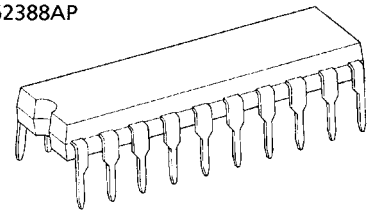
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62386AP,TD62386AF,TD62387AP TD62387AF,TD62388AP,TD62388AF

8 CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

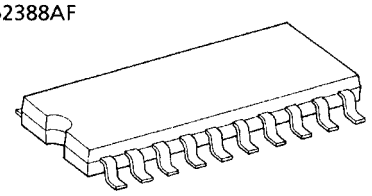
The TD62386AP, TD62386AF, TD62387AP, TD62387AF and TD62388AP, TD62388AF are non−inverting transistor arrays, which are comprised of eight NPN darlington output stages and PNP input stages.
All units feature integral clamp diodes for switching inductive loads.
These devices are Low Level input active drivers and are suitable for operations with TTL, 5 V CMOS and 5 V Microprocessor which have sink current output drivers.
Applications include relay, hammer, lamp and LED driver.

TD62386AP
TD62387AP
TD62388AP



DIP20-P-300-2.54A

TD62386AF
TD62387AF
TD62388AF



SOP20-P-300-1.27

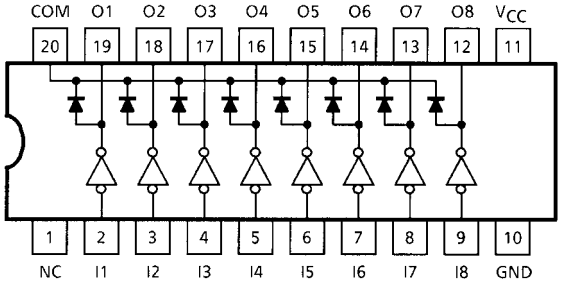
Weight
DIP20−P−300−2.54A : 2.25 g (Typ.)
SOP20−P−300−1.27 : 0.25 g (Typ.)

FEATURES

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

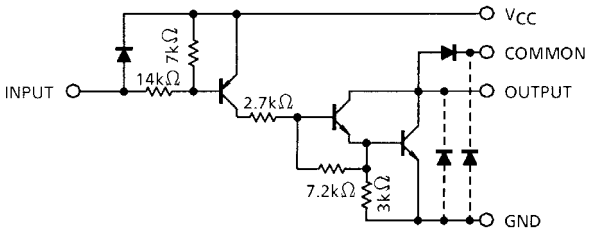
TYPE	$V_{IN\ (ON)}$
TD62386AP, TD62386AF	−20 V~V_{CC} − 2.8 V
TD62387AP, TD62387AF	0 V~V_{CC} − 3.7 V
TD62388AP, TD62388AF	

PIN CONNECTION (TOP VIEW)

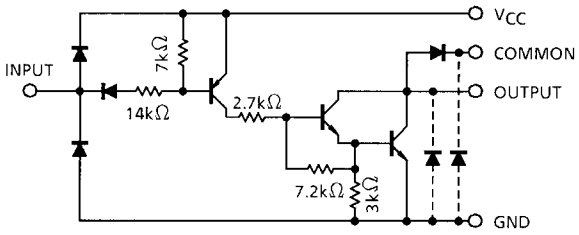


SCHEMATICS (EACH DRIVER)

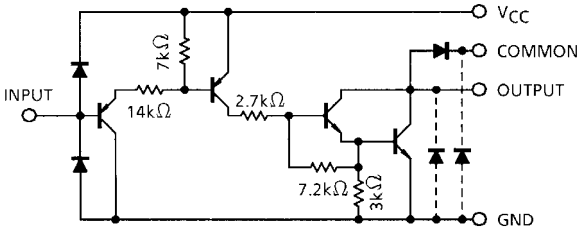
TD62386AP,TD62386AF



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 11.7 mW / °C (AP−Type), 7.7 mW / °C (F, AF−Type).
Note 4: On PCB (50 × 50 × 1.6 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}	Tpw = 25 ms, Duty = 10% 8 Circuits	0	—	270	mA / ch
Input Voltage	TD62386AP TD62386AF	V_{IN}	—	−20	—	V_{CC}	V
	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	

