

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

## TD62705P,TD62705F,TD62706P,TD62706F

### 6CH HIGH-VOLTAGE SOURCE DRIVER

The TD62705P, TD62705F and TD62706P, TD62706F are comprised of six source current transistor array.

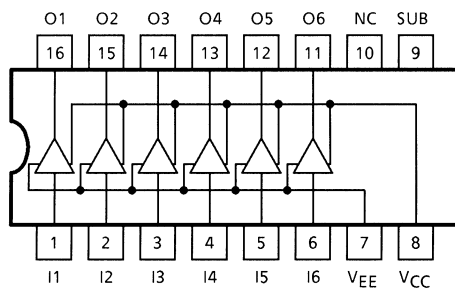
These drivers are specifically designed for fluorescent display applications.

For proper operation, the substrate (SUB) must be connected to the most negative voltage.

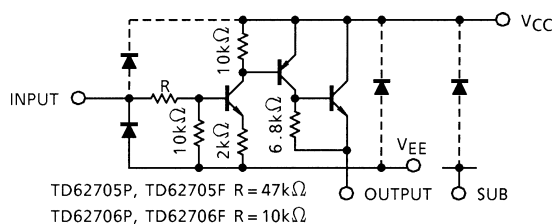
### FEATURES

- High output voltage :  $V_{CC} - V_{OUT} = 60 \text{ V (Min)}$
- Output current (single output) :  $I_{OUT} = -50 \text{ mA (Max)}$
- Input compatible with various types of logic  
 TD62705P, TD62705F  $R_{IN} = 47 \text{ k}\Omega$  : 6~25 V PMOS, CMOS  
 TD62706P, TD62706F  $R_{IN} = 10 \text{ k}\Omega$  : TTL, 5 V CMOS
- Package type-P: DIP-16 pin
- Package type-F: SOP-16 pin

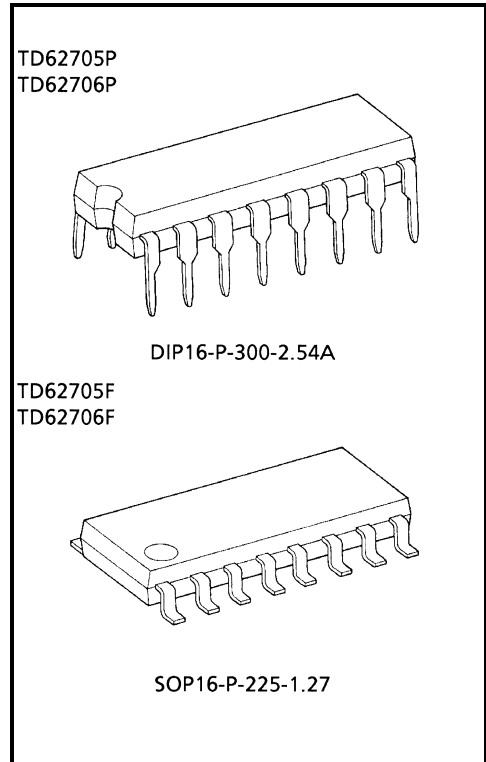
### PIN CONNECTION (TOP VIEW)



### SCHEMATICS (EACH DRIVER)



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)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
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	$P_D$ (Note 2)	1.0	W
	F		0.625 (Note 1)	
Operating Temperature		$T_{opr}$	-40~85	°C
Storage Temperature		$T_{stg}$	-55~150	°C

Note 1: On Glass Epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

Note 2: Delated above 25°C in the proportion 8.0 mw / °C (P Type), 5.0 mw / °C (F Type).

