

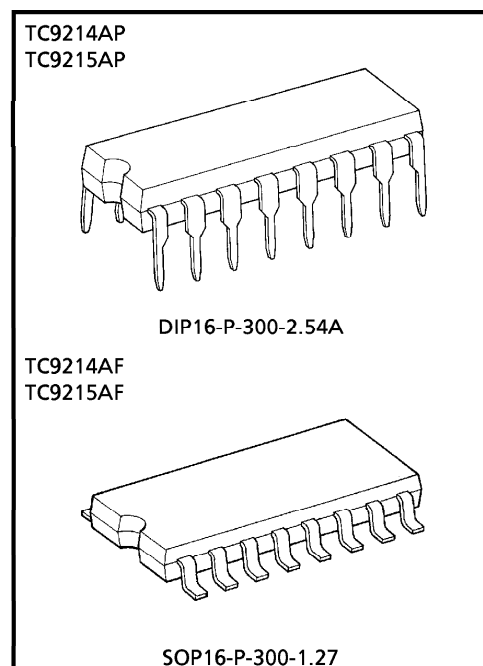
TC9214AP, TC9214AF, TC9215AP, TC9215AF

HIGH VOLTAGE ANALOG SWITCH

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

FEATURES

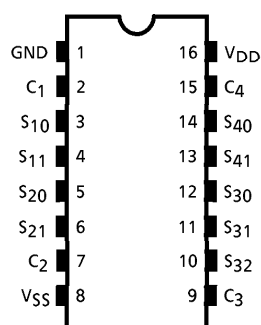
- Analog Switch Circuit Formation
TC9214AP, TC9214AF : 5 circuits
TC9215AP, TC9215AF : 6 circuits
- Dual Power Supply of (+) and (–) can be used.
- Including Level Shift Circuit, this IC can be operated by (+) power supply only under dual power supply operating.
- Setting Low Input-threshold-voltage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



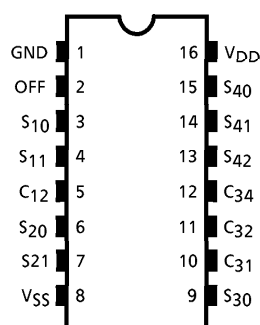
Weight
DIP16-P-300-2.54A : 1.0g (Typ.)
SOP16-P-300-1.27 : 0.16g (Typ.)

PIN CONNECTION (TOP VIEW)

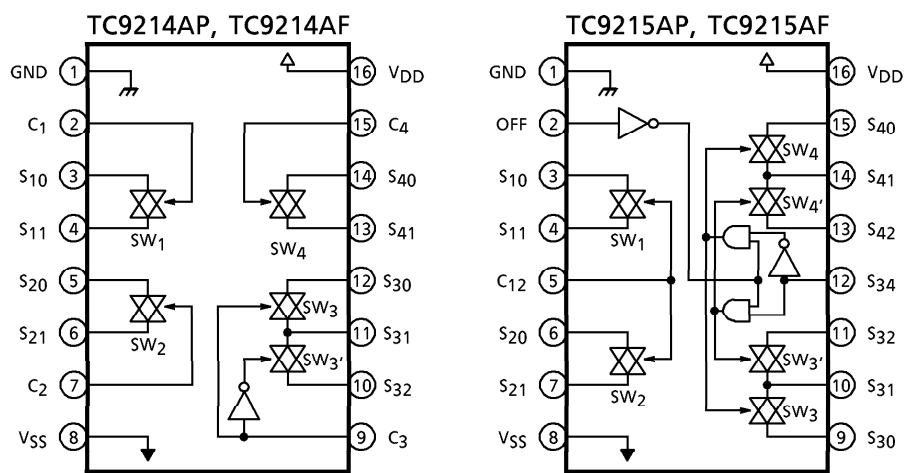
TC9214AP, TC9214AF



TC9215AP, TC9215AF

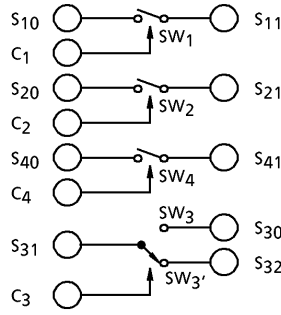


BLOCK DIAGRAM



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} Single power supplying: + B →V _{DD} 0V →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																				

