

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

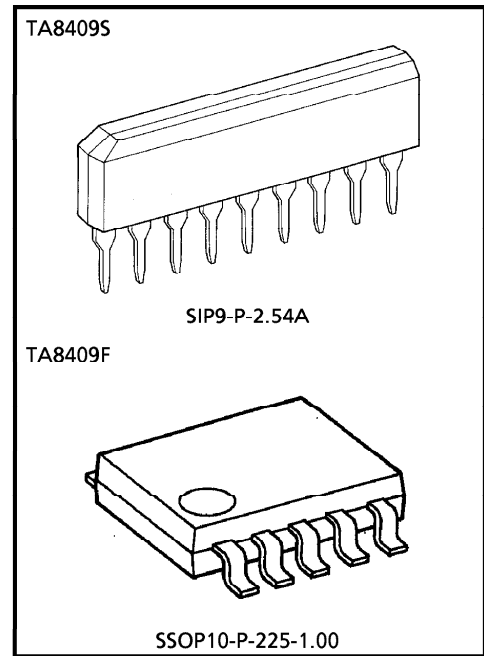
TA8409S, TA8409F

BRIDGE DRIVER

TA8409S and TA8409F are bridge driver with output voltage control.

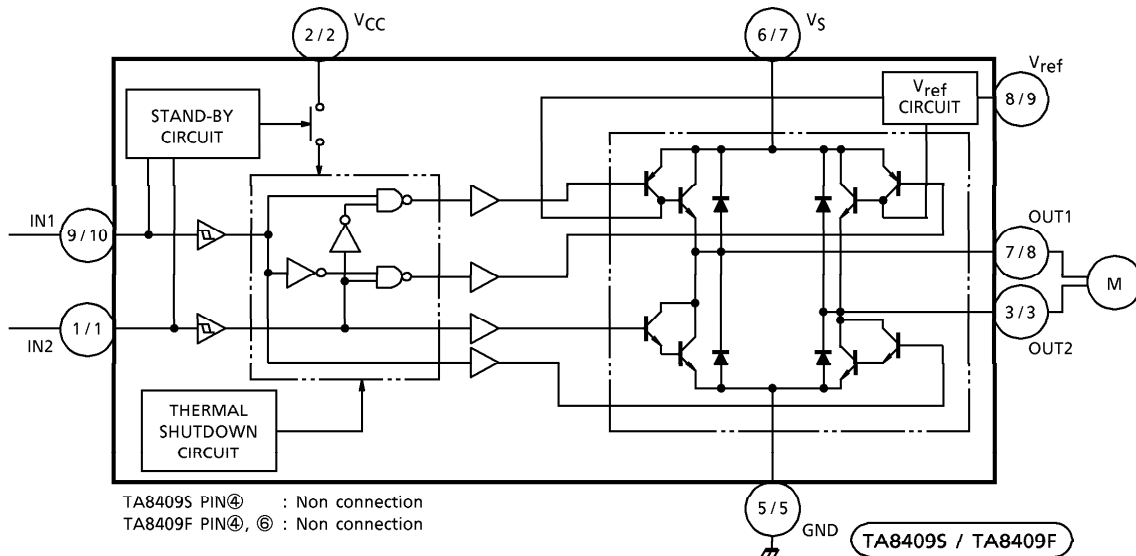
FEATURES

- Modes available (CW / CCW / STOP / BRAKE)
- Output current up to 0.4A (AVE) and 1.0A (PEAK)
- Wide range of operating voltage
 V_{CC} (opr.) = 4.5~20V
 V_S (opr.) = 0~20V
 V_{ref} (opr.) = 0~20V ($V_{ref} \leq V_S$)
- Built-in thermal shutdown
- Standby mode available (STOP MODE)
- Hysteresis for all inputs



Weight
 SIP9-P-2.54A : 0.92g (Typ.)
 SSOP10-P-225-1.00 : 0.09g (Typ.)

