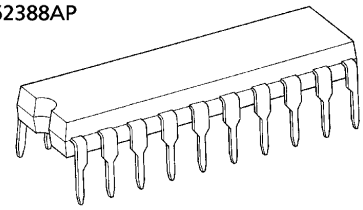
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62386AP, TD62386AF, TD62387AP TD62387AF, TD62388AP, TD62388AF

8 CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

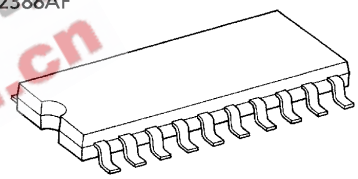
The TD62386AP, TD62386AF, TD62387AP, TD62387AF and TD62388AP, TD62388AF are non-inverting transistor arrays, which are comprised of eight NPN darlington output stages and PNP input stages.
All units feature integral clamp diodes for switching inductive loads.
These devices are Low Level input active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

TD62386AP
TD62387AP
TD62388AP



DIP20-P-300-2.54A

TD62386AF
TD62387AF
TD62388AF



SOP20-P-300-1.27

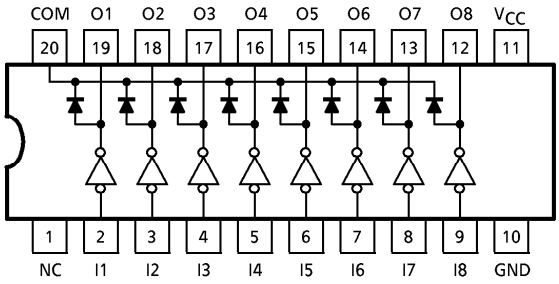
Weight
DIP20-P-300-2.54A : 2.25g (Typ.)
SOP20-P-300-1.27 : 0.25g (Typ.)

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	$-20V \sim V_{CC} - 2.8V$
TD62387AP, TD62387AF	$0V \sim V_{CC} - 3.7V$
TD62388AP, TD62388AF	

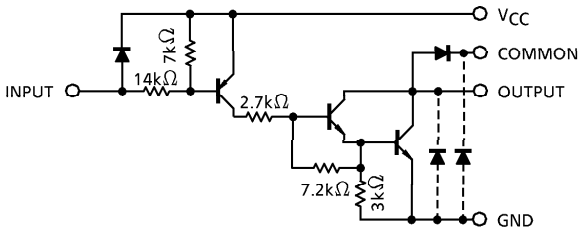
PIN CONNECTION (TOP VIEW)



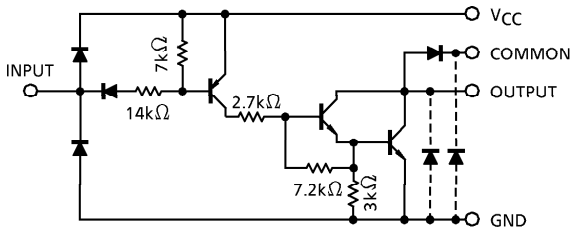
961001EBA2

SCHEMATICS (EACH DRIVER)

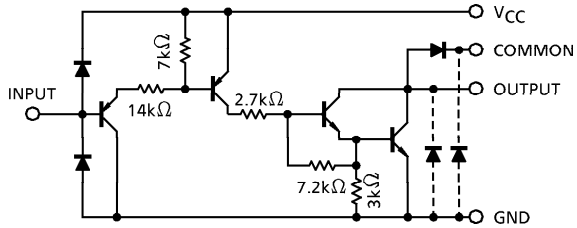
TD62386AP, TD62386AF



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 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	

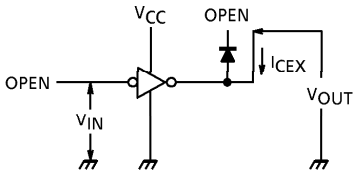
(Note 1) On Glass Epoxy PCB (50 × 50 × 1.6mm Cu 40%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

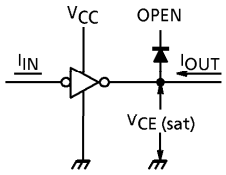
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current		I_{CEX}	1	V_{CC} = 5.5V, I_{IN} = 0 V_{OUT} = 50V, Ta = 85°C	—	—	100	μA
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 4.5V, V_{IN} = $V_{IN\ (ON)}$ MAX. I_{OUT} = 350mA	—	1.4	2.0	V
Input Current	Output On	$I_{IN\ (ON)}$	3	V_{CC} = 5.5V, V_{IN} = 0.4V	—	−0.32	−0.45	mA
				V_{CC} = 5.5V, V_{IN} = −20V	—	—	−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 = 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 R_L = 125Ω, C_L = 15pF	—	0.1	—	μs
Turn-Off Delay		t_{OFF}			—	3	—	

