

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62304APG,TD62304AFG TD62305APG,TD62305AFG

7CH LOW ACTIVE DARLINGTON SINK DRIVER

The TD62304APG/AFG and TD62305APG/AFG are non-inverting transistor arrays, which are comprised of eight NPN darlington buffer-transistor output stages and PNP input stages.

These devices can be operated by source input voltage and are suitable for operations with a 5-V general purposed logic IC such as 5-V TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers.

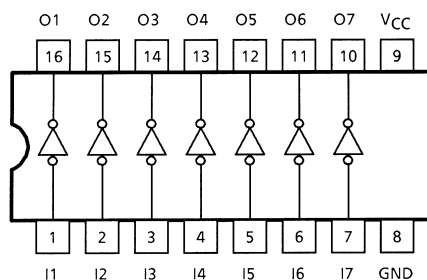
Please observe the thermal condition for using.

This devices are a product for the Pb free(Sn-Ag).

FEATURES

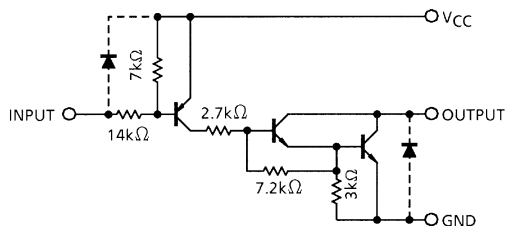
- Output current (single output) 500 mA (Max.)
- High sustaining voltage 50 V (Min.)
- Low level active input
- Input compatible with 5-V TTL and 5-V CMOS
- Package type- APG: DIP-16 pin
- Package type- AFG: SOP-18 pin

PIN CONNECTION (TOP VIEW)

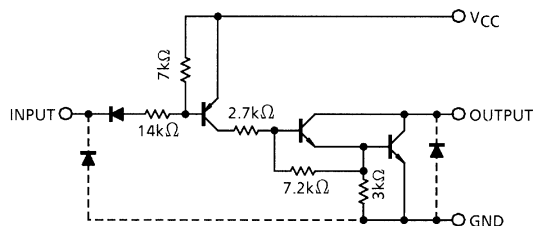


SCHEMATICS (EACH DRIVER)

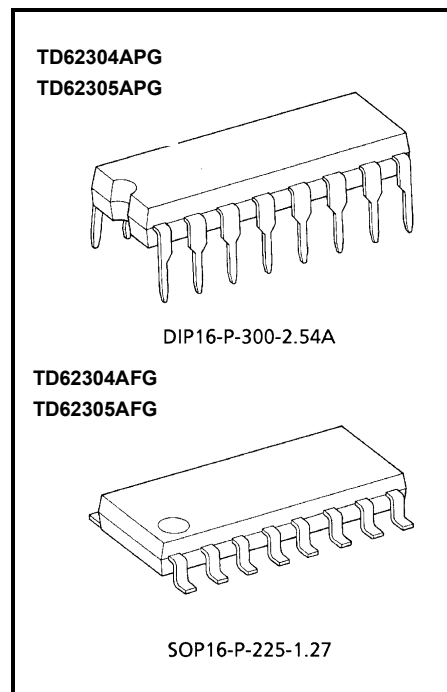
TD62304APG/AFG



TD62305APG/AFG



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



Weight
DIP16-P-300-2.54A : 1.11 g (Typ.)
SOP16-P-225-1.27 : 0.16 g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTICS		SYMBOL	RATING	UNIT
Supply Voltage		V _{CC}	-0.5~7.0	V
Output Sustaining Voltage		V _{CE (SUS)}	-0.5~50	V
Output Current		I _{OUT}	500	mA / ch
Input Voltage		V _{IN}	-22~V _{CC} +0.5	V
			-0.5~7 (Note 1)	
Input Current		I _{IN}	-10	mA
Power Dissipation	APG	P _D	1.47	W
	AFG		0.625 (Note 2)	
Operating Temperature		T _{opr}	-40~85	°C
Storage Temperature		T _{stg}	-55~150	°C

Note 1: TD62305APG / AFG

Note 2: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS (Ta = -40~85°C and Ta = -30~75°C for only Type-P)

CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT	
Supply Voltage		V _{CC}	—		4.5	5.0	5.5	V	
Output Sustaining Voltage		V _{CE (SUS)}	—		0	—	50	V	
Output Current		I _{OUT}	DC 1 Circuit		0	—	400	mA / ch	
			T _{pw} = 25 ms, duty = 10% 7 circuits		0	—	350		
			T _{pw} = 25 ms, duty = 20% 7 circuits		0	—	200		
			T _{pw} ≤ 25 ms 7 circuits T _J = 120°C Ta = 85°C (Note 1)	duty = 10%	0	—	240		
				duty = 50%	0	—	60		
Input Voltage	TD62304APG / AFG	V _{IN}	—		-20	—	V _{CC}	V	
	TD62305APG / AFG				0	—	5.5		
Power Dissipation		APG	P _D	—		—	—	0.52	W
		AFG		(Note 1)		—	—	0.325	

