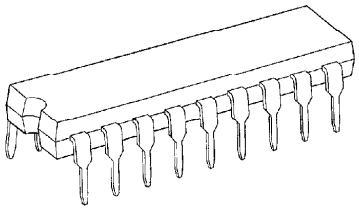
TOSHIBA INTEGRATED CIRCUIT TECHNICAL DATA

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT
TD62081AP, TD62081CP, TD62081F, TD62081AF
TD62082AP, TD62082CP, TD62082F, TD62082AF
TD62083AP, TD62083CP, TD62083F, TD62083AF
TD62084AP, TD62084CP, TD62084F, TD62084AF
SILICON MONOLITHIC

8CH DARLINGTON SINK DRIVER

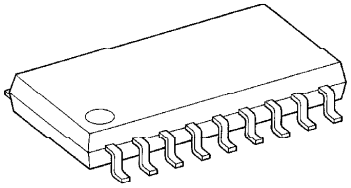
The TD62081AP / CP / F / AF Series are high-voltage, high-current darlington drivers comprised of eight NPN darlington pairs.
All units feature integral clamp diodes for switching inductive loads.
Applications include relay, hammer, lamp and display (LED) drivers.

TD62081AP / CP, TD62082AP / CP
TD62083AP / CP, TD62084AP / CP



DIP18-P-300D

TD62081F / AF, TD62082F / AF
TD62083F / AF, TD62084F / AF



SOP18-P-375

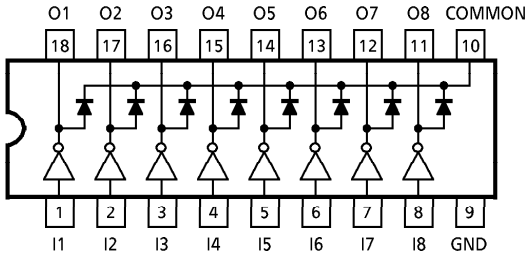
Weight DIP18-P-300D : 1.478g (Typ.)
SOP18-P-375 : 0.41g (Typ.)

FEATURES

- Output current (single output)
  500mA (Max.) (TD62081AP / F / AF series)
  400mA (Max.) (TD62081CP series)
- High sustaining voltage output
  35V (Min.) (TD62081F series)
  50V (Min.) (TD62081AP / AF series)
  100V (Min.) (TD62081CP series)
- Output clamp diodes
- Inputs compatible with various types of logic.
- Package type-AP, CP : DIP-18pin
- Package type-F, AF : SOP-18pin

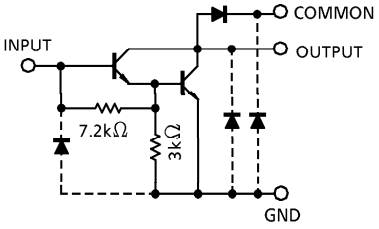
TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62081AP / CP / F / AF	External	General Purpose
TD62082AP / CP / F / AF	10.5-kΩ + 7V Zenner diode	14~25V PMOS
TD62083AP / CP / F / AF	2.7kΩ	TTL, 5V CMOS
TD62084AP / CP / F / AF	10.5kΩ	6~15V PMOS, CMOS

PIN CONNECTION (TOP VIEW)

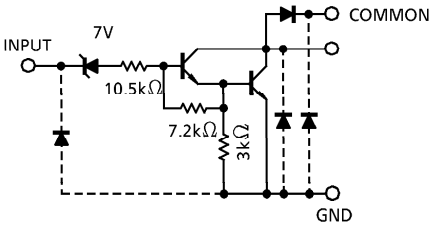


SCHEMATICS (EACH DRIVER)

