

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62591AP, TD62592AP, TD62593AP, TD62594AP
TD62595AP, TD62595AF, TD62596AP, TD62596AF
TD62597AP, TD62597AF, TD62598AP, TD62598AF

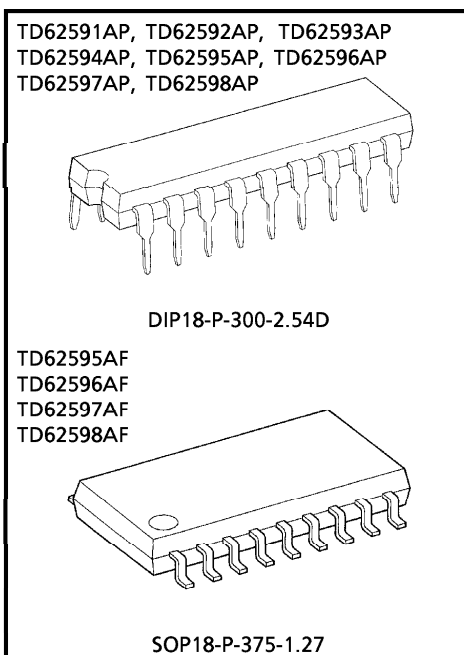
8CH SINGLE DRIVER

The TD62591AP, TD62591AF Series are comprised of eight NPN Transistor Arrays.

Applications include relay, hammer, lamp and display (LED) drivers.

FEATURES

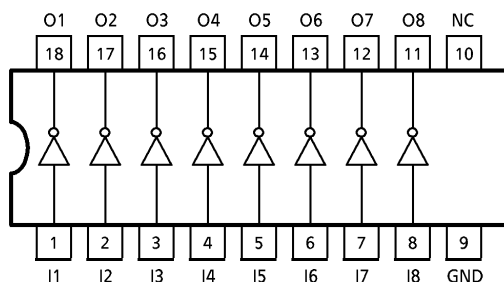
- Output current (single output) 200mA (Max.)
- High sustaining voltage output 50V (Min.)
- Low saturation voltage $V_{CE(sat)} = 0.8V$
- @Iout = 150mA·inputs compatible with various type logic.
TD62591, TD62595AP, TD62595AF : external.
general purpose
TD62592, TD62596AP, TD62596AF : 10.5k Ω + 7V
zener diode 14~25V
PMOS
TD62593, TD62597AP, TD62597AF : 2.7k Ω
TTL, 5V CMOS
TD62594, TD62598AP, TD62598AF : 10.5k Ω
6~15V PMOS, CMOS
- Package type-AP : DIP-18pin
- Package type-AF : SOP-18pin



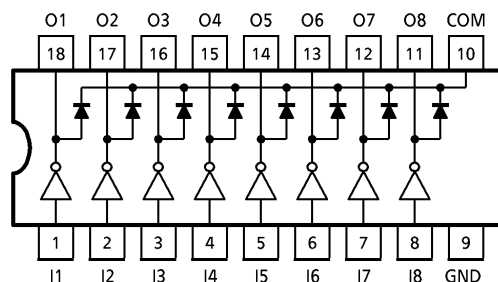
Weight
DIP18-P-300-2.54D : 1.47g (Typ.)
SOP18-P-375-1.27 : 0.5g (Typ.)

PIN CONNECTION (TOP VIEW)

TD62591AP, TD62592AP, TD62593AP, TD62594AP

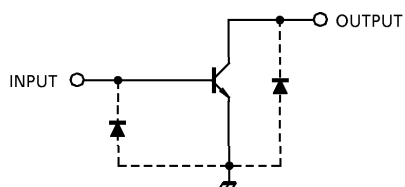
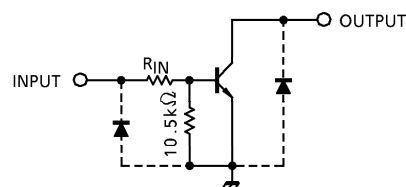