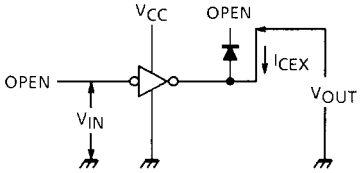
Note 1: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 40%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

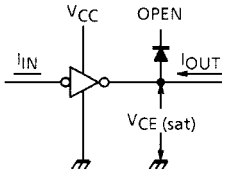
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		I_{CEX}	1	V_{CC} = 5.5 V, I_{IN} = 0 V_{OUT} = 50 V, Ta = 85°C	—	—	100	μA
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 4.5 V, V_{IN} = $V_{IN\ (ON)\ MAX.}$ I_{OUT} = 350 mA	—	1.4	2.0	V
Input Current	Output On	$I_{IN\ (ON)}$	3	V_{CC} = 5.5 V, V_{IN} = 0.4 V	—	−0.32	−0.45	mA
				V_{CC} = 5.5 V, V_{IN} = −20 V	—	—	−2.6	
	Output Off	$I_{IN\ (OFF)}$	4	—	—	—	−4.0	μA
Input Voltage (Output on)	TD62386AP TD62386AF	$V_{IN\ (ON)}$	5	—	—	—	V_{CC} − 2.8	V
	TD62387AP TD62387AF TD62388AP TD62388AF			—	—	—	V_{CC} − 3.7	
Clamp Diode Reverse Current		I_R	6	V_R = 50 V, Ta = 25°C	—	—	50	μA
				V_R = 50 V, Ta = 85°C	—	—	100	
Clamp Diode Forward Voltage		V_F	7	I_F = 350 mA	—	—	2.0	V
				I_F = 280 mA	—	—	1.8	
Supply Current		$I_{CC\ (ON)}$	8	V_{CC} = 5.5 V, V_{IN} = 0	—	17	22	mA
		$I_{CC\ (OFF)}$		V_{CC} = 5.5 V, V_{IN} = V_{CC}	—	—	100	μA
Turn−On Delay		t_{ON}	9	V_{CC} = 5 V, V_{OUT} = 50 V R_L = 125Ω, C_L = 15 pF	—	0.1	—	μs
Turn−Off Delay		t_{OFF}			—	3	—	

