

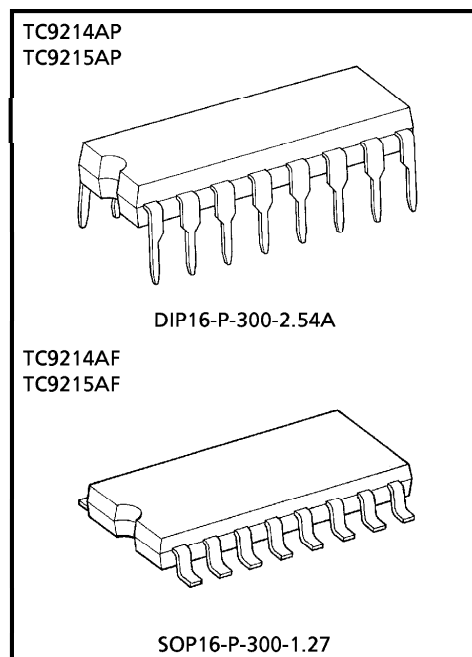
**TC9214AP, TC9214AF, TC9215AP, TC9215AF**

**HIGH VOLTAGE ANALOG SWITCH**

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

**FEATURES**

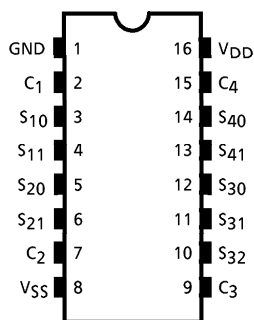
- Analog Switch Circuit Formation  
 TC9214AP, TC9214AF : 5 circuits  
 TC9215AP, TC9215AF : 6 circuits
- Dual Power Supply of (+) and (-) can be used.
- Including Level Shift Circuit, this IC can be operated by (+) power supply only under dual power supply operating.
- Setting Low Input-threshold-voltage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



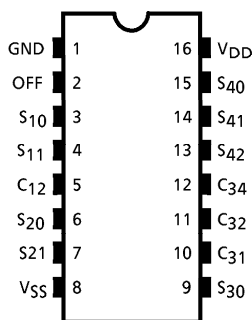
Weight  
 DIP16-P-300-2.54A : 1.0g (Typ.)  
 SOP16-P-300-1.27 : 0.16g (Typ.)

**PIN CONNECTION (TOP VIEW)**

TC9214AP, TC9214AF



TC9215AP, TC9215AF



980508EBA2

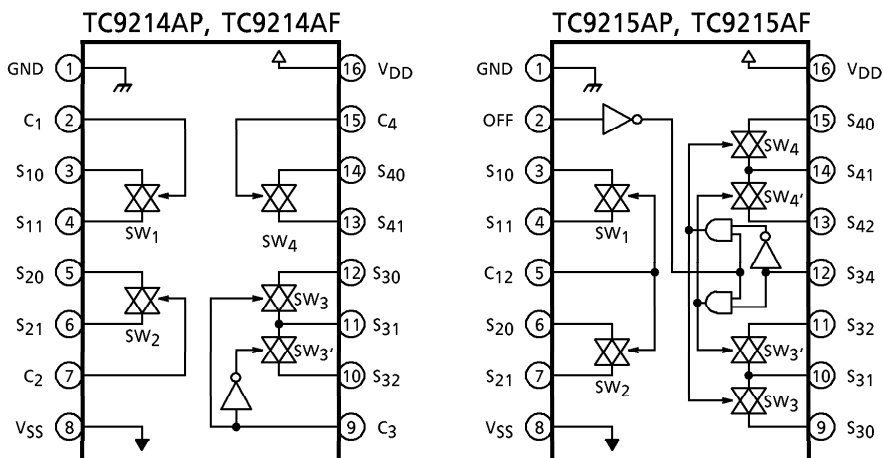
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**BLOCK DIAGRAM**



**PIN FUNCTION**

**1. TC9214AP, TC9214AF**

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

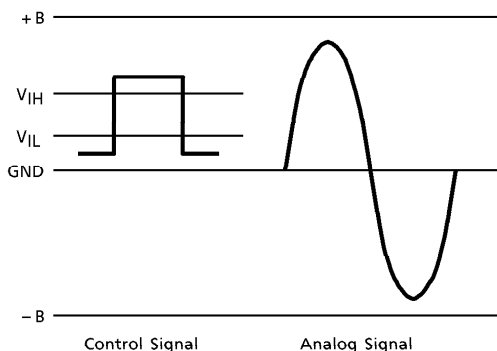
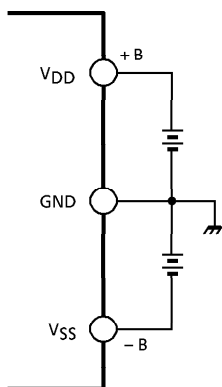
2. TC9215AP, TC9215AF

