

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TD62386AP, TD62386AF, TD62387AP
TD62387AF, TD62388AP, TD62388AF**

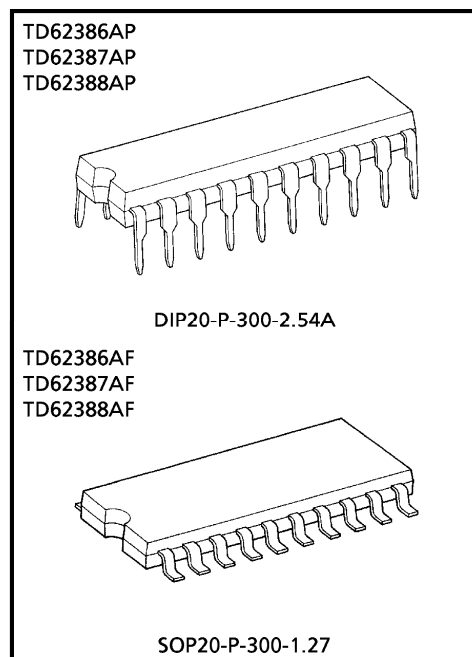
8 CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

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

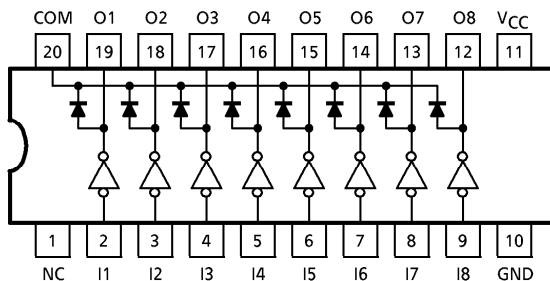
- Output current (single output) 500mA (Max.)
- High sustaining voltage 50V (Min.)
- Output clamp diodes
- Low level active input
- Standard supply voltage
- Inputs compatible with TTL and 5V CMOS
- Package type-AP : DIP-20 pin
- Package type-AF : SOP-20 pin

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



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

PIN CONNECTION (TOP VIEW)

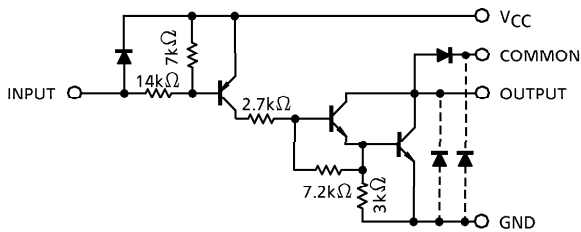


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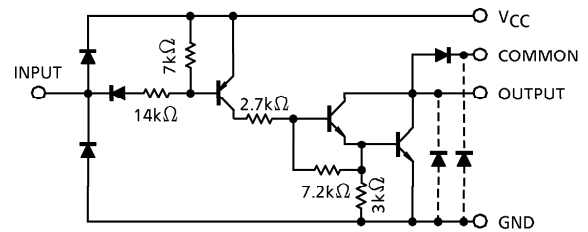
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SCHEMATICS (EACH DRIVER)

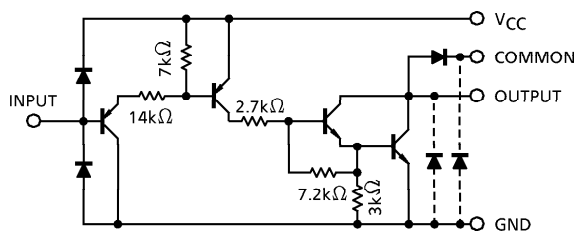
TD62386AP, TD62386AF



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} | -0.5~7.0 | V |
| Output Sustaining Voltage | AP | $V_{CE(SUS)}$ | -0.5~50 | V |
| | AF | | -0.5~35 | |
| Output Current | | I_{OUT} | 500 | mA / ch |
| Input Voltage | V_{IN} (Note 1) | | -22~ $V_{CC} + 0.5$ | V |
| | V_{IN} (Note 2) | | -0.5~7 | |
| 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} | -40~85 | °C |
| Storage Temperature | | T_{stg} | -55~150 | °C |

(Note 1) TD62386AP, TD62386AF only

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

(Note 3) Delated above 25°C in the proportion of 11.7mW/°C (AP-Type), 7.7mW/°C (F, AF-Type).