TD62595AP, TD62595AF, TD62596AP, TD62596AF
TD62597AP, TD62597AF, TD62598AP, TD62598AF

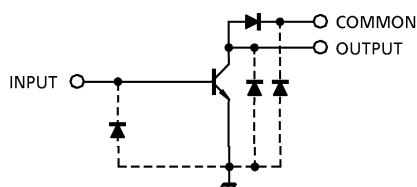
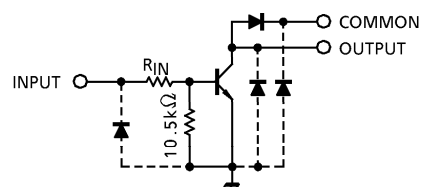


961001EBA2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

SCHEMATICS (EACH DRIVER)
TD62591AP

TD62592AP, TD62593AP, TD62594AP


TD62592AP $R_{IN} = 10.5k\Omega + V_Z = 7V$
 TD62593AP $R_{IN} = 2.7k\Omega$
 TD62594AP $R_{IN} = 10.5k\Omega$

TD62595AP, TD62595AF

TD62596AP, TD62596AF, TD62597AP, TD62597AF, TD62598AP, TD62598AF


TD62596AP $R_{IN} = 10.5k\Omega + V_Z = 7V$
 TD62597AP $R_{IN} = 2.7k\Omega$
 TD62598AP $R_{IN} = 10.5k\Omega$

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

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	V_{CEO}	50	V
Collector-Base Voltage	V_{CBO}	50	V
Clamp Diode Reverse Voltage	V_R (Note 1)	50	V
Collector Current	I_C	200	mA / ch
Input Voltage	V_{IN} (Note 2)	- 0.5~30	V
Input Current	I_{IN} (Note 3)	25	mA
Power Dissipation	P_D (Note 4)	0.96 (Note 5) / 1.47	W
Operating Temperature	T_{opr}	- 40~85	$^\circ\text{C}$
Storage Temperature	T_{stg}	- 55~150	$^\circ\text{C}$

(Note 1) Except TD62591~TD62594AP

(Note 2) Except TD62591AP, TD62595AP, TD62595AF

(Note 3) Only TD62591AP, TD62595AP, TD62595AF

(Note 4) 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 5) SOP-18pin

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector-Emitter Voltage		V_{CEO}	—	0	—	50	V
Collector-Base Voltage		V_{CBO}	—	0	—	50	V
Collector Current		I_C	—	0	—	150	mA / ch
Clamp Diode Reverse Voltage		V_R	(Note 1)	7	—	50	V
Input Voltage		V_{IN}	(Note 2)	0	—	25	V
Input Current		I_{IN}	(Note 3)	0	—	10	mA
Input Voltage (Output On)	TD62592 TD62596	$V_{IN} (ON)$	—	14.0	—	25	V
	TD62593 TD62597			2.4	—	25	
	TD62594 TD62598			7.0	—	25	
Power Dissipation	AP	P_D	—	—	—	0.52	W
	AF		—	—	—	0.355	

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current		I_{CEX}	1	$V_{CE} = 50V, V_{IN} = 0$	—	—	10	μA
Collector-Emitter Saturation Voltage		$V_{CE} (sat)$	2	$I_C = 10mA, I_{IN} = 0.4mA$	—	—	0.2	V
				$I_C = 150mA, I_{IN} = 3.0mA$	—	—	0.8	
DC Current Transfer Ratio		h_{FE}	2	$V_{CE} = 10V$ $I_C = 10mA$	(Note 3) 70	—	—	—
					(Note 2) 50	—	—	
Input Current	TD62591 TD62595	$I_{IN} (ON)$	3	$I_C = 50mA$	—	—	0.65	mA
	TD62592 TD62596			$V_{IN} = 14V, I_C = 50mA$	—	—	0.9	
	TD62593 TD62597			$V_{IN} = 2.4V, I_C = 50mA$	—	—	0.9	
	TD62594 TD62598			$V_{IN} = 7.0V, I_C = 50mA$	—	—	0.9	
Turn-On Delay		t_{ON}	4	$V_{OUT} = 50V, R_L = 330\Omega$	—	0.1	—	μs
Turn-Off Delay		t_{OFF}			—	0.3	—	μs