TEST CIRCUIT

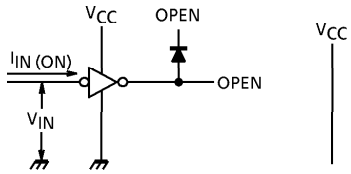
1. I_{CEX}



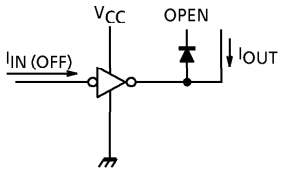
2. $V_{CE\ (sat)}$



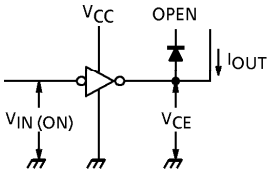
3. $I_{IN\ (ON)}$



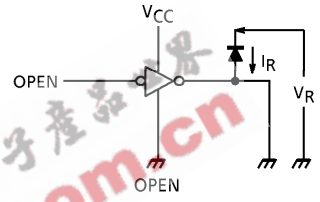
4. $I_{IN\ (OFF)}$



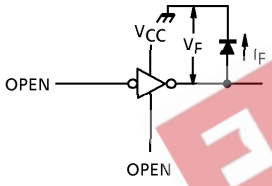
5. $V_{IN\ (ON)}$



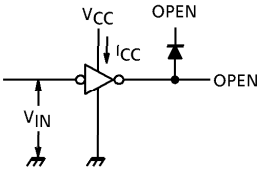
6. I_R



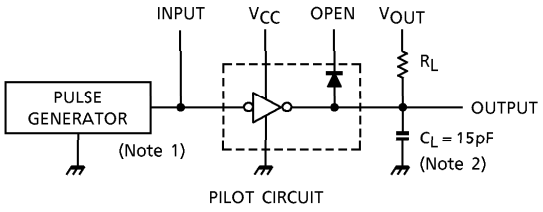
7. V_F

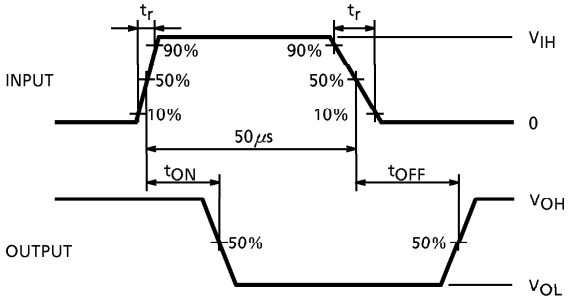


8. I_{CC}



9. t_{ON}, t_{OFF}





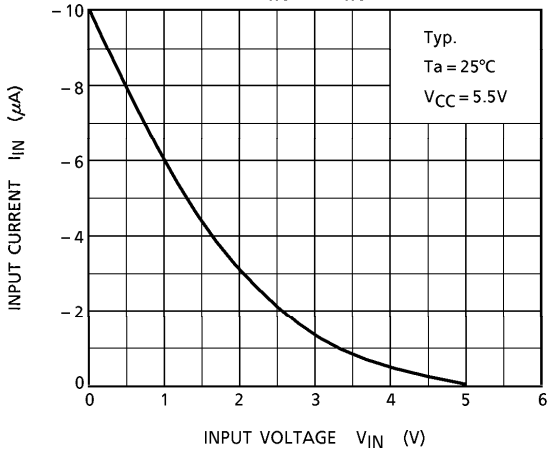
(Note 1) Pulse Width 50μs, Duty Cycle 10%
Output Impedance 50Ω, $t_r \leqq 5$ns, $t_f \geqq 10$ns

(Note 2) C_L includes probe and jig capacitance

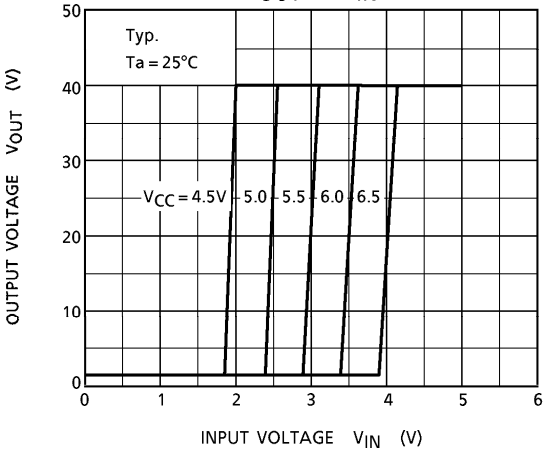
PRECAUTIONS for USING

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.

