

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62386AP, TD62386AF, TD62387AP TD62387AF, TD62388AP, TD62388AF

8 CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

The TD62386AP, TD62386AF, TD62387AP, TD62387AF and TD62388AP, TD62388AF are non-inverting transistor arrays, which are comprised of eight NPN darlington output stages and PNP input stages. All units feature integral clamp diodes for switching inductive loads.

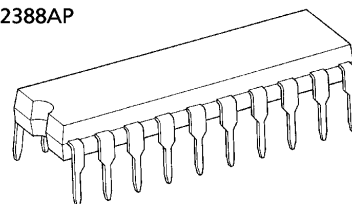
These devices are Low Level input active drivers and are suitable for operations with TTL, 5V CMOS and 5V Microprocessor which have sink current output drivers. Applications include relay, hammer, lamp and LED driver.

FEATURES

- Output current (single output) 500mA (Max.)
- High sustaining voltage 50V (Min.)
- Output clamp diodes
- Low level active input
- Standard supply voltage
- Inputs compatible with TTL and 5V CMOS
- Package type-AP : DIP-20 pin
- Package type-AF : SOP-20 pin

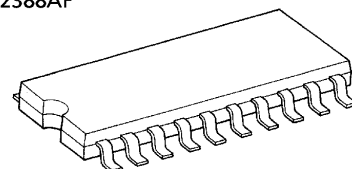
TYPE	V _{IN} (ON)
TD62386AP, TD62386AF	-20V~V _{CC} -2.8V
TD62387AP, TD62387AF	0V~V _{CC} -3.7V
TD62388AP, TD62388AF	

TD62386AP
TD62387AP
TD62388AP



DIP20-P-300-2.54A

TD62386AF
TD62387AF
TD62388AF

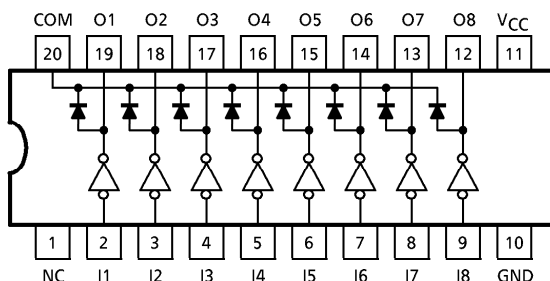


SOP20-P-300-1.27

Weight

DIP20-P-300-2.54A : 2.25g (Typ.)
SOP20-P-300-1.27 : 0.25g (Typ.)

PIN CONNECTION (TOP VIEW)

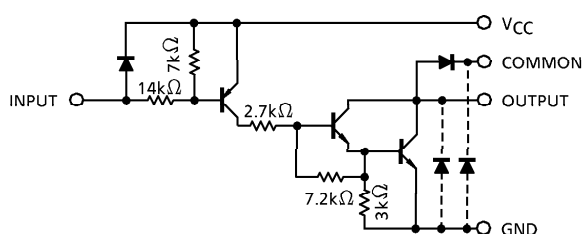


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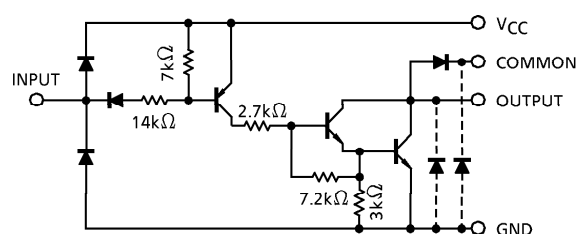
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SCHEMATICS (EACH DRIVER)

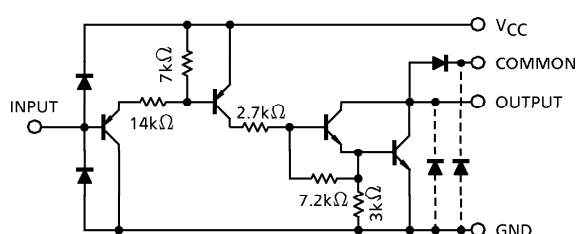
TD62386AP, TD62386AF



TD62387AP, TD62387AF



TD62388AP, TD62388AF



(Note) The output parasitic diode cannot be used as clamp diodes.

MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	$-0.5 \sim 7.0$	V
Output Sustaining Voltage	AP	$V_{CE(SUS)}$	$-0.5 \sim 50$	V
	AF		$-0.5 \sim 35$	
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN} (Note 1)	$-22 \sim V_{CC} + 0.5$	V
		V_{IN} (Note 2)	$-0.5 \sim 7$	
Input Current		I_{IN}	-10	mA
Clamp Diode Reverse Voltage		V_R	50	V
Clamp Diode Forward Current		I_F	500	mA
Power Dissipation	AP	P_D (Note 3)	1.38	W
	AF		1.0 (Note 4)	
Operating Temperature		T_{opr}	$-40 \sim 85$	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	$-55 \sim 150$	$^{\circ}\text{C}$

(Note 1) TD62386AP, TD62386AF only

(Note 2) TD62387AP, TD62387AF, TD62388AP, TD62388AF only

(Note 3) Delated above 25°C in the proportion of $11.7\text{mW}/^{\circ}\text{C}$ (AP-Type), $7.7\text{mW}/^{\circ}\text{C}$ (F, AF-Type).

(Note 4) On PCB ($50 \times 50 \times 1.6\text{mm}$ Cu 40% Glass Epoxy)

RECOMMENDED OPERATING CONDITIONS (Ta = -40~85°C)

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V _{CC}	—	4.5	5.0	5.5	V
Output Sustaining Voltage		V _{CE (SUS)}	—	0	—	50	V
Output Current		I _{OUT}	T _{pw} = 25ms, Duty = 10%, 8 Circuits	0	—	270	mA / ch
Input Voltage	TD62386AP	V _{IN}	—	-20	—	V _{CC}	V
	TD62386AF		—	—	—	—	
	TD62387AP		—	—	—	—	
	TD62387AF		—	—	—	—	
	TD62388AP TD62388AF		—	0	—	5.5	
Clamp Diode Reverse Voltage		V _R	—	—	—	50	V
Clamp Diode Forward Current		I _F	—	—	—	400	mA
Power Dissipation	AP	P _D	—	—	—	0.52	W
	AF		(Note 1)	—	—	0.4	

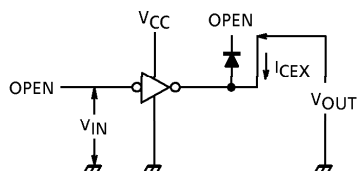
(Note 1) On Glass Epoxy PCB (50 × 50 × 1.6mm Cu 40%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

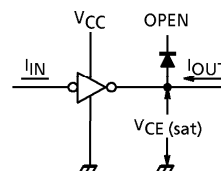
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current		I _{CEX}	1	V _{CC} = 5.5V, I _{IN} = 0 V _{OUT} = 50V, Ta = 85°C	—	—	100	μA
Output Saturation Voltage		V _{CE (sat)}	2	V _{CC} = 4.5V, V _{IN} = V _{IN (ON)} MAX. I _{OUT} = 350mA	—	1.4	2.0	V
Input Current	Output On	I _{IN (ON)}	3	V _{CC} = 5.5V, V _{IN} = 0.4V	—	-0.32	-0.45	mA
	Output Off	I _{IN (OFF)}	4	V _{CC} = 5.5V, V _{IN} = -20V	—	—	-2.6	
Input Voltage (Output On)	TD62386AP	V _{IN (ON)}	5	—	—	—	V _{CC} - 2.8	V
	TD62386AF			—	—	—	—	
	TD62387AP			—	—	—	—	
	TD62387AF			—	—	—	—	
	TD62388AP TD62388AF			—	—	—	V _{CC} - 3.7	
Clamp Diode Reverse Current		I _R	6	V _R = 50V, Ta = 25°C	—	—	50	μA
				V _R = 50V, Ta = 85°C	—	—	100	
Clamp Diode Forward Voltage		V _F	7	I _F = 350mA	—	—	2.0	V
				I _F = 280mA	—	—	1.8	
Supply Current		I _{CC (ON)}	8	V _{CC} = 5.5V, V _{IN} = 0	—	17	22	mA
		I _{CC (OFF)}		V _{CC} = 5.5V, V _{IN} = V _{CC}	—	—	100	μA
Turn-On Delay	t _{ON}	9		V _{CC} = 5V, V _{OUT} = 50V	—	0.1	—	μs
Turn-Off Delay	t _{OFF}			R _L = 125Ω, C _L = 15pF	—	3	—	

