

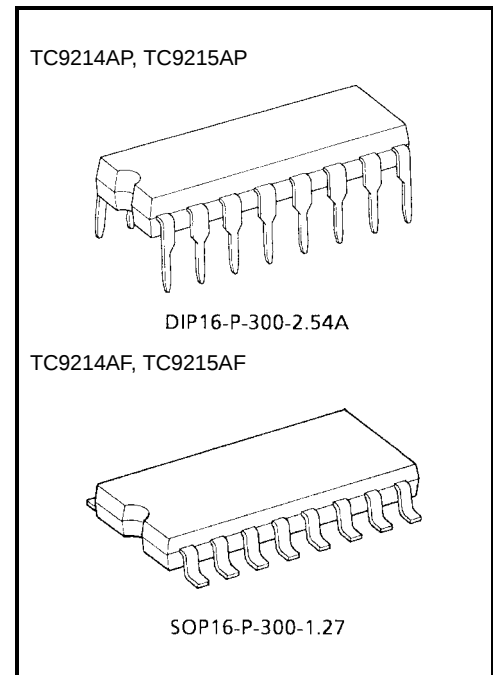
TC9214AP, TC9214AF, TC9215AP, TC9215AF

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. 5 V CPU application can control this IC directly.
- Package: DIP-16 pin
SOP-16 pin



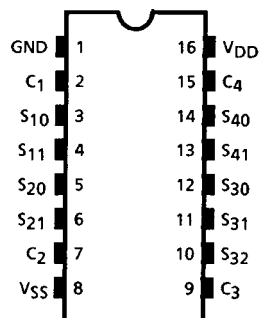
Weight

DIP16-P-300-2.54A: 1.0 g (typ.)

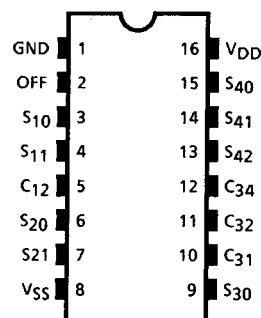
SOP16-P-300-1.27: 0.16 g (typ.)

Pin Assignment (top view)