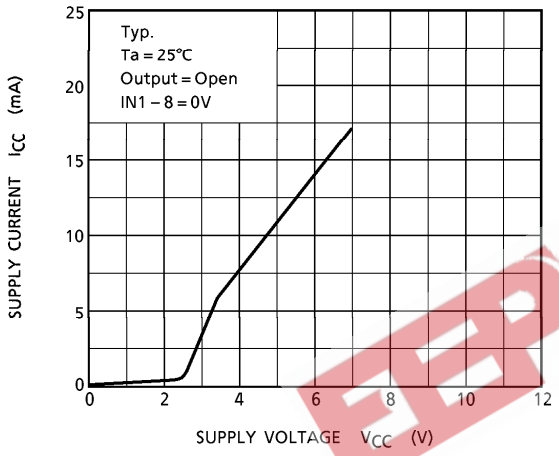
I_{IN} – V_{IN}



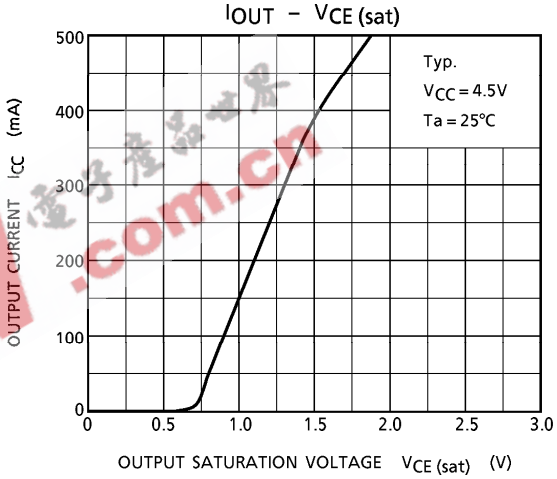
V_{OUT} – V_{IN}



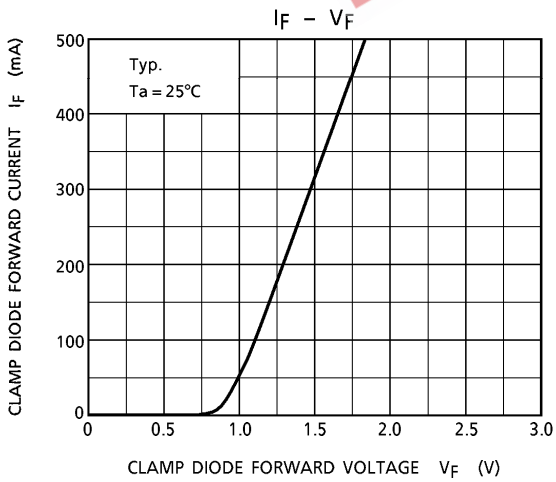
I_{CC} – V_{CC}



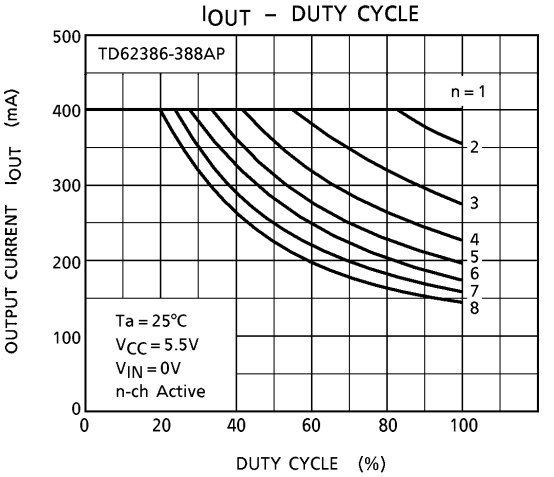
