

TOSHIBA**TC9250F/P**

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC9250F, TC9250P

16 BITS RESISTER STRINGS DA CONVERTER

TC9250F, TC9250P is 16 bits resister strings DA converter for digital audio. Data input accepts 1fs~8fs.
It is possible to construct the DA converter unit at a low price.

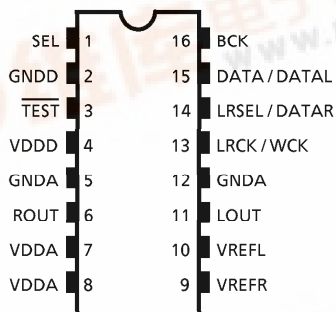
FEATURES

- Data input accepts 1fs~8fs.
- Built-in twin DA converter.
- Simultaneous outputs to L-ch and R-ch.
- Built-in output buffer.
- DA converter characteristics is as follows.

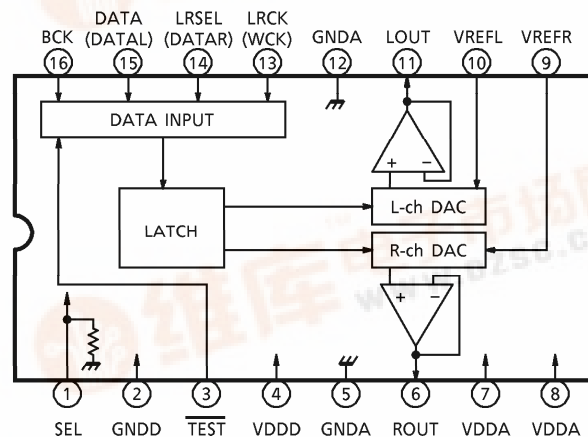
THD + N	S / N	D-RANGE
- 65dB (Typ.)	100dB (Typ.)	93dB (Typ.)

- 2 kinds of package, 16 pin flat package and 16 pin DIP.

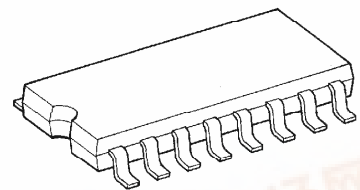
PIN CONNECTION



BLOCK DIAGRAM

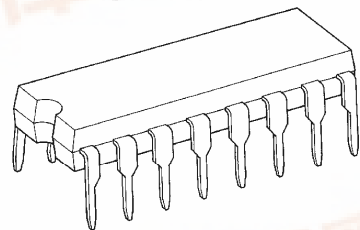


TC9250F



SOP16-P-300-1.27

TC9250P



DIP16-P-300-2.54A

Weight

SOP16-P-300-1.27 : 0.16g (Typ.)
DIP16-P-300-2.54A : 1.00g (Typ.)

