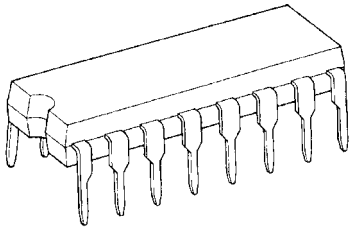
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62308APA

4CH LOW INPUT ACTIVE HIGH−CURRENT DARLINGTON SINK DRIVER

The TD62308APA is 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 TTL, 5 V CMOS and 5 V Microprocessor which have sink current output drivers.
Applications include relay, hammer, lamp and stepping moter drivers.



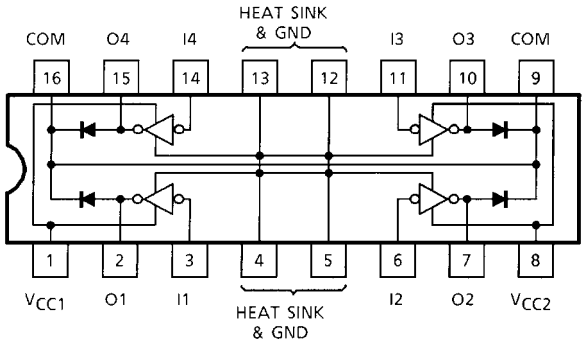
DIP16-P-300-2.54A

Weight: 1.11 g (Typ.)

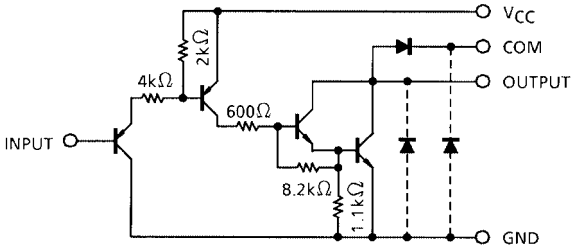
FEATURES

- 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−APA: DIP−16 pin

PIN CONNECTION (TOP VIEW)



SCHEMATICS (EACH DRIVER)



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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	−0.5~10	V
Output Sustaining Voltage	$V_{CE\ (SUS)}$	−0.5~50	V
Output Current	I_{OUT}	1.5	A / ch
Input Current	I_{IN}	−10	mA
Input Voltage	V_{IN}	−0.5~30	V
Clamp Diode Reverse Voltage	V_R	50	V
Clamp Diode Forward Current	I_F	1.5	A
Power Dissipation	P_D (Note)	1.47 / 2.7	W
Operating Temperature	T_{opr}	−40~85	°C
Storage Temperature	T_{stg}	−55~150	°C

Note: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

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

CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT
Supply Voltage		V_{CC}			4.5	—	5.0	V
Output Sustaining Voltage		$V_{CE\ (SUS)}$			0	—	50	V
Output Current		I_{OUT}	DC 1 Circuit Ta = 25°C		0	—	1250	mA / ch
			T_{pw} ≤ 25 ms 4 Circuits Ta = 85°C T_j = 120°C	Duty = 10%	0	—	1250	
				Duty = 50%	0	—	700	
Input Voltage		V_{IN}			0	—	25	V
	Output On	$V_{IN\ (ON)}$			0	—	V_{CC} −3.6	
	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		P_D	Ta = 85°C	(Note)	—	—	1.4	W

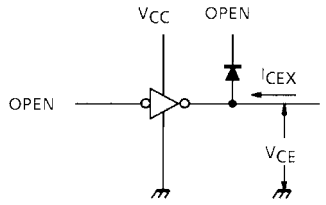
Note: On Glass Epoxy (50 × 50 × 1.6 mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

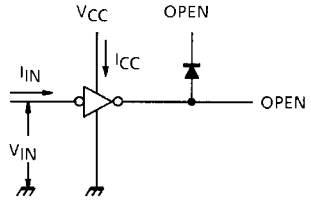
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		I_{CEX}	1	V_{CE} = 50 V, Ta = 25°C	—	—	50	μA
				V_{CE} = 50 V, Ta = 85°C	—	—	100	
Output Saturation Voltage		$V_{CE\ (sat)}$	3	I_{OUT} = 1.25 A	—	—	1.8	V
				I_{OUT} = 0.7 A	—	—	1.3	
Input Voltage	"H" Level	V_{IH}	—		V_{CC} −1.6	—	25	V
	"L" Level	V_{IL}			—	—	V_{CC} −3.6	
Input Current	"H" Level	I_{IH}	2		—	—	10	μA
	"L" Level	I_{IL}			—	−0.05	−0.36	mA
Clamp Diode Reverse Current		I_R	4	V_R = 50 V, Ta = 25°C	—	—	50	μA
				V_R = 50 V, Ta = 85°C	—	—	100	
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}	—	—	10	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}			—	5.0	—	