BLOCK DIAGRAM



961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

PIN FUNCTION
TA8409S

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN2	Input terminal
2	V _{CC}	Supply voltage terminal for logic
3	OUT2	Output terminal
4	NC	Non connection
5	GND	GND terminal
6	V _S	Supply voltage terminal for motor driver
7	OUT1	Output terminal
8	V _{ref}	Reference voltage terminal for control circuit
9	IN1	Input terminal

TA8409F

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN2	Input terminal
2	V _{CC}	Supply voltage terminal for logic
3	OUT2	Output terminal
4	NC	Non connection
5	GND	GND terminal
6	NC	Non connection
7	V _S	Supply voltage terminal for motor driver
8	OUT1	Output terminal
9	V _{ref}	Reference voltage terminal for control circuit.
10	IN1	Input terminal

FUNCTION

INPUT		OUTPUT		MODE
IN1	IN2	OUT1	OUT2	MOTOR
0	0	∞	∞	STOP
1	0	H	L	CW / CCW
0	1	L	H	CCW / CW
1	1	L	L	BRAKE

(∞) High impedance

(Note) Inputs are all high active type.

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 ● The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

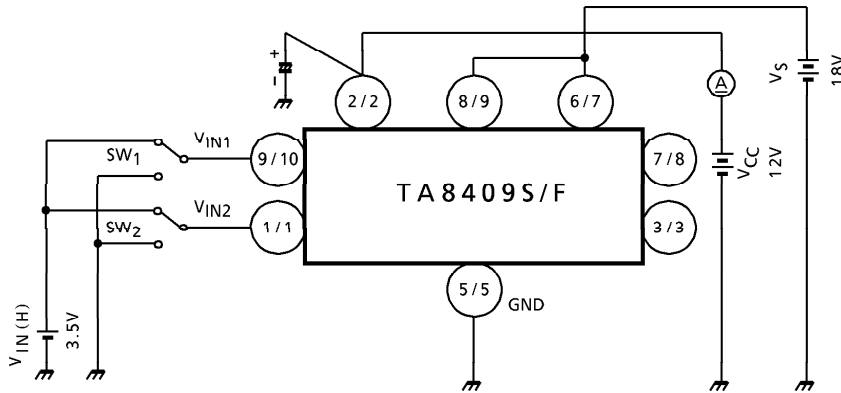
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V _{CC}	25	V
Motor Drive Voltage		V _S	25	V
Reference Voltage		V _{ref}	25	V
Output Current	PEAK	I _O (PEAK)	1.0	A
	AVE	I _O (AVE.)	0.4	
Power Dissipation	TA8409F	P _D	0.735 (Note)	W
	TA8409S		0.95	
Operating Temperature		T _{opr}	- 30~75	°C
Storage Temperature		T _{stg}	- 55~150	°C

(Note) This rating is obtained by mounting on 50×50×1.6mm PCB that occupied above 30% of copper area.

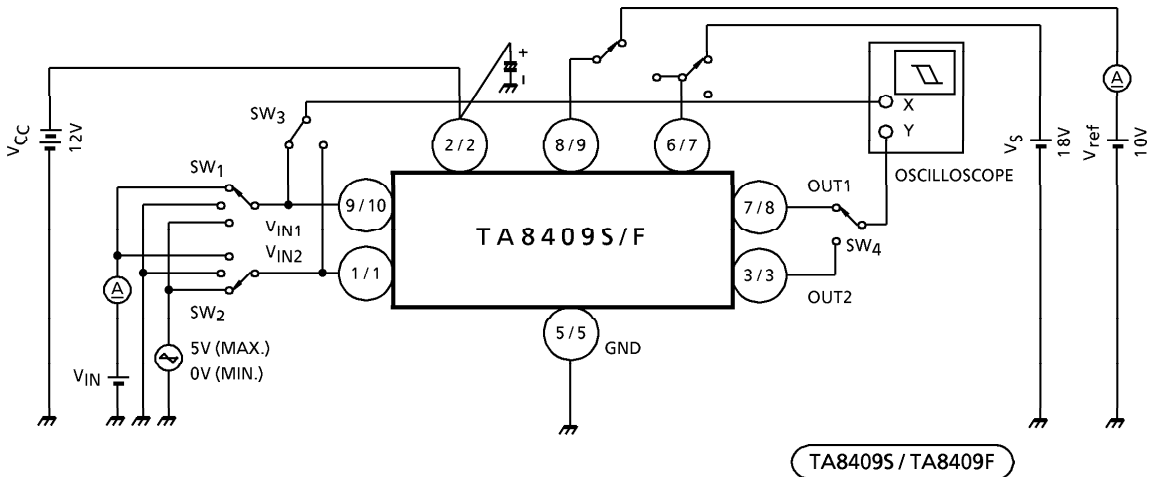
ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 12V, V_S = 18V)

