TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62783APG, TD62783AFG, TD62784APG, TD62784AFG

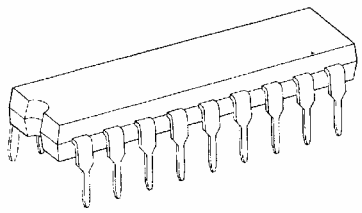
8 ch High-Voltage Source Driver

The TD62783APG/AFG Series are comprised of eight source current Transistor Array.

These drivers are specifically designed for fluorescent display applications.

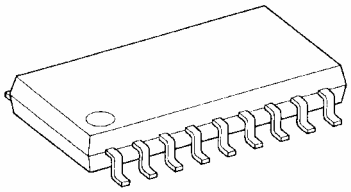
Applications include relay, hammer and lamp drivers.

TD62783APG
TD62784APG



DIP18-P-300-2.54D

TD62783AFG
TD62784AFG



SOP18-P-375-1.27

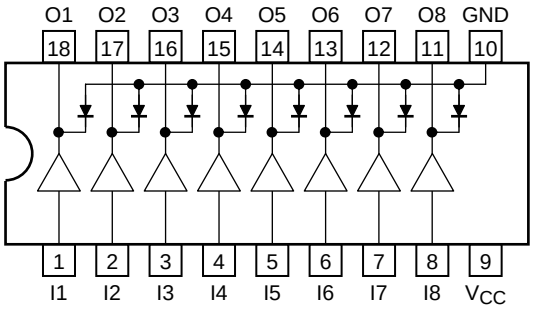
Weight
DIP18-P-300-2.54D: 1.47 g (typ.)
SOP18-P-375-1.27: 0.41 g (typ.)

Features

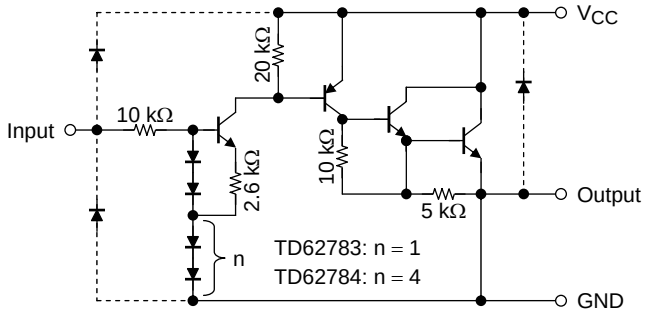
- High output voltage: V_{CC} = 50 V (min)
- Output current (single output): I_{OUT} = −500 mA (min)
- Output clamp diodes
- Single supply voltage
- Input compatible with various types of logic
- Package type-APG: DIP-18 pin
- Package type-AFG: SOP-18 pin

Type	Designation
TD62783APG/AFG	TTL, 5V CMOS
TD62784APG/AFG	6 to 15V PMOS, CMOS

Pin Assignment (top view)



Schematics (each driver)



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

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		V_{CC}	50	V
Output current		I_{OUT}	−500	mA/ch
Input voltage		V_{IN} (Note 1)	15	V
		V_{IN} (Note 2)	30	
Clamp diode reverse voltage		V_R	50	V
Clamp diode forward current		I_F	500	mA
Power dissipation	APG	P_D (Note 3)	1.47	W
	AFG		0.96	
Operating temperature		T_{opr}	−40 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C

Note 1: Only TD62783APG/AFG

Note 2: Only TD62784APG/AFG

Note 3: Delated above 25°C in the proportion of 11.7 W/°C (APG type), 7.7 W/°C (AFG type)

Recommended Operating Conditions (Ta = –40 to 80°C)

