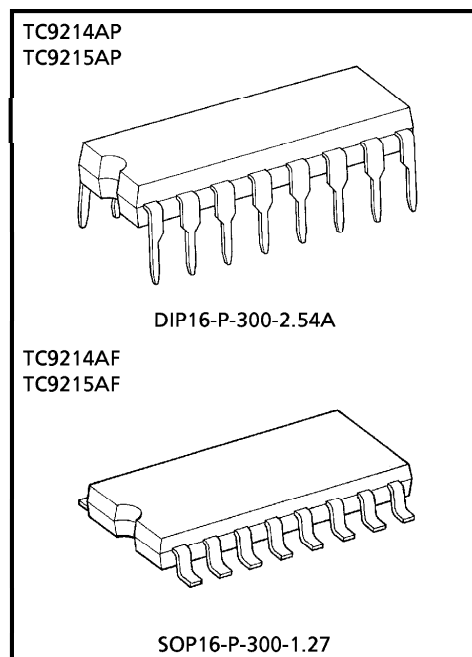
TC9214AP, TC9214AF, TC9215AP, TC9215AF

HIGH VOLTAGE ANALOG SWITCH

TC9214AP/AF, TC9215AP/AF are Analog Switch for high voltage audio application.

FEATURES

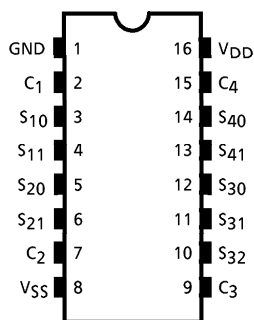
- Analog Switch Circuit Formation
 TC9214AP, TC9214AF : 5 circuits
 TC9215AP, TC9215AF : 6 circuits
- Dual Power Supply of (+) and (-) can be used.
- Including Level Shift Circuit, this IC can be operated by (+) power supply only under dual power supply operating.
- Setting Low Input-threshold-voltage in control signal input terminal. 5V CPU application can control this IC directly.
- Package : DIP-16 PIN
 SOP-16 PIN



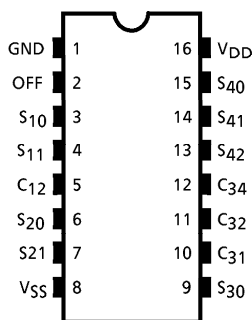
Weight
 DIP16-P-300-2.54A : 1.0g (Typ.)
 SOP16-P-300-1.27 : 0.16g (Typ.)

PIN CONNECTION (TOP VIEW)

TC9214AP, TC9214AF



TC9215AP, TC9215AF



980508EBA2

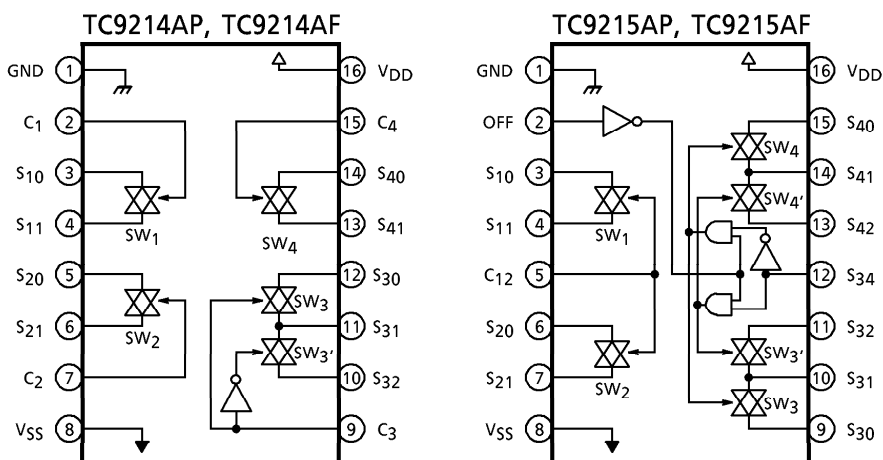
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BLOCK DIAGRAM