TEST CIRCUIT

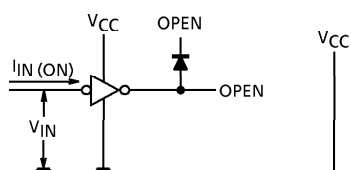
1. I_{CEX}



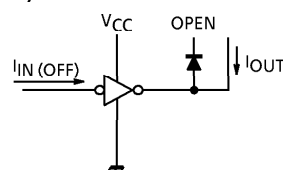
2. $V_{CE}(\text{sat})$



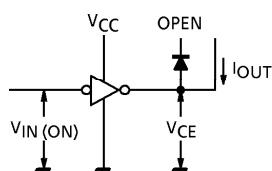
3. $I_{IN}(\text{ON})$



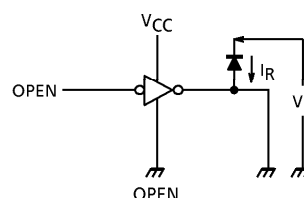
4. $I_{IN}(\text{OFF})$



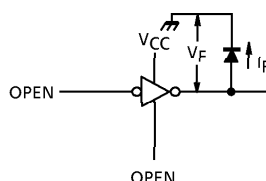
5. $V_{IN}(\text{ON})$



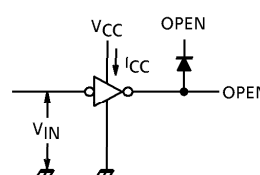
6. I_R



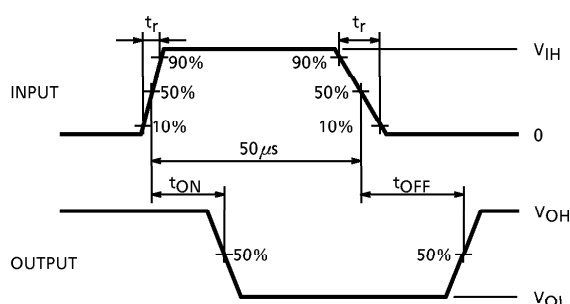
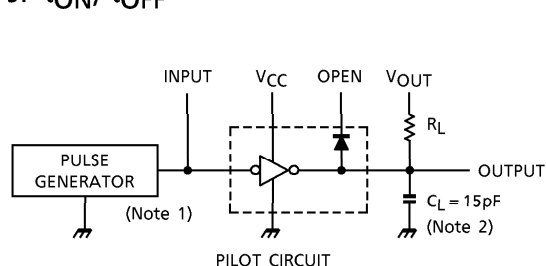
7. V_F