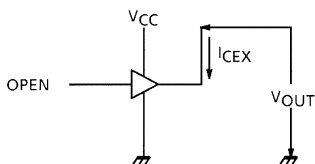
Note 1: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

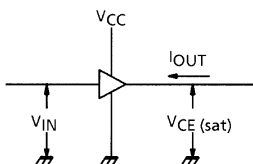
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		I _{CEX}	1	V _{CC} = 5.5 V V _{IN} = 0 V	—	—	-100	μA
Output Saturation Voltage		V _{CE (sat)}	2	V _{CC} = 4.5 V I _{OUT} = 350 mA	—	1.4	2.0	V
Input Current	(Output On)	I _{IN (ON)}	3	V _{CC} = 5.5 V, V _{IN} = 0.4 V	—	-0.32	-0.45	mA
	(Output Off)	I _{IN (OFF)}	4	V _{CC} = 5.5 V, V _{IN} = -20 V	—	—	-2.6	
Input Voltage (Output On)	TD62304	V _{IN (ON)}	5	—	—	—	V _{CC} -2.8	V
	TD62305				—	—	V _{CC} -3.7	
Supply Current	(Output On)	I _{CC (ON)}	6	V _{CC} = 5.5 V, V _{IN} = 0 V	—	17	22	mA
	(Output Off)	I _{CC (OFF)}	6	V _{CC} = V _{IN} = 5.5 V	—	—	100	
Turn-On Delay	t _{ON}	7	V _{CC} = 5 V, C _L = 15 pF	V _{OUT} = 50 V R _L = 125 Ω	—	0.1	—	μs
Turn-Off Delay	t _{OFF}			V _{OUT} = 50 V R _L = 125 Ω	—	3	—	

TEST CIRCUIT

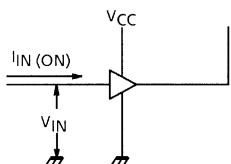
1. I_{CEX}



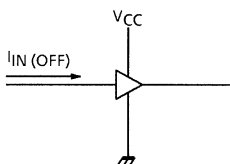
2. h_{FE} , $V_{CE(sat)}$



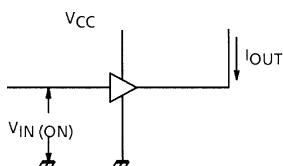
3. $I_{IN(ON)}$



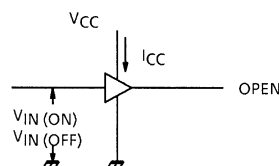
4. $I_{IN(OFF)}$



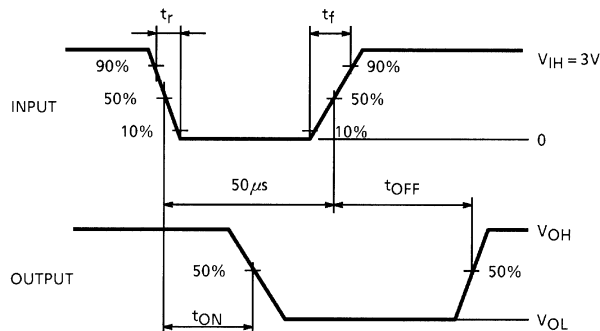
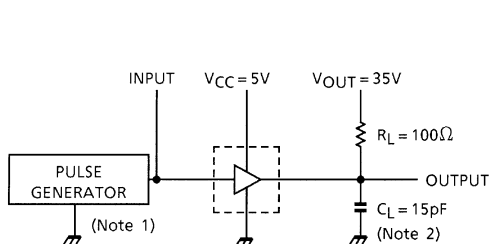
5. $V_{IN(ON)}$