TC9214AP, TC9214AF

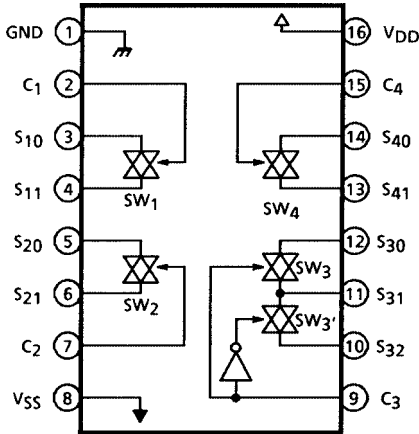


TC9215AP, TC9215AF

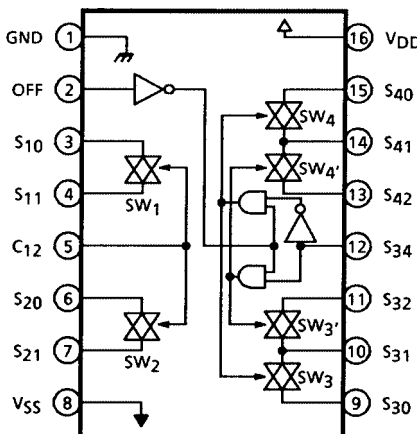


Block Diagram

TC9214AP, TC9214AF



TC9215AP, TC9215AF

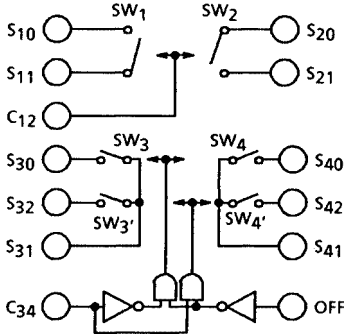


Pin Function

1. TC9214AP, TC9214AF

Pin No.	Symbol	Pin Name	Function	Note																		
1	GND	Ground Terminal	Dual power supplying: +B → V _{DD} 0 V → GND -B → V _{SS} Single power supplying: +B → V _{DD} 0 V → GND, V _{SS}	—																		
8	V _{SS}	(-) Power Supply Terminal																				
16	V _{DD}	(+) Power Supply Terminal																				
2	C ₁	Switch (1) Control Terminal	SWITCH CONNECTION TRUTH TABLE <table><tr><th>C₁, C₂, C₄</th><th colspan="2">SW₁, SW₂, SW₃</th></tr><tr><td>H</td><td colspan="2">ON</td></tr><tr><td>L</td><td colspan="2">OFF</td></tr></table> <table><tr><th>C₃</th><th>S₃₀-S₃₁</th><th>S₃₁-S₃₂</th></tr><tr><td>H</td><td>ON</td><td>OFF</td></tr><tr><td>L</td><td>OFF</td><td>ON</td></tr></table>	C ₁ , C ₂ , C ₄	SW ₁ , SW ₂ , SW ₃		H	ON		L	OFF		C ₃	S ₃₀ -S ₃₁	S ₃₁ -S ₃₂	H	ON	OFF	L	OFF	ON	—
C ₁ , C ₂ , C ₄	SW ₁ , SW ₂ , SW ₃																					
H	ON																					
L	OFF																					
C ₃	S ₃₀ -S ₃₁	S ₃₁ -S ₃₂																				
H	ON	OFF																				
L	OFF	ON																				
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																				
11	S ₃₁																					
12	S ₃₀																					
13	S ₄₁	Switch (4) Input/Output Terminal																				
14	S ₄₀																					
15	C ₄	Switch (4) Control Terminal																				

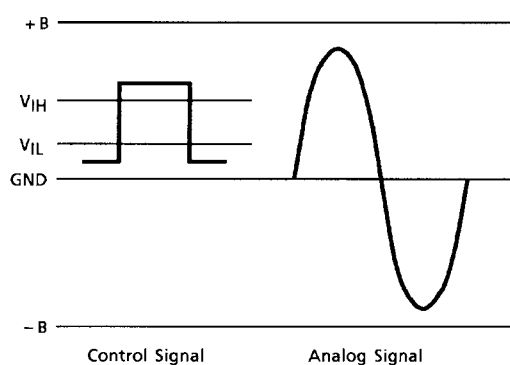
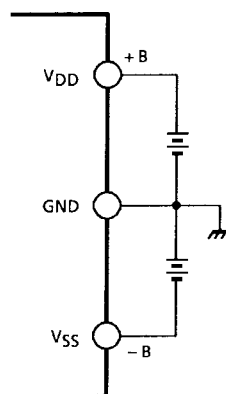
2. TC9215AP, TC9215AF

Pin No.	Symbol	Pin Name	Function	Note																					
1	GND	Ground Terminal	Dual power supplying: +B → V _{DD} 0 V → GND -B → V _{SS} Single power supplying: +B → V _{DD} 0 V → 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><tr><th>C₁₂</th><th>SW₁, SW₂</th></tr><tr><td>H</td><td>ON</td></tr><tr><td>L</td><td>OFF</td></tr></table> <table><tr><th>OFF</th><th>C₃₄</th><th>S₃₀-S₃₁ S₄₀-S₄₁</th><th>S₃₁-S₃₂ S₄₁-S₄₂</th></tr><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>(Note 1)</td><td>OFF</td><td>OFF</td></tr></table> Note 1: 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	(Note 1)	OFF	OFF	—
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	(Note 1)	OFF		OFF																					
3	S ₁₀	Switch (1) Input/Output Terminal																							
4	S ₁₁																								
5	C ₁₂	Switch (1), (2) Control Terminal																							
6	S ₂₀	Switch (2) Input/Output Terminal																							
7	S ₂₁																								
9	S ₃₀	Switch (3) Input/Output Terminal																							
10	S ₃₁																								
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12	C ₃₄	Switch (3), (4) Control Terminal																							
13	S ₄₂	Switch (4) Input/Output Terminal																							
14	S ₄₁																								
15	S ₄₀																								

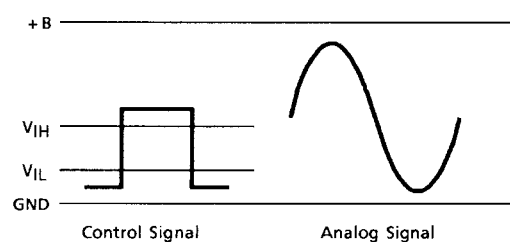
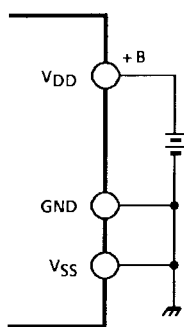
Notation: Power Supply

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, 5 V CPU application can control this IC directly.

Dual Power Supply Use



Single Power Supply Use



Note 2: In case of using single power supply in common with V_{SS} and GND terminal, half voltage of dual power supply must be supplied because of low operating voltage of a control circuit. ($V_{DD} - GND \leq 18\text{ V}$)

Maximum Ratings (Ta = 25°C)

Characteristics	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.

