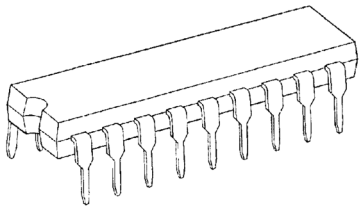
Toshiba Bipolar Digital Integrated Circuit Silicon Monolithic

TD62081APG,TD62081AFG,TD62082APG,TD62082AFG, TD62083APG,TD62083AFG,TD62084APG,TD62084AFG

8ch Darlington Sink Driver

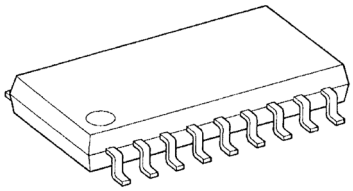
The TD62081APG/AFG Series are high-voltage, high-current darlington drivers comprised of eight NP darlington pairs.
All units feature integral clamp diodes for switching inductive loads.
Applications include relay, hammer, lamp and display (LED) drivers.
The suffix (G) appended to the part number represents a Lead (Pb)-Free product.

TD62081APG, TD62082APG
TD62083APG, TD62084APG



DIP18-P-300-2.54D

TD62081AFG, TD62082AFG
TD62083AFG, TD62084AFG



SOP18-P-375-1.27

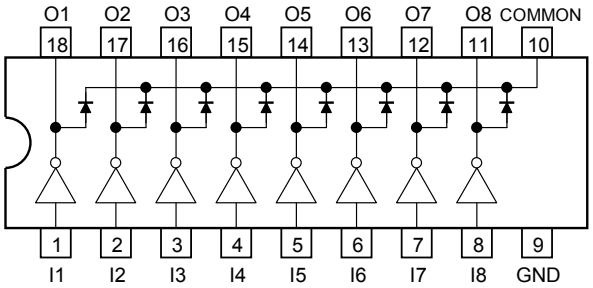
Weight
DIP18-P-300-2.54D: 1.47 g (typ.)
SOP18-P-375-1.27 : 0.41 g (typ.)

Features

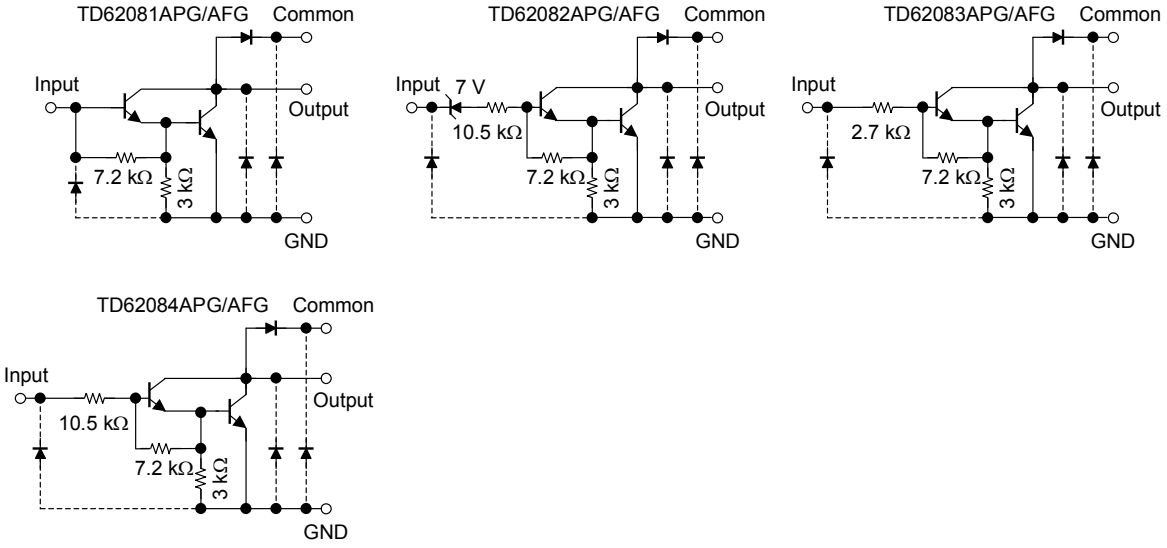
- Output current (single output)
  500 mA (max) (TD62081APG/AFG series)
- High sustaining voltage output
  50 V (min) (TD62081APG/AFG series)
- Output clamp diodes
- Inputs compatible with various types of logic.
- Package type-APG: DIP-18 pin
- Package type-AFG: SOP-18 pin