TEST CIRCUIT

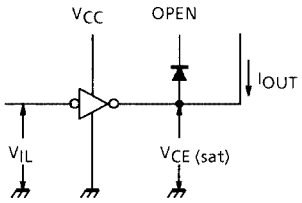
1. I_{CEX}



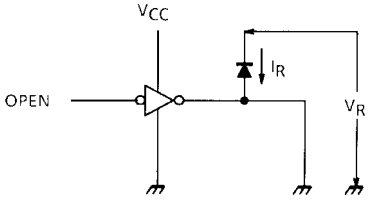
2. I_{CC}



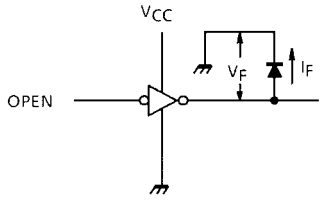
3. $V_{CE\ (sat)}$



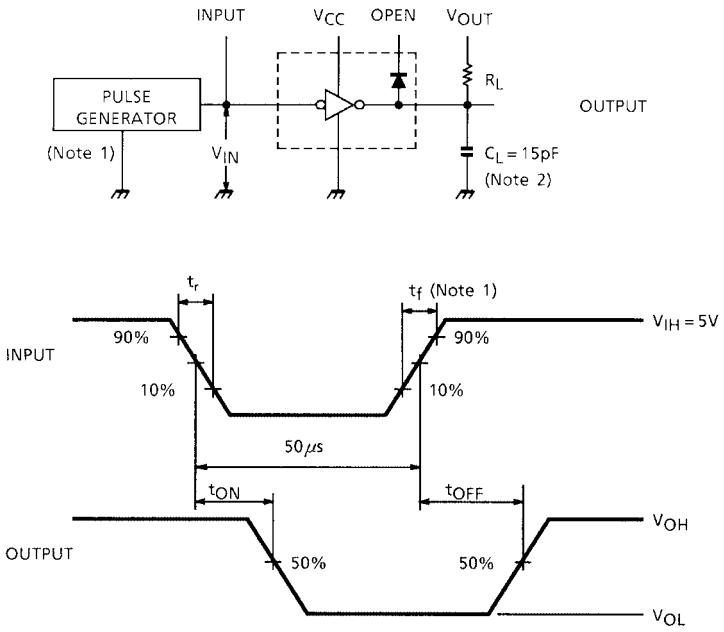
4. I_R



5. V_F



6. t_{ON}, t_{OFF}

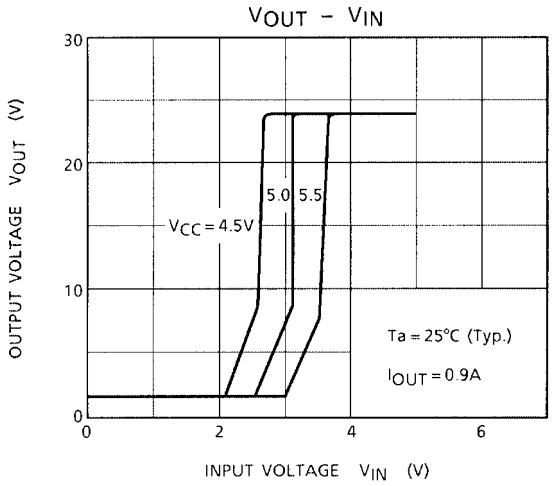


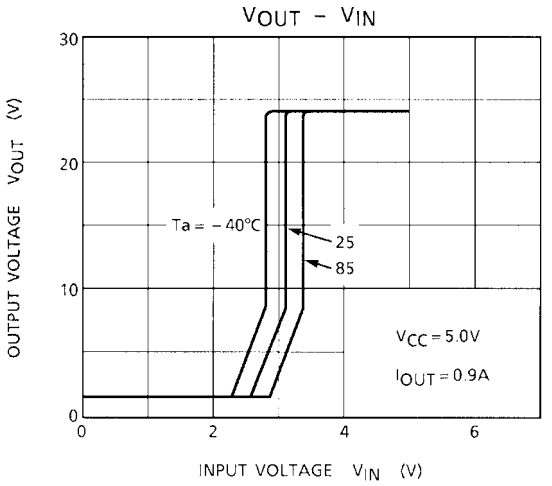
Note 1: Pulse width 50 μs, duty cycle 10%
Output impedance 50 Ω tr ≤ 5 ns, tf ≤ 10 ns