I_{OUT} – $V_{CE\ (sat)}$

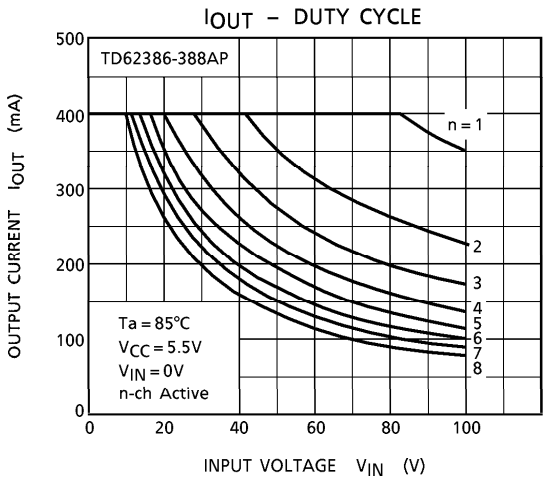


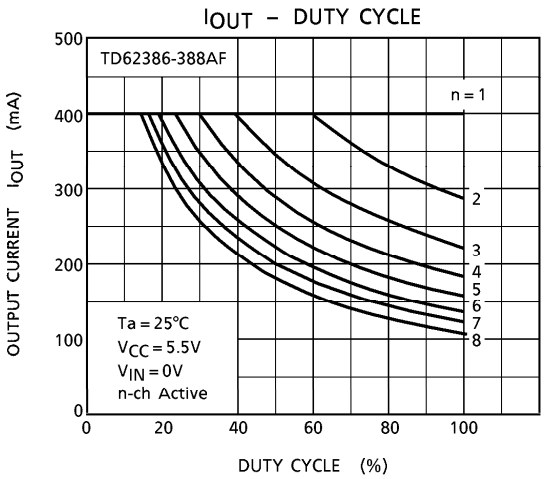
I_F – V_F

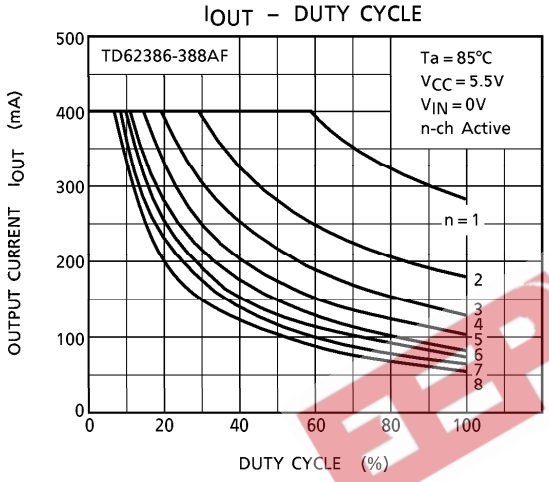


I_{OUT} – DUTY CYCLE