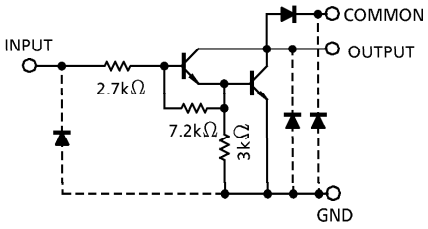
TD62081AP / CP / F / AF



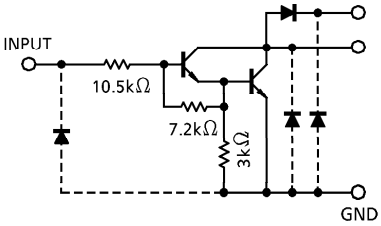
TD62082AP / CP / F / AF



TD62083AP / CP / F / AF



TD62084AP / CP / F / AF



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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage	AP, AF	$V_{CE\ (SUS)}$	−0.5~50	V
	CP		−0.5~100	
	F		−0.5~35	
Output Current		I_{OUT}	500	mA / ch
	CP		400	
Input Voltage		V_{IN} (Note 1)	−0.5~30	V
Input Current		I_{IN} (Note 2)	25	mA
Clamp Diode Reverse Voltage	AP, AF	V_R	50	V
	CP		100	
	F		35	
Clamp Diode Forward Current		I_F	500	mA
	CP		400	
Power Dissipation	AP, CP	P_D	1.47	W
	F, AF		0.96	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−55~150	°C

(Note 1) Except TD62081AP / CP / F / AF
(Note 2) Only TD62081AP / CP / F / AF

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

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	AP, AF	$V_{CE\ (SUS)}$		0	—	50	V
	CP			0	—	100	
	F			0	—	35	
Output Current	AP, CP	I_{OUT}	T_{pw} = 25ms, Duty = 10%, 8 Circuits	0	—	347	mA / ch
			T_{pw} = 25ms, Duty = 50%, 8 Circuits	0	—	123	
	F, AF		T_{pw} = 25ms, Duty = 10%, 8 Circuits	0	—	268	
			T_{pw} = 25ms, Duty = 50%, 8 Circuits	0	—	90	
Input Voltage	Except TD62081AP / CP / F / AF	V_{IN}		0	—	30	V
Input Voltage (Output On)	TD62082AP / CP / F / AF	$V_{IN\ (ON)}$		14	—	30	V
	TD62083AP / CP / F / AF			3.5	—	30	
	TD62084AP / CP / F / AF			8	—	30	
Input Current	Only TD62081AP / CP / F / AF	I_{IN}		0	—	5	mA
Clamp Diode Reverse Voltage	AP, AF	V_R		—	—	50	V
	CP			—	—	100	
	F			—	—	35	
Clamp Diode Forward Current		I_F		—	—	400	mA
	CP			—	—	320	
Power Dissipation	AP, CP	P_D		—	—	0.52	W
	F, AF			—	—	0.4	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

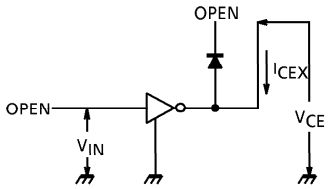