(Note 4) On PCB (50×50×1.6mm 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 | | | | | | | |
| Clamp Diode Reverse Voltage | | V _R | — | — | 50 | V | |
| Clamp Diode Forward Current | | I _F | — | — | 400 | mA | |
| Power Dissipation | AP | P _D | (Note 1) | — | — | 0.52 | W |
| | AF | | | | | 0.4 | |

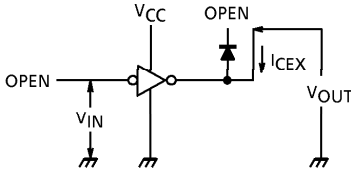
(Note 1) On Glass Epoxy PCB (50 × 50 × 1.6mm Cu 40%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

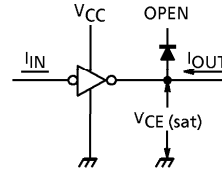
| CHARACTERISTIC | | SYMBOL | TEST CIRCUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|-----------------------|-----------------------|--------------|---|------|-------|-----------------------|------|
| Output Leakage Current | | I _{CEX} | 1 | V _{CC} = 5.5V, I _{IN} = 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 | | | | | | | | |
| 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 | 8 | V _{CC} = 5.5V, V _{IN} = 0 | — | 17 | 22 | mA |
| | I _{CC (OFF)} | | | V _{CC} = 5.5V, V _{IN} = V _{CC} | — | — | 100 | |
| Turn-On Delay | t _{ON} | 9 | 9 | V _{CC} = 5V, V _{OUT} = 50V R _L = 125Ω, C _L = 15pF | — | 0.1 | — | μs |
| Turn-Off Delay | t _{OFF} | | | | — | 3 | — | |