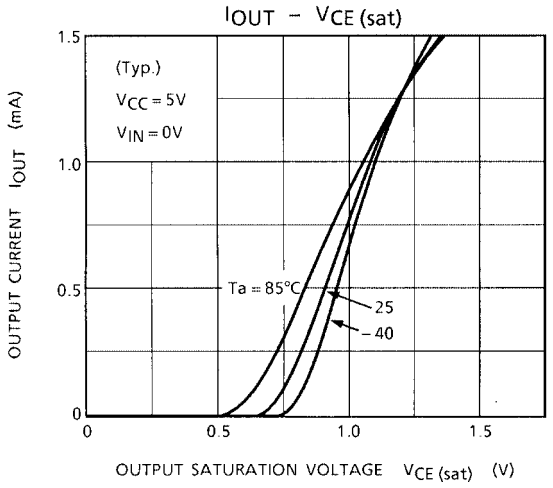
Note 2: C_L includes probe and jig capacitance.

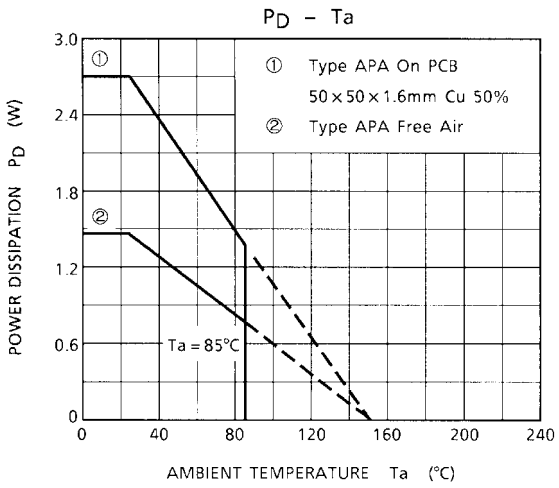
PRECAUTIONS for USING

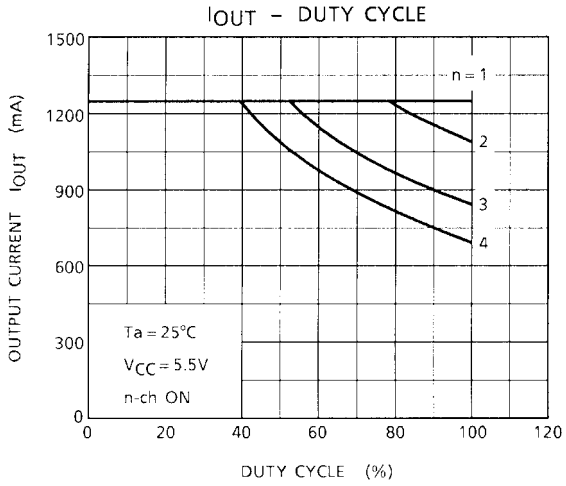
This IC does not include built-in protection circuits for excess current or overvoltage.
If this IC is subjected to excess current or overvoltage, it may be destroyed.
Hence, the utmost care must be taken when systems which incorporate this IC are designed.
Utmost care is necessary in the design of the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

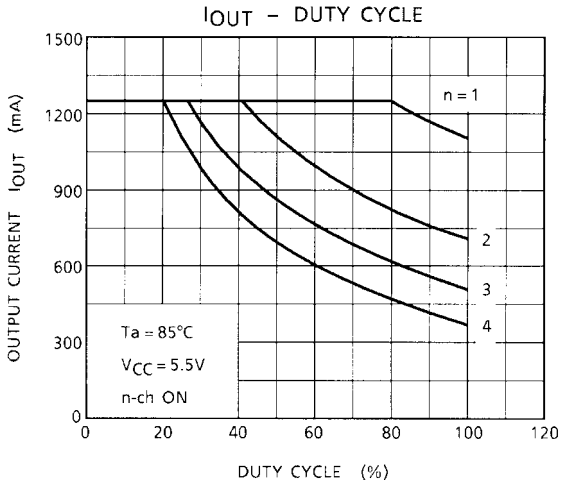

VOUT – VIN
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)
VCC = 4.5V
5.0
5.5
Ta = 25°C (Typ.)
IOUT = 0.9A