6. I_{CC}



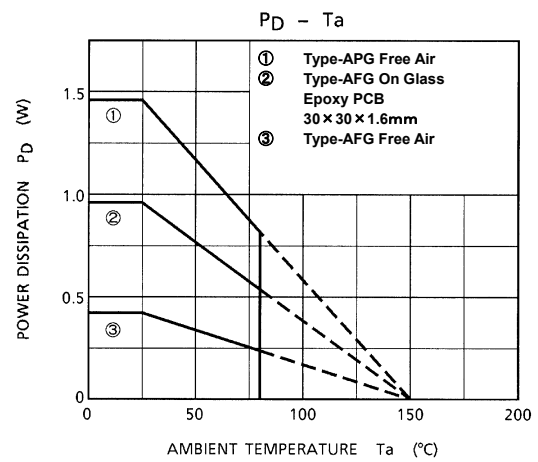
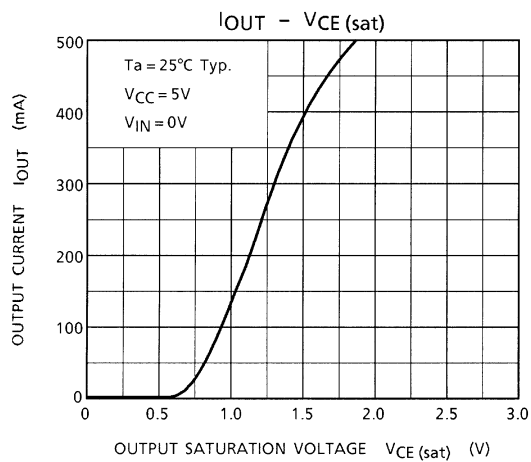
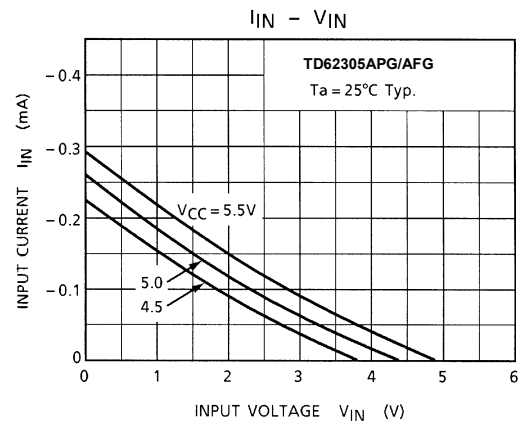
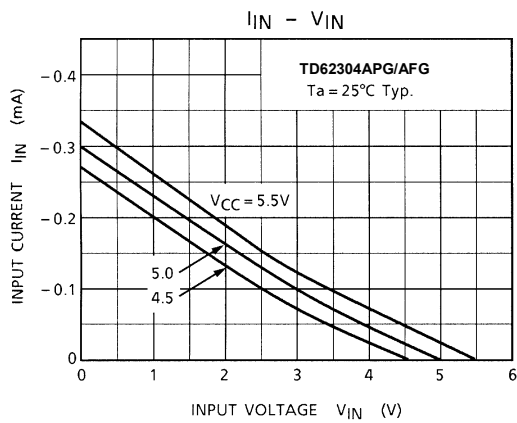
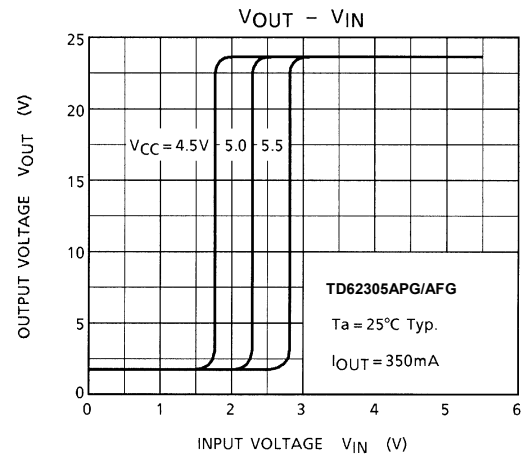
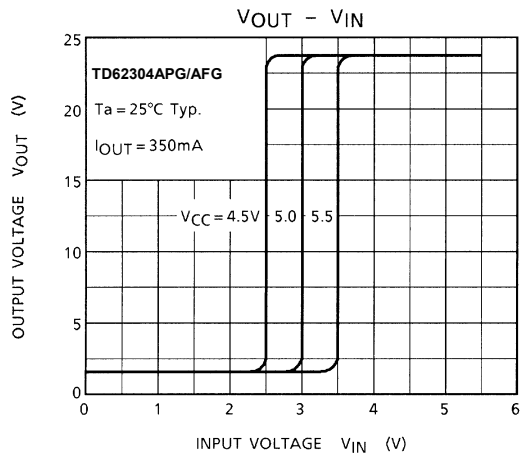
7. t_{ON} , t_{OFF}



Note 1: Pulse Width 50 μ s, duty cycle 10%
Output impedance 50 Ω , $t_r \leq 10$ ns, $t_f \leq 5$ ns
Note 2: C_L includes probe and jig capacitance.