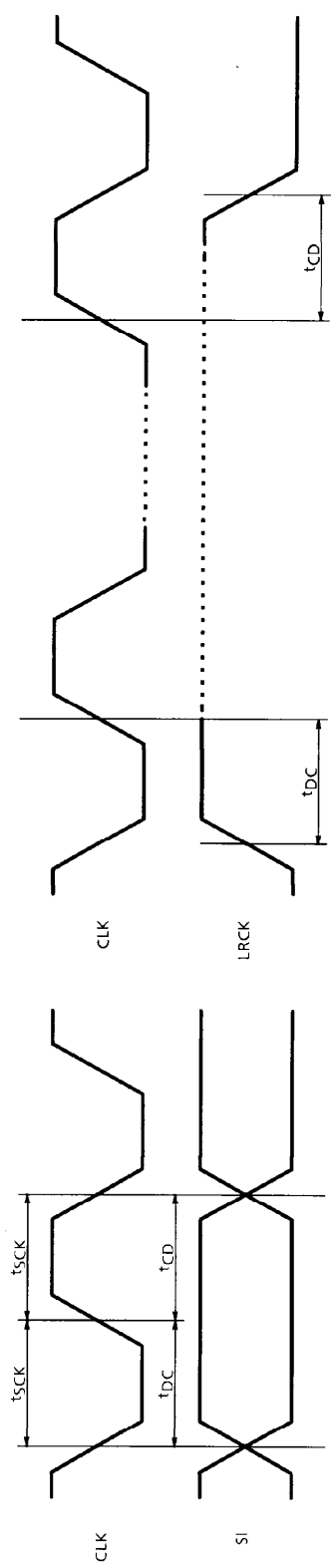
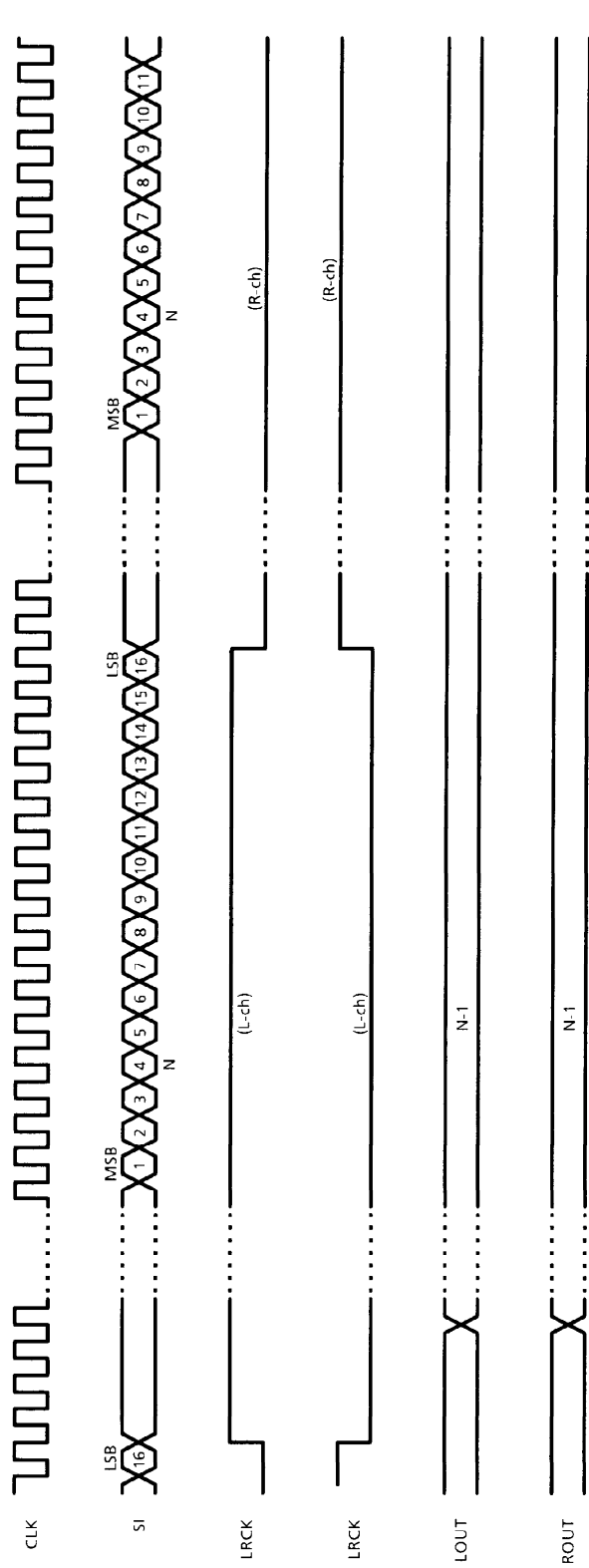