8. I_{CC}



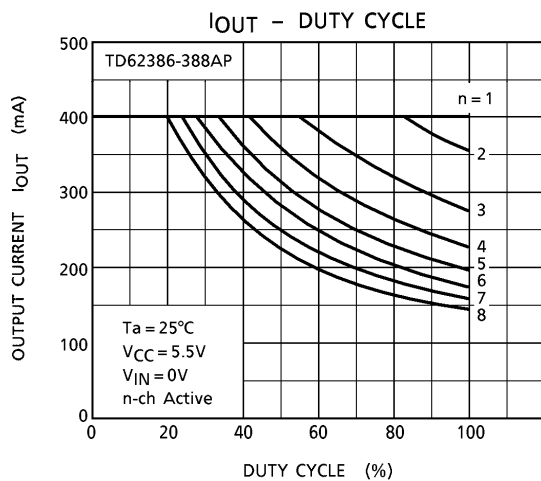
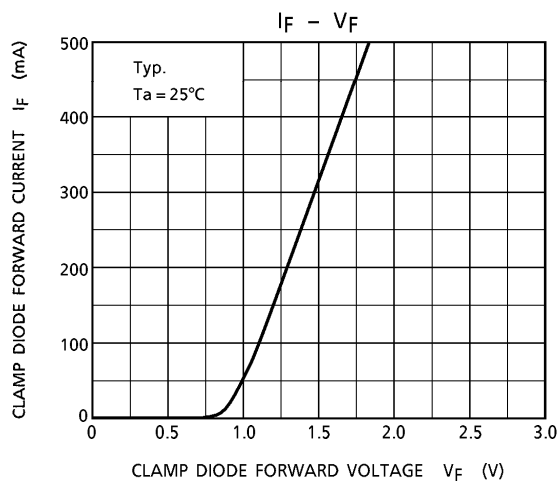
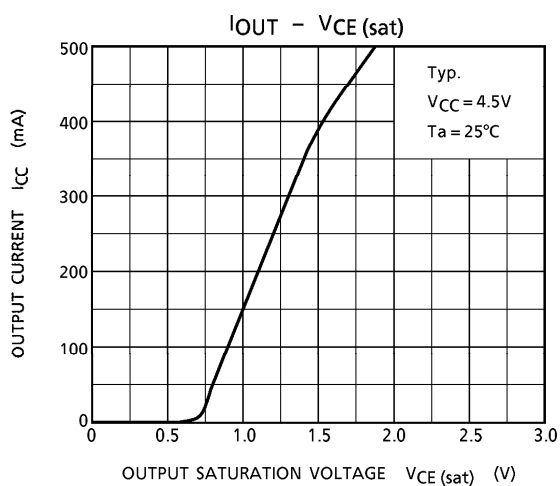
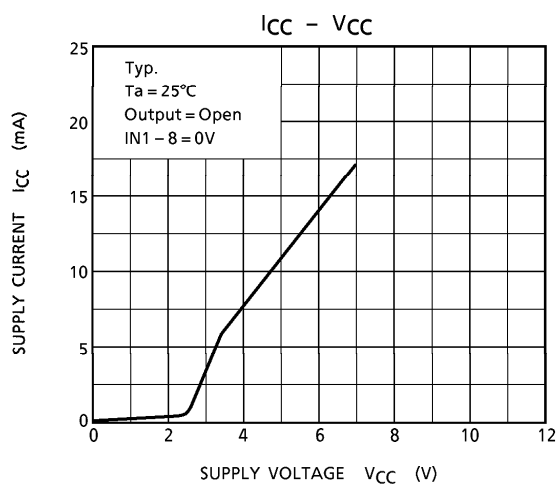
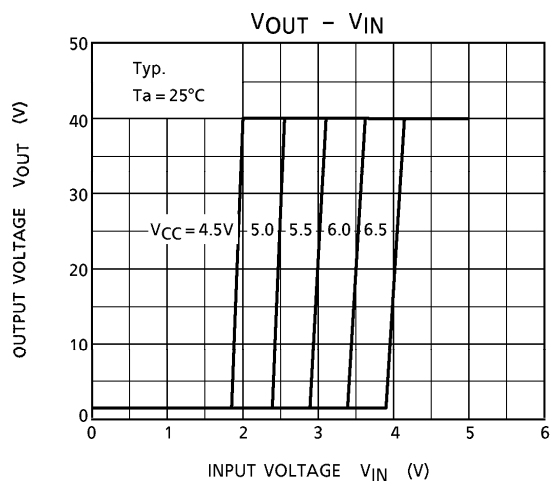
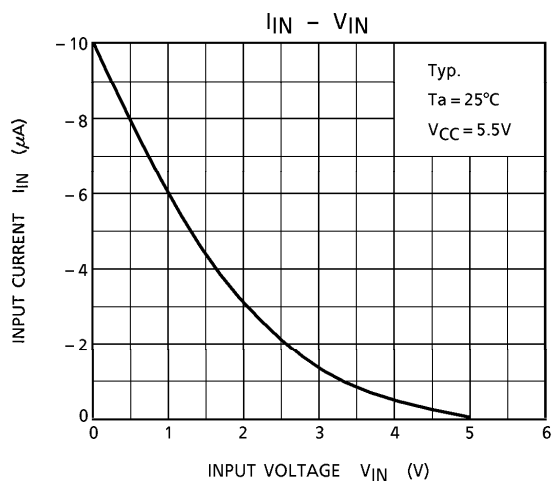
9. t_{ON} , t_{OFF}