PRECAUTIONS for USING

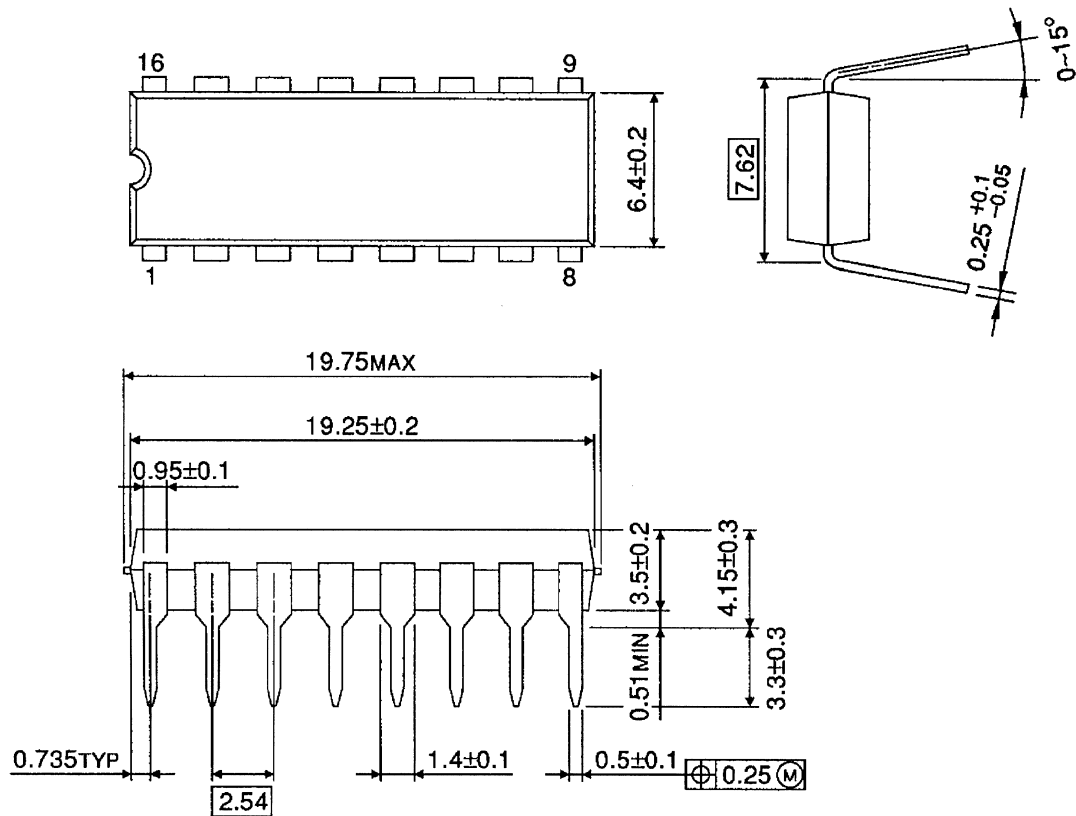
This IC does not include built-in protection circuits for excess current or overvoltage. If this IC is subjected to excess current or overvoltage, it may be destroyed. Hence, the utmost care must be taken when systems which incorporate this IC are designed. Utmost care is necessary in the design of the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



PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit : mm

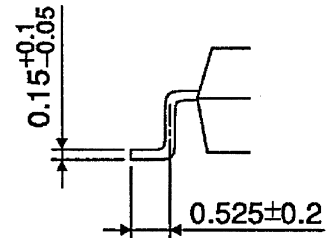
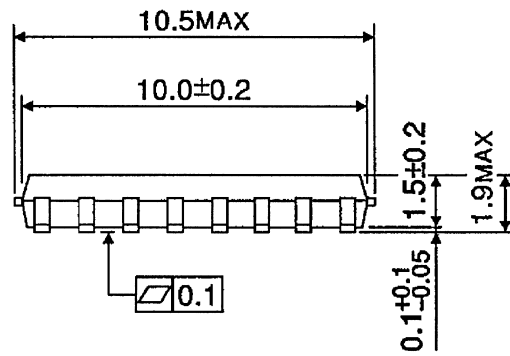
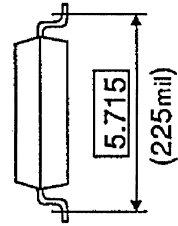
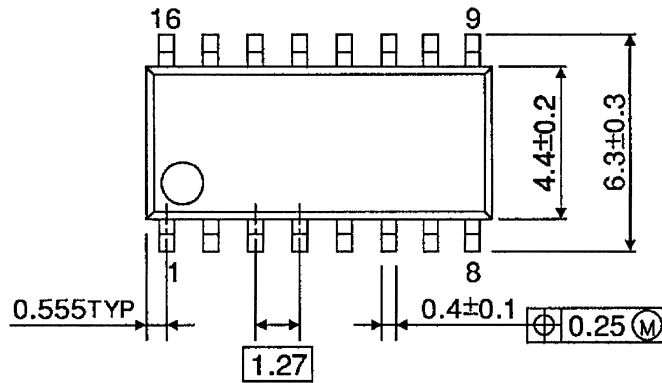


Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SOP16-P-225-1.27

Unit : mm



Weight: 0.16 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

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030619EBA

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