TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62308AP,TD62308AF

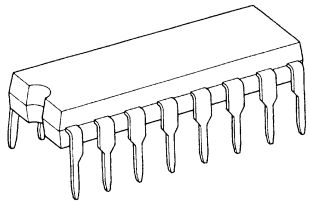
4ch Low Input Active High-Current Darlington Sink Driver

The TD62308AP/AF is a non−inverting transistor array which is comprised of four NPN darlington output stages and PNP input stages.

This device is low−level input active driver and is suitable for operation with 5-V TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers.

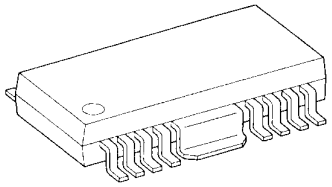
Application include relay, hammer, lamp and stepping motor drivers.

TD62308AP



DIP16-P-300-2.54A

TD62308AF



HSOP16-P-300-1.00

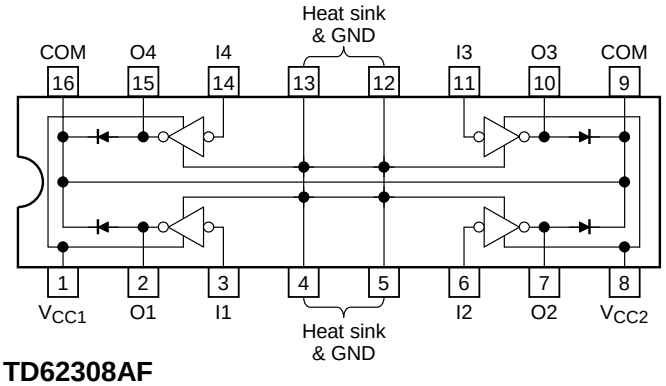
Weight
DIP16-P-300-2.54A: 1.11 g (typ.)
HSOP16-P-300-1.00: 0.50 g (typ.)

Features

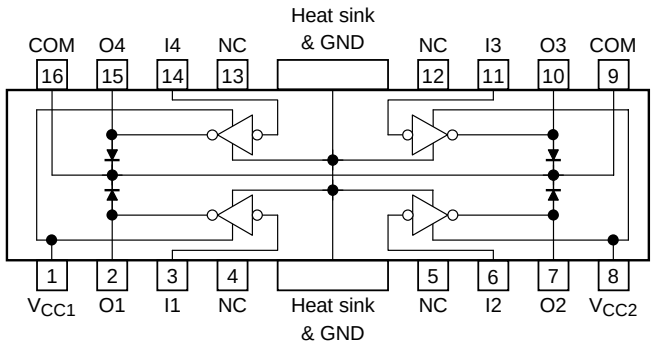
- Output current (single output): 1.5 A (max)
- High sustaining voltage output: 50 V (min)
- Output clamp diodes
- Input compatible with TTL and 5 V CMOS
- Low level active inputs
- Standard supply voltage
- Two V_{CC} terminals V_{CC1}, V_{CC2} (separated)
- GND and SUB terminal = Heat sink
- Package type-AP: DIP-16 pin
- Package type-AF: HSOP-16 pin

Pin Assignment (top view)

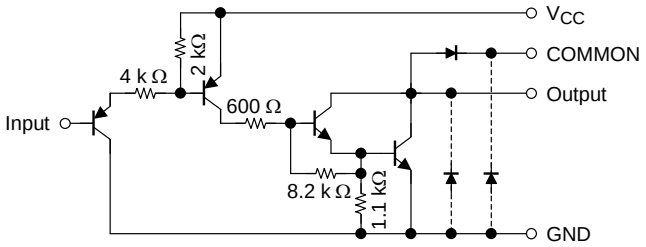
TD62308AP



TD62308AF



Schematics (each driver)



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

Precautions for Using

(1) 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, 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.

(2) If a TD62308AP/AF is being used to drive an inductive load (such as a motor, solenoid or relay), Toshiba recommends that the diodes (pins 9 and 16) be connected to the secondary power supply pin so as to absorb the counter electromotive force generated by the load. Please adhere to the device's maximum ratings.
Toshiba recommends that zener diodes be connected between the diodes (pins 9 and 16) and the secondary power supply pin (as the anode) so as to enable rapid absorption of the counter electromotive force. Again, please adhere to the device's maximum ratings.