TEST CIRCUIT

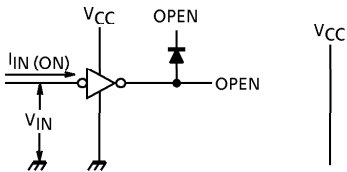
1. I_{CEX}



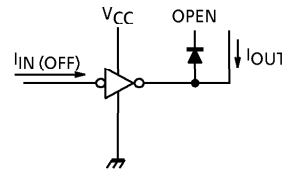
2. $V_{CE(sat)}$



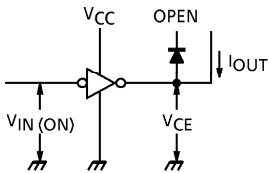
3. $I_{IN(ON)}$



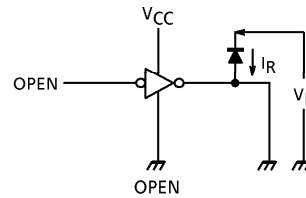
4. $I_{IN(OFF)}$



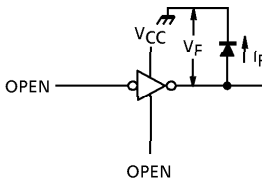
5. $V_{IN(ON)}$



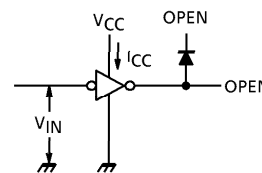
6. I_R



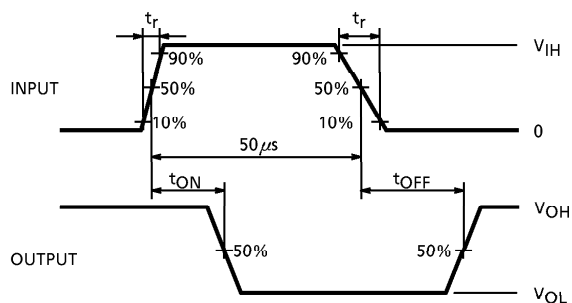
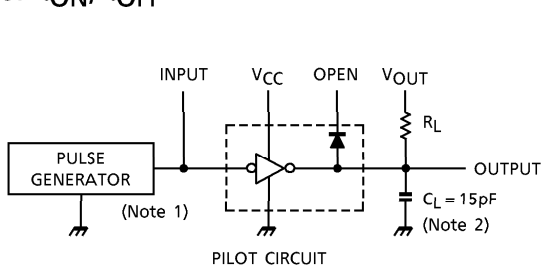
7. V_F



8. I_{CC}



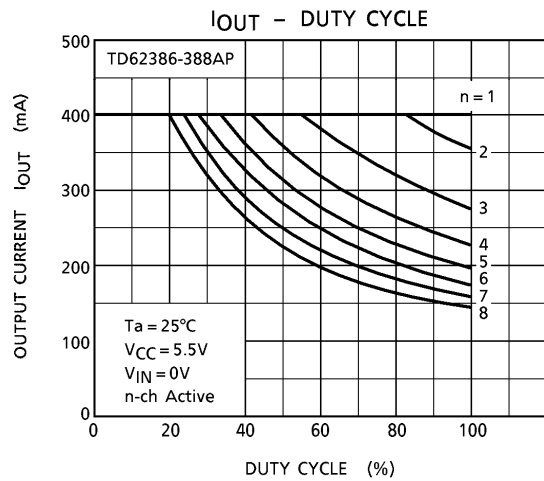
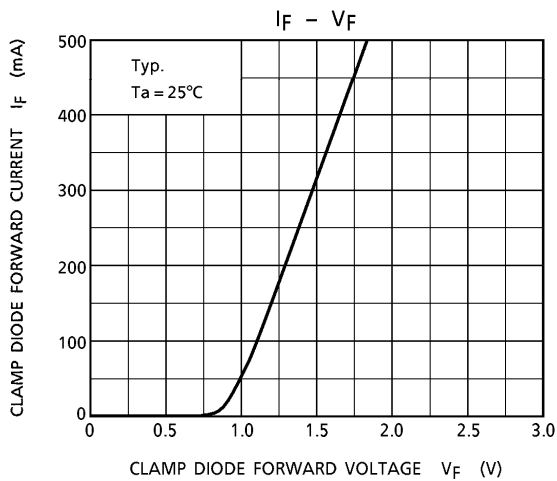
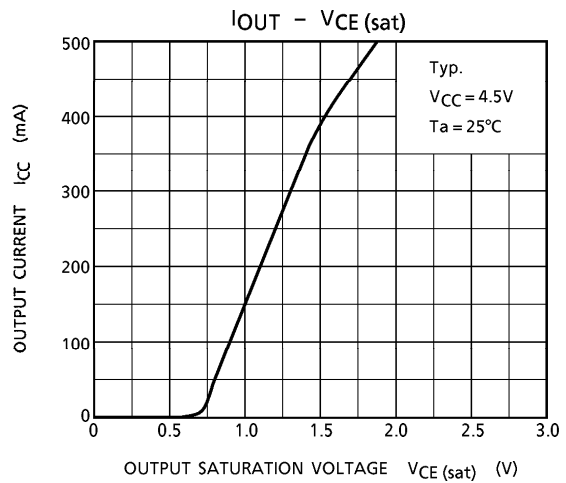
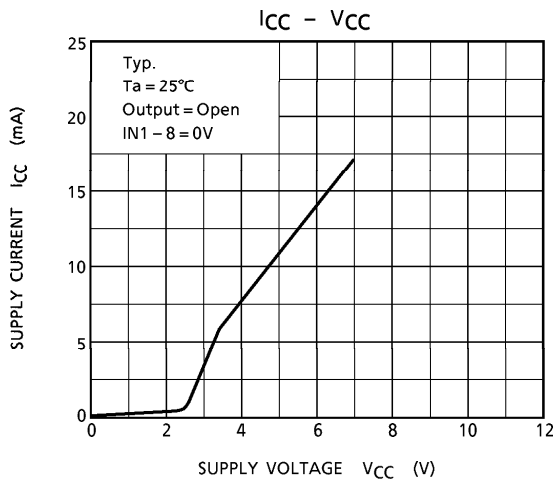
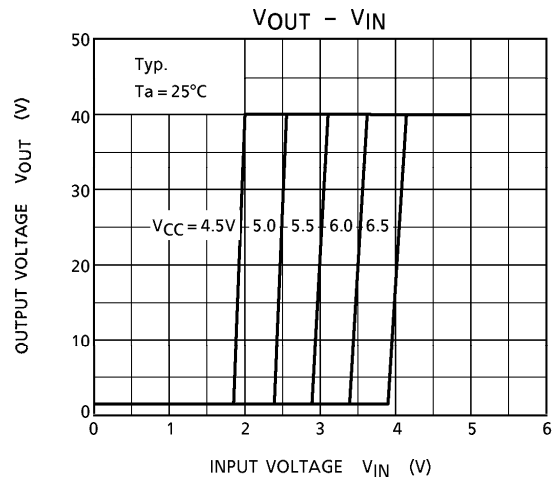
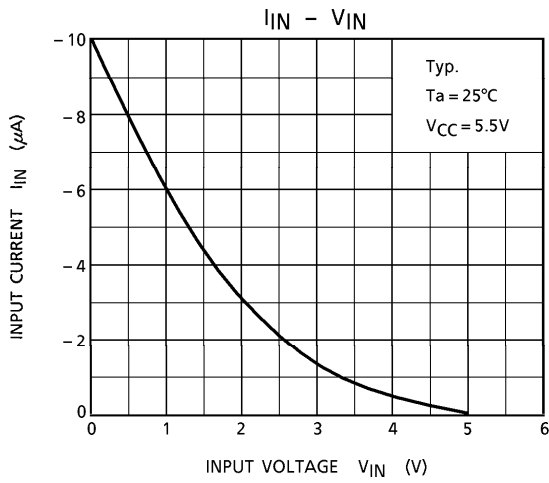
9. t_{ON}, t_{OFF}