Type	Input Base Resistor	Designation
TD62081APG/AFG	External	General purpose
TD62082APG/AFG	10.5-kΩ + 7 V Zenner diode	14 V to 25 V PMOS
TD62083APG/AFG	2.7 kΩ	TTL, 5 V CMOS
TD62084APG/AFG	10.5 kΩ	6 V to 15 V PMOS, CMOS

Pin Connection (top view)



Schematics (each driver)



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

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Output sustaining voltage		$V_{CE\ (SUS)}$	−0.5 to 50	V
Output current		I_{OUT}	500	mA/ch
Input voltage		V_{IN} (Note 1)	−0.5 to 30	V
Input current		I_{IN} (Note 2)	25	mA
Clamp diode reverse voltage		V_R	50	V
Clamp diode forward current		I_F	500	mA
Power dissipation	APG	P_D	1.47	W
	AFG		0.96	
Operating temperature		T_{opr}	−40 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C

Note 1: Except TD62081APG/AFG
Note 2: Only TD62081APG/AFG

Recommended Operating Conditions (Ta = –40 to 85°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Output sustaining voltage		$V_{CE\ (SUS)}$		0	—	50	V
Output current	APG	I_{OUT}	T_{pw} = 25 ms, Duty = 10% 8 circuits	0	—	347	mA/ch
			T_{pw} = 25 ms, Duty = 50% 8 circuits	0	—	123	
	AFG		T_{pw} = 25 ms, Duty = 10% 8 circuits	0	—	268	
			T_{pw} = 25 ms, Duty = 50% 8 circuits	0	—	90	
Input voltage	Except TD62081APG/AFG	V_{IN}		0	—	30	V
Input voltage (Output on)	TD62082APG/AFG	$V_{IN\ (ON)}$		14	—	30	V
	TD62083APG/AFG			2.5	—	30	
	TD62084APG/AFG			8	—	30	
Input voltage (Output off)	TD62082APG/AFG	$V_{IN\ (OFF)}$		0	—	7.4	V
	TD62083APG/AFG			0	—	0.5	
	TD62084APG/AFG			0	—	1.0	
Input current	Only TD62081APG/AFG	I_{IN}		0	—	5	mA
Clamp diode reverse voltage		V_R		—	—	50	V
Clamp diode forward current		I_F		—	—	400	mA
Power dissipation	APG	P_D		—	—	0.52	W
	AFG			—	—	0.4	