TEST CIRCUIT

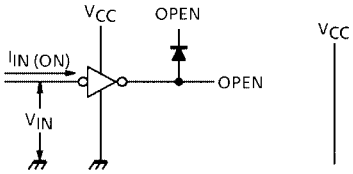
1. I_{CEX}



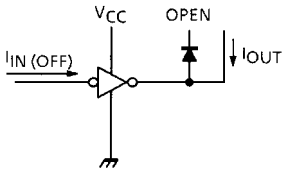
2. $V_{CE\ (sat)}$



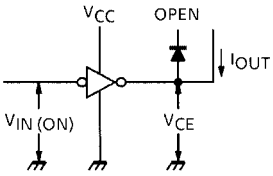
3. $I_{IN\ (ON)}$



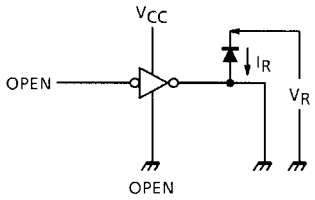
4. $I_{IN\ (OFF)}$



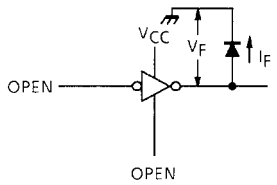
5. $V_{IN\ (ON)}$



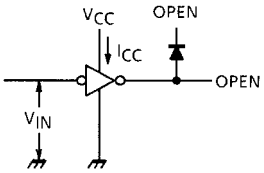
6. I_R



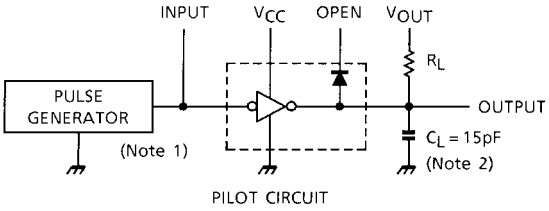
7. V_F

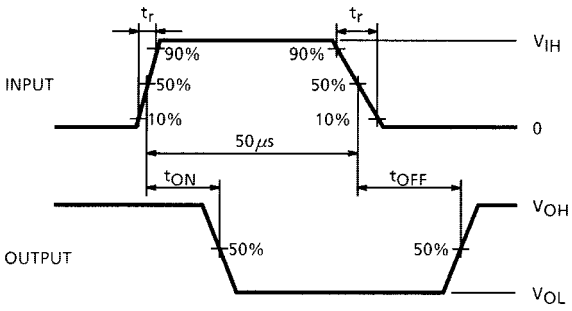


8. I_{CC}



9. t_{ON}, t_{OFF}





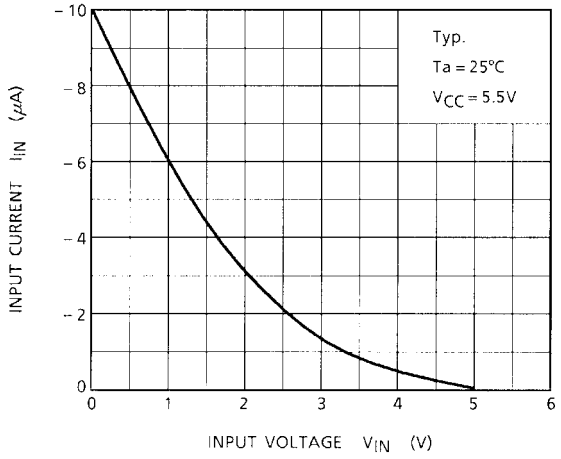
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Output Impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: C_L includes probe and jig capacitance.

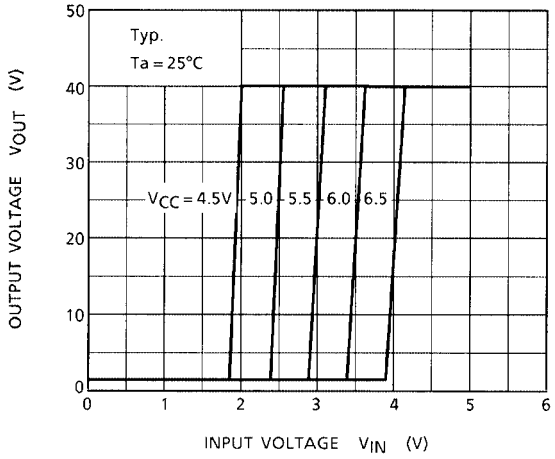
PRECAUTIONS for USING

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.
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.