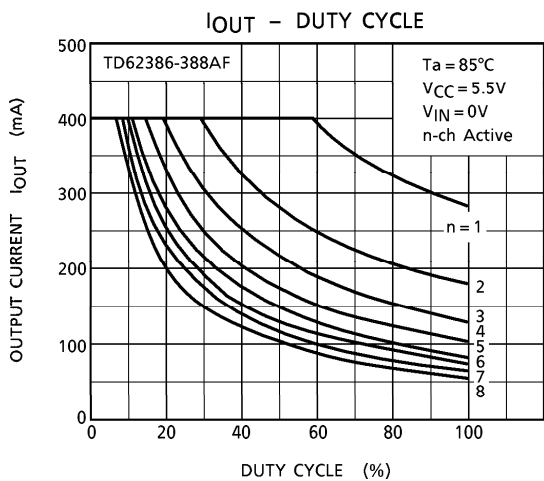
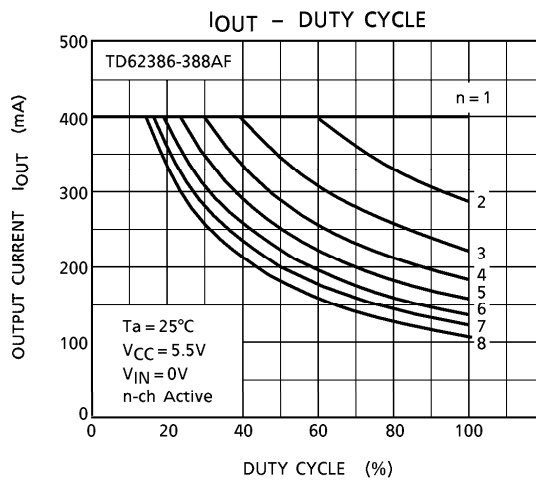
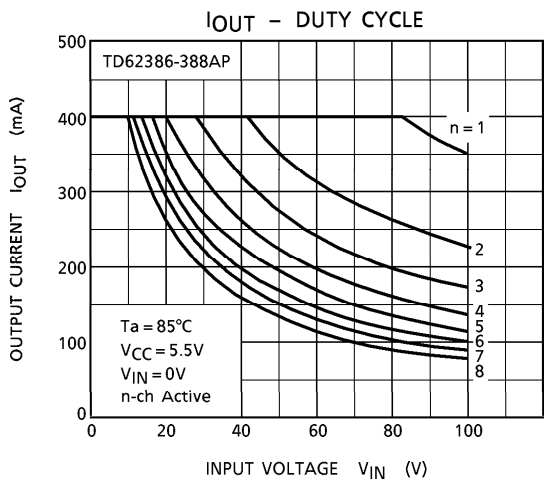