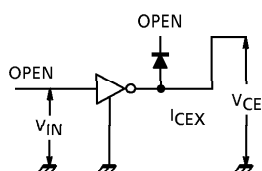
(Note 1) Except TD62591~TD62594AP

(Note 2) Except TD62591AP, TD62595AP, TD62595AF

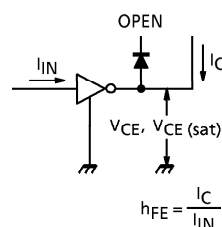
(Note 3) Only TD62591AP, TD62595AP, TD62595AF

TEST CIRCUIT

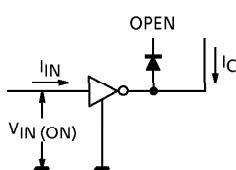
1. I_{CEX}



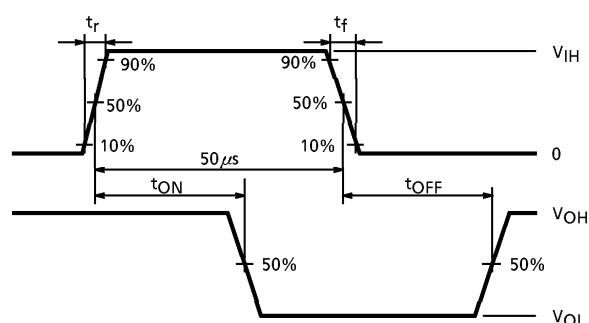
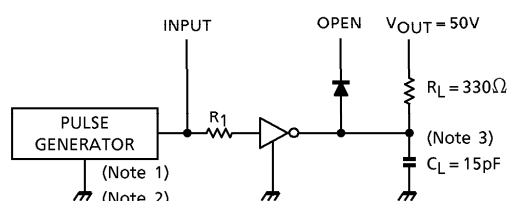
2. h_{FE} , $V_{CE(sat)}$



3. $V_{IN(ON)}$



4. t_{ON} , t_{OFF}



(Note 1) Pulse width $50\mu s$, duty cycle 10%
Output impedance 50Ω , $t_r \leq 5ns$, $t_f \leq 10ns$