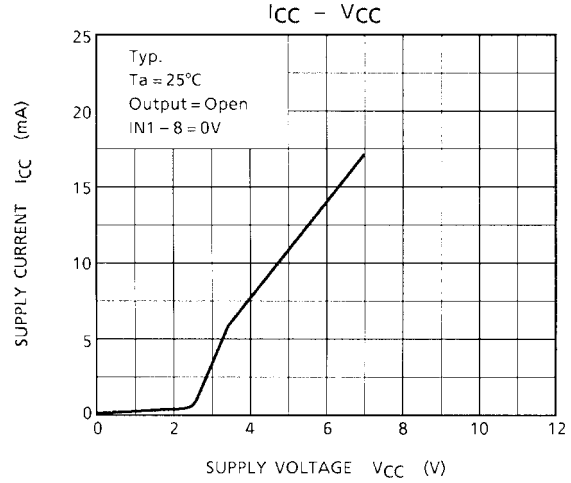
I_{IN} – V_{IN}



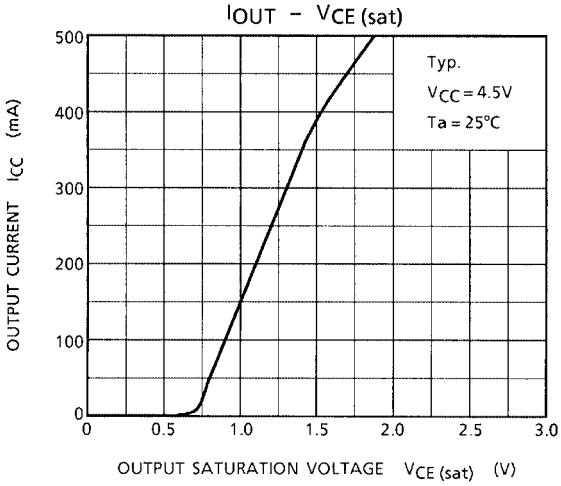
V_{OUT} – V_{IN}



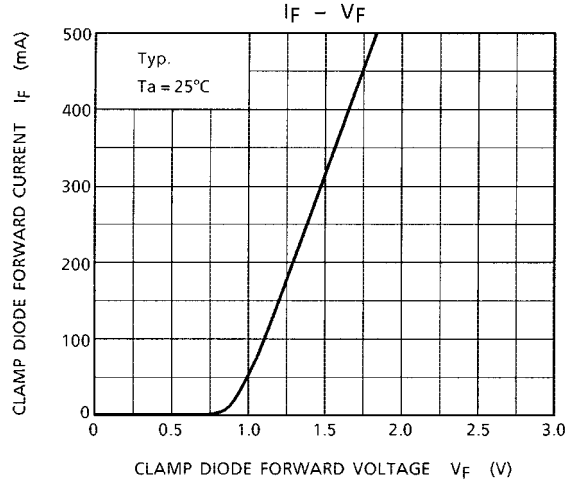
I_{CC} – V_{CC}



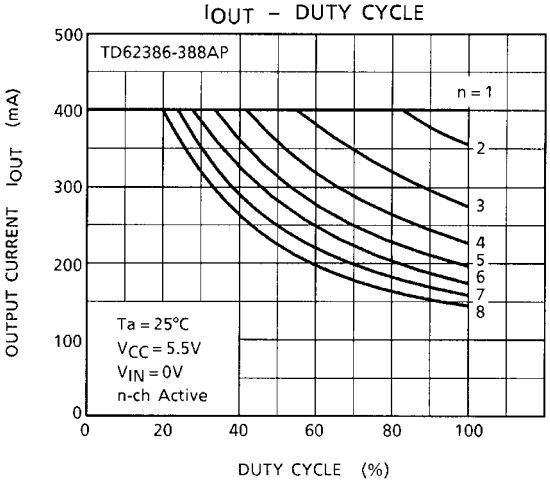
I_{OUT} – $V_{CE\ (sat)}$



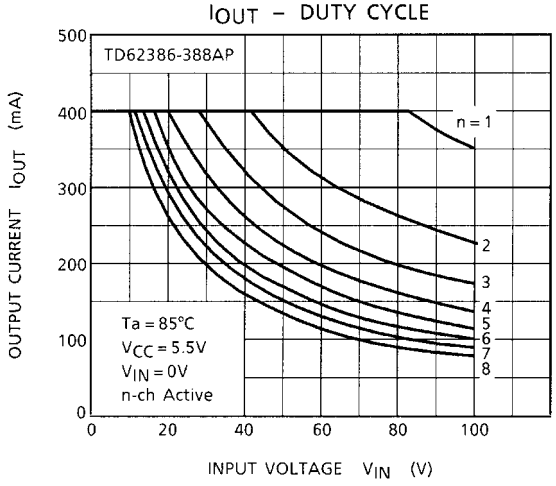