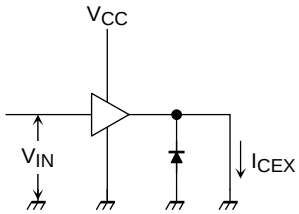
Characteristics			Symbol	Test Condition		Min	Typ.	Max	Unit
Supply voltage			V_{CC}	—		—	—	50	V
Output current		APG	I_{OUT}	Ta = 85°C, T_j = 120°C, T_{pw} = 25 ms	Duty = 10% 8 circuits	—	—	–260	mA/ch
					Duty = 50% 8 circuits	—	—	–59	
		AFG			Duty = 10% 8 circuits	—	—	–180	
					Duty = 50% 8 circuits	—	—	–38	
Input voltage		TD62783APG/AFG	V_{IN}	—		—	—	12	V
		TD62784APG/AFG		—		—	—	24	
Input voltage	Output ON	TD62783APG/AFG	$V_{IN (ON)}$	—		20	50	15	V
		TD62784APG/AFG	$V_{IN (OFF)}$	—		4.5	12.0	30	
	Output OFF	TD62783APG/AFG		—		0	—	0.8	
		TD62784APG/AFG		—		0	—	2.0	
Clamp diode reverse voltage		APG	V_R	—		—	—	50	V
		AFG		—		—	—	35	
Clamp diode forward current			I_F	—		—	—	400	mA
Power dissipation		APG	P_D	—		—	—	0.52	W
		AFG		—		—	—	0.35	

Electrical Characteristics (Ta = 25°C)

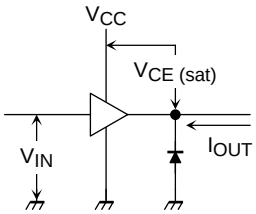
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current		I_{CEX}	1	V_{CC} = V_{CC} max V_{IN} = 0.4 V Ta = 25°C	—	—	100	μA
Output saturation voltage		$V_{CE (sat)}$	2	V_{IN} = $V_{IN (ON)}$, I_{OUT} = –350 mA	—	—	2.0	V
				V_{IN} = $V_{IN (ON)}$, I_{OUT} = –225 mA	—	—	1.9	
				V_{IN} = $V_{IN (ON)}$, I_{OUT} = –100 mA	—	—	1.8	
Input current	TD62783APG/AFG	$I_{IN (ON)}$	3	V_{IN} = 2.4 V	—	36	52	μA
				V_{IN} = 3.85 V	—	180	260	
	TD62784APG/AFG			V_{IN} = 5 V	—	92	130	
				V_{IN} = 12 V	—	790	1130	
Input voltage	TD62783APG/AFG	$V_{IN (ON)}$	4	V_{CE} = 2.0 V	—	—	2.0	V
	TD62784APG/AFG			I_{OUT} = –350 mA	—	—	4.5	
	TD62783APG/AFG	$V_{IN (OFF)}$		I_{OUT} = –500 μA	0.8	—	—	
	TD62784APG/AFG				2.0	—	—	
Supply current		$I_{CC (ON)}$	3	V_{IN} = $V_{IN (ON)}$, V_{CC} = 50 V	—	—	2.5	mA/ch
Clamp diode reverse current		I_R	5	V_R = 50 V	—	—	50	μA
Clamp diode forward voltage		V_F	6	I_F = 350 mA	—	—	2.0	V
Turn-ON delay		t_{ON}	7	V_{CC} = V_{CC} max R_L = 125 Ω C_L = 15 pF, R_L = 88 Ω	—	0.15	—	μs
Turn-OFF delay		t_{OFF}	7	V_{CC} = V_{CC} max R_L = 125 Ω C_L = 15 pF, R_L = 88 Ω	—	1.8	—	μs