VOUT – VIN
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)
Ta = – 40°C
25
85
VCC = 5.0V
IOUT = 0.9A


IOUT – VCE (sat)
OUTPUT CURRENT IOUT (mA)
OUTPUT SATURATION VOLTAGE VCE (sat) (V)
(Typ.)
VCC = 5V
VIN = 0V
Ta = 85°C
25
– 40

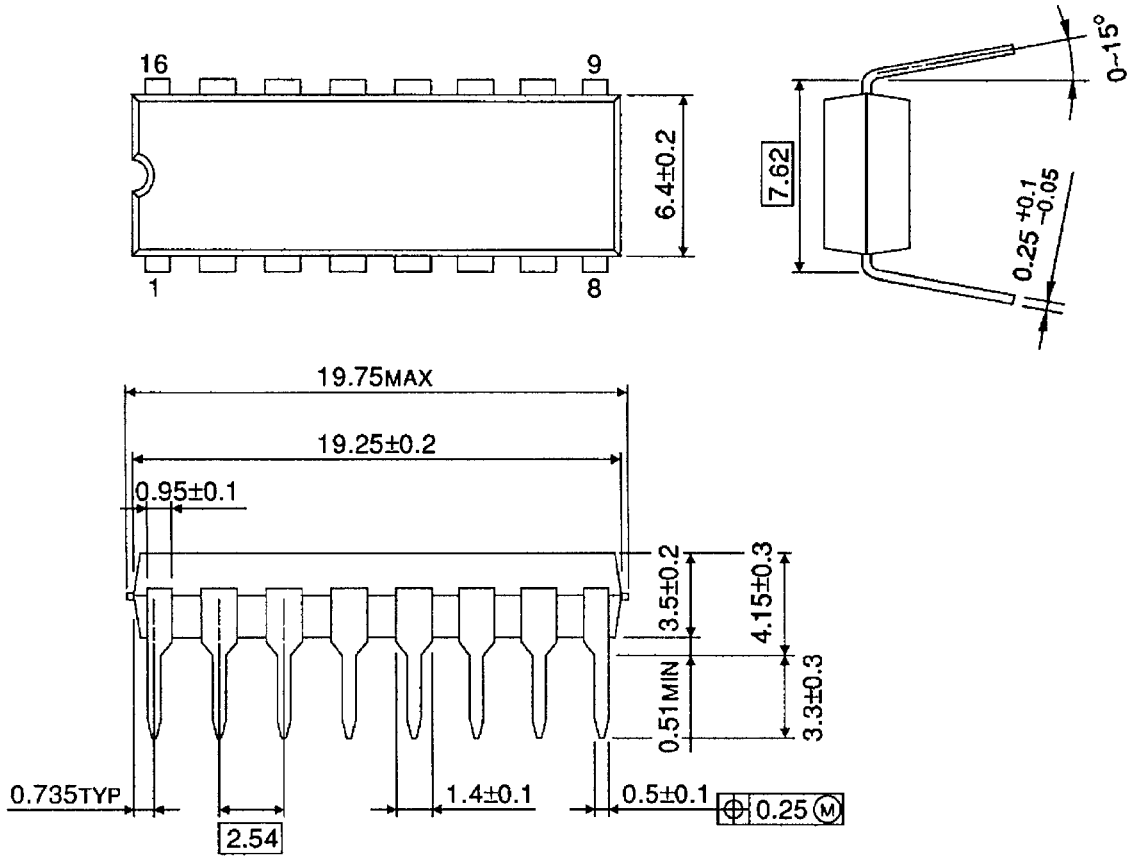

PD – Ta
POWER DISSIPATION PD (W)
AMBIENT TEMPERATURE Ta (°C)
① Type APA On PCB
50 × 50 × 1.6mm Cu 50%
② Type APA Free Air
Ta = 85°C


IOUT – DUTY CYCLE
OUTPUT CURRENT IOUT (mA)
DUTY CYCLE (%)
n = 1
2
3
4
Ta = 25°C
VCC = 5.5V
n-ch ON


IOUT – DUTY CYCLE
OUTPUT CURRENT IOUT (mA)
DUTY CYCLE (%)
n = 1
2
3
4
Ta = 85°C
VCC = 5.5V
n-ch ON

PACKAGE DIMENSIONS

DIP16−P−300−2.54A Unit: mm



Weight: 1.11 g (Typ.)

RESTRICTIONS ON PRODUCT USE

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