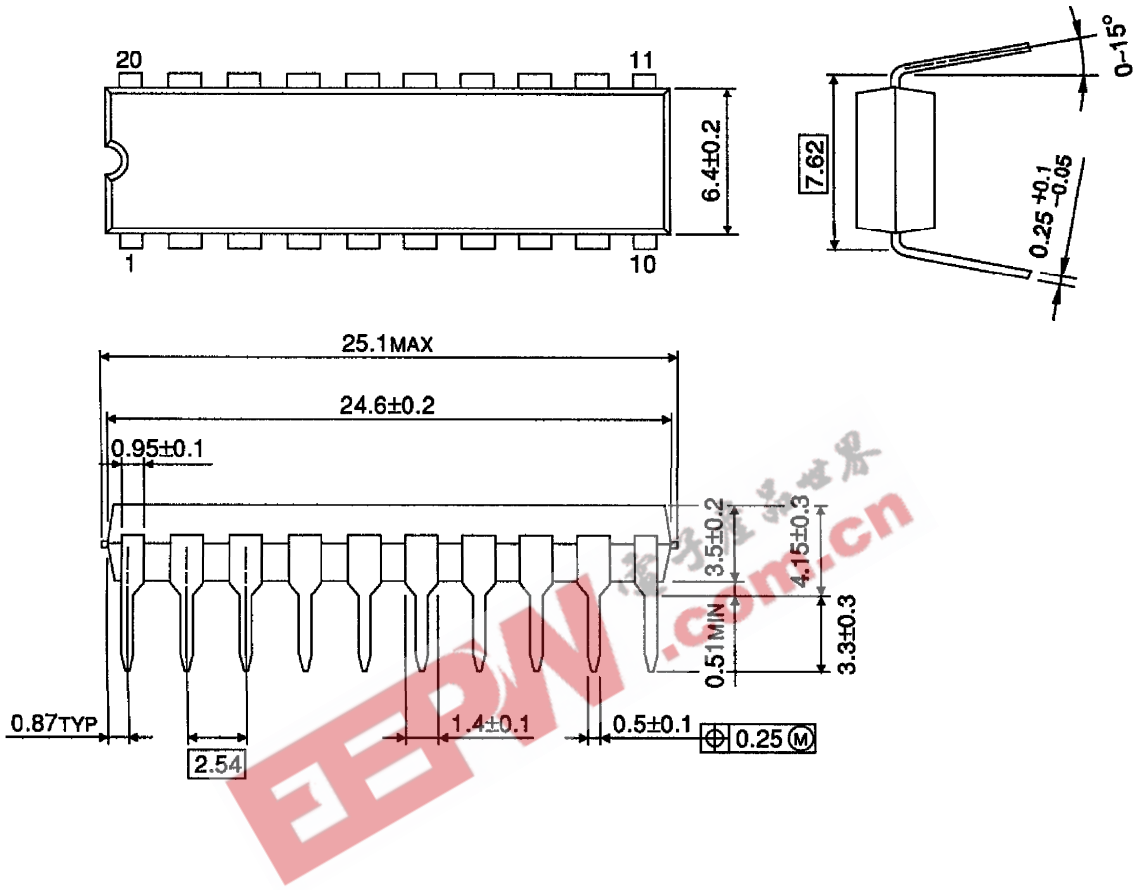




OUTLINE DRAWING

DIP20-P-300-2.54A

Unit : mm

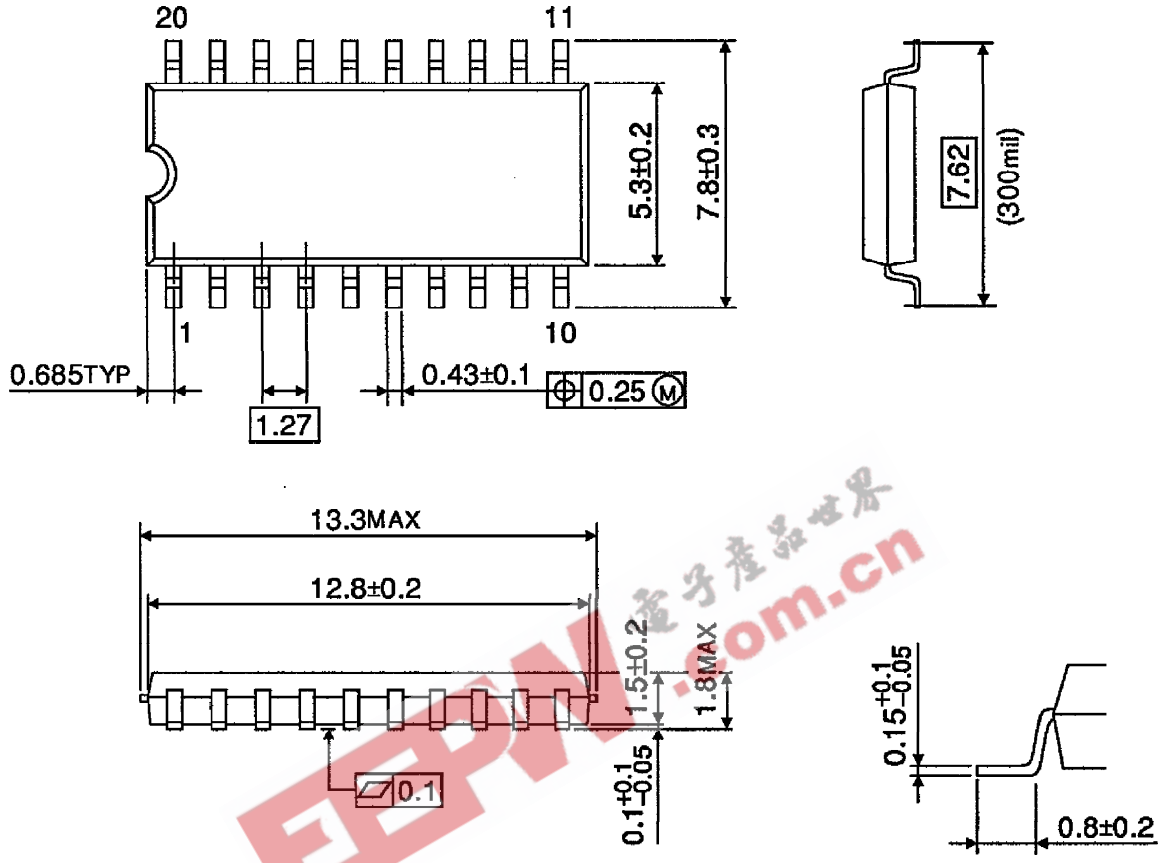


Weight : 2.25g (Typ.)

OUTLINE DRAWING

SOP20-P-300-1.27

Unit : mm



Weight : 0.25g (Typ.)