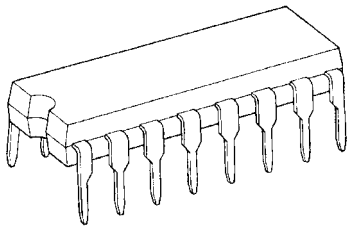
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62706P−H,TD62706FA−H

6CH HIGH−VOLTAGE SOURCE−CURRENT DRIVER

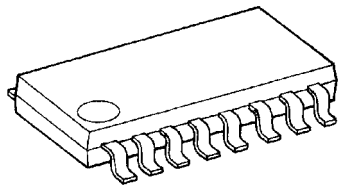
The TD62706P−H and TD62706FA−H are comprised of six source current Transistor Arrays.
These drivers are specifically designed for fluorescent display applications.
For proper operation, the substrate (SUB) must be connected to the most negative voltage.
Please observe the thermal condition for using.

TD62706P-H



DIP16-P-300-2.54A

TD62706FA-H



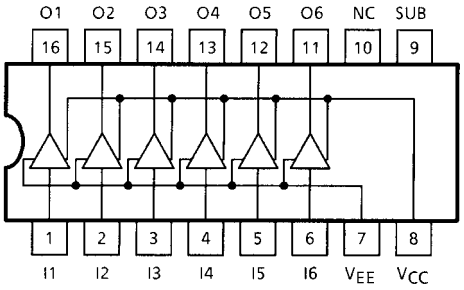
SSOP16-P-225-1.00A

Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
SSOP16−P−225−1.00A : 0.14 g (Typ.)

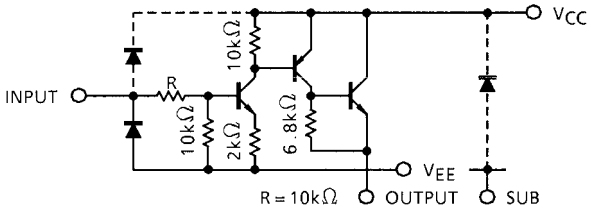
FEATURES

- Package Type
  P−H Type : DIP16pin
  FA−H Type : SSOP16pin (1.0 mm pitch)
- High Output Voltage
  : $V_{CC} - V_{OUT} = 60$ V (MIN)
- Output Current (Single Output)
  : $I_{OUT} = -50$ mA (MAX)
- Input Compatible with Various Types of Logic
  : $R_{IN} = 10$ kΩ
- Wide operating temperature range. : $T_{opr} = -40 \sim 105°C$

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)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}−V_{EE}	30	V
	V_{CC}−V_{SUB}	60	
Output Voltage	V_{CC}−V_{OUT}	60	V
Input Voltage	V_{IN}−V_{EE}	V_{CC}−V_{EE}	V
Output Current	I_{OUT}	−50	mA / ch
Input Current	I_{IN}	±10	mA
Power Dissipation	P_D (Note 1)	1.0	W
	P_D (Note 2)	0.78	
Operating Temperature	T_{opr}	−40~105	°C
Storage Temperature	T_{stg}	−55~150	°C

Note 1: TD62706P−H : Delated above 25°C in the proportion of 8.0 mw / °C.
Note 2: TD62706FA−H : On Glass Epoxy PCB (50. × 50 × 1.6 mm Cu 40%).
Delated above 25°C in the proportion of 6.2 mw / °C.

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Power Supply Voltage	V_{CC}	V_{EE} = 0 V	4.5	—	25	V
	V_{SUB}	V_{CC} = 0 V	V_{OUT}	—	−55	
Output Voltage	V_{OUT}	V_{CC} = 0 V	0	—	−55	V
Output Current	I_{OUT}	—	0	—	−40	mA / ch
Input Voltage	V_{IN}	V_{EE} = 0 V, V_{CC} = 25 V	0	—	7	V
Power Dissipation	P_D	TD62706P−H	—	—	0.52	W
		TD62706FA−H when mounting	—	—	0.4	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MA	UNIT
Input Voltage	"H" Level	V_{IH}	1	V_{EE} = 0 V	2.2	—	—	V
	"L" Level	V_{IL}		V_{EE} = 0 V	—	—	0.8	
Input Current	"H" Level	I_{IH}	2	V_{EE} = 0 V, V_{IN} = 2.4 V	—	0.12	0.18	mA
	"L" Level	I_{IL}		V_{EE} = V_{IN} = 0V, V_{CC} = 25 V	—	—	±1	μA
Output Leakage Current		I_{CEX}	3	V_{EE} = 0 V, V_{CC} = 25 V V_{IN} = $V_{IL\ MAX.}$, V_{OUT} = −30 V	—	—	−100	μA
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	4	V_{EE} = 0 V, V_{CC} = $V_{CC\ MIN.}$ V_{IN} = $V_{IH\ MIN.}$ I_{OUT} = −40 mA	—	—	V_{CC} −2.5	V
Supply Current (Output On)		$I_{CC\ (ON)}$	1	V_{EE} = 0 V, V_{CC} = 25 V V_{IN} = $V_{IH\ MAX.}$ OUTPUT = OPEN	—	—	25	mA
Turn−On Delay		t_{ON}	5	R_L = 1.4 kΩ C_L = 15 pF	—	0.2	—	μs
Turn−Off Delay		t_{OFF}			—	1.5	—	