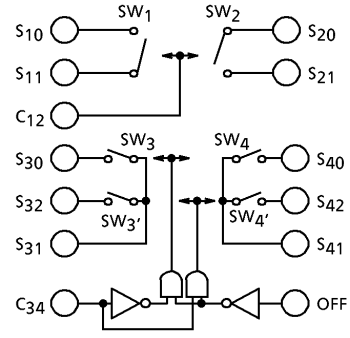


PIN FUNCTION

1. TC9214AP, TC9214AF

PIN No.	SYMBOL	PIN NAME	FUNCTION	NOTE								
1	GND	Ground Terminal	Dual power supplying : + B →V _{DD} 0V →GND - B →V _{SS}	—								
8	V _{SS}	(-) Power Supply Terminal										
16	V _{DD}	(+) Power Supply Terminal										
2	C ₁	Switch (1) Control Terminal	SWITCH CONNECTION	—								
3	S ₁₀	Switch (1) Input / Output Terminal										
4	S ₁₁											
5	S ₂₀	Switch (2) Input / Output Terminal										
6	S ₂₁											
7	C ₂	Switch (2) Control Terminal										
9	C ₃	Switch (3) Control Terminal										
10	S ₃₂	Switch (3) Input / Output Terminal	<p>TRUTH TABLE</p> <table border="1"> <thead> <tr> <th>C₁, C₂, C₄</th> <th colspan="2">SW₁, SW₂, SW₃</th> </tr> </thead> <tbody> <tr> <td>H</td> <td colspan="2">ON</td> </tr> <tr> <td>L</td> <td colspan="2">OFF</td> </tr> </tbody> </table>	C ₁ , C ₂ , C ₄	SW ₁ , SW ₂ , SW ₃		H	ON		L	OFF	
C ₁ , C ₂ , C ₄	SW ₁ , SW ₂ , SW ₃											
H	ON											
L	OFF											
11	S ₃₁											
12	S ₃₀											
13	S ₄₁	Switch (4) Input / Output Terminal	<table border="1"> <thead> <tr> <th>C₃</th> <th>S₃₀-S₃₁</th> <th>S₃₁-S₃₂</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>L</td> <td>OFF</td> <td>ON</td> </tr> </tbody> </table>	C ₃	S ₃₀ -S ₃₁	S ₃₁ -S ₃₂	H	ON	OFF	L	OFF	ON
C ₃	S ₃₀ -S ₃₁			S ₃₁ -S ₃₂								
H	ON	OFF										
L	OFF	ON										
14	S ₄₀											
15	C ₄	Switch (4) Control Terminal										

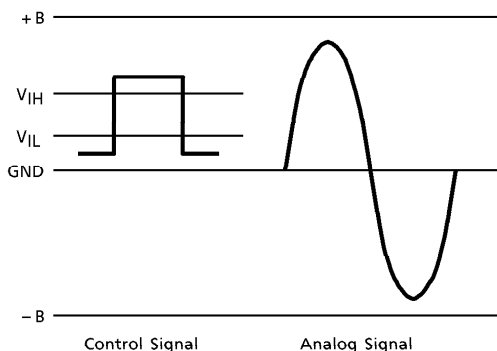
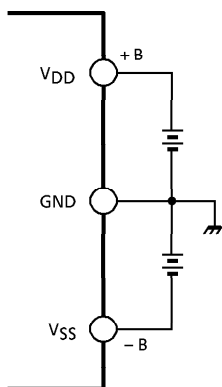
2. TC9215AP, TC9215AF