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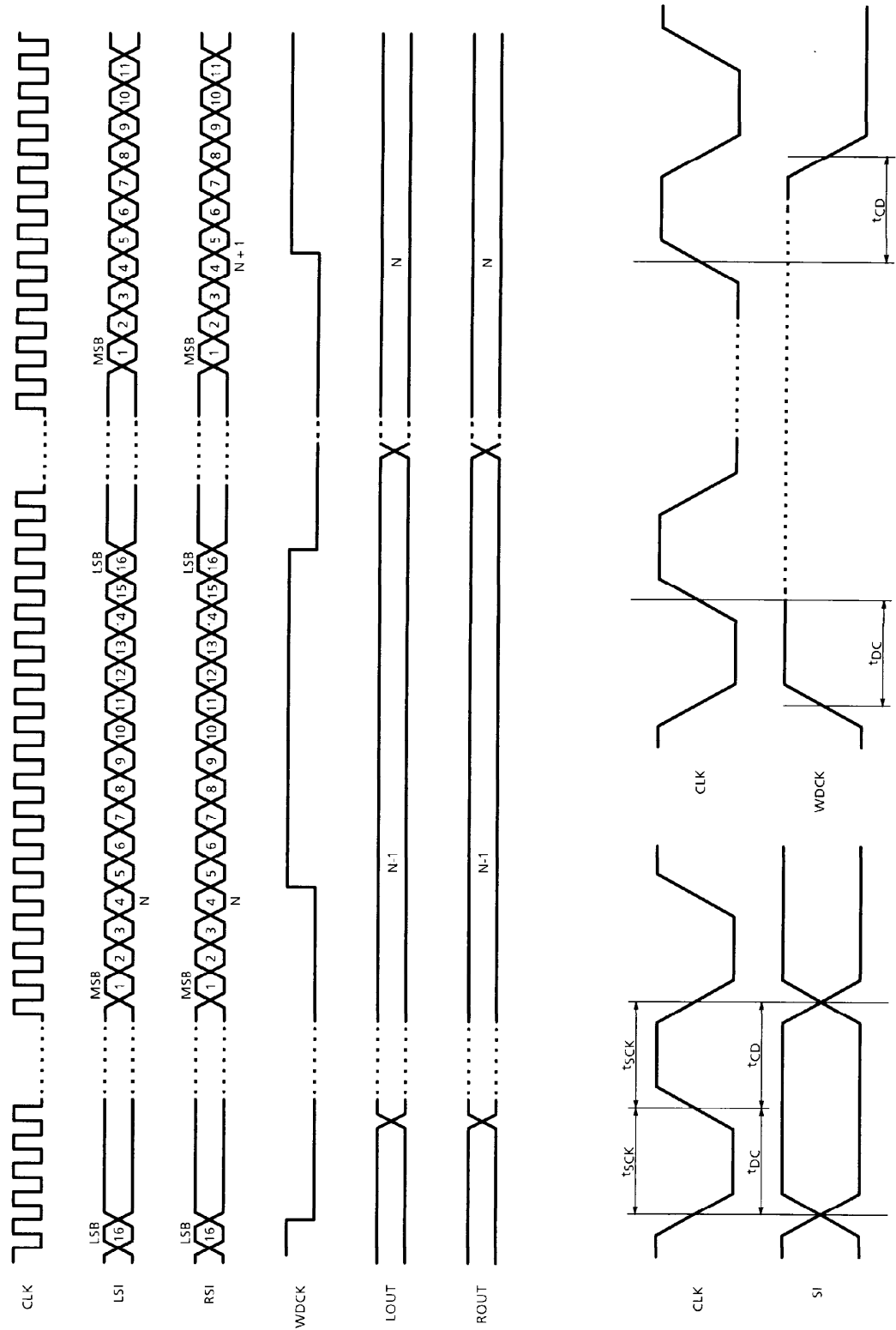
PIN FUNCTION