Test Circuit

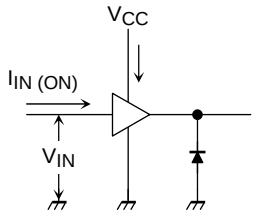
1. I_{CEX}



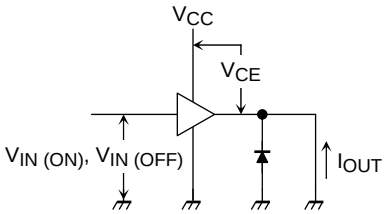
2. $V_{CE\ (sat)}$



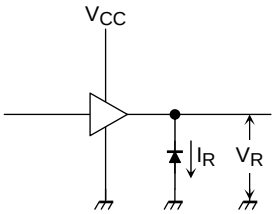
3. $I_{IN\ (ON)}$, I_{CC}



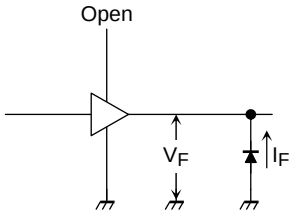
4. $V_{IN\ (ON)}$, $V_{IN\ (OFF)}$



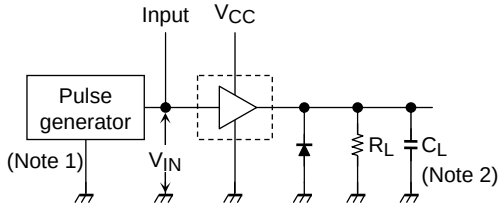
5. I_R

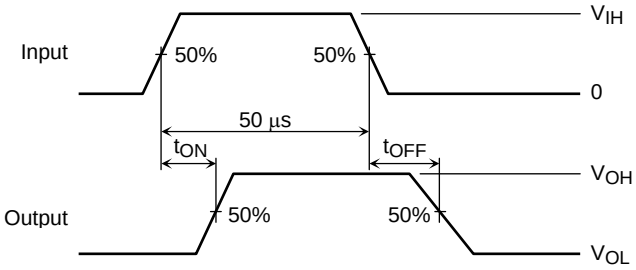


6. V_F



7. 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

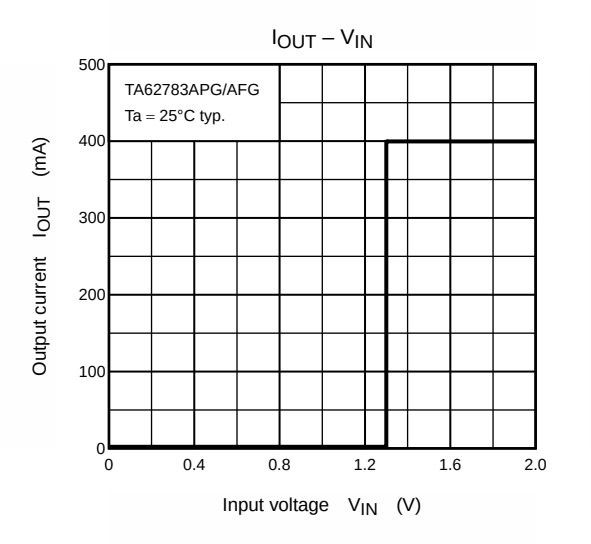
Note 2: C_L includes probe and jig capacitance.

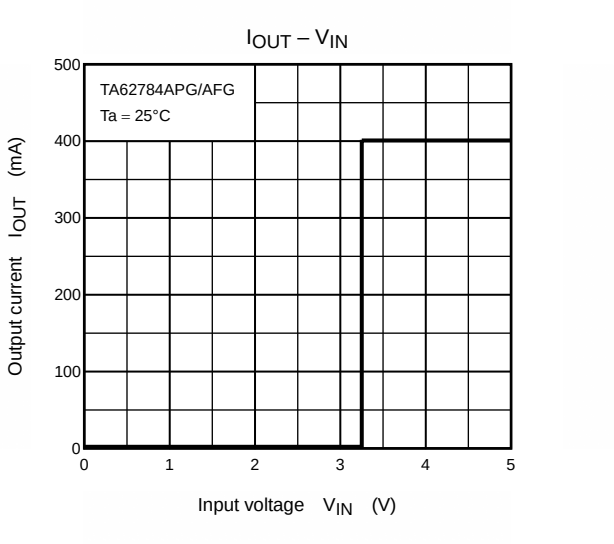
Precautions for Using

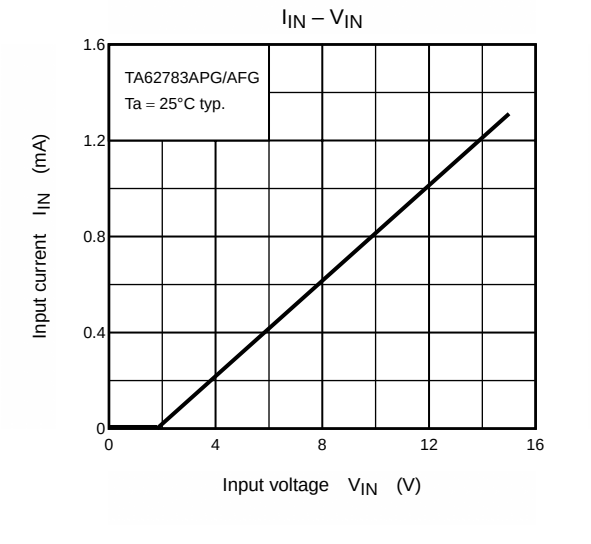
This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.