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		V_{CC}	−0.5 to 10	V
Output sustaining voltage		$V_{CE\ (SUS)}$	−0.5 to 50	V
Output current		I_{OUT}	1.5	A/ch
Input current		I_{IN}	−10	mA
Input voltage		V_{IN}	−0.5 to 30	V
Clamp diode reverse voltage		V_R	50	V
Clamp diode forward current		I_F	1.5	A
Power dissipation	AP	P_D	1.47/2.7 (Note 1)	W
	AF		0.9/1.4 (Note 2)	
Operating temperature		T_{opr}	−40 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

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

Characteristics		Symbol	Test Condition		Min	Typ.	Max	Unit
Supply voltage		V_{CC}	—		4.5	—	5.5	V
Output sustaining voltage		$V_{CE\ (SUS)}$	—		0	—	50	V
Output current		I_{OUT}	DC1 circuit, Ta = 25°C		0	—	1250	mA/ch
	AP		T_{pw} = 25 ms 4 circuits Ta = 85°C T_j = 120°C	Duty = 10%	0	—	1250	
				Duty = 50%	0	—	700	
	AF			Duty = 10%	0	—	1250	
				Duty = 50%	0	—	390	
Input voltage		V_{IN}	—		0	—	25	V
	Output ON	$V_{IN\ (ON)}$	—		0	—	V_{CC} –3.6	V
	Output OFF	$V_{IN\ (OFF)}$	—		V_{CC} –1.0	—	V_{CC}	
Clamp diode reverse voltage		V_R	—		—	—	50	V
Clamp diode forward current		I_F	—		—	—	1.25	A
Power dissipation	AP	P_D	Ta = 85°C	(Note 1)	—	—	1.4	W
	AF		Ta = 85°C	(Note 2)	—	—	0.7	

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

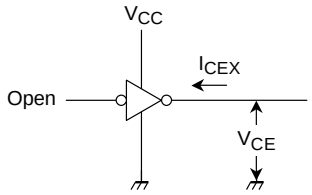
Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C)

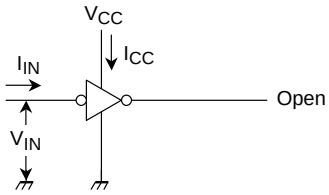
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current		I_{CEX}	1	V_{CE} = 50 V, Ta = 25°C	—	—	50	μA
				V_{CE} = 50 V, Ta = 85°C	—	—	100	
Output saturation voltage		$V_{CE\ (sat)}$	3	I_{OUT} = 1.25 A	—	—	1.8	V
				I_{OUT} = 0.75 A	—	—	1.3	
Input voltage	High level	V_{IH}	—	—	V_{CC} –1.6	—	25	V
	Low level	V_{IL}	—	—	—	—	V_{CC} –3.6	
Input current	High level	I_{IH}	—	—	—	—	10	μA
	Low level	I_{IL}	—	—	—	–0.05	–0.36	mA
Clamp diode reverse current		I_R	4	V_R = 50 V, Ta = 25°C	—	—	50	μA
Clamp diode forward voltage		V_F	5	I_F = 1.25 A	—	1.5	2.0	V
Supply current	Output ON	$I_{CC\ (ON)}$	2	V_{CC} = 5.5 V, V_{IN} = 0 V	—	8.5	12.5	mA/ch
	Output OFF	$I_{CC\ (OFF)}$		V_{CC} = 5.5 V, V_{IN} = V_{CC}	—	—	1.0	μA
Turn-ON delay		t_{ON}	6	C_L = 15 pF, V_{OUT} = 50 V, R_L = 40 Ω	—	0.2	—	μs
Turn-OFF delay		t_{OFF}	6	C_L = 15 pF, V_{OUT} = 35 V, R_L = 40 Ω	—	5.0	—	μs