CHARACTERISTIC			SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Leakage Current		AP, AF	I_{CEX}	1	V_{CE} = 50V	Ta = 25°C	—	—	50	μA
		CP			V_{CE} = 100V					
		F			V_{CE} = 35V					
		AP, AF			V_{CE} = 50V	Ta = 85°C	—	—	100	
		CP			V_{CE} = 100V					
		F			V_{CE} = 35V					
	TD62082	AP, AF			V_{CE} = 50V	V_{IN} = 6V	—	—	500	
		CP			V_{CE} = 100V					
		F			V_{CE} = 35V					
	TD62084	AP, AF			V_{CE} = 50V	V_{IN} = 1V	—	—	500	
		CP			V_{CE} = 100V					
		F			V_{CE} = 35V					
Collector-Emitter Saturation Voltage			$V_{CE\ (sat)}$	2	I_{OUT} = 350mA, I_{IN} = 500μA		—	1.3	1.6	V
					I_{OUT} = 200mA, I_{IN} = 350μA		—	1.1	1.3	
					I_{OUT} = 100mA, I_{IN} = 250μA		—	0.9	1.1	
Input Current	TD62082AP / CP / F / AF		$I_{IN\ (ON)}$	2	V_{IN} = 17V		—	0.82	1.25	mA
	TD62083AP / CP / F / AF				V_{IN} = 3.85V		—	0.93	1.35	
	TD62084AP / CP / F / AF				V_{IN} = 5V		—	0.35	0.5	
					V_{IN} = 12V		—	1.0	1.45	
			$I_{IN\ (OFF)}$	4	I_{OUT} = 500μA, Ta = 85°C		50	65	—	μA
Input Voltage (Output On)	TD62082AP / CP / F / AF		$V_{IN\ (ON)}$	5	V_{CE} = 2V, I_{OUT} = 300mA		—	—	13	V
	TD62083AP / CP / F / AF				V_{CE} = 2V, I_{OUT} = 200mA		—	—	2.4	
					V_{CE} = 2V, I_{OUT} = 250mA		—	—	2.7	
					V_{CE} = 2V, I_{OUT} = 300mA		—	—	3.0	
	TD62084AP / CP / F / AF				V_{CE} = 2V, I_{OUT} = 125mA		—	—	5.0	
					V_{CE} = 2V, I_{OUT} = 200mA		—	—	6.0	
					V_{CE} = 2V, I_{OUT} = 275mA		—	—	7.0	
					V_{CE} = 2V, I_{OUT} = 350mA		—	—	8.0	
DC Current Transfer Ratio			h_{FE}	2	V_{CE} = 2V, I_{OUT} = 350mA		1000	—	—	
Clamp Diode Reverse Current			I_R	6	Ta = 25°C (Note)		—	—	50	μA
					Ta = 85°C (Note)		—	—	100	
Clamp Diode Forward Voltage		CP	V_F	7	I_F = 350mA		—	—	2.0	V
					I_F = 280mA		—	—	1.8	
Input Capacitance			C_{IN}	—			—	15	—	pF