RECOMMENDED OPERATING CONDITIONS (Ta = −40~105°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN	TYP.	MAX	UNIT
Power Supply Voltage	V_{CC}	V_{EE} = 0 V		4.5	—	25	V
	V_{SUB}	V_{CC} = 0 V		V_{OUT}	—	−55	
Output Voltage	V_{OUT}	V_{CC} = 0 V		0	—	−55	V
Output Current	I_{OUT}	2 Circuits Parallel ON	TD62706P−H	0	—	−40	mA / ch
			TD62706FA−H	0	—	−40	
		4 Circuits Parallel ON	TD62706P−H	0	—	−37	
			TD62706FA−H	0	—	−30	
		6 Circuits Parallel ON	TD62706P−H	0	—	−15	
			TD62706FA−H	0	—	−25	
Input Voltage	V_{IN}	V_{EE} = 0 V, V_{CC} = 25 V		0	—	7	V
Power Dissipation	P_D	TD62706P−H		—	—	0.36	W
		TD62706FA−H when mounting		—	—	0.28	

ELECTRICAL CHARACTERISTICS (Ta = 105°C): TD62706P−H

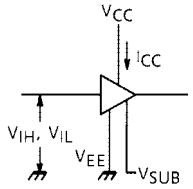
CHARACTERISTIC		SYMBOL	TEST CIR−CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level	V_{IH}	1	V_{EE} = 0 V	1.8	—	—	V
	"L" Level	V_{IL}		V_{EE} = 0 V	—	—	0.6	
Input Current	"H" Level	I_{IH}	2	V_{EE} = 0 V, V_{IN} = 2.4V	—	0.12	0.18	mA
	"L" Level	I_{IL}		V_{EE} = V_{IN} = 0 V, V_{CC} = 25 V	—	—	±10	μA
Output Leakage Current		I_{CEX}	3	V_{EE} = 0 V, V_{CC} = 25 V V_{IN} = $V_{IL\ MAX.}$ V_{OUT} = −30 V	—	—	−300	μA
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	4	V_{EE} = 0 V, V_{CC} = $V_{CC\ MIN.}$ V_{IN} = $V_{IH\ MIN.}$ I_{OUT} = −40 mA	—	—	V_{CC} −2.5	V
Supply Current (Output On)		$I_{CC\ (ON)}$	1	V_{EE} = 0 V, V_{CC} = 25 V V_{IN} = $V_{IH\ MAX.}$ OUTPUT = OPEN	—	—	25	mA
Turn−On Delay		t_{ON}	5	R_L = 1.4 kΩ, Single circuit C_L = 15 pF	—	0.4	—	μs
Turn−Off Delay		t_{OFF}			—	3.0	—	

ELECTRICAL CHARACTERISTICS (Ta = 105°C): TD62706A−H

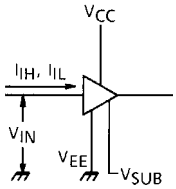
CHARACTERISTIC		SYMBOL	TEST CIR−CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level	V_{IH}	1	V_{EE} = 0 V	1.8	—	—	V
	"L" Level	V_{IL}		V_{EE} = 0 V	—	—	0.6	
Input Current	"H" Level	I_{IH}	2	V_{EE} = 0 V, V_{IN} = 2.4V	—	0.12	0.18	mA
	"L" Level	I_{IL}		V_{EE} = V_{IN} = 0 V, V_{CC} = 25 V	—	—	±10	μA
Output Leakage Current		I_{CEX}	3	V_{EE} = 0 V, V_{CC} = 25 V V_{IN} = $V_{IL\ MAX.}$ V_{OUT} = −30 V	—	—	−300	μA
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	4	V_{EE} = V_{SUB} = 0 V V_{CC} = $V_{CC\ MIN.}$ V_{IN} = $V_{IH\ MIN.}$ I_{OUT} = −25mA	—	—	V_{CC} −1.1	V
Supply Current (Output On)		$I_{CC\ (ON)}$	1	V_{EE} = V_{SUB} = 0 V V_{CC} = 16 V V_{IN} = $V_{IH\ MAX.}$ OUTPUT = OPEN	—	—	10	mA
Turn−On Delay		t_{ON}	5	R_L = 1.4 kΩ, Single circuit C_L = 15 pF	—	0.4	—	μs
Turn−Off Delay		t_{OFF}			—	3.0	—	