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage	TD62705P TD62705F	$V_{CC}$	$V_{EE} = 0\text{ V}$	6.0	—	25	V
	TD62706P TD62706F			4.5	—	25	
		$V_{SUB}$	$V_{CC} = 0\text{ V}$	$V_{OUT}$	—	-55	
Output Voltage		$V_{OUT}$	$V_{CC} = 0\text{ V}$	0	—	-55	V
Output Current		$I_{OUT}$	—	0	—	-40	mA / ch
Input Voltage	TD62705P TD62705F	$V_{IN}$	$V_{EE} = 0\text{ V}, V_{CC} = 25\text{ V}$	0	—	25	V
	TD62706P TD62706F			0	—	7	
Power Dissipation	P	$P_D$	—	—	—	0.36	W
	F		On PCB (Note)	—	—	0.325	

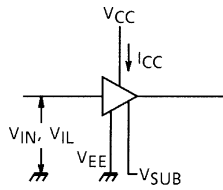
Note: On Glass Epoxy PCB (50 × 50 × 1.6 mm, Cu 50%)

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

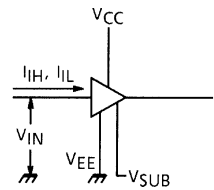
CHARACTERISTIC			SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level	TD62705P TD62705F	V <sub>IH</sub>	1	V <sub>EE</sub> = 0 V	6.0	—	—	V
		TD62706P TD62706F			V <sub>EE</sub> = 0 V	2.2	—	—	
	"L" Level	TD62705P TD62705F	V <sub>IL</sub>	1	V <sub>EE</sub> = 0 V	—	—	2.2	
		TD62706P TD62706F			V <sub>EE</sub> = 0 V	—	—	0.8	
Input Current	"H" Level	TD62705P TD62705F	I <sub>IH</sub>	2	V <sub>EE</sub> = 0 V, V <sub>IN</sub> = 6.0 V	—	0.11	0.16	mA
		TD62706P TD62706F			V <sub>EE</sub> = 0 V, V <sub>IN</sub> = 2.4 V	—	0.12	0.18	
	"L" Level		I <sub>IL</sub>	2	V <sub>EE</sub> = V <sub>IN</sub> = 0 V, V <sub>CC</sub> = 25 V	—	—	±1	μA
Output Leakage Current			I <sub>CEX</sub>	3	V <sub>EE</sub> = 0 V, V <sub>CC</sub> = 25 V V <sub>IN</sub> = V <sub>IL</sub> MAX. I <sub>OUT</sub> = -30 V	—	—	-100	μA
Collector-Emitter Saturation Voltage			V <sub>CE (sat)</sub>	4	V <sub>EE</sub> = 0 V, V <sub>CC</sub> = V <sub>CC</sub> MIN. V <sub>IN</sub> = V <sub>IH</sub> MIN. I <sub>OUT</sub> = -40 mA	—	—	V <sub>CC</sub> - 2.5	V
Supply Current (Output On)		TD62705P TD62705F	I <sub>CC</sub>	1	V <sub>EE</sub> = 0 V, V <sub>CC</sub> = 25 V V <sub>IN</sub> = V <sub>IN</sub> MAX. I <sub>OUT</sub> = 0 mA	—	—	32	mA
		TD62706P TD62706F				—	—	25	
Turn-On Delay			t <sub>ON</sub>	5	R <sub>L</sub> = 1.4 kΩ, C <sub>L</sub> = 15 pF	—	0.2	—	μs
Turn-Off Delay			t <sub>OFF</sub>			—	1.5	—	μs

TEST CIRCUIT

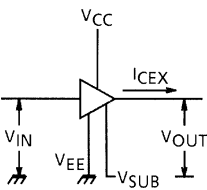
1.  $V_{IH}$ ,  $V_{IL}$ ,  $I_{CC}$



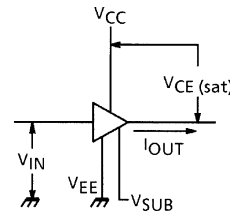
2.  $I_{IH}$ ,  $I_{IL}$



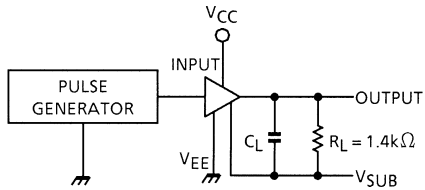
3.  $I_{CEX}$



4.  $V_{CE(sat)}$



5.  $t_{ON}$ ,  $t_{OFF}$



$C_L = 15\text{ pF}$   
(Includes probe and jig capacitance)