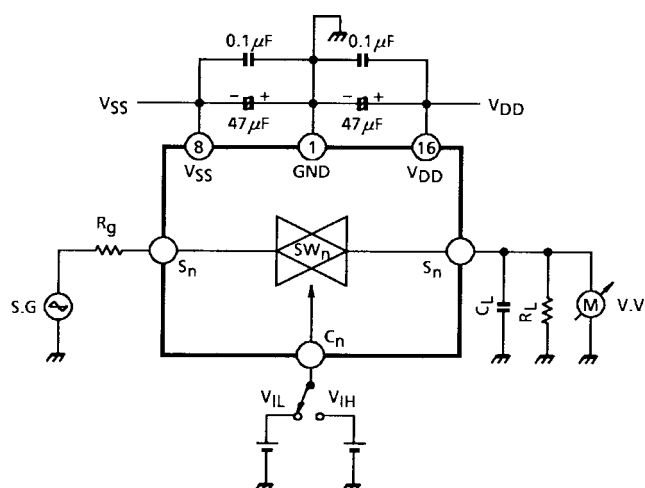
Electrical Characteristics

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

Characteristics		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	V
Operating supply current		I _{DD}	—	No load, No signal		—	0.1	0.5	mA
Input voltage	“H” level	V _{IH}	—	Control input terminal		4.0	~	V _{DD}	V
	“L” level	V _{IL}		V _{DD} = 4.5~18 V		GND	~	1.0	
Input current	“H” level	I _{IH}	—	Control input terminal	V _{IH} = 15 V	-0.1	~	0.1	μA
	“L” level	I _{IL}			V _{IL} = 0 V	-0.1	~	0.1	
Analog switch ON resistance		R _{ON}	—	V _{DD} = 5.0 V, V _{SS} = -5.0 V		—	200	300	Ω
				V _{DD} = 9.0 V, V _{SS} = -9.0 V		—	80	100	
				V _{DD} = 15 V, V _{SS} = -15 V		—	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} = 1 kHz, V _{IN} = 1 V _{rms}		—	0.01	0.05	%
Cross talk		C _T		R _g = 600 Ω, R _L = 10 kΩ		80	90	—	dB
Output noise voltage		V _N		BW = 20 Hz~20 kHz		—	2.0	—	μV _{rms}
Maximum control frequency		f _{max}		V _{IL} = 0 V, V _{IH} = 5 V		50	100	—	kHz
Maximum transfer frequency				R _L = 10 kΩ, C _L = 15 pF (Note 3)		—	5	—	MHz
Field through		F _S		R _L = 10 kΩ, C _L = 15 pF (Note 4)		—	300	—	kHz

Note 3: To supply the V_{IN} = 1.0 V_{rms} sign wave. f_{max} means 3dB down frequency from f_{IN} = 1 kHz.Note 4: To supply the V_{IN} = 1.0 V_{rms} sign wave. F_S means frequency for cross-talk 50dB.