- (Note 1) Pulse Width $50\mu s$, Duty Cycle 10%
Output Impedance 50Ω , $t_r \leq 5ns$, $t_f \geq 10ns$
- (Note 2) C_L includes probe and jig capacitance

PRECAUTIONS for USING

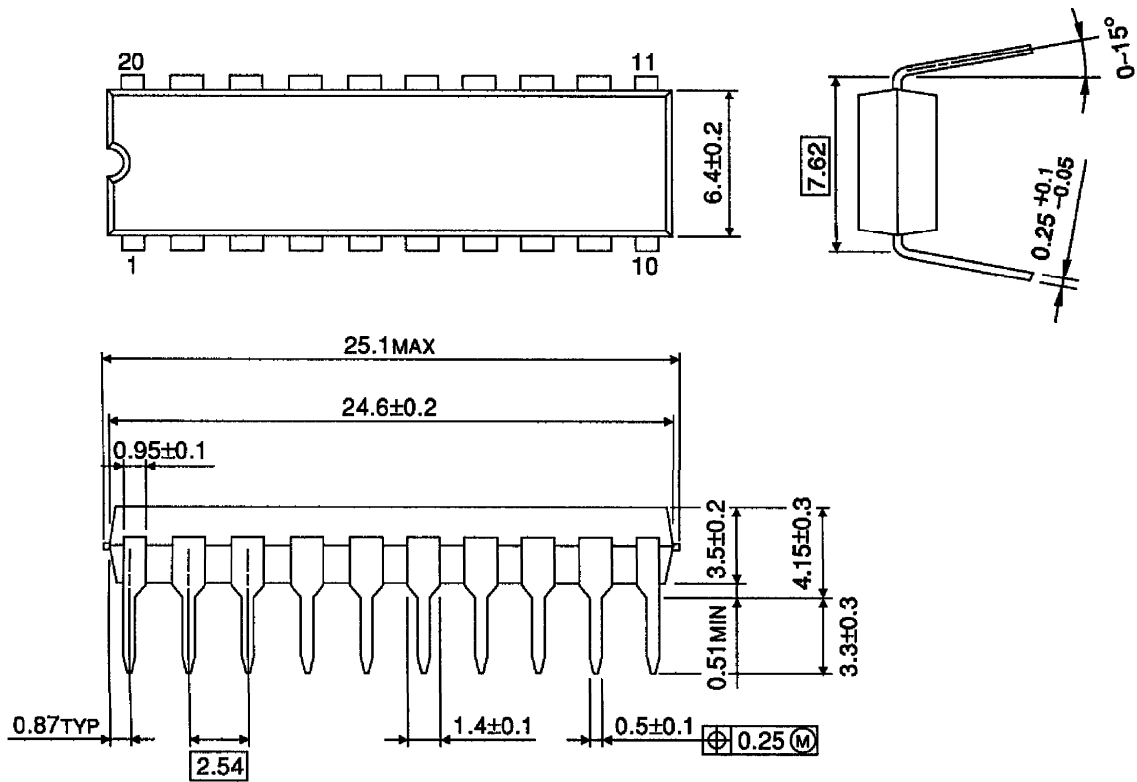
Utmost care is necessary in the design of the output line, V_{CC} , COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.