(Note) $V_R = V_R$ MAX.

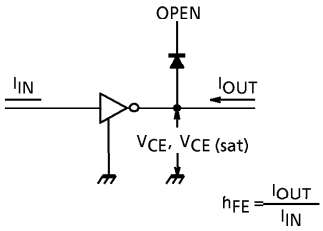
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-On Delay	AP, AF	t_{ON}	8	$R_L = 125\Omega$, $V_{OUT} = 50V$	—	0.1	—	μs
	CP			$R_L = 312\Omega$, $V_{OUT} = 100V$	—	0.1	—	
	F			$R_L = 87.5\Omega$, $V_{OUT} = 35V$	—	0.1	—	
Turn-Off Delay	AP, AF	t_{OFF}		$R_L = 125\Omega$, $V_{OUT} = 50V$	—	0.2	—	
	CP			$R_L = 312\Omega$, $V_{OUT} = 100V$	—	3.0	—	
	F			$R_L = 87.5\Omega$, $V_{OUT} = 35V$	—	0.2	—	

TEST CIRCUIT

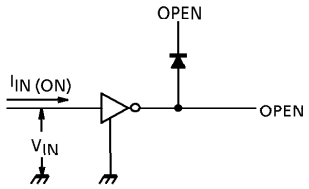
1. I_{CEX}



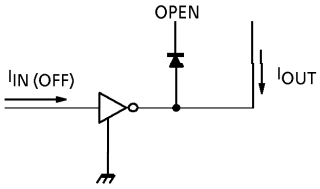
2. $V_{CE\ (sat)}$, h_{FE}



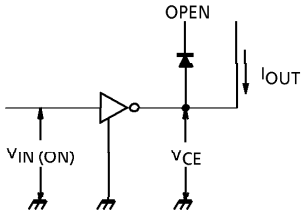
3. $I_{IN\ (ON)}$



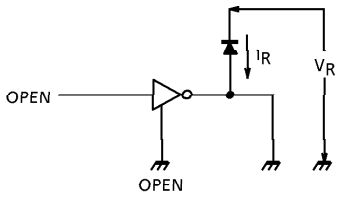
4. $I_{IN\ (OFF)}$



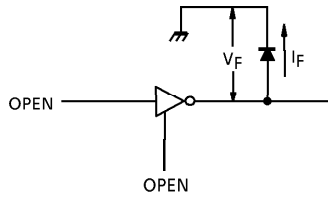
5. $V_{IN\ (ON)}$



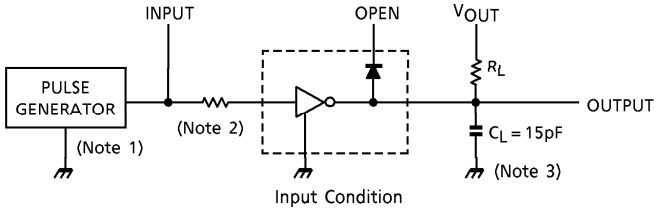
6. I_R

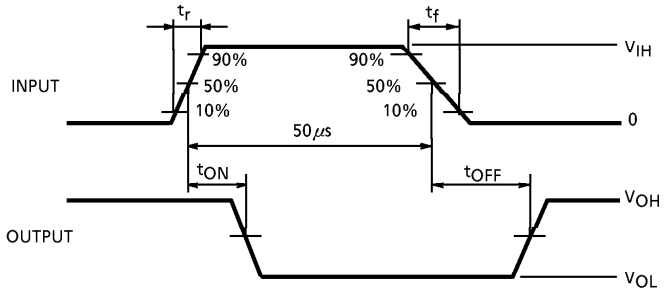


7. V_F



8. t_{ON}, t_{OFF}





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

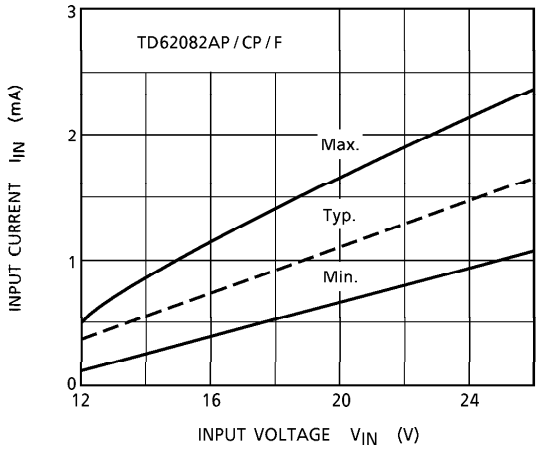
(Note 2) See below.

INPUT CONDITION

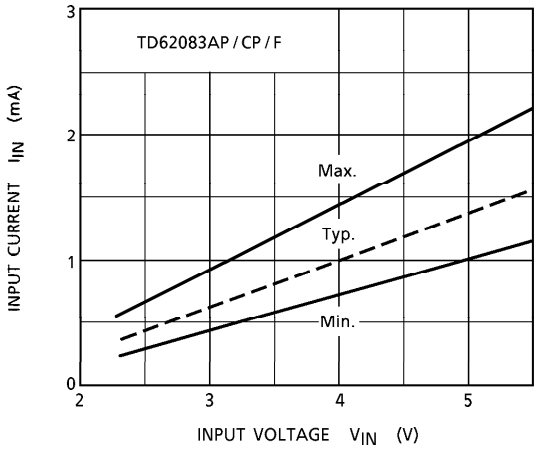
TYPE NUMBER	R1	V_{IH}
TD62081AP / CP / F / AF	2.7kΩ	3V
TD62082AP / CP / F / AF	0Ω	13V
TD62083AP / CP / F / AF	0Ω	3V
TD62084AP / CP / F / AF	0Ω	8V