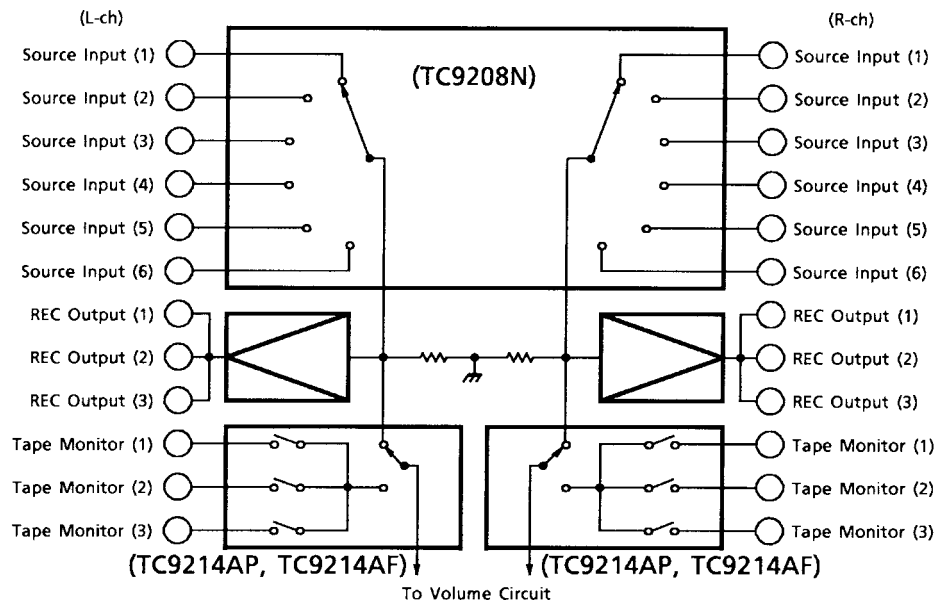
Test Circuit 1



Application Circuit

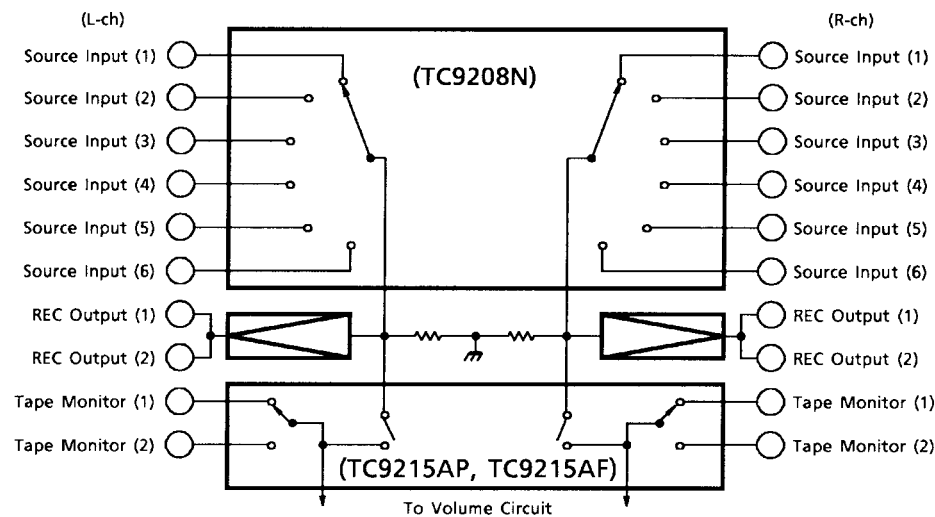
1. TC9208N + TC9214AP, TC9214AF × 2

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



2. TC9208N + TC9215AP, TC9215AF

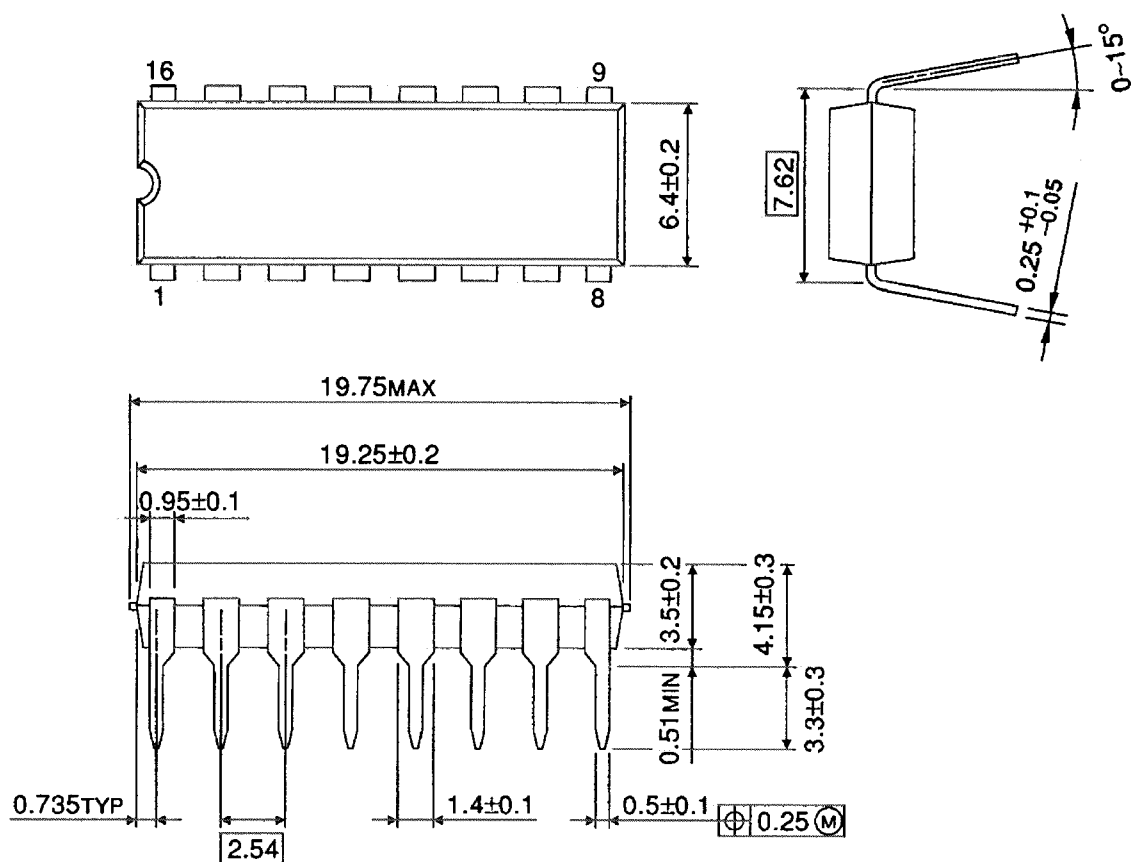
- Monitor switching for 6 source input circuits and 2 tape-recorder.