TEST CIRCUIT

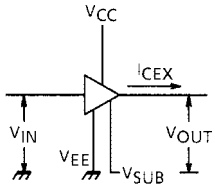
1. V_{IH}, V_{IL}, I_{CC}



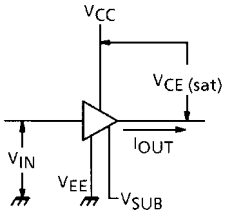
2. I_{IH}, I_{IL}



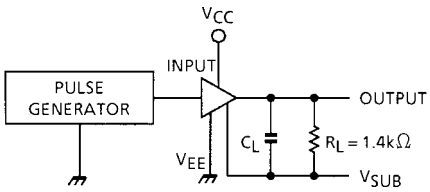
3. I_{CEX}



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



5. t_{ON}, t_{OFF}



C_L = 15 pF
(Includes probe and jig capacitance)

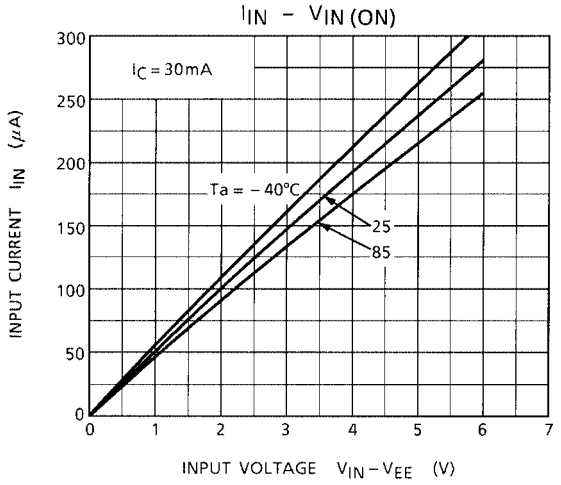
Input condition

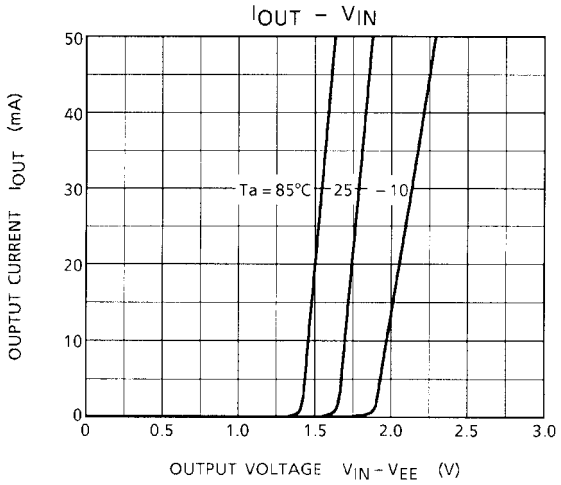
	V_{IN}	V_{CC}	V_{SUB}
TD62706	0 − 3 V	25 V	−30

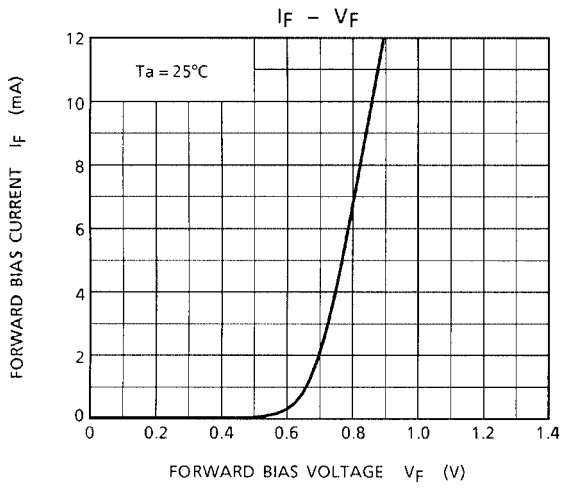
V_{IN}: Pulse Width 50 μs
Duty Cycle 50%
$t_r \leq 5$ ns
$t_f \leq 10$ ns