PIN No.	SYMBOL	PIN NAME	FUNCTION	NOTE																					
1	GND	Ground Terminal	Dual power supplying : + B →V <sub>DD</sub> 0V →GND - B →V <sub>SS</sub> Single power supplying : + B →V <sub>DD</sub> 0V →GND, V <sub>SS</sub>	—																					
8	V <sub>SS</sub>	(-) Power Supply Terminal																							
16	V <sub>DD</sub>	(+) Power Supply Terminal																							
2	OFF	Switch (3), (4) OFF Input Terminal	<p><b>SWITCH CONNECTION</b></p> <p><b>TRUTH TABLE</b></p> <table border="1"> <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"> <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> <p>(※ H or L)</p>	C12	SW1, SW2	H	ON	L	OFF	OFF	C34	S30-S31 S40-S41	S31-S32 S41-S42	L	L	ON	OFF	H	OFF	ON	H	※	OFF	OFF	—
C12	SW1, SW2																								
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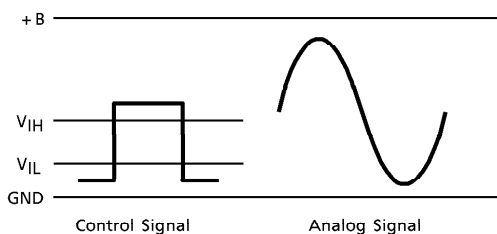
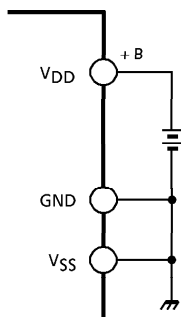
**NOTATION : POWER SUPPLY**

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 <sub>DD</sub> -V <sub>SS</sub>	- 0.3~36	V
Power Supply Voltage (2)	V <sub>DD</sub> -GND	- 0.3~20	V
GND Input Voltage	V <sub>IN</sub> (1)	- 0.3~V <sub>DD</sub> + 0.3	V
V <sub>SS</sub> Input Voltage	V <sub>IN</sub> (2)	V <sub>SS</sub> - 0.3~V <sub>DD</sub> + 0.3	V
Power Dissipation	P <sub>D</sub>	600 (300)	mW
Operating Temperature	T <sub>opr</sub>	- 40~85	°C
Storage Temperature	T <sub>stg</sub>	- 65~150	°C

( ) : SOP-16 pin.

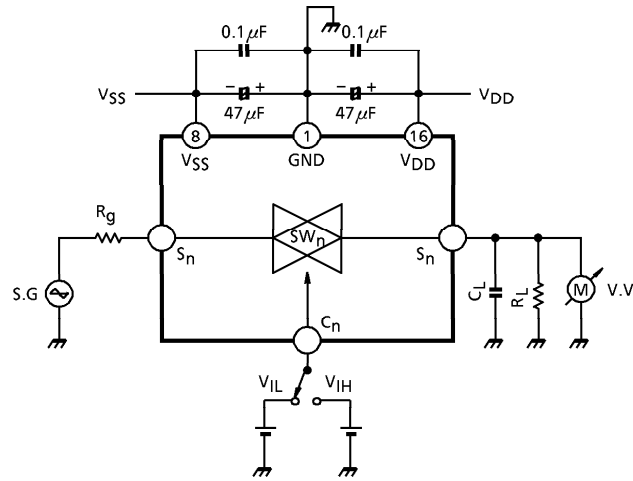
**ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V<sub>DD</sub> = 15V, V<sub>SS</sub> = - 15V, GND = 0V, Ta = 25°C)**

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

(\*1) To supply the V<sub>IN</sub> = 1.0V<sub>rms</sub> sign wave. f<sub>MAX</sub> means 3dB down frequency from f<sub>IN</sub> = 1kHz.

(\*2) To supply the V<sub>IN</sub> = 1.0V<sub>rms</sub> sign wave. F<sub>S</sub> means frequency for cross-talk 50dB.