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I _{CC1}	1	Output OFF, CW / CCW mode	—	10.0	15.0	mA
		I _{CC2}	1	Output OFF, STOP mode	—	0	50	μA
		I _{CC3}	1	Output OFF, BREAK mode	—	6.5	10.0	mA
Input Operating Voltage	1 (High)	V _{IN1}	2	T _j = 25°C IN1, 2	3.5	—	5.5	V
	1 (Low)	V _{IN2}	2	T _j = 25°C IN1, 2	GND	—	0.8	
Input Current		I _{IN}	2	Sink mode, V _{IN} = 3.5V	—	3	10	μA
Input Hysteresis Voltage		ΔV _T	2	—	—	0.7	—	V
Saturation Voltage	Upper Side	V _{SAT U-1}	3	V _{ref} = V _S , V _{OUT} -V _S measure I _O = 0.2A, CW / CCW mode	—	0.9	1.2	V
	Lower Side	V _{SAT L-1}	3	V _{ref} = V _S , V _{OUT} -GND measure I _O = 0.2A, CW / CCW mode	—	0.8	1.2	
	Upper Side	V _{SAT U-2}	3	V _{ref} = V _S , V _{OUT} -V _S measure I _O = 0.4A, CW / CCW mode	—	1.0	1.35	
	Lower Side	V _{SAT L-2}	3	V _{ref} = V _S , V _{OUT} -GND measure I _O = 0.4A, CW / CCW mode	—	0.9	1.35	
Output Voltage		V _{SAT U-1'}	3	V _{ref} = 10V, V _{OUT} -GND measure I _O = 0.2A	10.4	11.2	12.2	V
		V _{SAT U-2'}	3	V _{ref} = 10V, V _{OUT} -GND measure I _O = 0.4A	—	10.9	—	
Output Transistor Leakage Current	Upper Side	I _{LU}	4	V _L = 25V	—	—	50	μA
	Lower Side	I _{LL}	4	V _L = 25V	—	—	50	
Diode Forward Voltage	Upper Side	V _{F U-1}	5	I _F = 0.4A	—	1.5	—	V
	Lower Side	V _{F L-1}	5	I _F = 0.4A	—	0.9	—	
Reference Current		I _{ref}	2	V _{ref} = 10V, source mode	—	20	40	μA

TEST CIRCUIT 1
 I_{CC1} , I_{CC2} , I_{CC3}



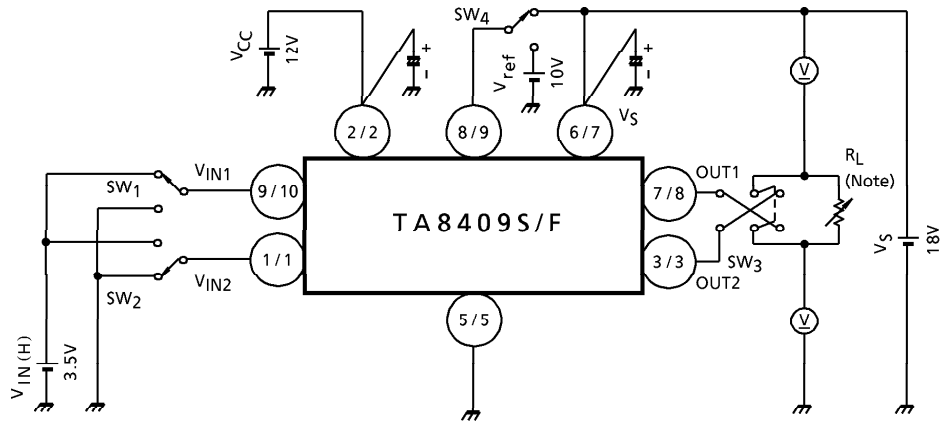
TEST CIRCUIT 2
 V_{IN1} , V_{IN2} , I_{IN} , ΔV_T , I_{ref}