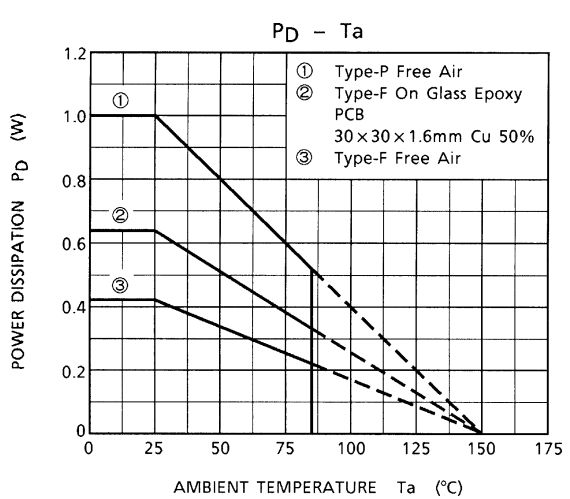
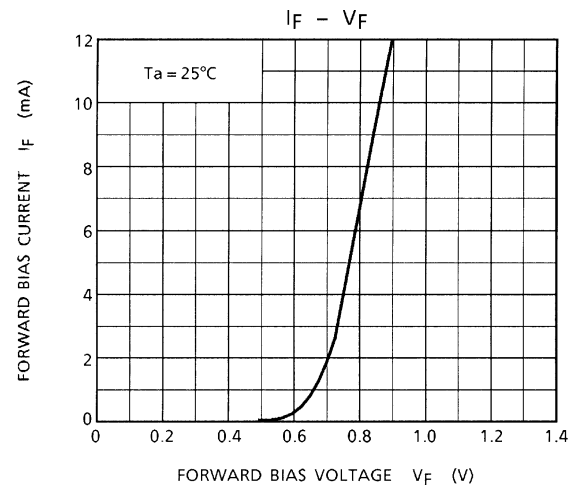
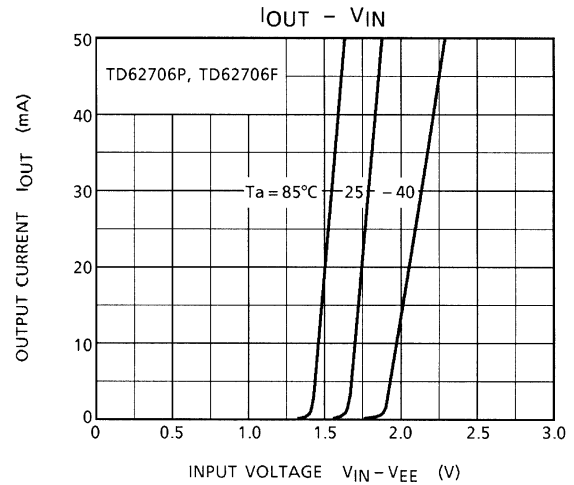
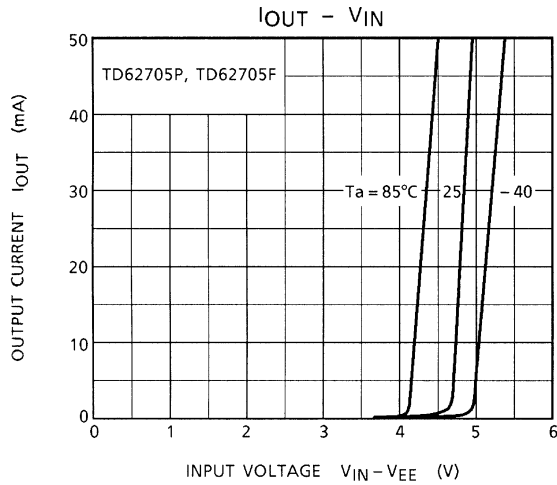
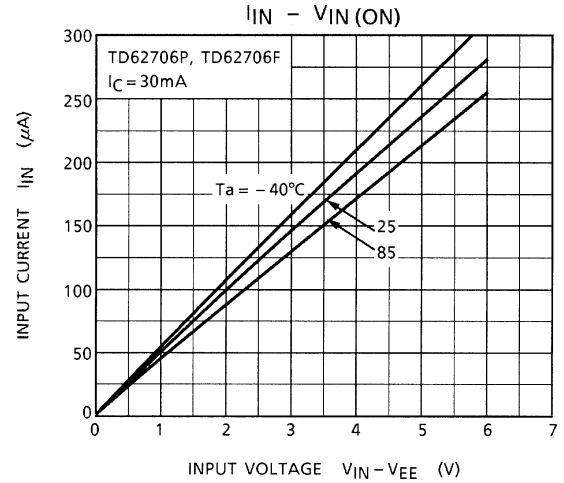
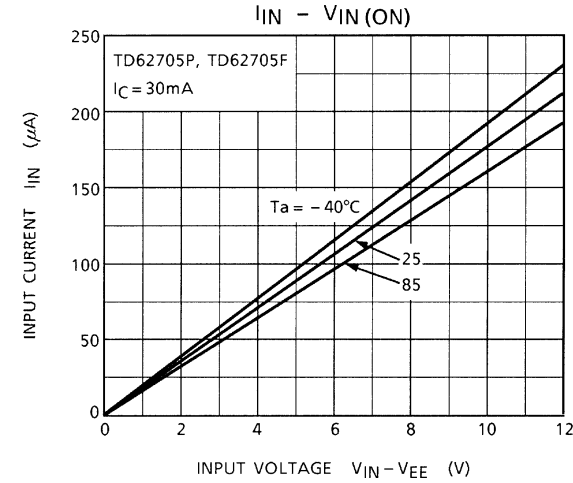
INPUT CONDITION