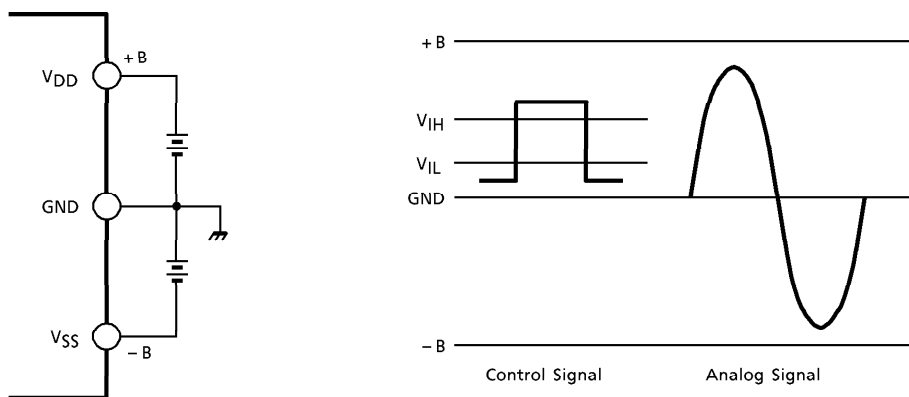
2. TC9215AP, TC9215AF

PIN No.	SYMBOL	PIN NAME	FUNCTION	NOTE																					
1	GND	Ground Terminal	Dual power supplying : + B →V _{DD} 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><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>※</td><td>OFF</td><td>OFF</td></tr></table> (※ H or L)	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																								
H	ON																								
L	OFF																								
OFF	C34	S30-S31 S40-S41		S31-S32 S41-S42																					
L	L	ON		OFF																					
	H	OFF		ON																					
H	※	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																							
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11	S ₃₂																								
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15	S ₄₀																								

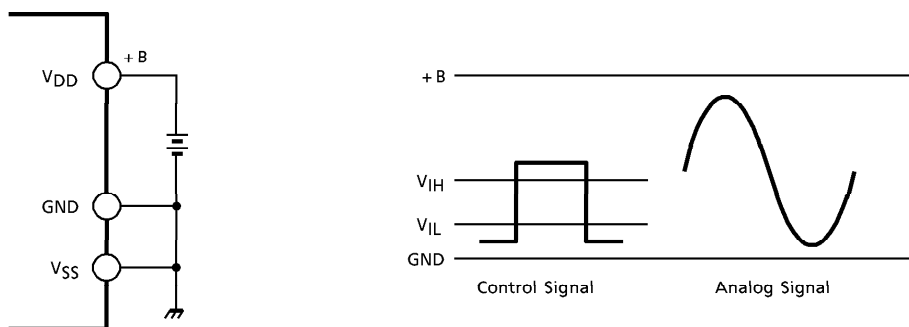
NOTATION : POWER SUPPLY

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, 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 V_{SS} and GND terminal, half voltage of dual power supply must be supplied because of low operating voltage of a control circuit. ($V_{DD} - GND \leq 18V$)

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.

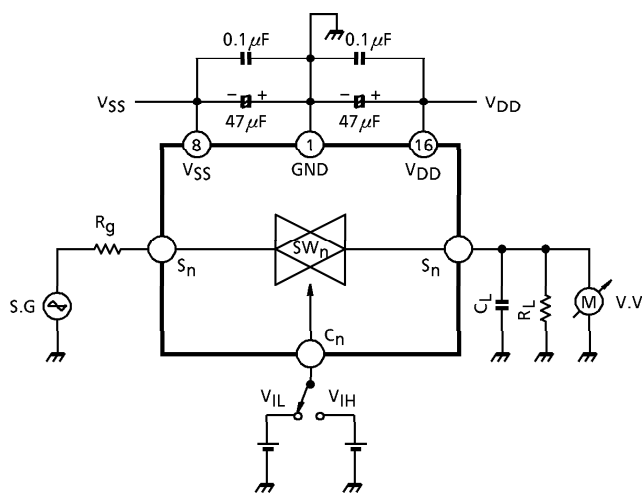
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{DD} = 15V, V_{SS} = - 15V, GND = 0V, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	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	—

(*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.