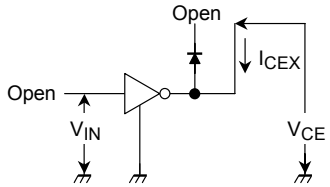
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output leakage current		I_{CEX}	1	V_{CE} = 50 V	Ta = 25°C	—	—	50	μA
					Ta = 85°C	—	—	100	
	TD62082				V_{IN} = 6 V	—	—	500	
	TD62084				V_{IN} = 1 V	—	—	500	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	2	I_{OUT} = 350 mA, I_{IN} = 500 μA		—	1.3	1.6	V
				I_{OUT} = 200 mA, I_{IN} = 350 μA		—	1.1	1.3	
				I_{OUT} = 100 mA, I_{IN} = 250 μA		—	0.9	1.1	
Input current	TD62082APG/AFG	$I_{IN\ (ON)}$	2	V_{IN} = 17 V		—	0.82	1.25	mA
	TD62083APG/AFG			V_{IN} = 3.85 V		—	0.93	1.35	
	TD62084APG/AFG			V_{IN} = 5 V		—	0.35	0.5	
				V_{IN} = 12 V		—	1.0	1.45	
		$I_{IN\ (OFF)}$	4	I_{OUT} = 500 μA, Ta = 85°C		50	65	—	μA
Input voltage (Output on)	TD62082APG/AFG	$V_{IN\ (ON)}$	5	V_{CE} = 2 V, I_{OUT} = 300 mA		—	—	13	V
	TD62083APG/AFG			V_{CE} = 2 V, I_{OUT} = 200 mA		—	—	2.4	
				V_{CE} = 2 V, I_{OUT} = 250 mA		—	—	2.7	
				V_{CE} = 2 V, I_{OUT} = 300 mA		—	—	3.0	
	TD62084APG/AFG			V_{CE} = 2 V, I_{OUT} = 125 mA		—	—	5.0	
				V_{CE} = 2 V, I_{OUT} = 200 mA		—	—	6.0	
				V_{CE} = 2 V, I_{OUT} = 275 mA		—	—	7.0	
				V_{CE} = 2 V, I_{OUT} = 350 mA		—	—	8.0	
DC current transfer ratio		h_{FE}	2	V_{CE} = 2 V, I_{OUT} = 350 mA		1000	—	—	
Clamp diode reverse current		I_R	6	Ta = 25°C	(Note)	—	—	50	μA
				Ta = 85°C	(Note)	—	—	100	
Clamp diode forward voltage		V_F	7	I_F = 350 mA		—	—	2.0	V
Input capacitance		C_{IN}	—			—	15	—	pF
Turn-on delay		t_{ON}	8	R_L = 125 Ω, V_{OUT} = 50 V		—	0.1	—	μs
Turn-off delay		t_{OFF}		R_L = 125 Ω, V_{OUT} = 50 V		—	0.2	—	