TYPE NAME	$V_{IN}$	$V_{CC}$	$V_{SUB}$
TD62705P, TD62705F	0–9V	25V	–30
TD62706P, TD62706F	0–3V	25V	–30

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

PRECAUTIONS for USING

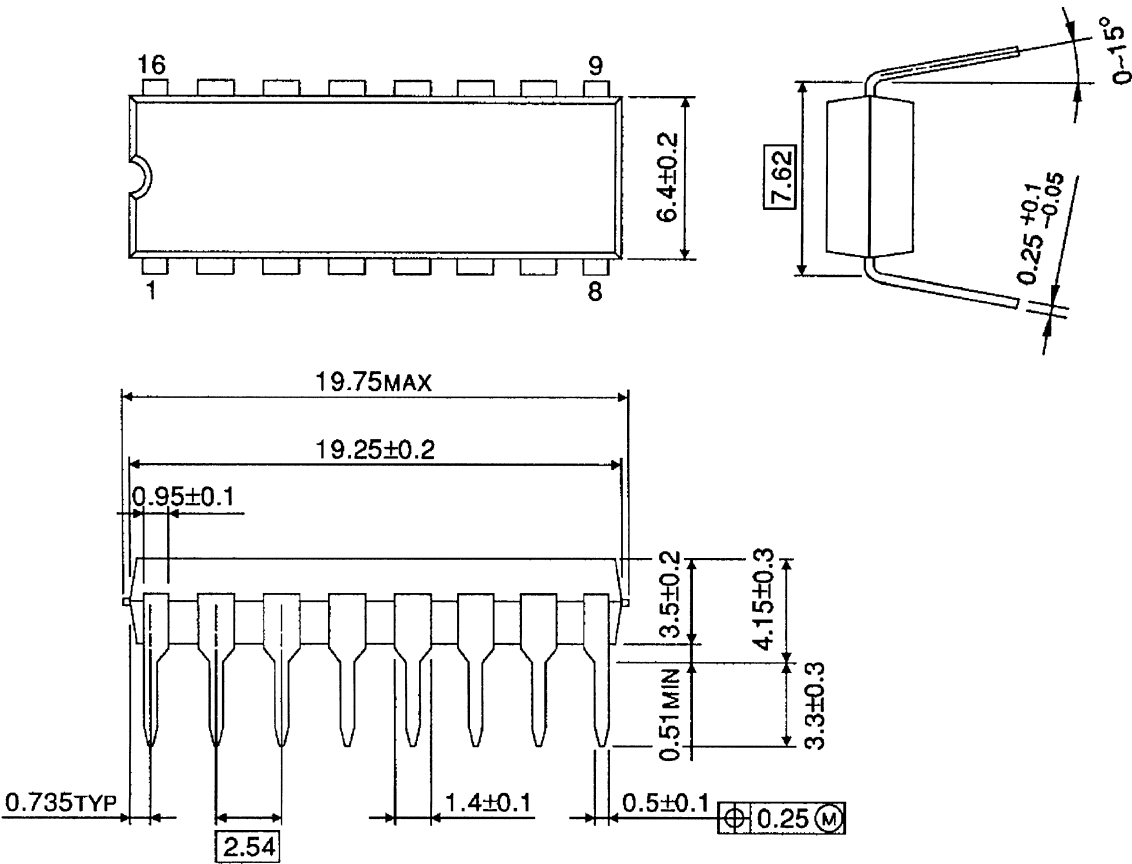
This IC does not integrate protection circuits such as overcurrent and overvoltage protectors. Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC. Utmost care is necessary in the design of 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.