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TEST CIRCUIT 3

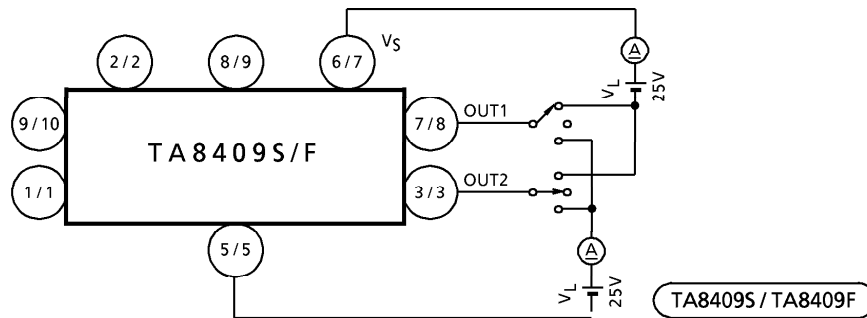
V_{SAT} U-1, 2, V_{SAT} L-1, 2, V_{SAT} U-1', 2'



(Note) Calibrate I_{OUT} to 0.2/0.4A by R_L .

TEST CIRCUIT 4

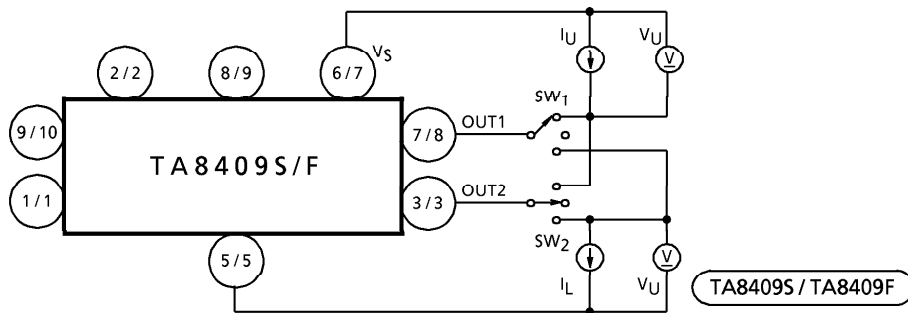
I_L U, L