(Note 3) C_L includes probe and jig capacitance

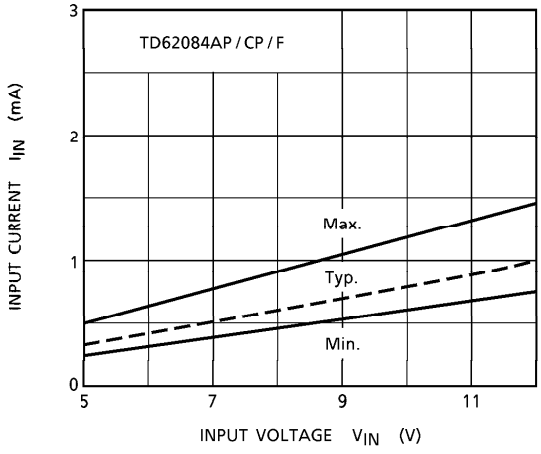
I_{IN} – V_{IN}



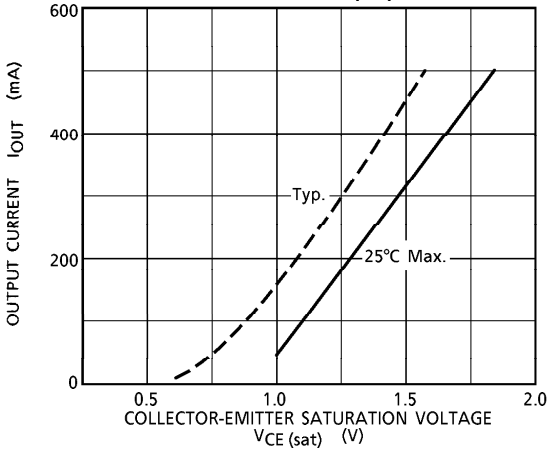
I_{IN} – V_{IN}



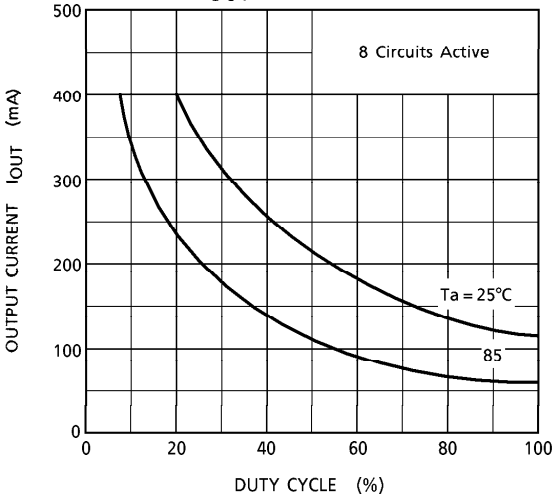
I_{IN} – V_{IN}



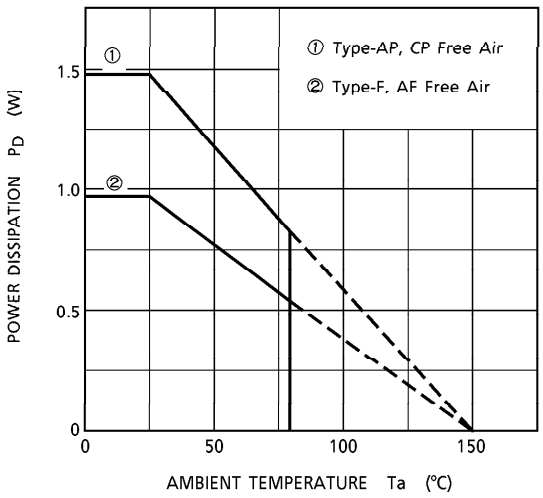