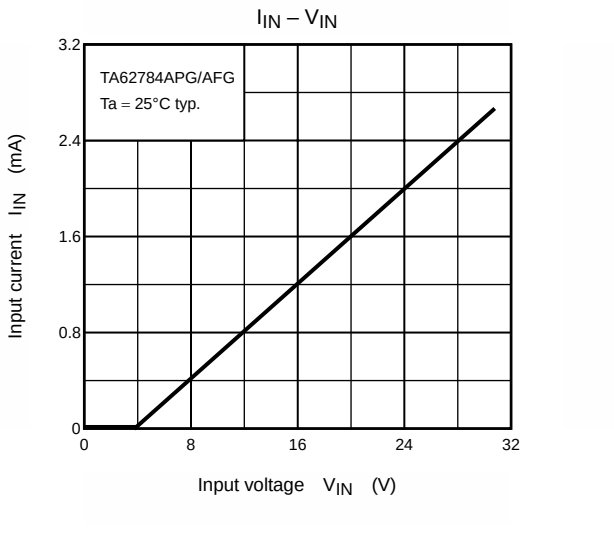
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.

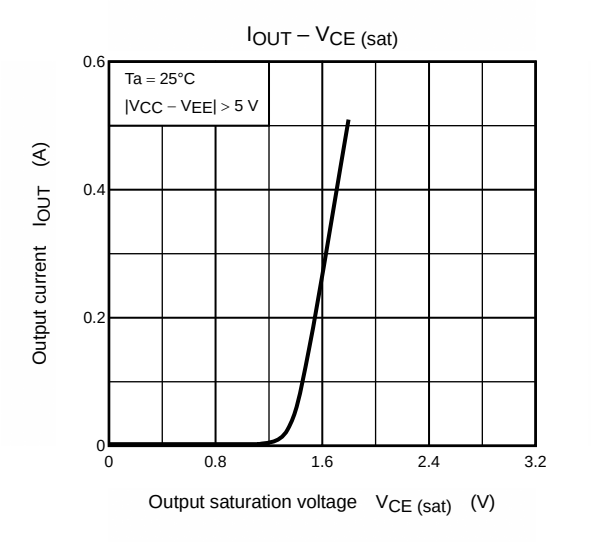
Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

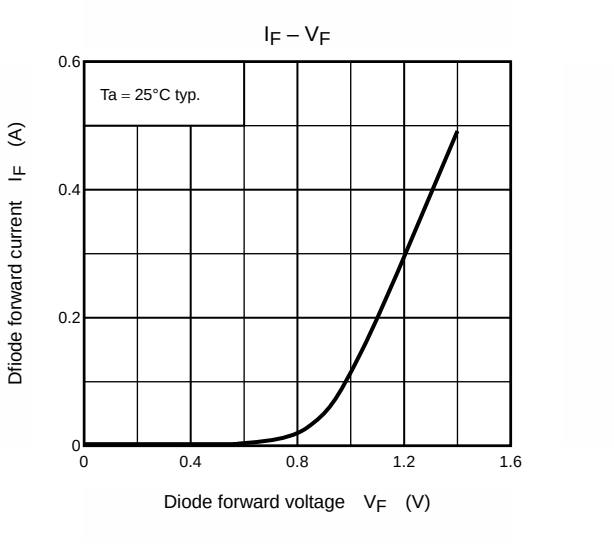

$I_{OUT} – V_{IN}$
TA62783APG/AFG
Ta = 25°C typ.
Output current I_{OUT} (mA)
500
400
300
200
100
0
0
0.4
0.8
1.2
1.6
2.0
Input voltage V_{IN} (V)

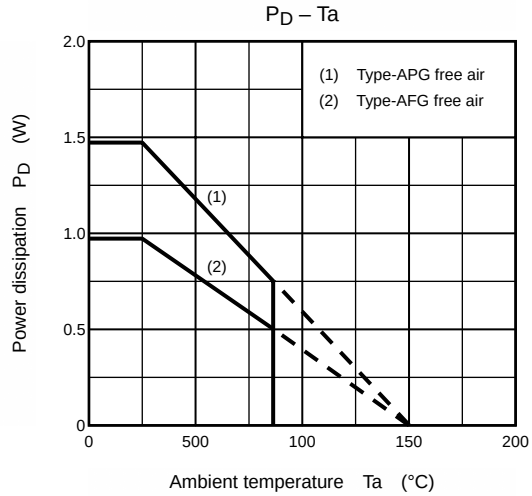

$I_{OUT} – V_{IN}$
TA62784APG/AFG
Ta = 25°C
Output current I_{OUT} (mA)
500
400
300
200
100
0
0
1
2
3
4
5
Input voltage V_{IN} (V)