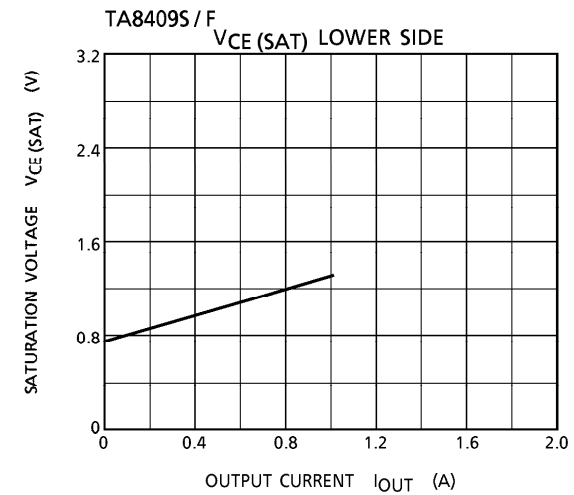
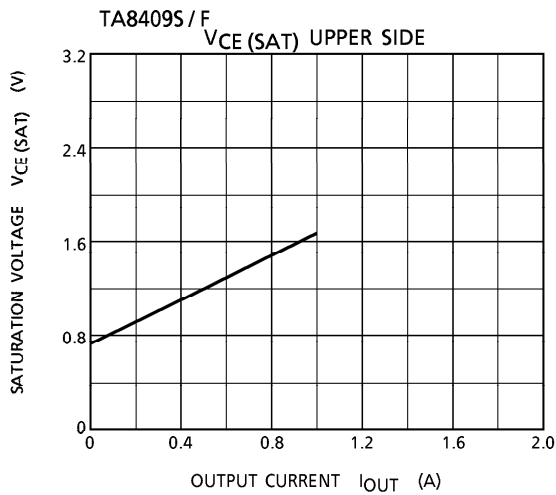
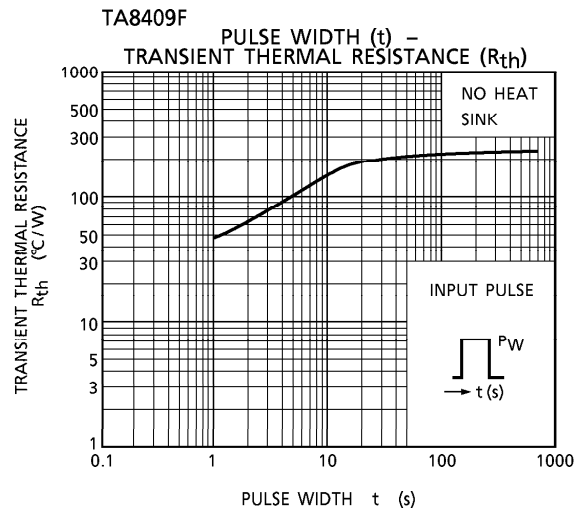
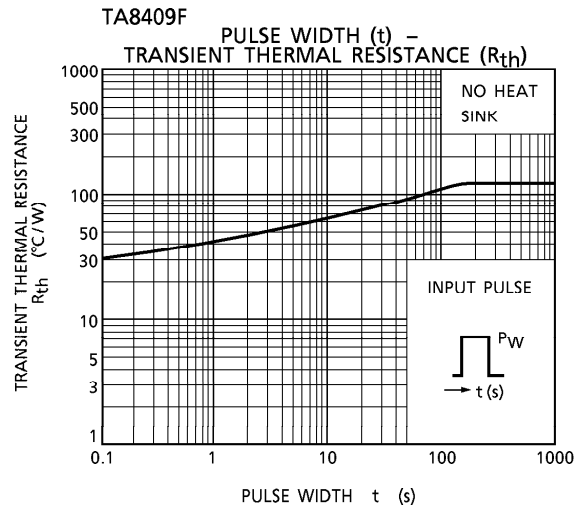
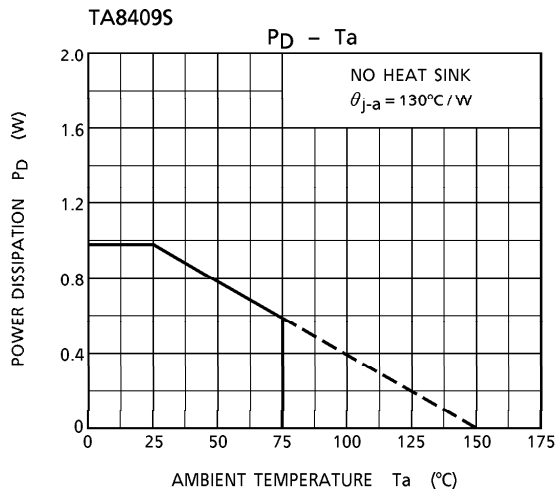
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TEST CIRCUIT 5