I_F – V_F



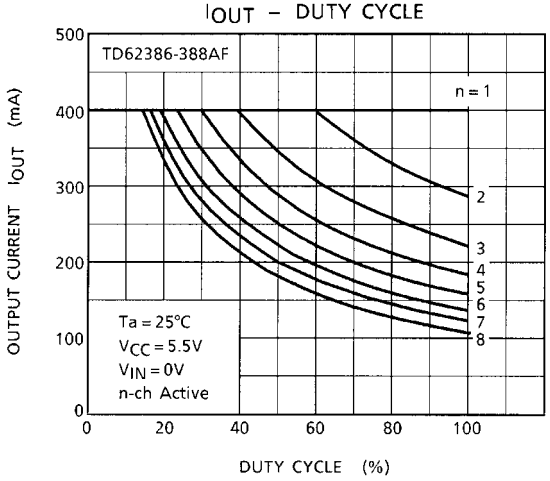
I_{OUT} – DUTY CYCLE



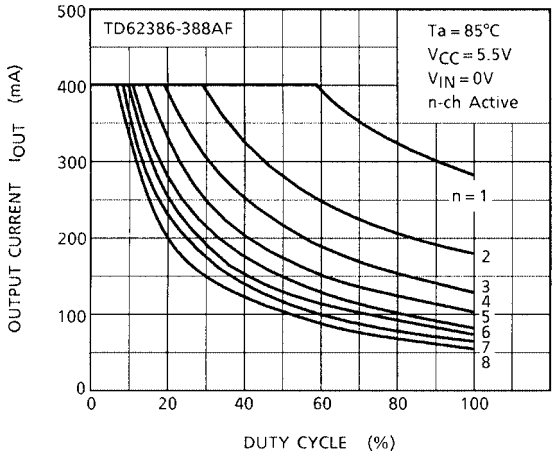
I_{OUT} – DUTY CYCLE



I_{OUT} – DUTY CYCLE

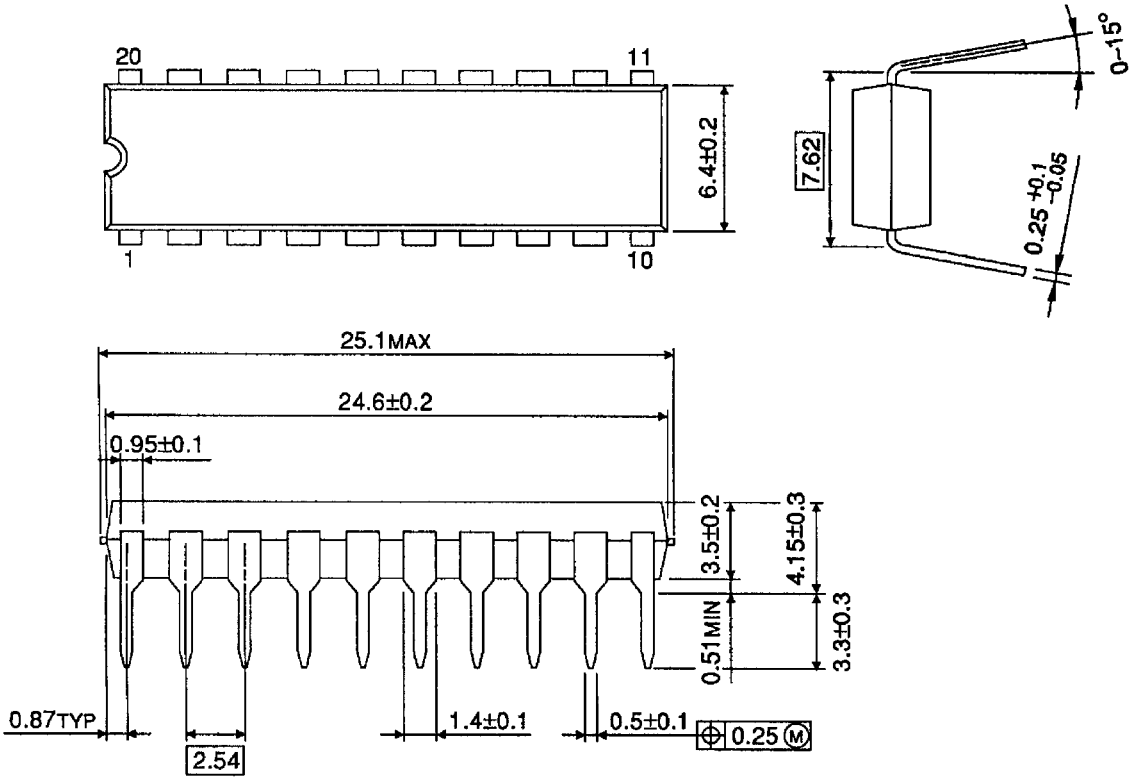


I_{OUT} – DUTY CYCLE



PACKAGE DIMENSIONS