$I_{IN} – V_{IN}$
TA62783APG/AFG
Ta = 25°C typ.
Input current I_{IN} (mA)
1.6
1.2
0.8
0.4
0
0
4
8
12
16
Input voltage V_{IN} (V)


$I_{IN} – V_{IN}$
TA62784APG/AFG
Ta = 25°C typ.
Input current I_{IN} (mA)
3.2
2.4
1.6
0.8
0
0
8
16
24
32
Input voltage V_{IN} (V)

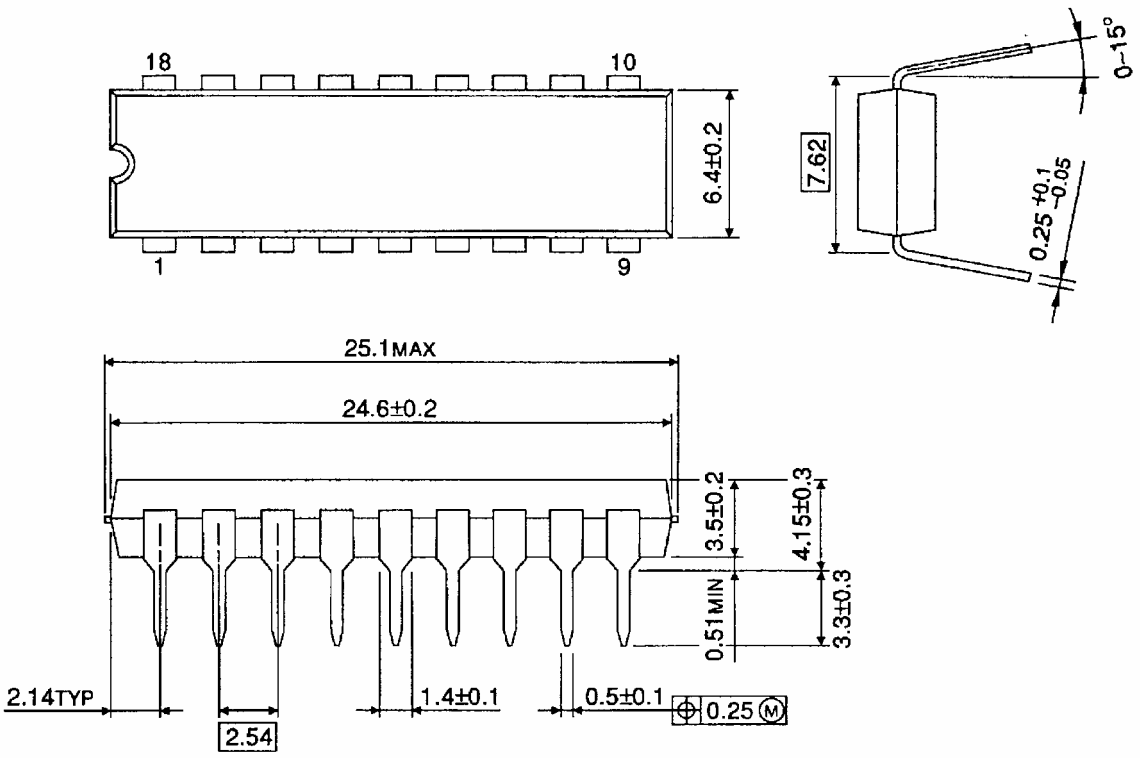

$I_{OUT} – V_{CE\ (sat)}$
Ta = 25°C
$|V_{CC} – V_{EE}| > 5$ V
Output current I_{OUT} (A)
0.6
0.4
0.2
0
0
0.8
1.6
2.4
3.2
Output saturation voltage $V_{CE\ (sat)}$ (V)


$I_F – V_F$
Ta = 25°C typ.
Dfiode forward current I_F (A)
0.6
0.4
0.2
0
0
0.4
0.8
1.2
1.6
Diode forward voltage V_F (V)