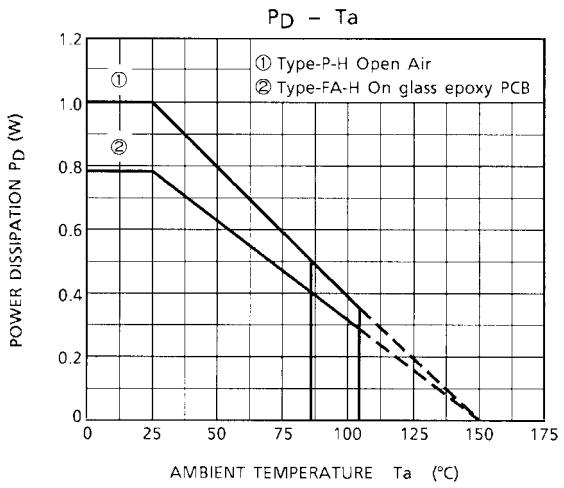
PRECAUTIONS for USING

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 (SUB, V_{EE}) line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.


I_{IN} – $V_{IN\,(ON)}$
I_C = 30mA
Ta = – 40°C
25
85
INPUT CURRENT I_{IN} (μA)
INPUT VOLTAGE $V_{IN} - V_{EE}$ (V)

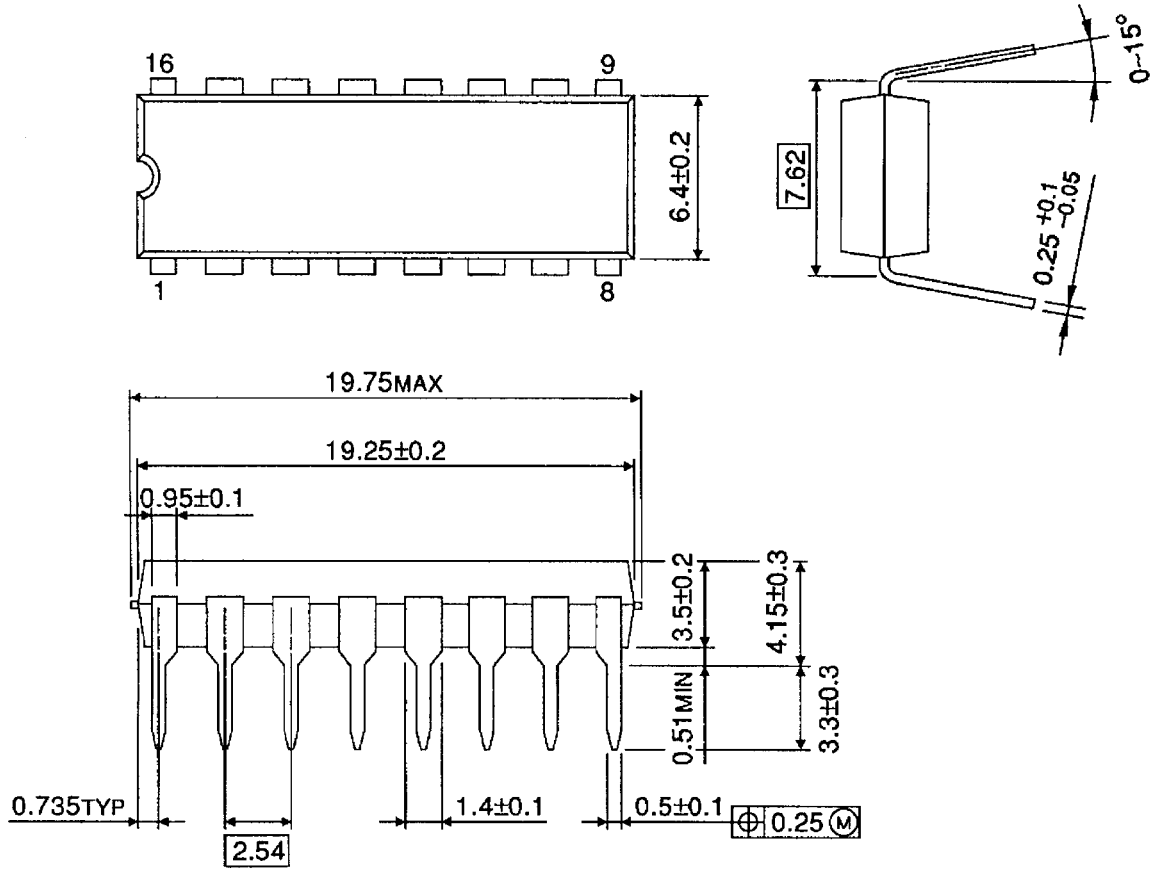

I_{OUT} – V_{IN}
Ta = 85°C
25
– 10
OUPTUT CURRENT I_{OUT} (mA)
OUTPUT VOLTAGE $V_{IN} - V_{EE}$ (V)