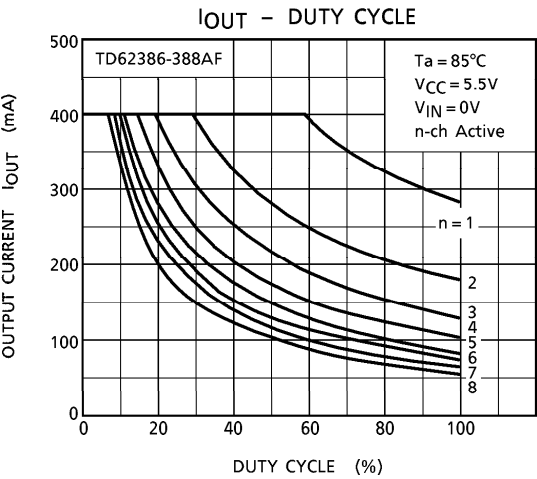
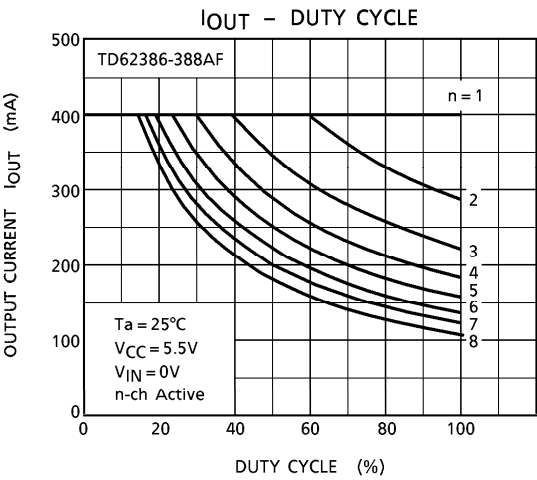
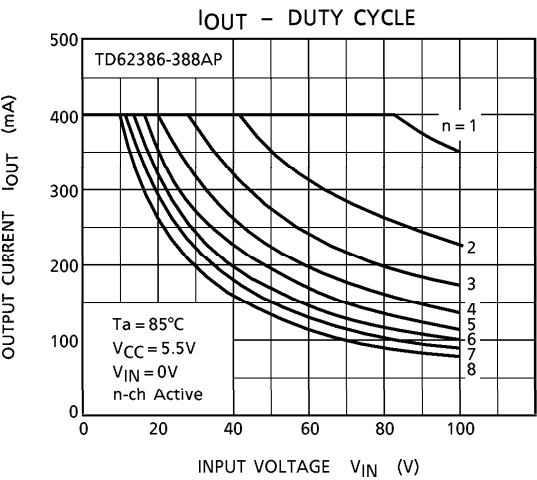


- (Note 1) Pulse Width $50\mu\text{s}$, Duty Cycle 10%
Output Impedance 50Ω , $t_r \leq 5\text{ns}$, $t_f \geq 10\text{ns}$
(Note 2) C_L includes probe and jig capacitance

PRECAUTIONS for USING

Utmost care is necessary in the design of the output line, V_{CC} , COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