PIN No.	SYMBOL	PIN NAME	FUNCTION	NOTE																					
1	GND	Ground Terminal	Dual power supplying : + B →V _{DD} 0V →GND - B →V _{SS} Single power supplying : + B →V _{DD} 0V →GND, V _{SS}	—																					
8	V _{SS}	(-) Power Supply Terminal																							
16	V _{DD}	(+) Power Supply Terminal																							
2	OFF	Switch (3), (4) OFF Input Terminal	SWITCH CONNECTION  TRUTH TABLE <table border="1" data-bbox="726 996 1189 1131"> <thead> <tr> <th>C₁₂</th> <th>SW₁, SW₂</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>ON</td> </tr> <tr> <td>L</td> <td>OFF</td> </tr> </tbody> </table> <table border="1" data-bbox="726 1153 1284 1332"> <thead> <tr> <th>OFF</th> <th>C₃₄</th> <th>S₃₀-S₃₁ S₄₀-S₄₁</th> <th>S₃₁-S₃₂ S₄₁-S₄₂</th> </tr> </thead> <tbody> <tr> <td rowspan="2">L</td> <td>L</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>H</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>H</td> <td>※</td> <td>OFF</td> <td>OFF</td> </tr> </tbody> </table> (※ H or L)	C ₁₂	SW ₁ , SW ₂	H	ON	L	OFF	OFF	C ₃₄	S ₃₀ -S ₃₁ S ₄₀ -S ₄₁	S ₃₁ -S ₃₂ S ₄₁ -S ₄₂	L	L	ON	OFF	H	OFF	ON	H	※	OFF	OFF	—
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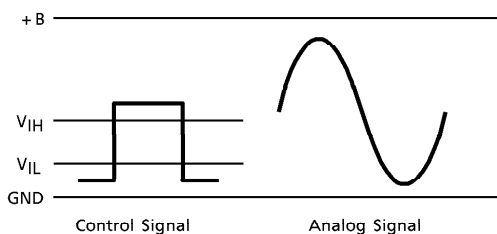
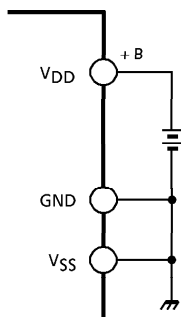
NOTATION : POWER SUPPLY

As the power supply is parted between analog switch unit and control unit, the analog switch unit operates in dual power supply of (+) and (-), in which case, the control unit operates in single power supply. Setting a low input-threshold voltage in control input terminal, 5V CPU application can control this IC directly.

Dual power supply use



Single power supply use



(Note) In case of using single power supply in common with VSS and GND terminal, half voltage of dual power supply must be supplied because of low operating voltage of a control circuit. ($V_{DD} - GND \leq 18V$)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage (1)	V _{DD} -V _{SS}	-0.3~36	V
Power Supply Voltage (2)	V _{DD} -GND	-0.3~20	V
GND Input Voltage	V _{IN} (1)	-0.3~V _{DD} + 0.3	V
V _{SS} Input Voltage	V _{IN} (2)	V _{SS} - 0.3~V _{DD} + 0.3	V
Power Dissipation	P _D	600 (300)	mW
Operating Temperature	T _{opr}	-40~85	°C
Storage Temperature	T _{stg}	-65~150	°C

() : SOP-16 pin.

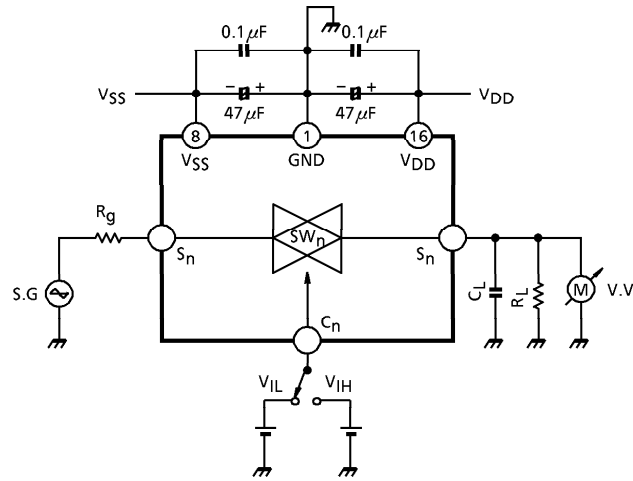
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{DD} = 15V, V_{SS} = -15V, GND = 0V, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Operating Supply Voltage (1)		V _{DD} -V _{SS}	—	Dual power supplying	9.0	~	34	V	
Operating Supply Voltage (2)		V _{DD} -GND		Single power supplying	4.5	~	18		
Operating Supply Current		I _{DD}	—	No load, No signal	—	0.1	0.5	mA	
Input Voltage	"H" Level	V _{IH}	—	Control input terminal V _{DD} = 4.5~18V	4.0	~	V _{DD}	V	
	"L" Level	V _{IL}			GND	~	1.0		
Input Current	"H" Level	I _{IH}	—	Control input terminal	V _{IH} = 15V	-0.1	—	0.1	μA
	"L" Level	I _{IL}			V _{IL} = 0V	-0.1	—	0.1	
Analog Switch ON Resistance		R _{ON}	—	V _{DD} = 5.0V, V _{SS} = -5.0V	—	200	300	Ω	
				V _{DD} = 9.0V, V _{SS} = -9.0V	—	80	100		
				V _{DD} = 15V, V _{SS} = -15V	—	60	80		
Analog Switch OFF Leak		I _{OFF}	—	V _{IN} = V _{DD} ~V _{SS}	—	±0.1	±100	nA	
Total Harmonic Distortion		THD	1	f _{IN} = 1kHz, V _{IN} = 1V _{rms} R _g = 600Ω, R _L = 10kΩ BW = 20Hz~20kHz	—	0.01	0.05	%	
Cross Talk		C _T			80	90	—	dB	
Output Noise Voltage		V _N			—	2.0	—	μV _{rms}	
Maximum Control Frequency		f _{MAX}			V _{IL} = 0V, V _{IH} = 5V	50	100	—	kHz
Maximum Transfer Frequency			R _L = 10kΩ, C _L = 15pF (*1)	—	5	—	MHz		
Field Through		F _S	—	R _L = 10kΩ, C _L = 15pF (*2)	—	300	—	kHz	