Test Circuit

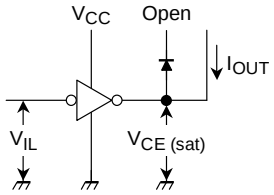
1. I_{CEX}



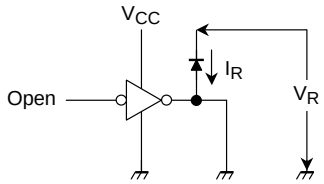
2. I_{CC}



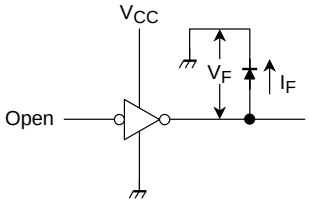
3. $V_{CE\ (sat)}$



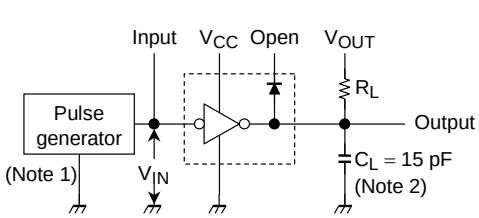
4. I_R

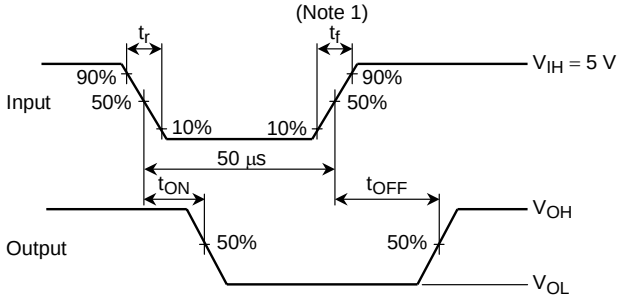


5. V_F



6. t_{ON}, t_{OFF}

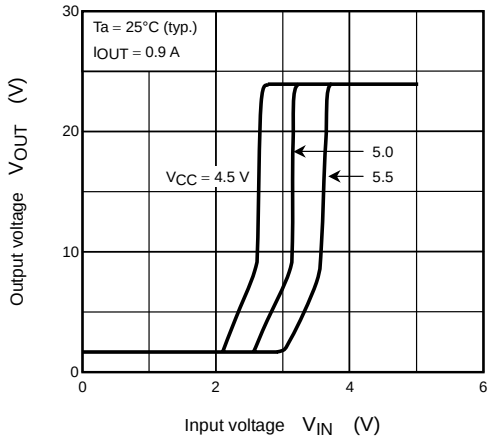




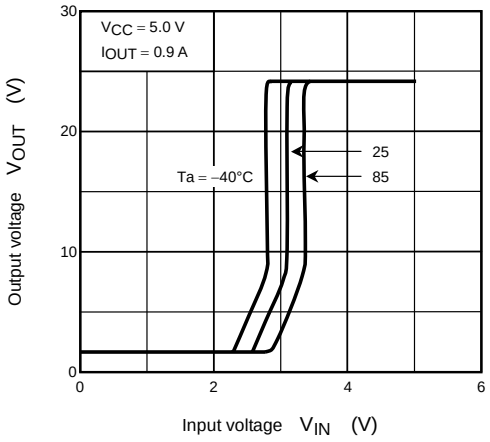
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Output Impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: C_L includes probe and jig capacitance

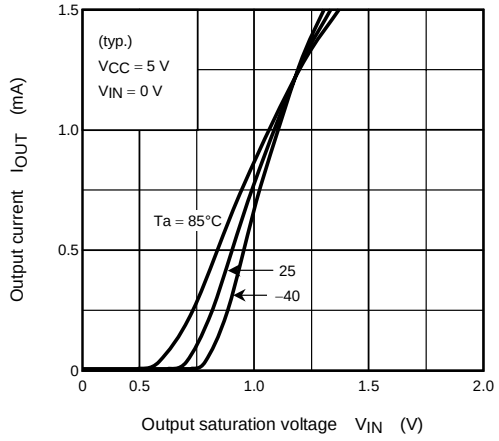
$V_{OUT} – V_{IN}$



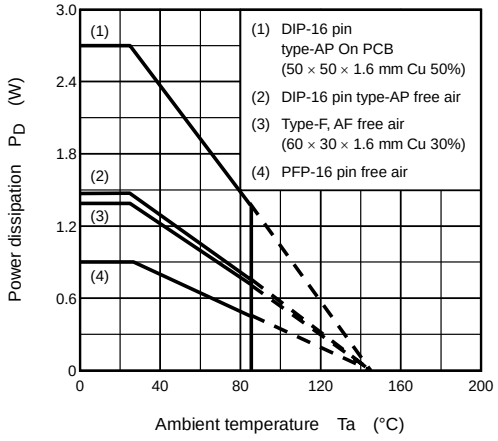
$V_{OUT} – V_{IN}$



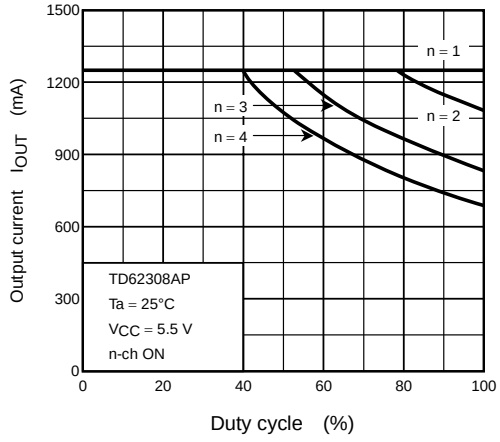
$I_{OUT} – V_{CE}$ (sat)