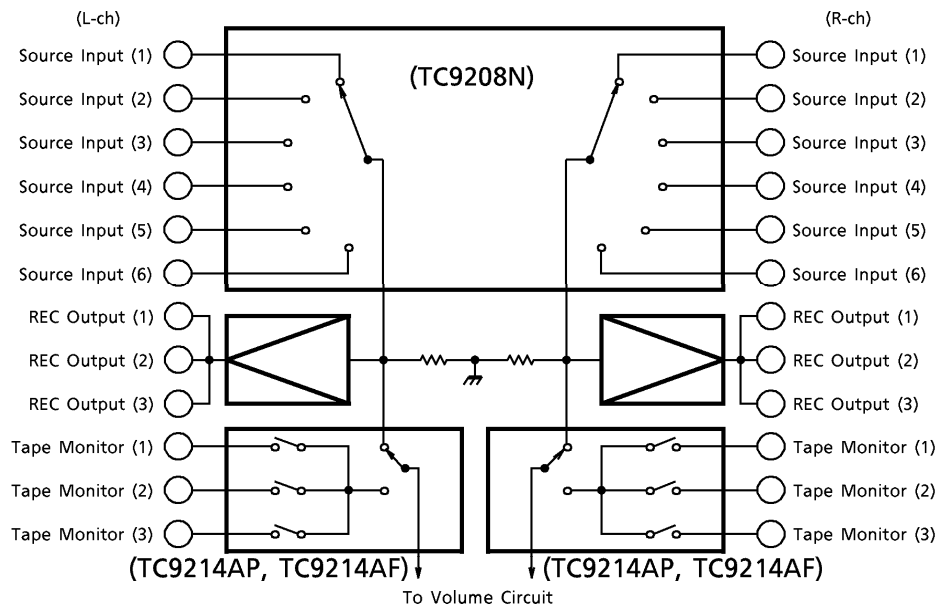
TEST CIRCUIT 1



APPLICATION CIRCUIT

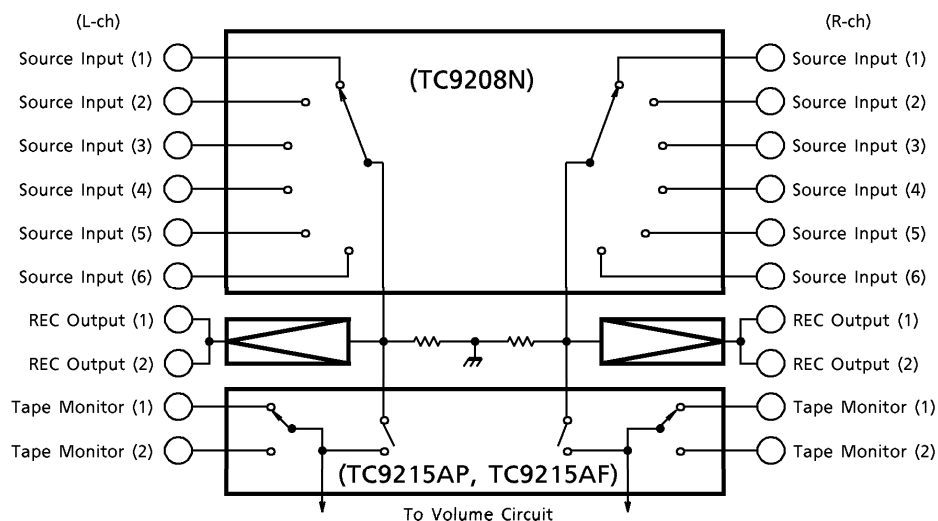
1. TC9208N + TC9214AP, TC9214AF × 2

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



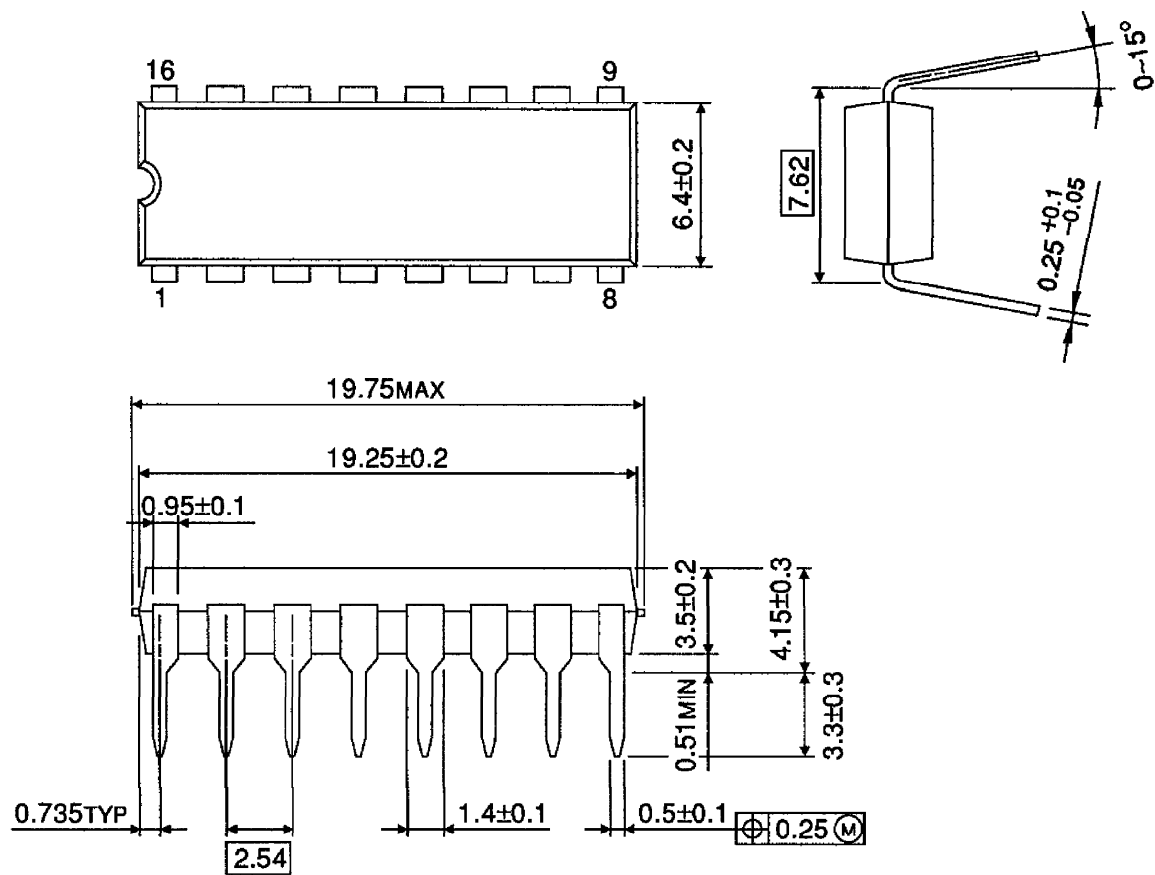
2. TC9208N + TC9215AP, TC9215AF

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



PACKAGE DIMENSIONS
DIP16-P-300-2.54A