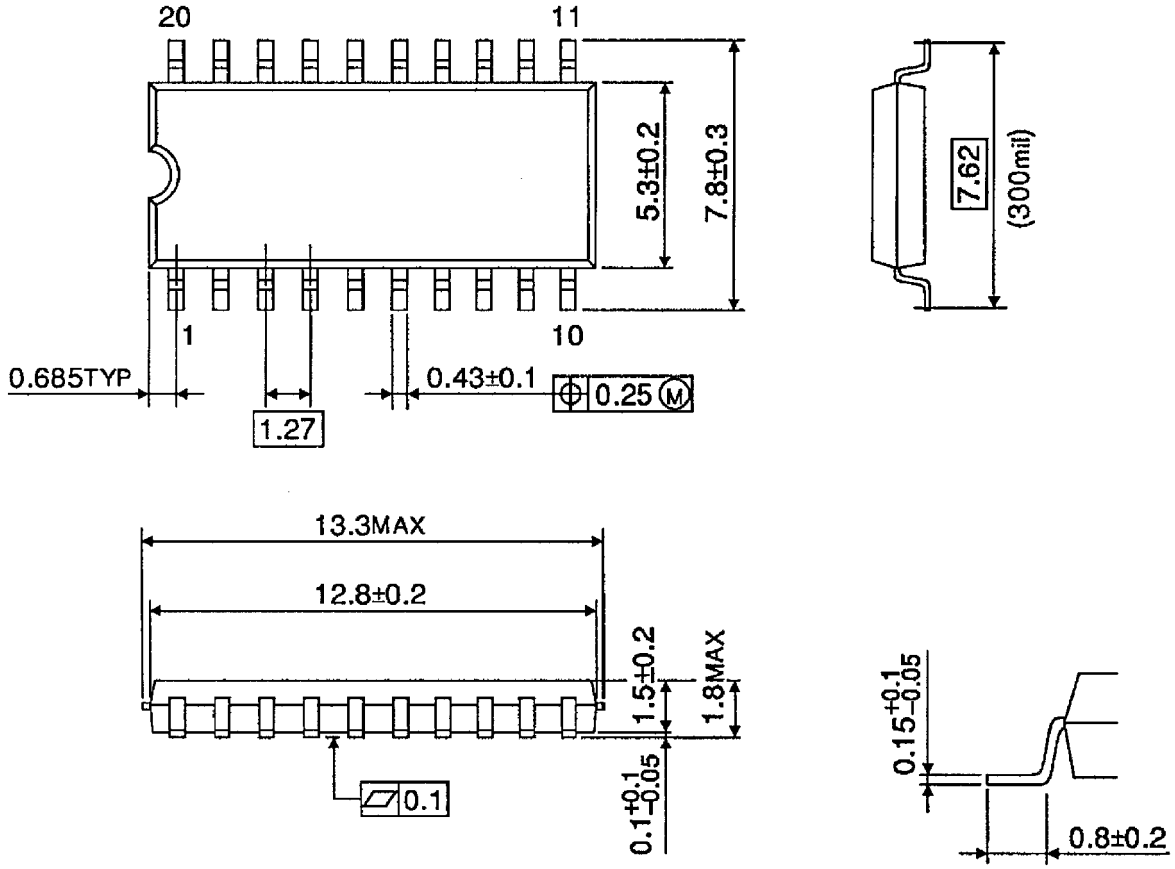
DIP20−P−300−2.54A Unit: mm



Weight: 2.25 g (Typ.)

PACKAGE DIMENSIONS

SOP20−P−300−1.27 Unit: mm



Weight: 0.25 g (Typ.)

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000707EBA

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