PACKAGE DIMENSIONS

DIP16-P-300-2.54A

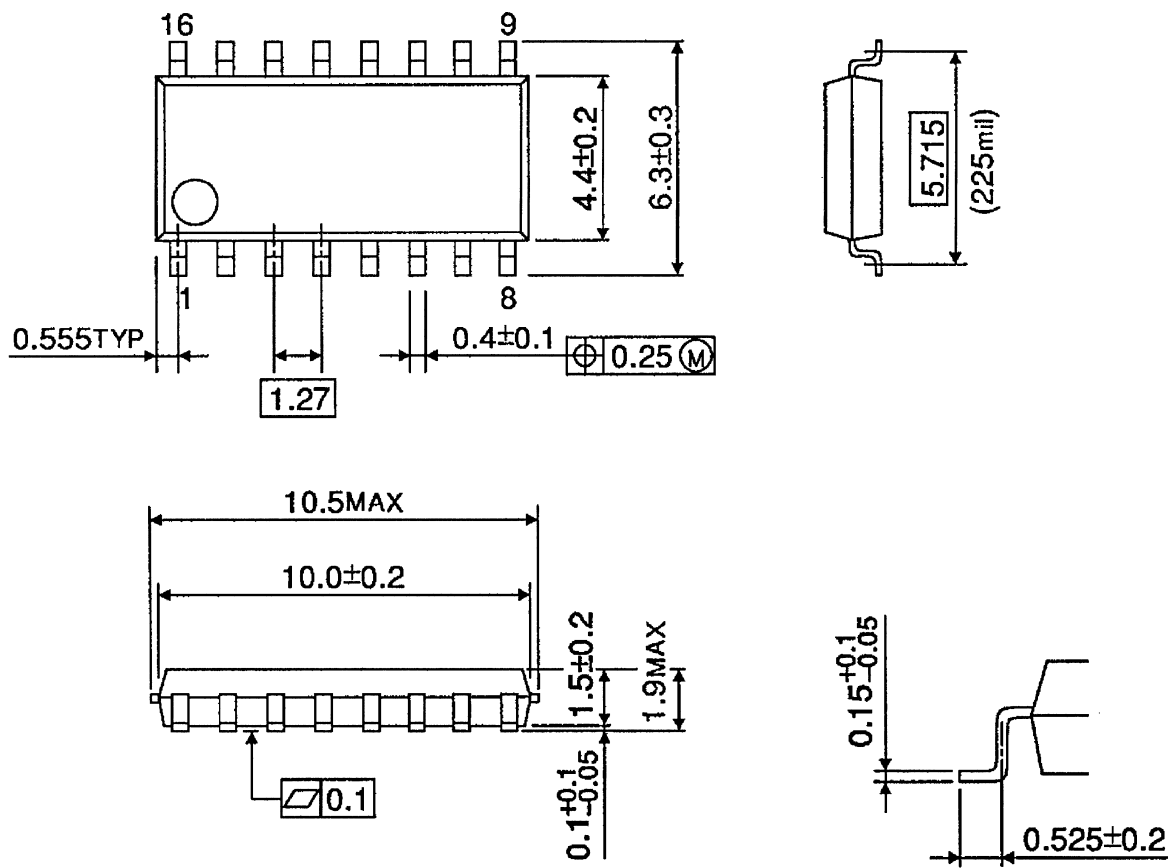
Unit: mm



PACKAGE DIMENSIONS

SOP16-P-225-1.27

Unit: mm



Weight: 0.16 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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