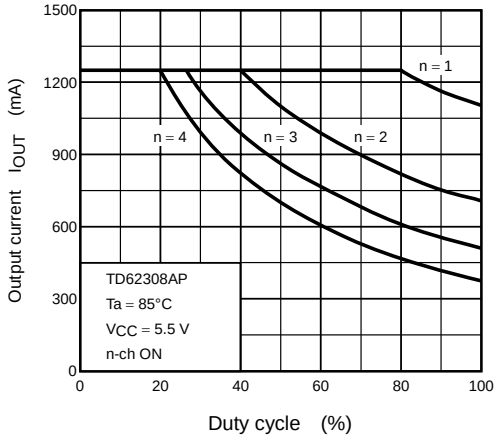
P_D – Ta



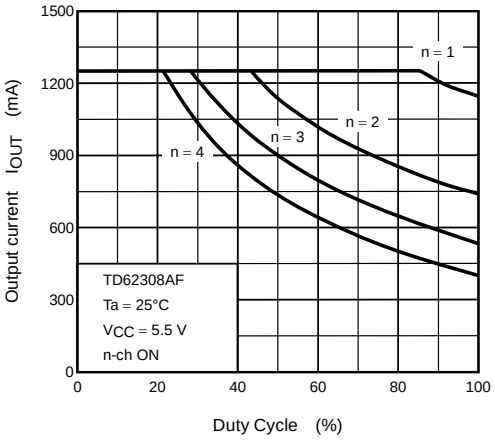
I_{OUT} – Duty cycle



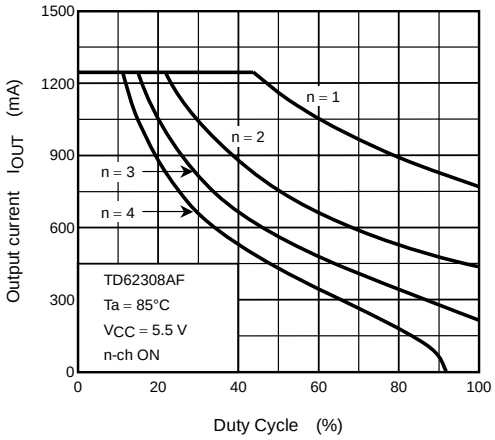
I_{OUT} – Duty cycle



I_{OUT} – Duty cycle

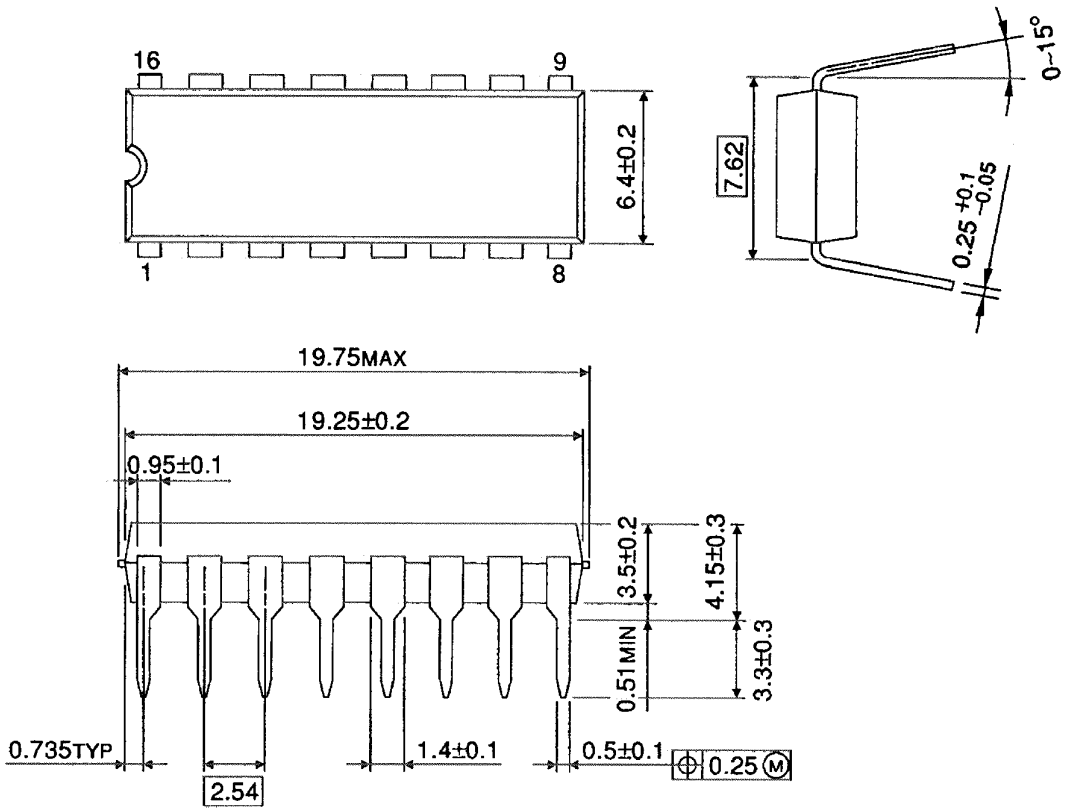