OUTLINE DRAWING
DIP20-P-300-2.54A

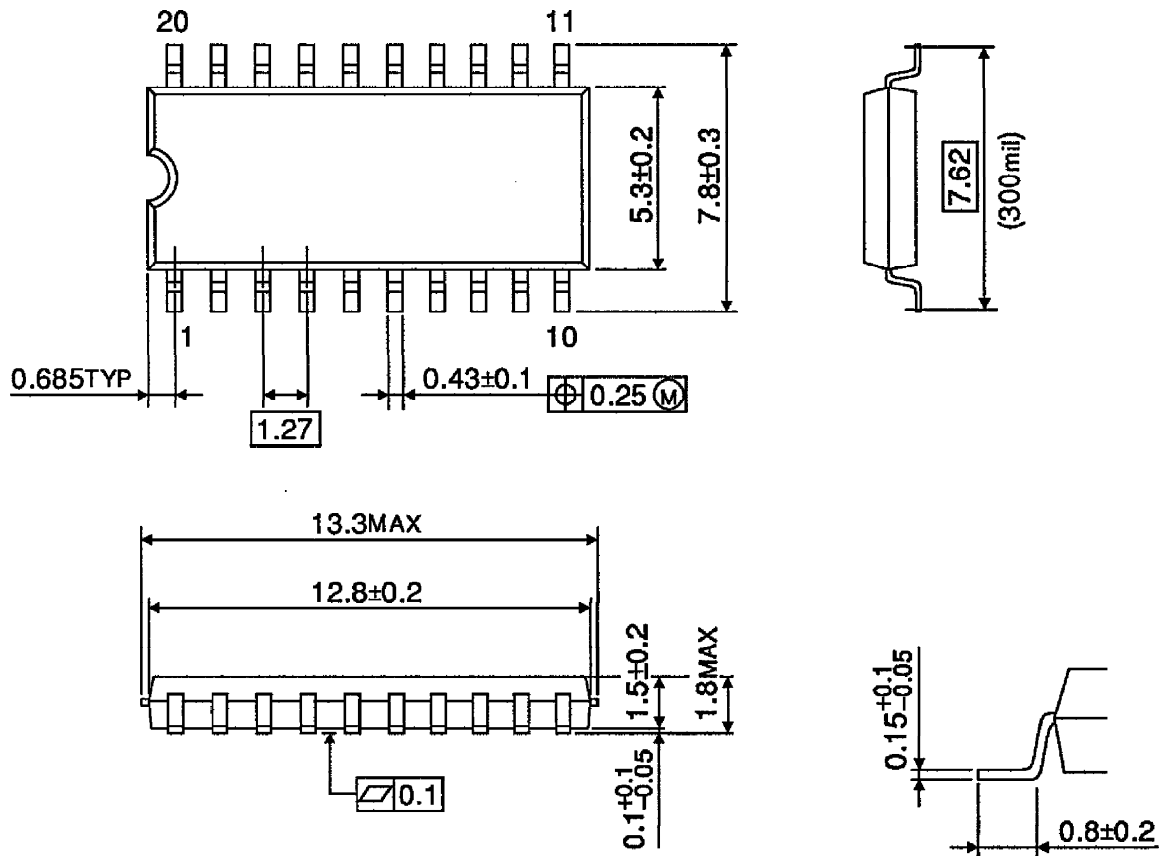
Unit : mm



Weight : 2.25g (Typ.)

OUTLINE DRAWING
SOP20-P-300-1.27

Unit : mm



Weight : 0.25g (Typ.)