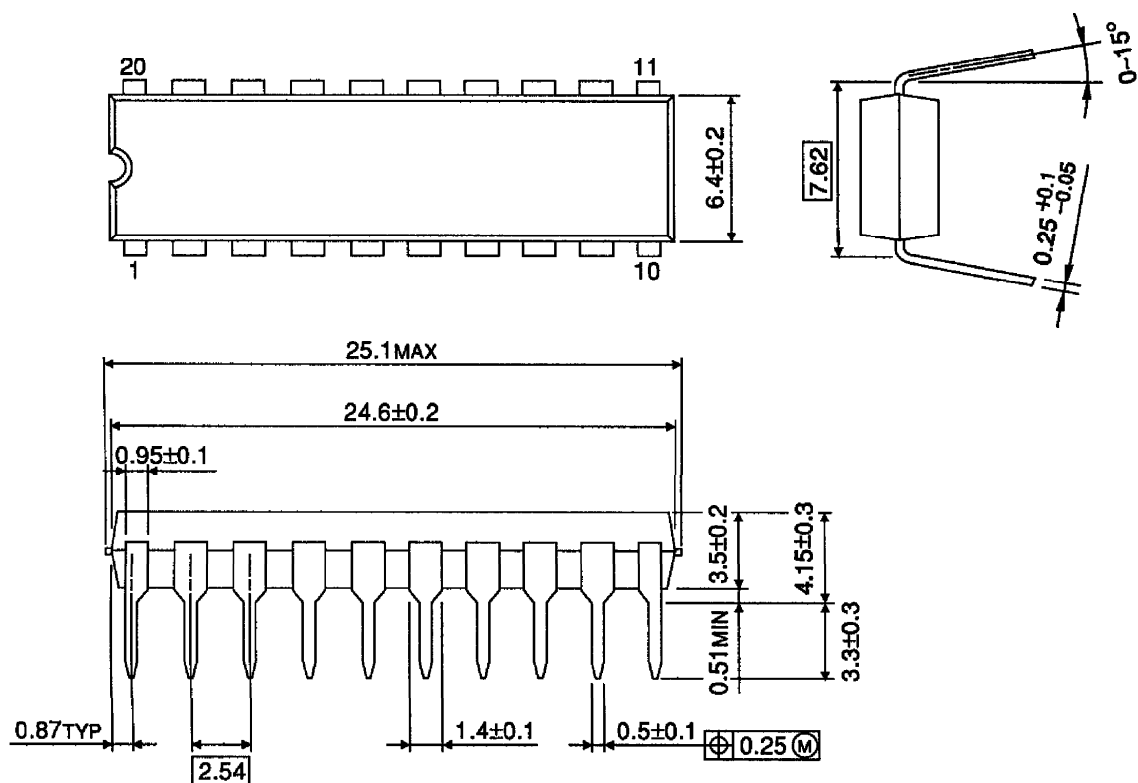




OUTLINE DRAWING

DIP20-P-300-2.54A

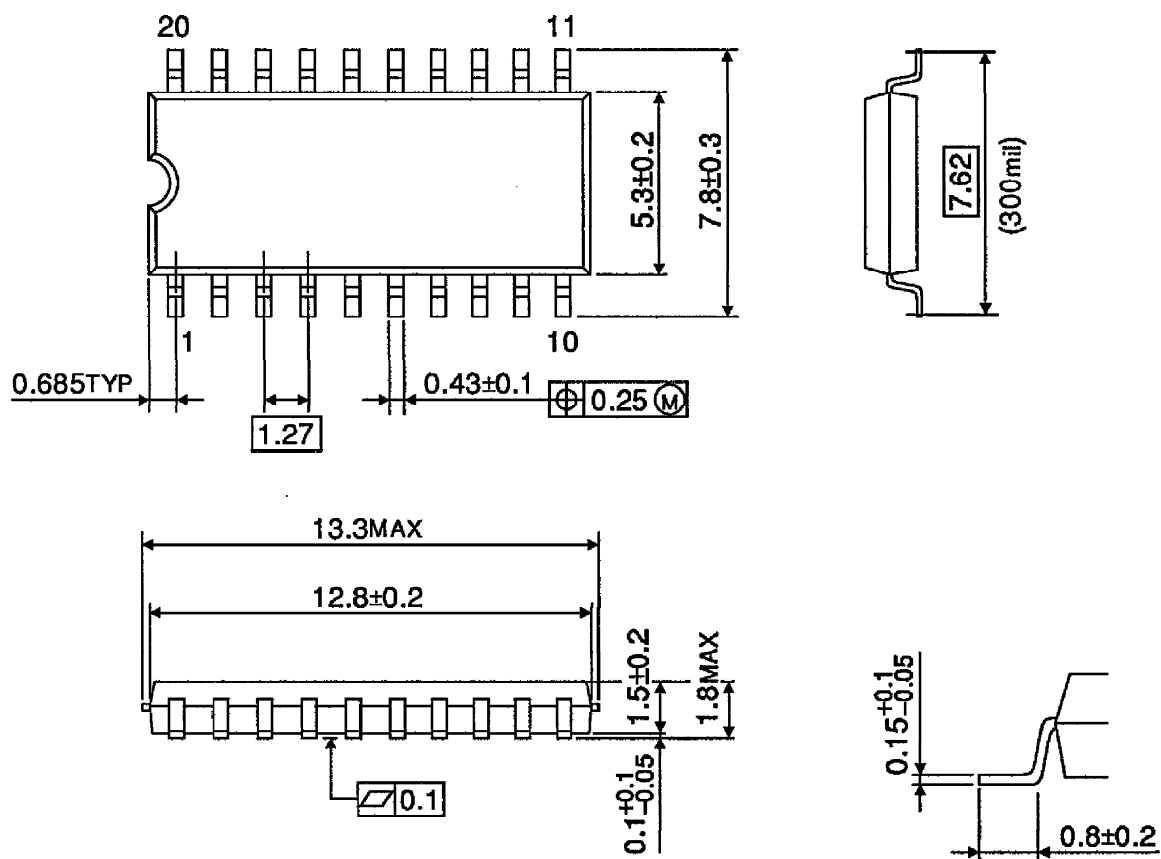
Unit : mm



Weight : 2.25g (Typ.)

OUTLINE DRAWING
SOP20-P-300-1.27

Unit : mm



Weight : 0.25g (Typ.)