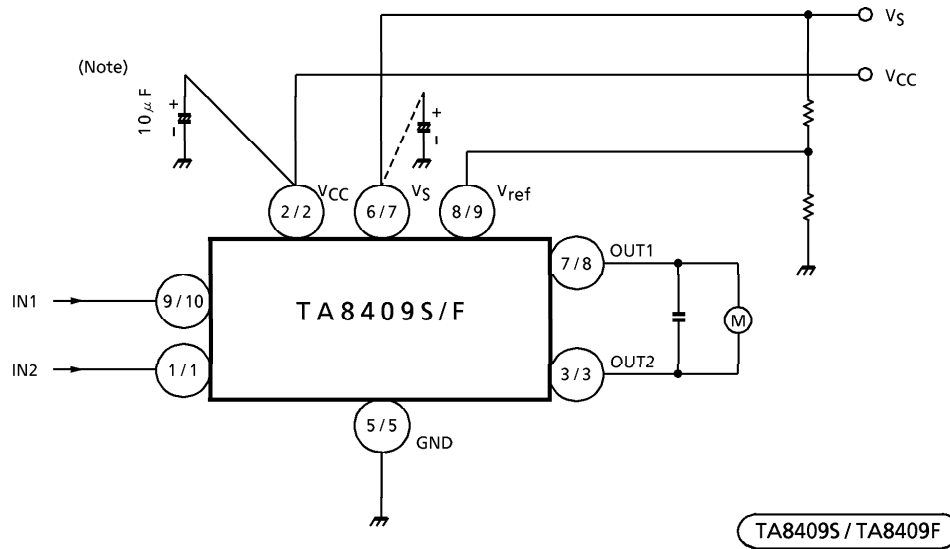
V_F U-1, 2, V_F L-1, 2



TA8409S / TA8409F



APPLICATION CIRCUIT

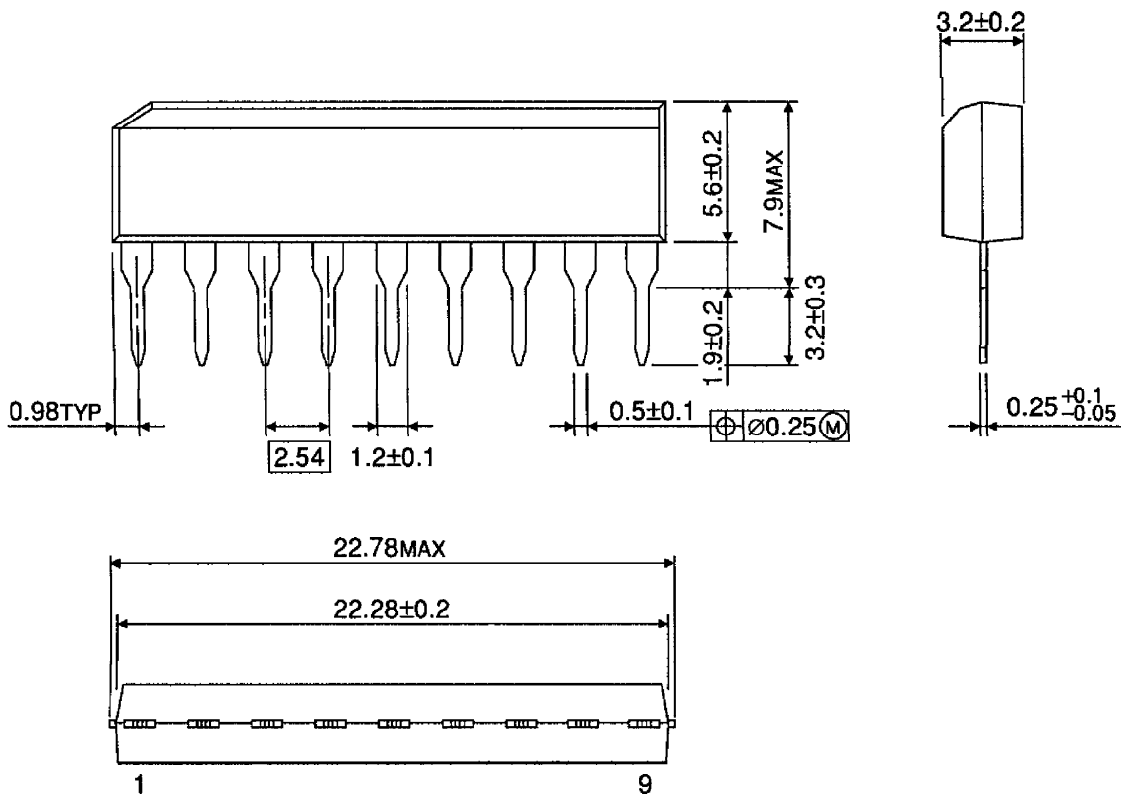


(Note 1) Connect if required.