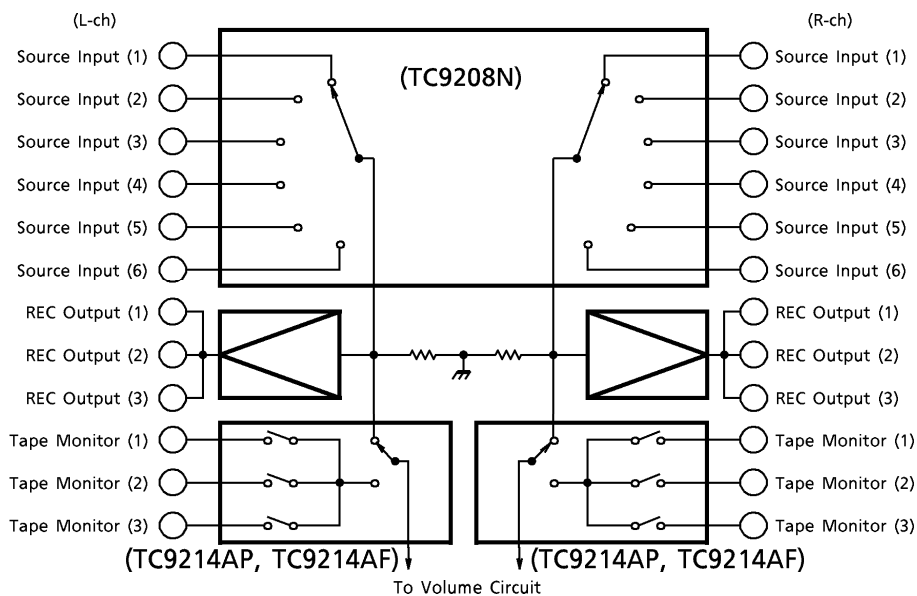
TEST CIRCUIT 1



**APPLICATION CIRCUIT**

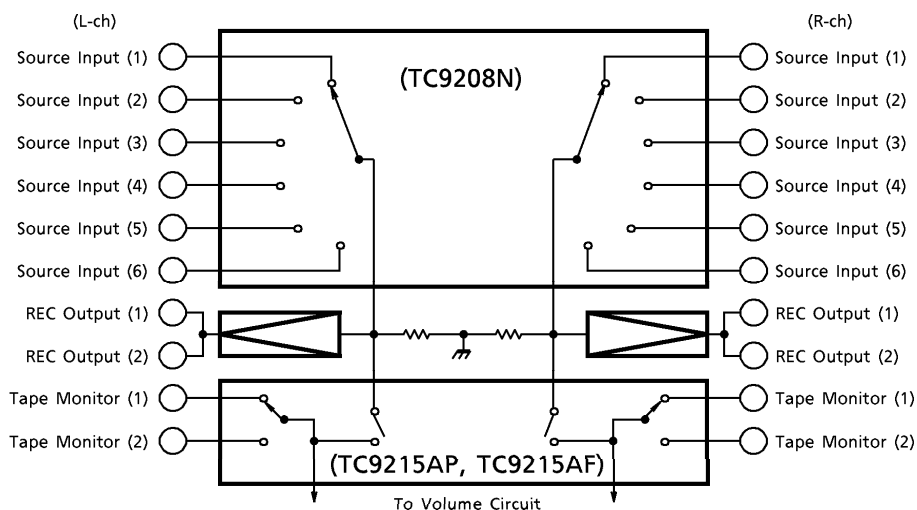
**1. TC9208N + TC9214AP, TC9214AF × 2**

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



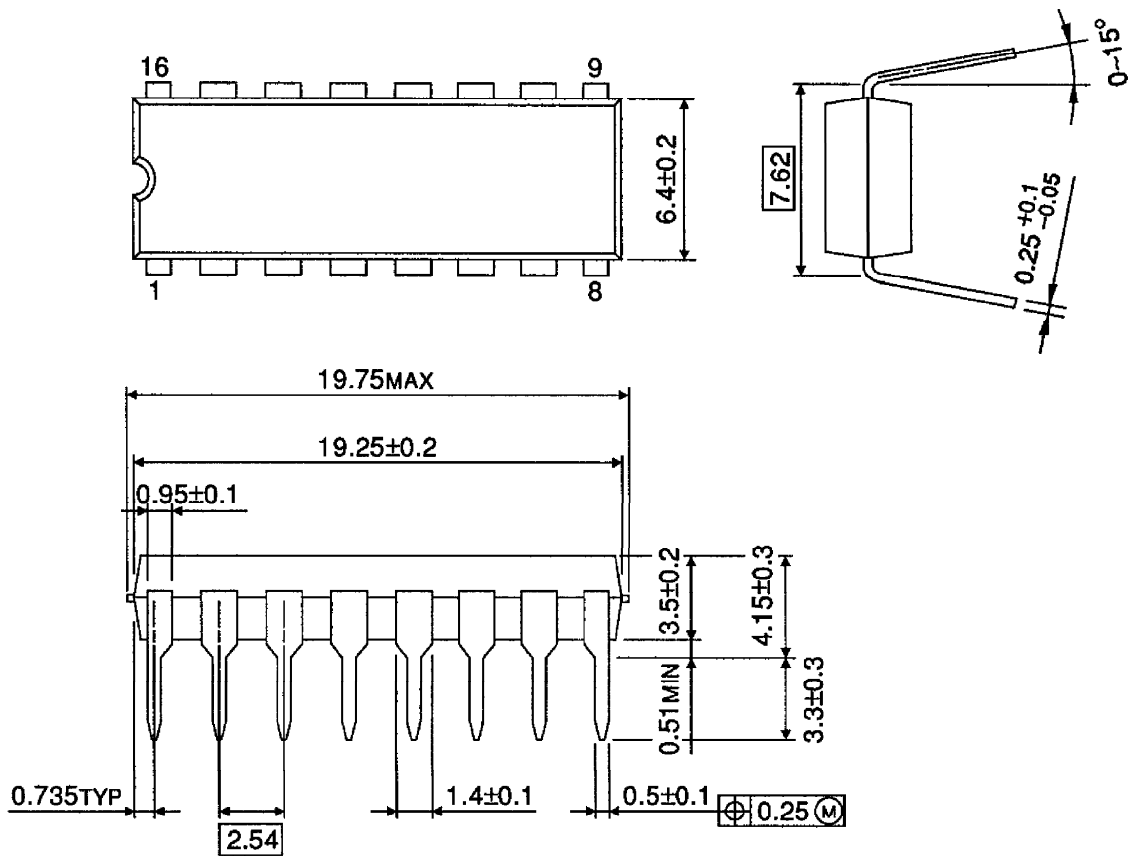
**2. TC9208N + TC9215AP, TC9215AF**

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