(Note 2) See below

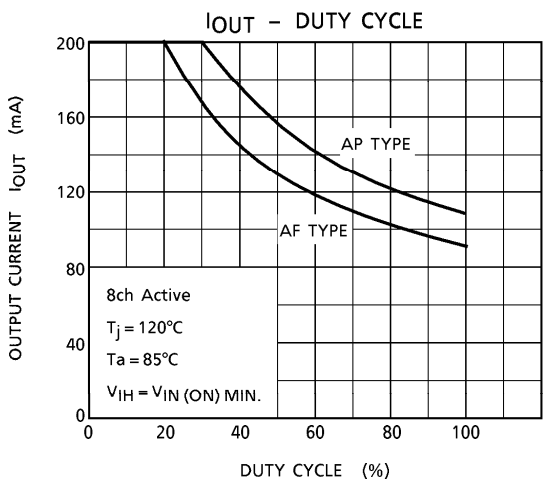
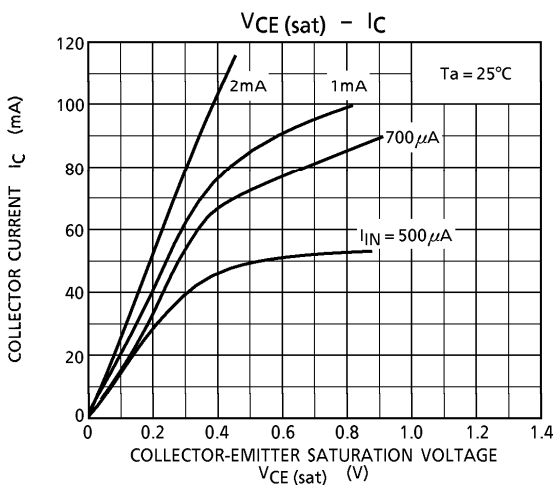
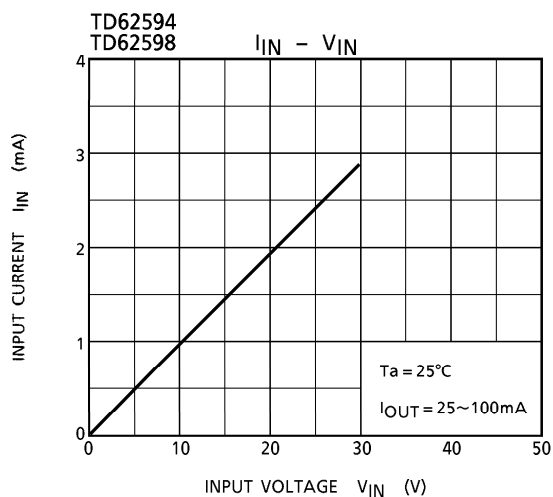
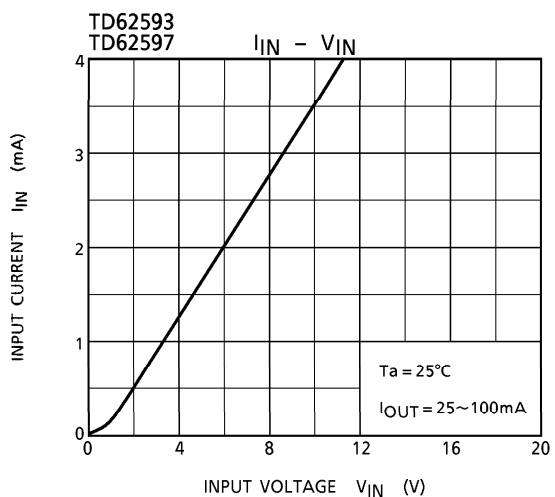
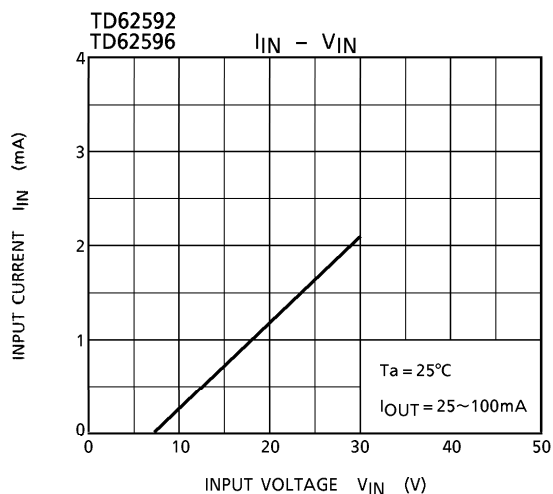
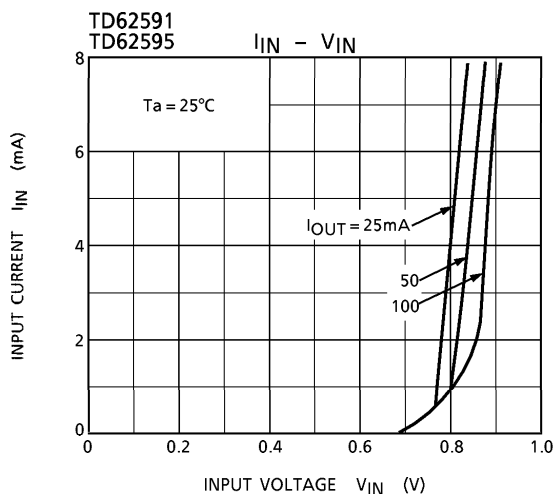
Input Condition

TYPE NUMBER	R_{IN}	V_{IH}
TD62591AP, TD62595AP, TD62595AF	$2.7k\Omega$	3V
TD62592AP, TD62596AP, TD62596AF	0Ω	15V
TD62593AP, TD62597AP, TD62597AF	0Ω	3V
TD62594AP, TD62598AP, TD62598AF	0Ω	10V