(*1) To supply the V_{IN} = 1.0V_{rms} sign wave. f_{MAX} means 3dB down frequency from f_{IN} = 1kHz.

(*2) To supply the V_{IN} = 1.0V_{rms} sign wave. F_S means frequency for cross-talk 50dB.

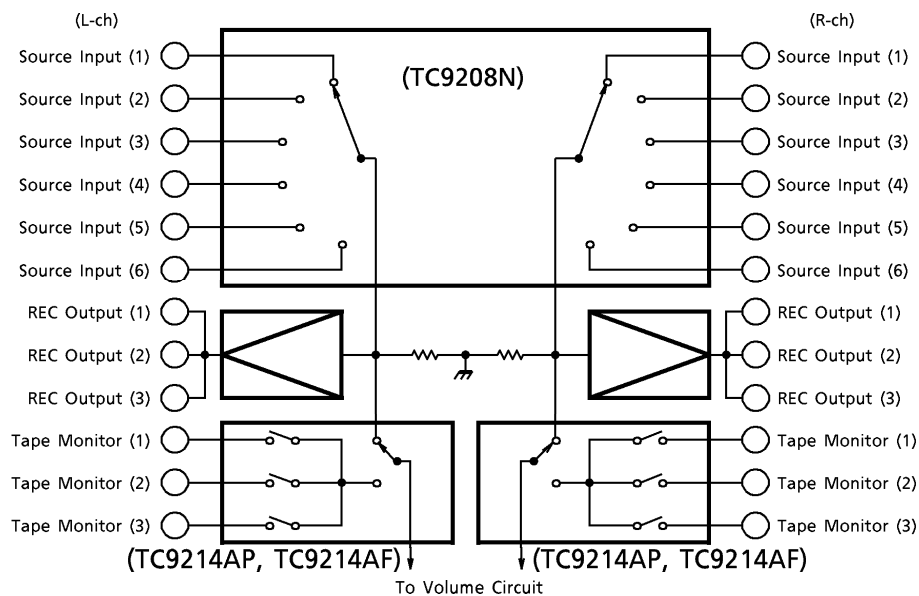
TEST CIRCUIT 1



APPLICATION CIRCUIT