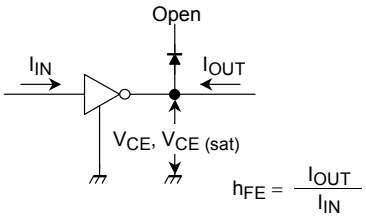
Note: $V_R = V_R$ max

Test Circuit

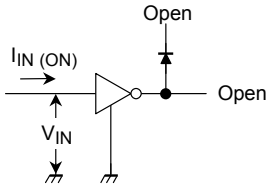
1. I_{CEX}



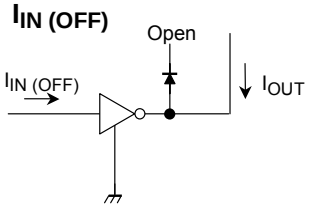
2. $V_{CE\ (sat)}$, h_{FE}



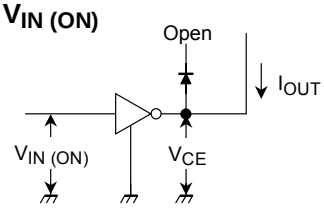
3. $I_{IN\ (ON)}$



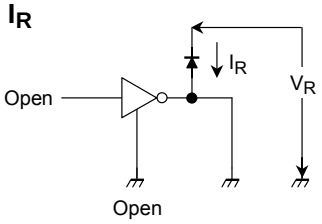
4. $I_{IN\ (OFF)}$



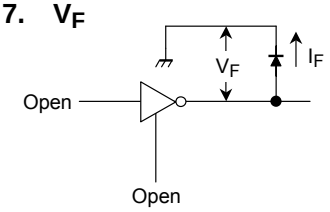
5. $V_{IN\ (ON)}$



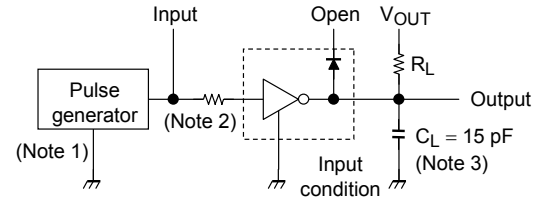
6. I_R

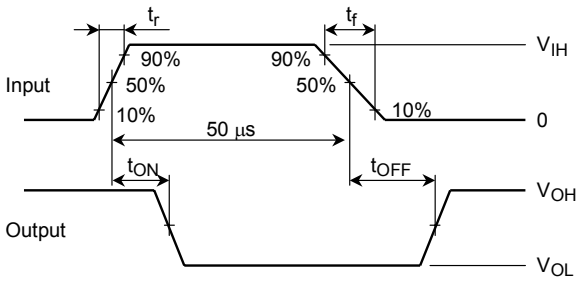


7. V_F



8. t_{ON}, t_{OFF}





Note 1: Pulse width 50 μs, duty cycle 10%
Output impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: See below.
Input condition

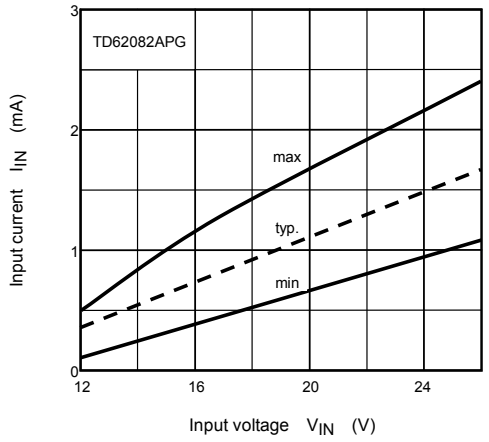
Type Number	R1	V_{IH}
TD62081APG/AFG	2.7 kΩ	3 V
TD62082APG/AFG	0 Ω	13 V
TD62083APG/AFG	0 Ω	3 V
TD62084APG/AFG	0 Ω	8 V

Note 3: C_L includes probe and jig capacitance

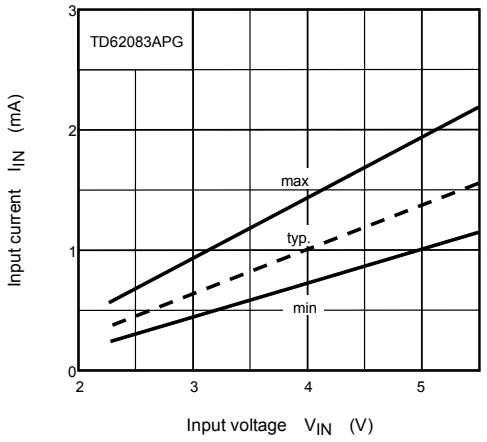
Precautions for Using

This IC does not include built-in protection circuits for excess current or overvoltage.
If this IC is subjected to excess current or overvoltage, it may be destroyed.
Hence, the utmost care must be taken when systems which incorporate this IC are designed.
Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