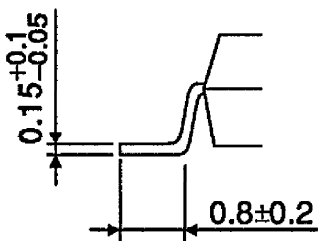
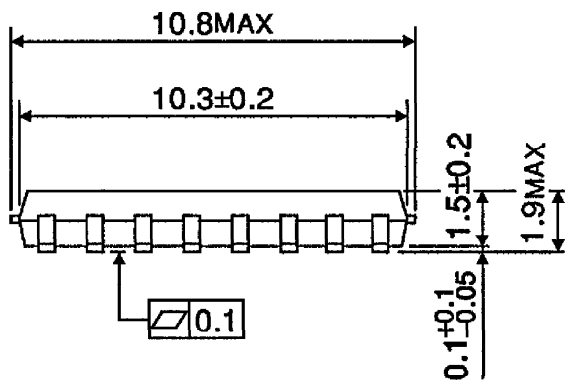
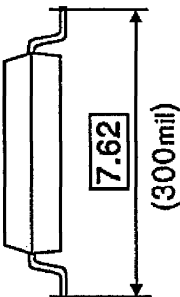
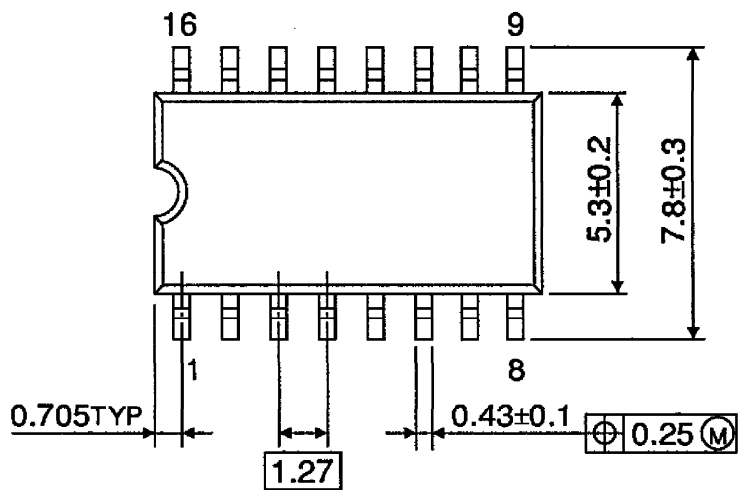
Unit : mm



Weight : 1.0g (Typ.)

PACKAGE DIMENSIONS
SOP16-P-300-1.27

Unit : mm



Weight : 0.16g (Typ.)

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000707EBA

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