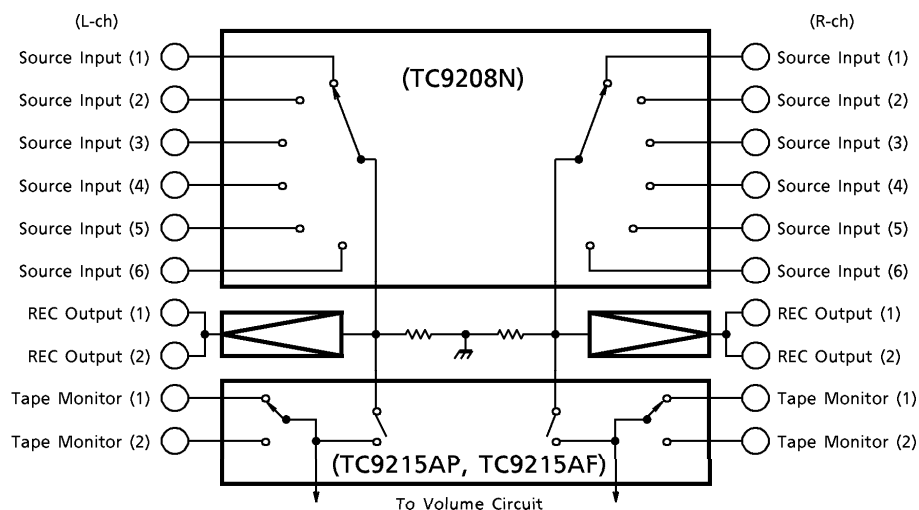
1. TC9208N + TC9214AP, TC9214AF × 2

- Monitor switching for 6 source input circuits and 3 tape-recorder.



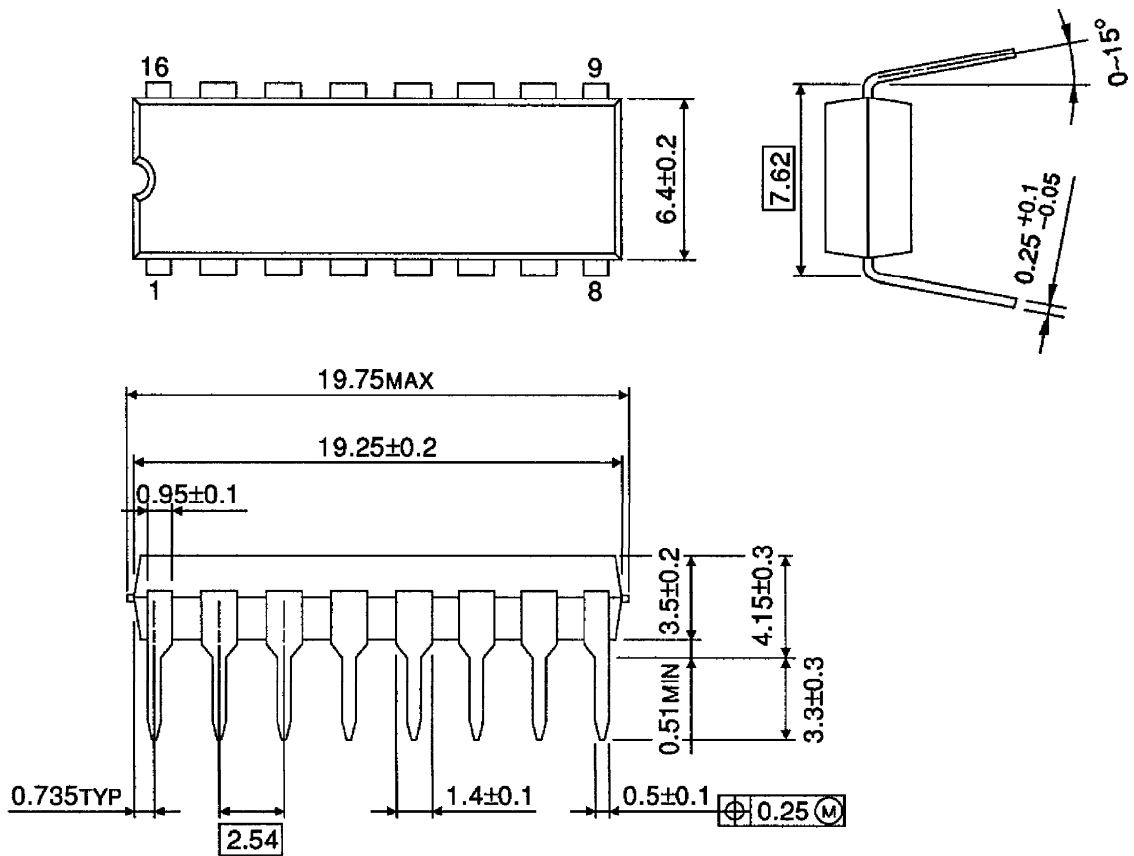
2. TC9208N + TC9215AP, TC9215AF

- Monitor switching for 6 source input circuits and 2 tape-recorder.