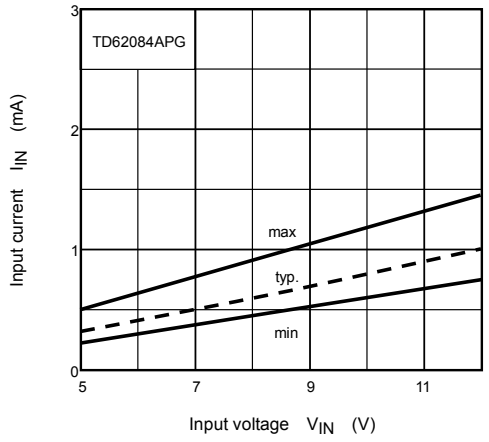
$I_{IN} - V_{IN}$



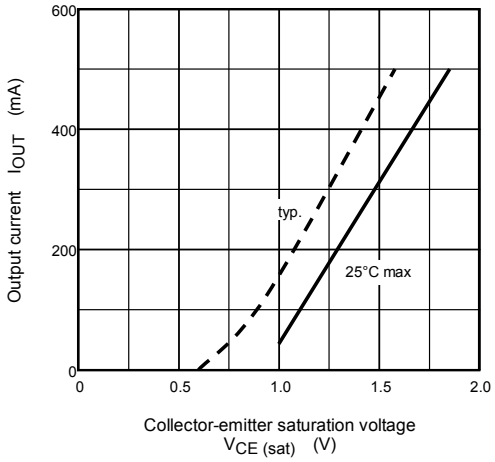
$I_{IN} - V_{IN}$



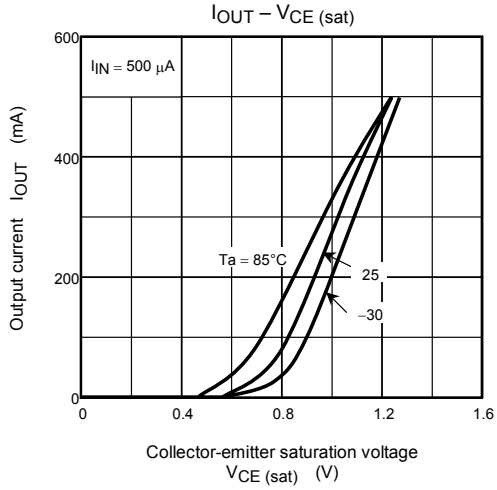
$I_{IN} - V_{IN}$



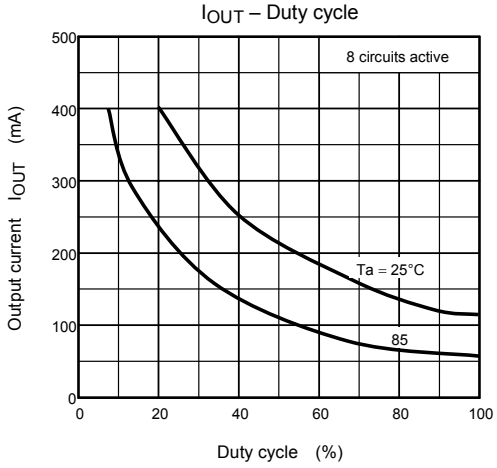
$I_{OUT} - V_{CE}$ (sat)



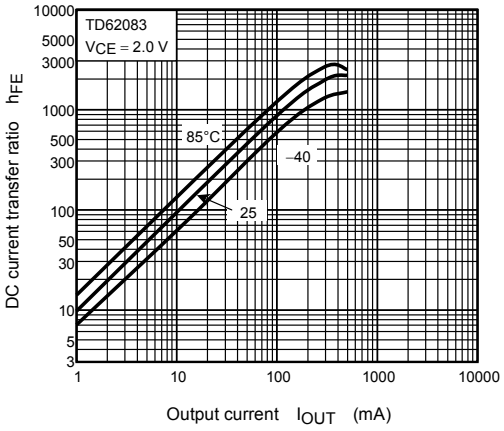
$I_{OUT} - V_{CE}$ (sat)