I_{OUT} – Duty cycle



Package Dimensions

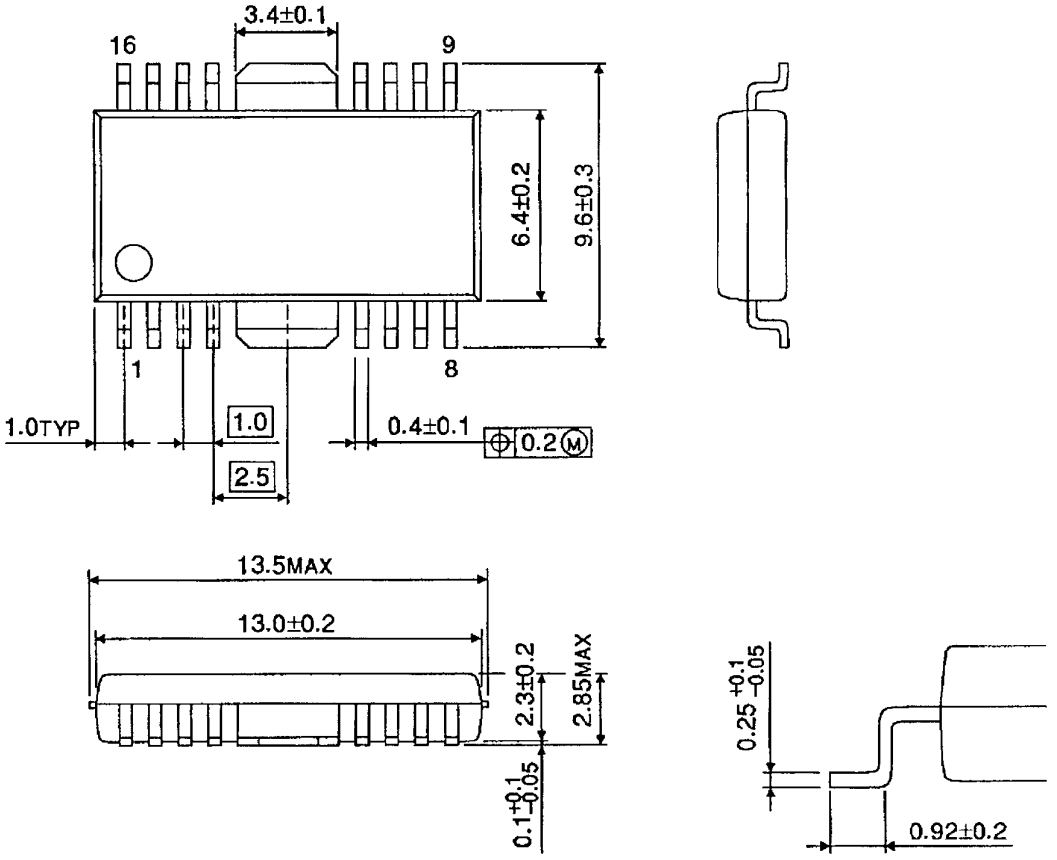
DIP16-P-300-2.54A Unit : mm



Weight: 1.11 g (typ.)

Package Dimensions

HSOP16-P-300-1.00 Unit : mm



Weight: 0.50 g (typ.)

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.