OUTLINE DRAWING
DIP16-P-300-2.54A

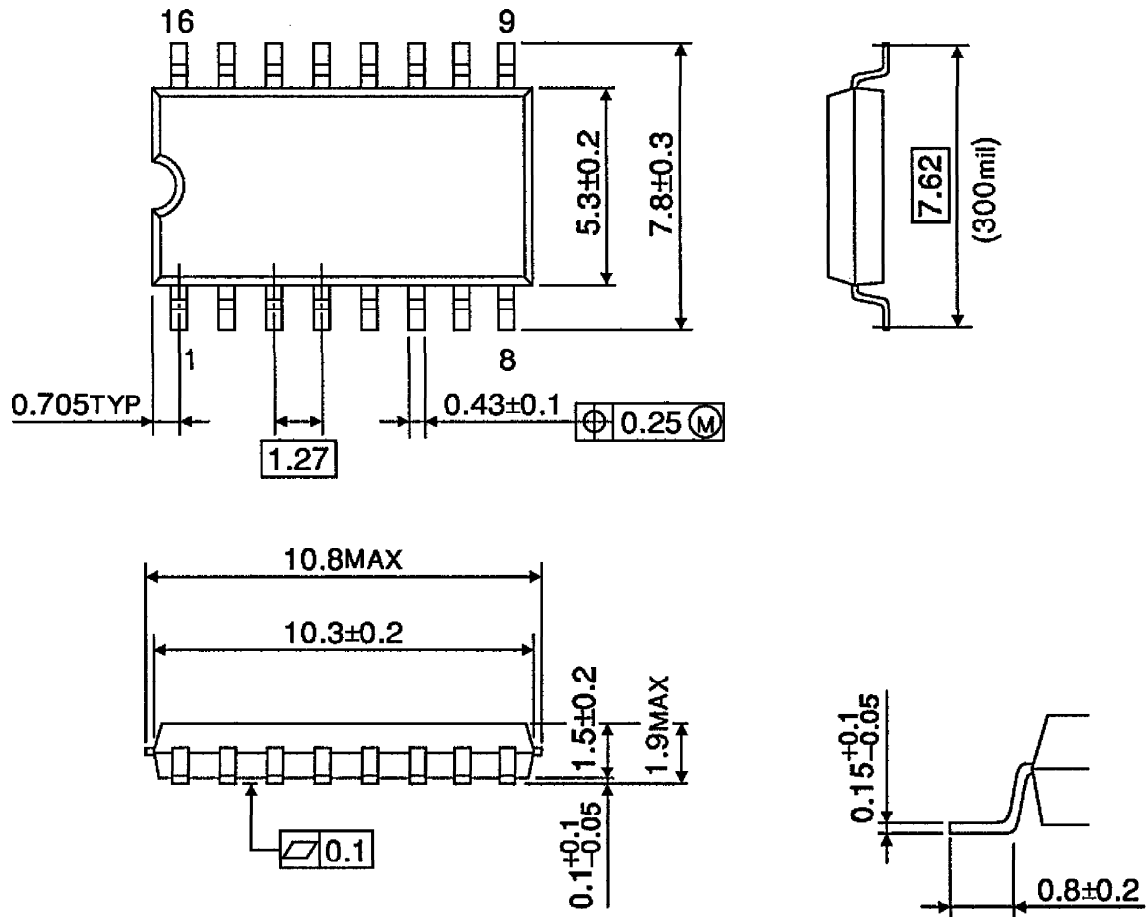
Unit : mm



Weight : 1.0g (Typ.)

OUTLINE DRAWING
SOP16-P-300-1.27

Unit : mm



Weight : 0.16g (Typ.)