I_{OUT} – $V_{CE\ (sat)}$



I_{OUT} – DUTY CYCLE



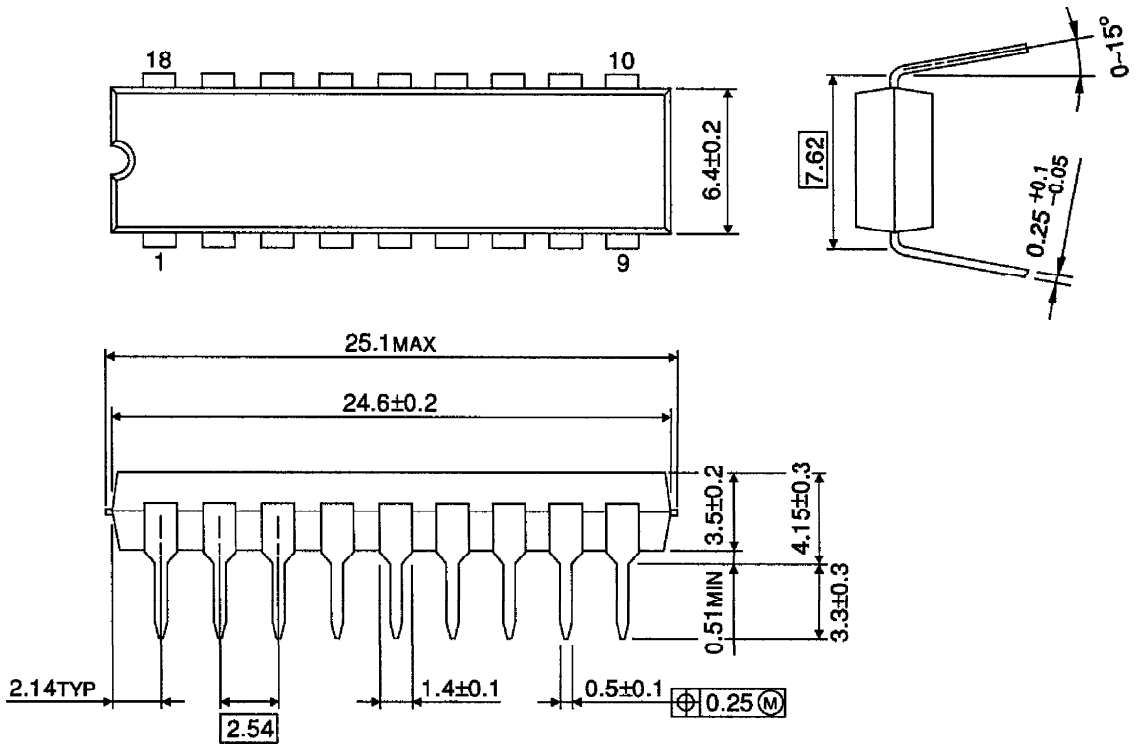
P_D – Ta



OUTLINE DRAWING

DIP18-P-300D

Unit : mm

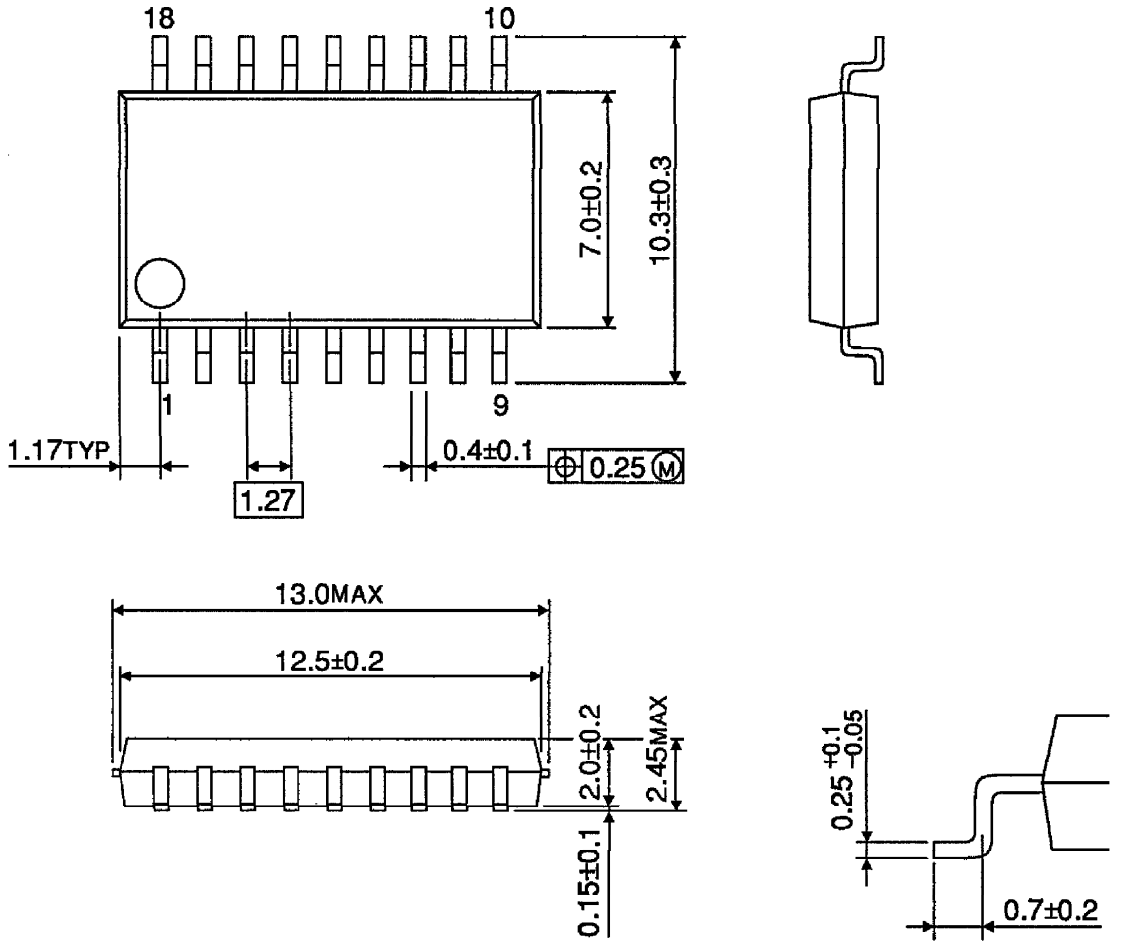


Weight : 1.478g (Typ.)

OUTLINE DRAWING

SOP18-P-375

Unit : mm



Weight : 0.41g (Typ.)