PIN No.	SYMBOL	I / O	FUNCTION / OPERATION	REMARKS											
1	SEL	I	Input data selection terminal. At "L" or open, L-ch and R-ch serial data input pin15. At "H", L-ch data input pin15 and R-ch data input pin14.	Pull-down Resistance											
2	GNDD	—	Logic grand terminal.												
3	TEST	I	Test terminal. Normally, use at "L".												
4	VDDD	—	Logic power supply terminal.												
5	GNDA	—	Analog grand terminal.												
6	ROUT	O	R-ch analog output terminal.												
7	VDDA	—	Analog power supply terminal.												
8	VDDA														
9	VREFR	—	R-ch reference voltage terminal.												
10	VREFL	—	L-ch reference voltage terminal.												
11	LOUT	O	L-ch analog output terminal.												
12	GNDA	—	Analog grand terminal.												
13	LRCK / WCK	I	At pin1 "H" or "OPEN", LR clock input terminal. At pin1 "L", word clock input terminal.												
14	LRSEL / DATAR	I	At pin 1 "L", LR channel data selection terminal. <table border="1"><tr><th rowspan="2">LRSEL INPUT</th><th colspan="2">LRCK</th></tr><tr><th>"L"</th><th>"H"</th></tr><tr><td>"L"</td><td>R-ch data input</td><td>L-ch data input</td></tr><tr><td>"H"</td><td>L-ch data input</td><td>R-ch data input</td></tr></table> At pin1 "H", R-ch data input terminal.	LRSEL INPUT	LRCK		"L"	"H"	"L"	R-ch data input	L-ch data input	"H"	L-ch data input	R-ch data input	
LRSEL INPUT	LRCK														
	"L"	"H"													
"L"	R-ch data input	L-ch data input													
"H"	L-ch data input	R-ch data input													
15	DATA / DATAL	I	At pin1 "L", L-ch and R-ch data input terminal. At pin1 "H", L-ch data input terminal.												
16	BCK	I	Bit clock input terminal.												