**OUTLINE DRAWING**  
DIP16-P-300-2.54A

Unit : mm

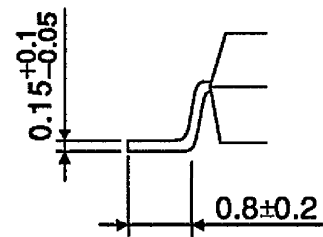
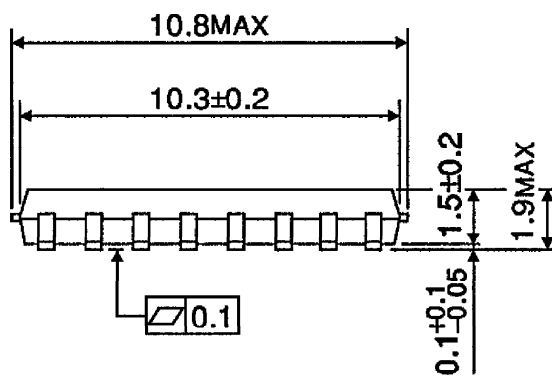
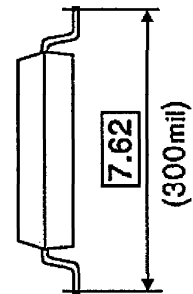
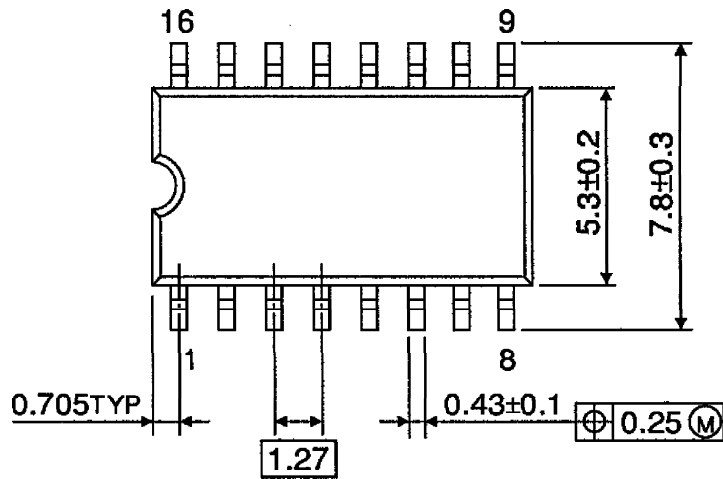


Weight : 1.0g (Typ.)



**OUTLINE DRAWING**  
SOP16-P-300-1.27

Unit : mm



Weight : 0.16g (Typ.)