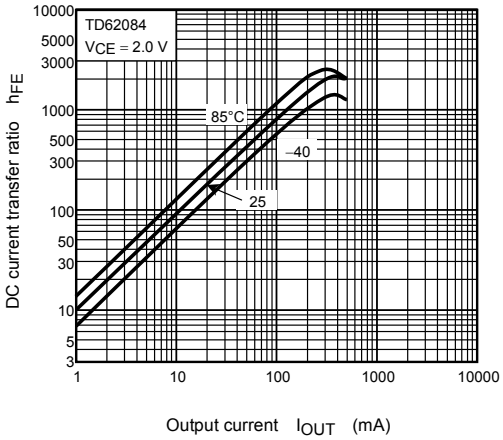
I_{OUT} – Duty cycle



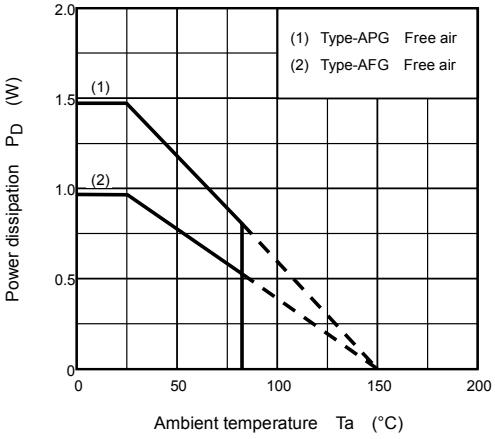
$h_{FE} - I_{OUT}$



$h_{FE} - I_{OUT}$

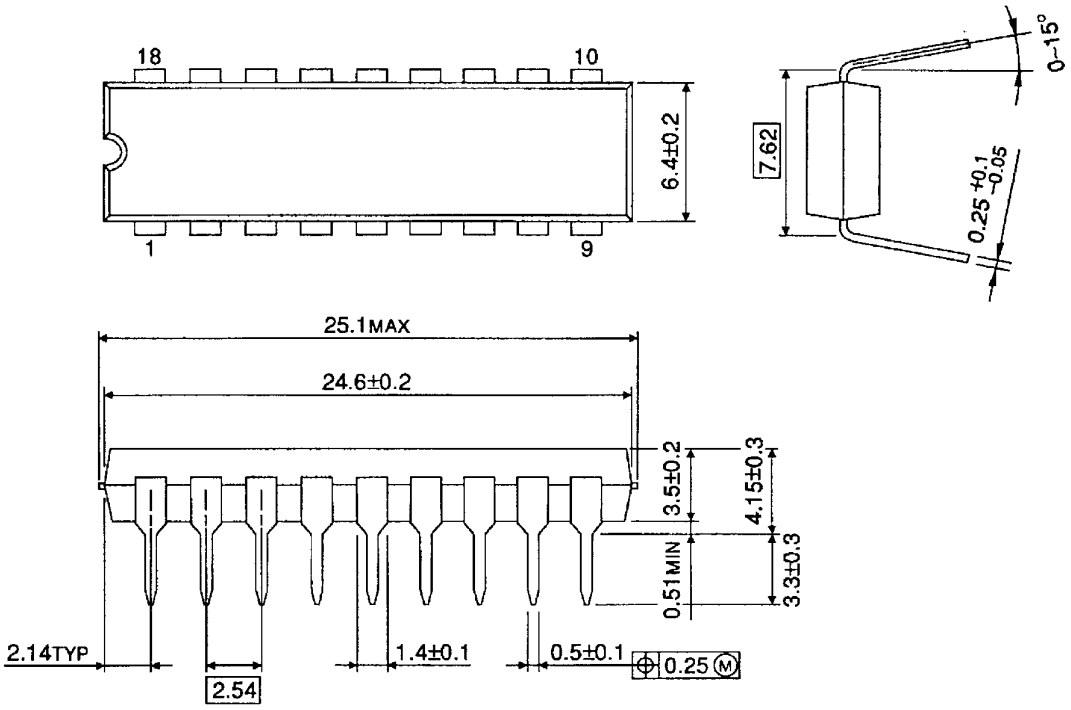


$P_D - Ta$



Package Dimensions

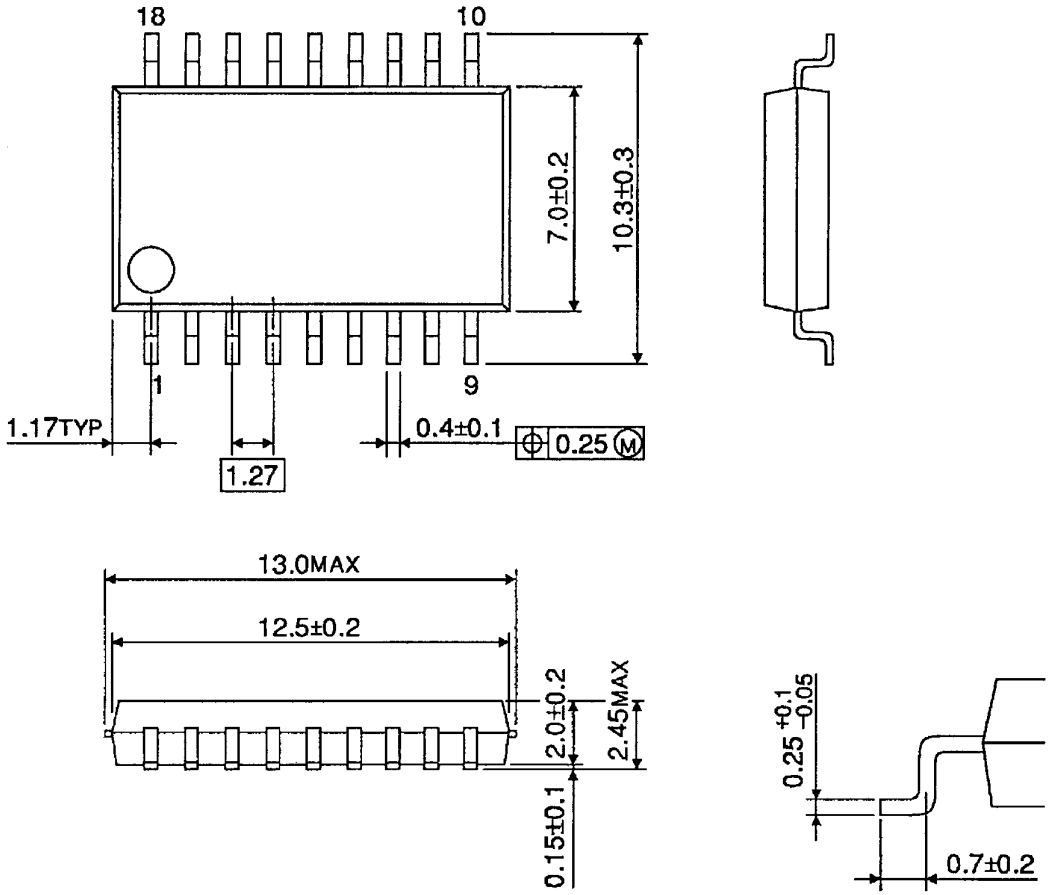
DIP18-P-300-2.54D Unit : mm



Weight: 1.47 g (typ.)

Package Dimensions

SOP18-P-375-1.27 Unit : mm



Weight: 0.41 g (typ.)

Notes on Contents

1. Schematics

The schematics may be simplified or some parts of them may be omitted for explanatory purposes.

2. Absolute Maximum Ratings

The absolute maximum ratings of a semiconductor device are a set of specified parameter values that must not be exceeded during operation, even for an instant.
If any of these ratings are exceeded during operation, the electrical characteristics of the device may be irreparably altered and the reliability and lifetime of the device can no longer be guaranteed.
Moreover, any exceeding of the ratings during operation may cause breakdown, damage and/or degradation in other equipment. Applications using the device should be designed so that no absolute maximum rating will ever be exceeded under any operating conditions.
Before using, creating and/or producing designs, refer to and comply with the precautions and conditions set forth in this document.

3. Recommended Operating Conditions

The values of the conditions are applied within the range of the operating temperature and not guaranteed.

4. AC Characteristics

AC characteristics that mean turn-on and turn-off time are targeted design values and not guaranteed.

5. Application Circuits

The application circuits shown in this document are provided for reference purposes only. Thorough evaluation is required, especially in the phase of mass production design.
In furnishing these examples of application circuits, Toshiba does not grant the use of any industrial property rights.

6. Graphics Characteristics

Graphics characteristics are reference ones and not guaranteed.

Handling of the IC

Ensure that the product is installed correctly to prevent breakdown, damage and/or degradation in the product or equipment.

About solderability, following conditions were confirmed

- Solderability

  (1) Use of Sn-37Pb solder Bath
  - solder bath temperature = 230°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux

  (2) Use of Sn-3.0Ag-0.5Cu solder Bath
  - solder bath temperature = 245°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux

RESTRICTIONS ON PRODUCT USE

060116EBA

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