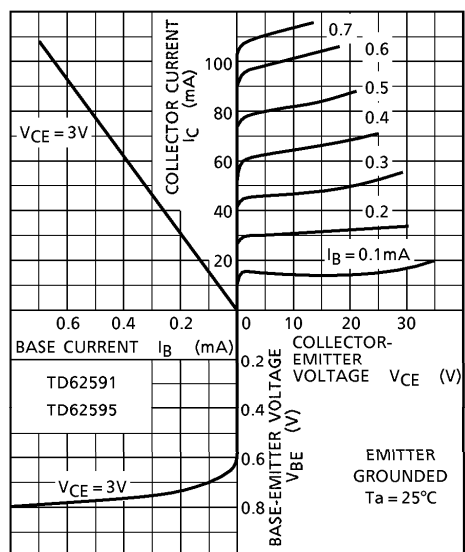
(Note 3) C_L includes probe and jig capacitance

PRECAUTIONS for USING

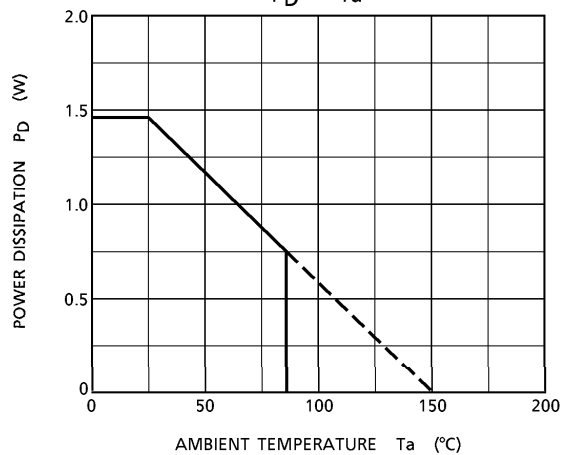
Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