P_D – Ta
(1) Type-APG free air
(2) Type-AFG free air
(1)
(2)
Power dissipation P_D (W)
2.0
1.5
1.0
0.5
0
0
500
100
150
200
Ambient temperature Ta (°C)

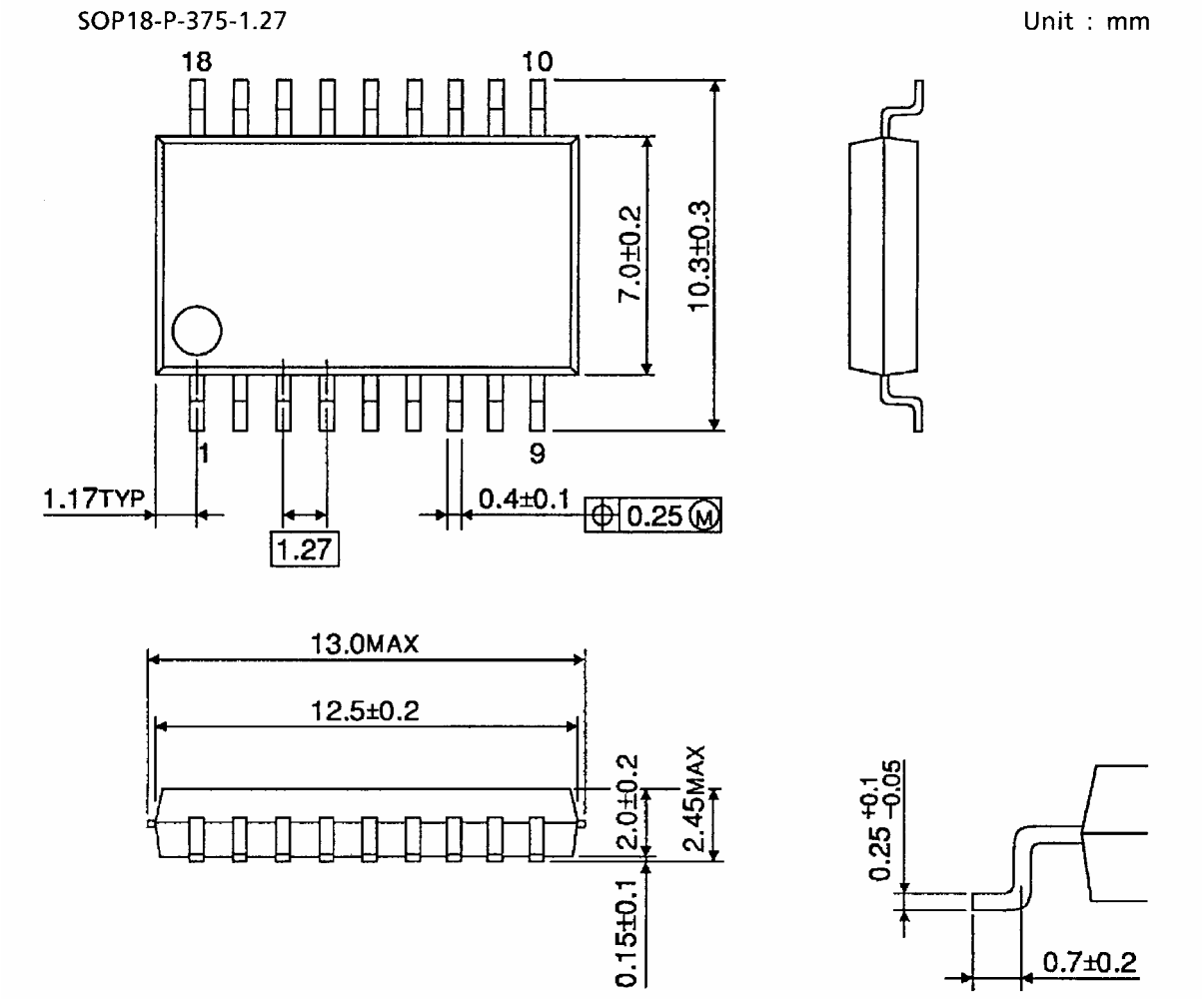
Package Dimensions

DIP18-P-300-2.54D Unit : mm



Weight: 1.47 g (typ.)

Package Dimensions



Weight: 0.41 g (typ.)

About solderability, following conditions were confirmed

- Solderability

  (1) Use of Sn-63Pb 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

030619EBA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.