(Note 2) Utmost care is necessary in the design of the output line, V_s and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

OUTLINE DRAWING
SIP9-P-2.54A

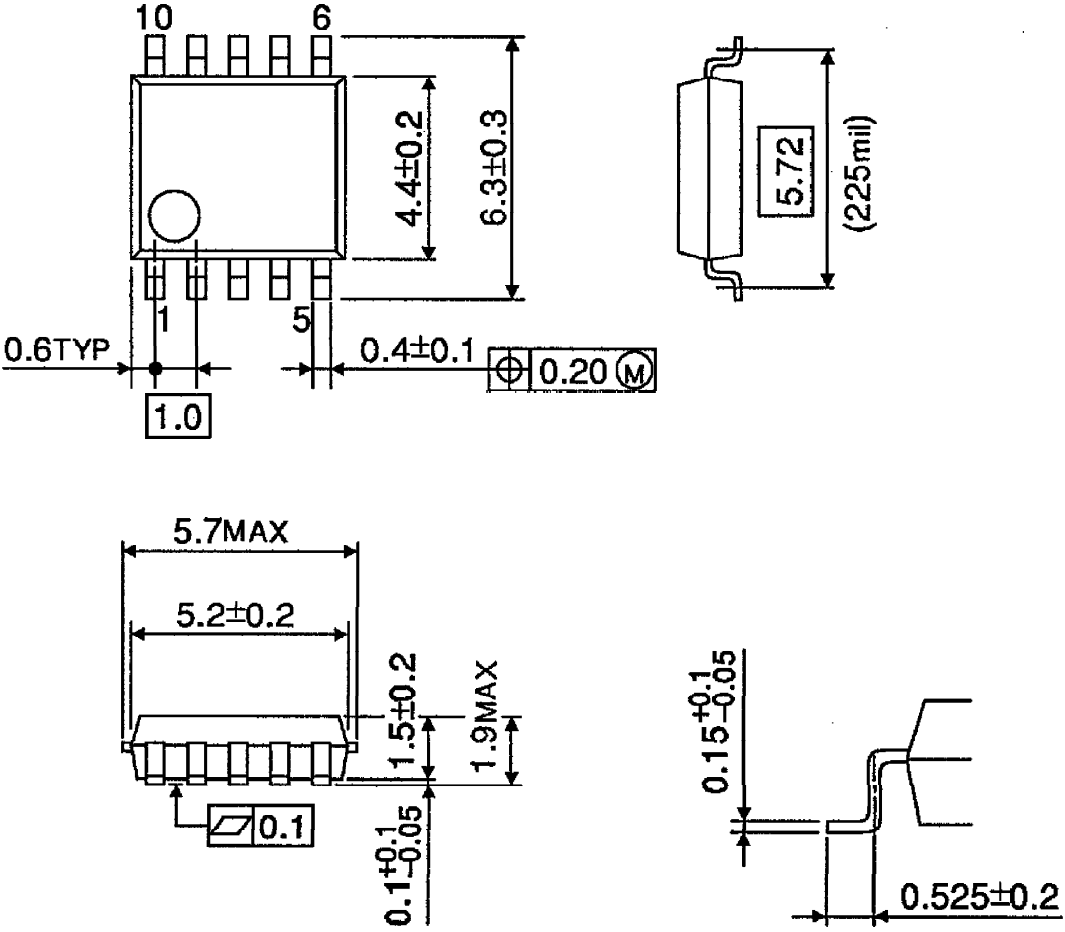
Unit : mm



Weight : 0.92g (Typ.)

OUTLINE DRAWING
SSOP10-P-225-1.00

Unit : mm



Weight : 0.09g (Typ.)