1-1 DATA INPUT TIMING (SEL = "L")



1-2 DATA INPUT TIMING (SEL = "H")



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V _{DD}	- 0.3~6.0	V
Input Voltage		V _{IN}	- 0.3~V _{DD} + 0.3	V
Power Dissipation	TC9250F	P _D	200	mW
	TC9250P		300	
Operating Temperature		T _{opr}	- 20~85	°C
Storage Temperature		T _{stg}	- 40~125	°C

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = 25°C, V_{DD} = 5V)

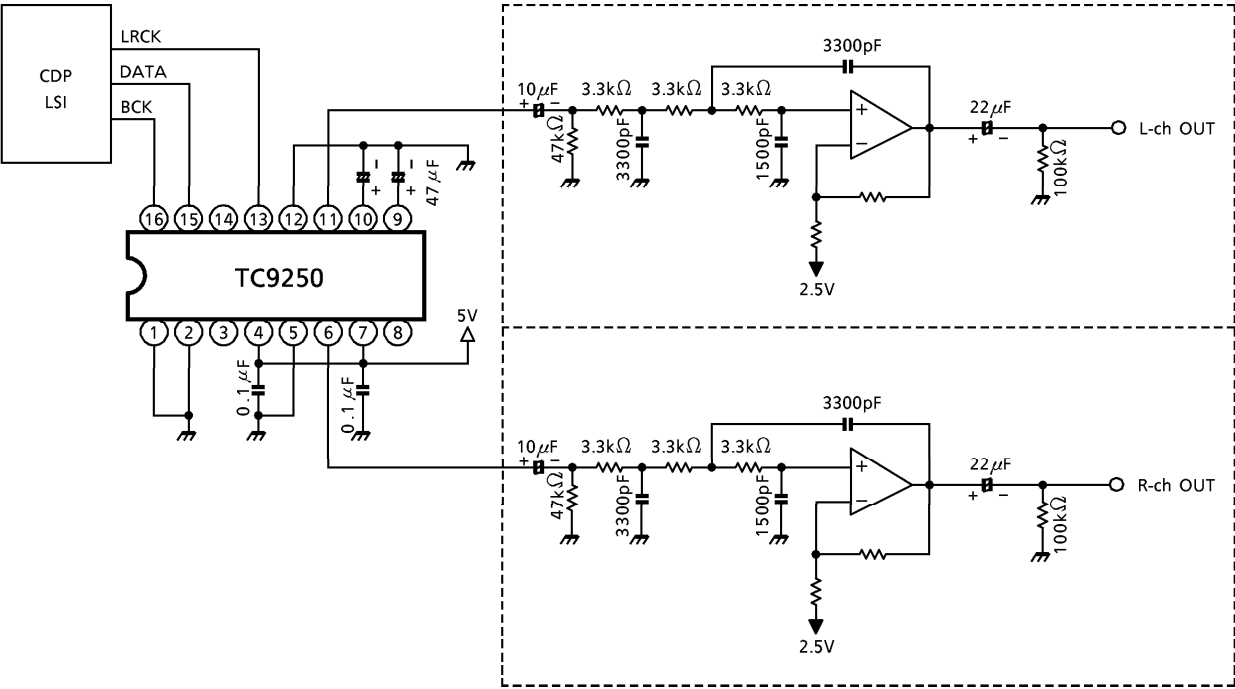
DC characteristic

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V _{DD}	1	Ta = - 35~85°C	4.5	5.0	5.5	V
Power Dissipation	I _{DD}	1	f _s = 44.1kHz, 8 times data input	—	2.0	6.0	mA
Input Voltage	V _{IH}	1		V _{DD} × 0.7	—	V _{DD}	V
	V _{IL}			0	—	V _{DD} × 0.3	
Output Resister	R _L	—	ROUT, LOU _T terminal	5	—	—	kΩ
Convert Frequency	f _s	1		—	—	400	kHz
Clock Frequency	f _{CLK}	1		—	—	10	MHz
Clock Pulse Width	f _{SCK}	1		40	—	—	ns
SI, LRCK Setuptime	t _{DC}	1		12	—	—	ns
SI, LRCK Holdtime	t _{CD}	1		12	—	—	ns

AC characteristic

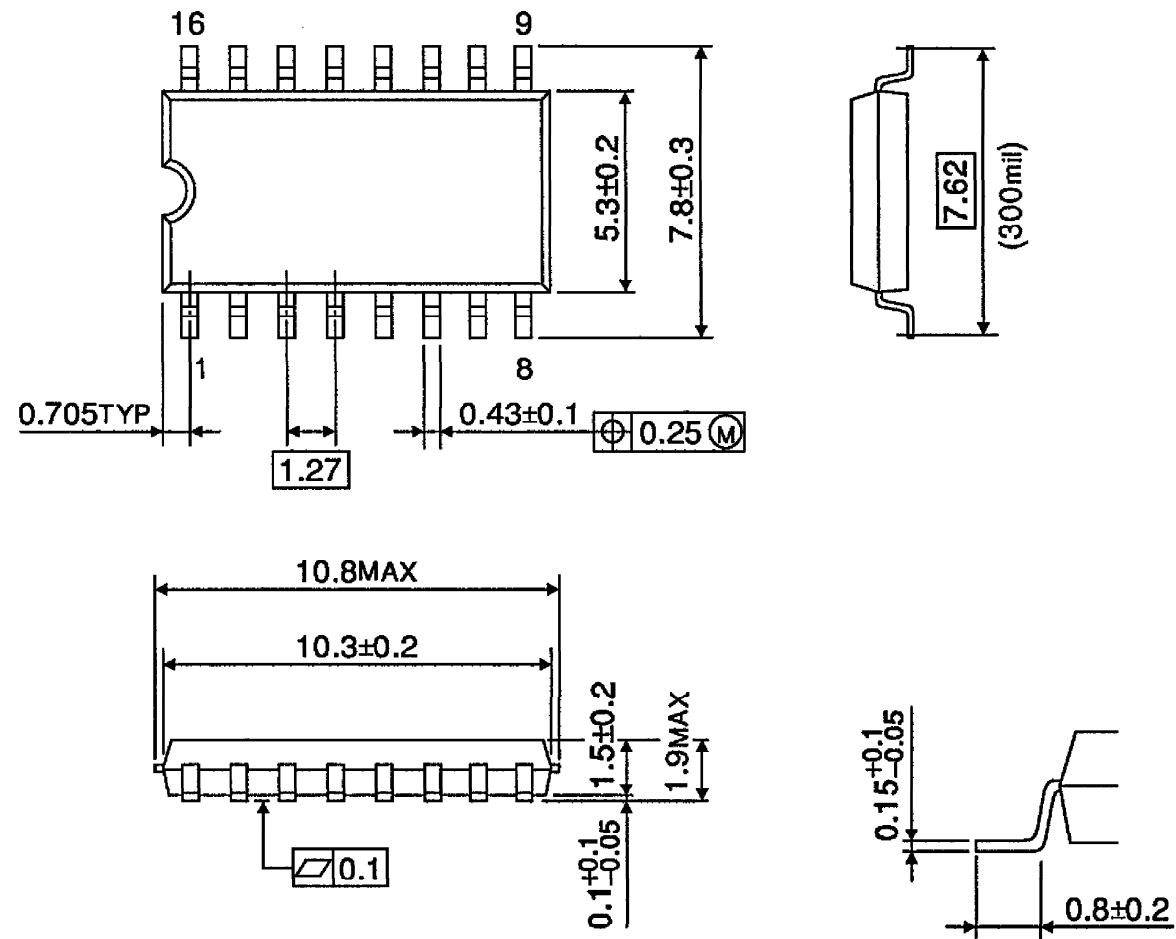
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Resolution	RES	—		—	16	—	bit
Noise Distortion	THD + N	1	f _{IN} = 1kHz, 0dB 20kHz LPF ON	—	- 65	- 60	dB
S / N	S / N	—	JIS-A	96	100	—	dB
Dynamic Range	DR	—	f _{IN} = 1kHz, - 60dB, JIS-A ON	90	93	—	dB
Cross-Talk	CT	—	One channel 1kHz 0dB input	85	95	—	dB
Full Scale Output Voltage	V _{FS}	—	1kHz 0dB output	—	2.0	2.3	V _{p-p}