I_F – V_F
Ta = 25°C
FORWARD BIAS CURRENT I_F (mA)
FORWARD BIAS VOLTAGE V_F (V)


P_D – Ta
① Type-P-H Open Air
② Type-FA-H On glass epoxy PCB
POWER DISSIPATION P_D (W)
AMBIENT TEMPERATURE Ta (°C)

PACKAGE DIMENSIONS

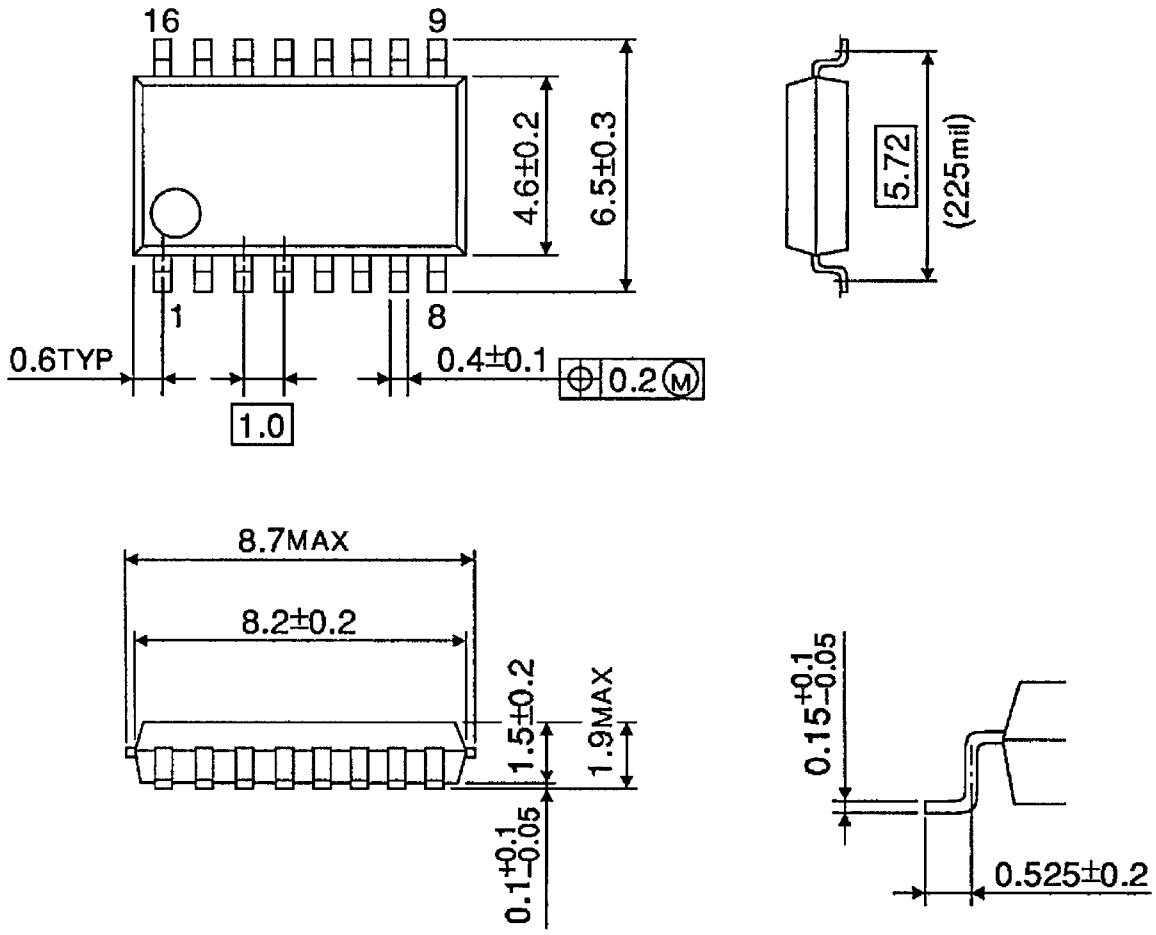
DIP16−P−300−2.54A Unit: mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SSOP16−P−225−1.00A Unit: mm



Weight: 0.14 g (Typ.)

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000707EBA

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