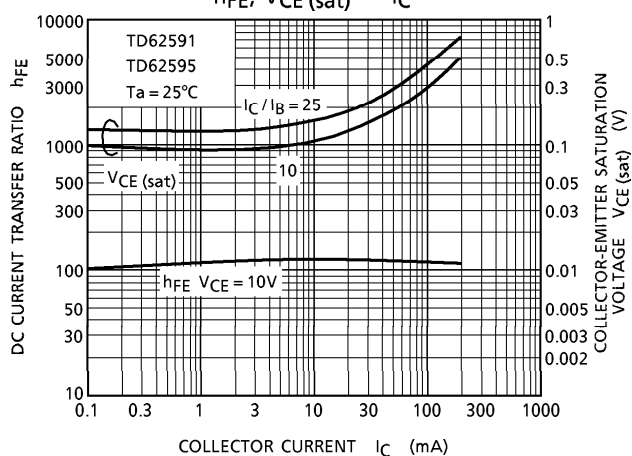
STATIC CHARACTERISTICS



$P_D - T_a$



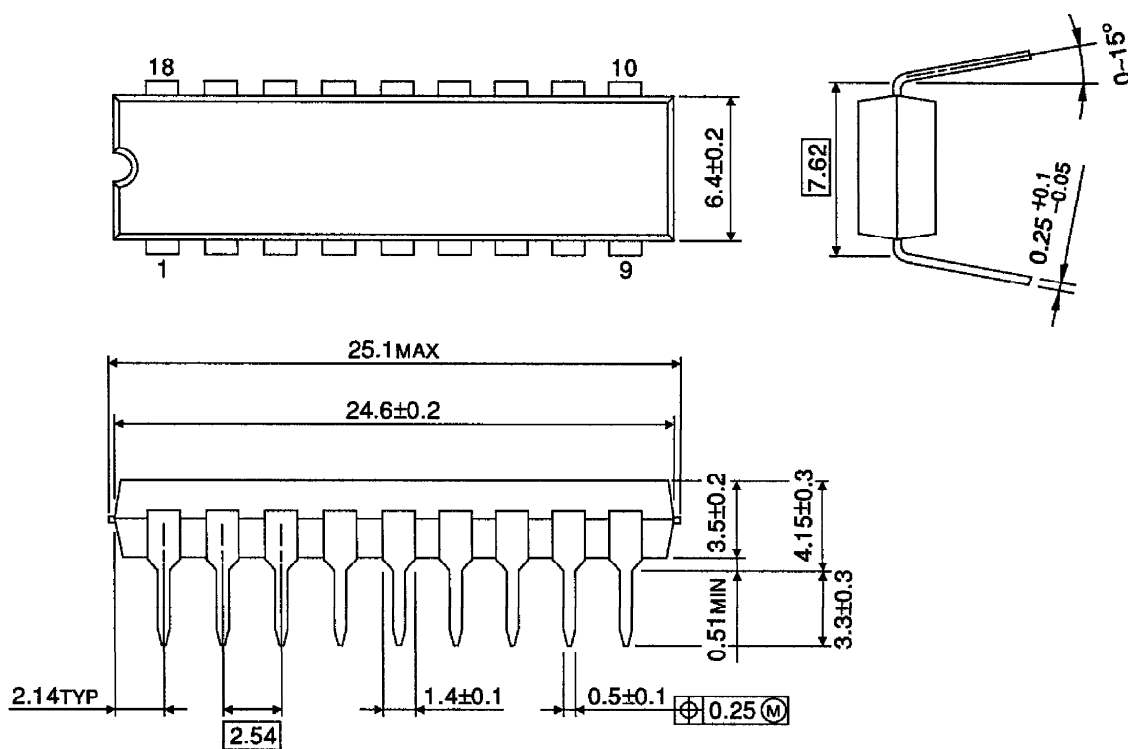
$h_{FE}, V_{CE(sat)} - I_C$



OUTLINE DRAWING

DIP18-P-300-2.54D

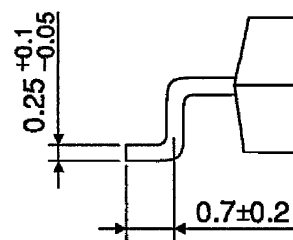
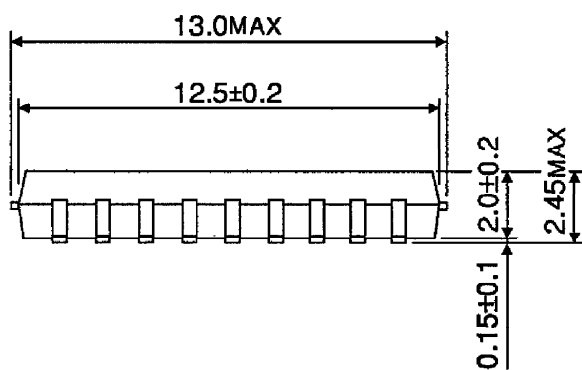
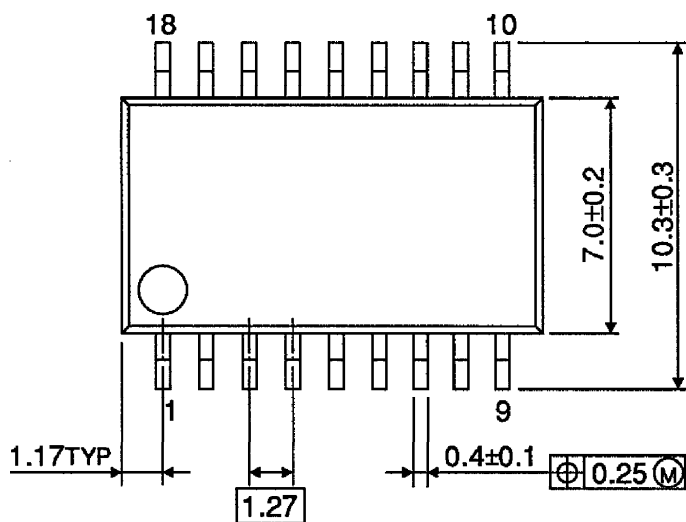
Unit : mm



Weight : 1.47g (Typ.)

OUTLINE DRAWING
SOP18-P-375-1.27

Unit : mm



Weight : 0.50g (Typ.)