APPLICATION CIRCUUIT (Test circuit 1)



PACKAGE DIMENSIONS
SOP16-P-300-1.27

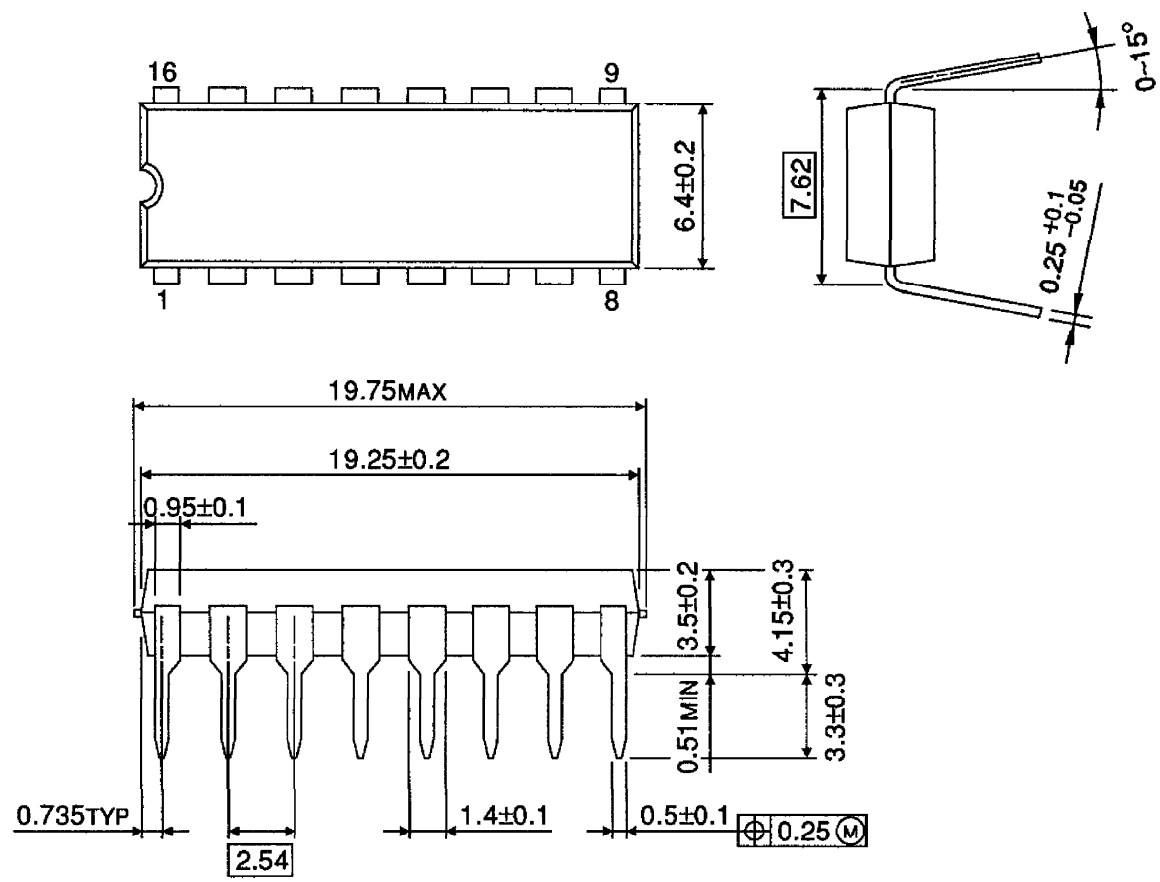
Unit : mm



Weight : 0.16g (Typ.)

PACKAGE DIMENSIONS
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)