Package Dimensions

DIP16-P-300-2.54A

Unit : mm

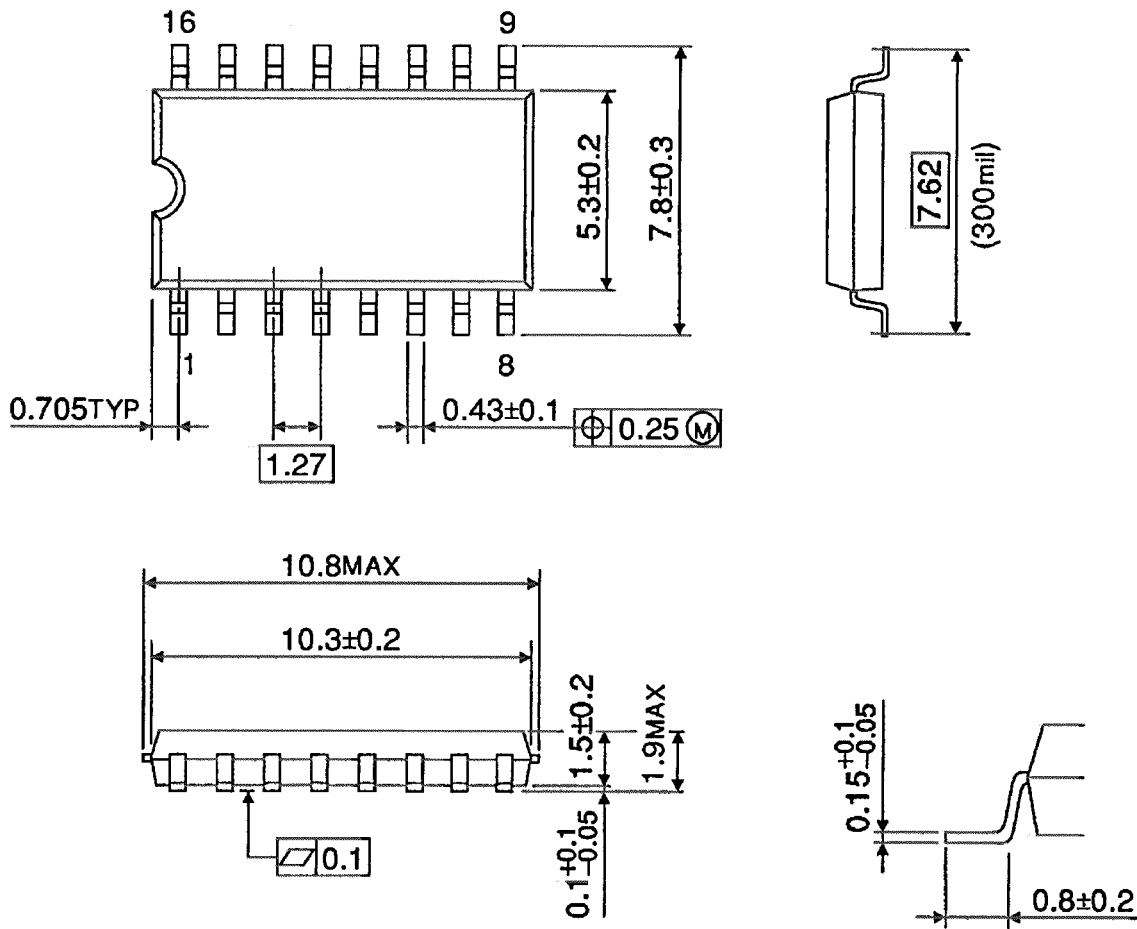


Weight: 1.0 g (typ.)

Package Dimensions

SOP16-P-300-1.27

Unit : mm



Weight: 0.16 g (typ.)

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