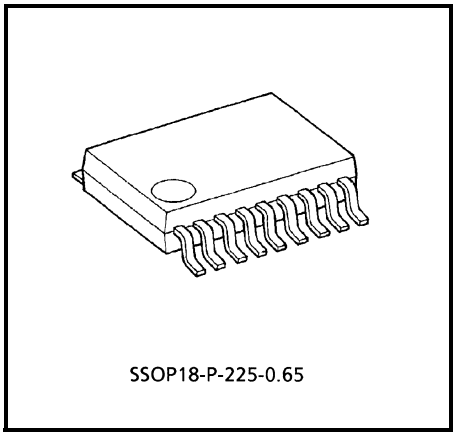
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62783AFNG,TD62784AFNG

8CH HIGH−VOLTAGE HIGH SOURCE−CURRENT DRIVER

The TD62783AFNG, TD62784AFNG are comprised of eight source current Transistor Array.
These drivers are specifically designed for fluorescent display applications.
Applications include relay, hammer and lamp and display (LED) drivers.
This devices are a product for the Pb free(Sn-Ag).



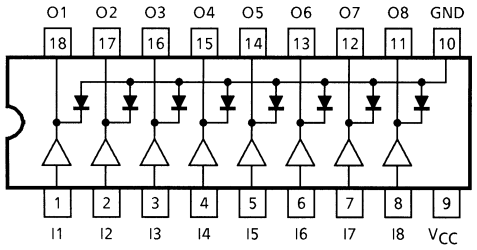
Weight: 0.09 g (Typ.)

FEATURES

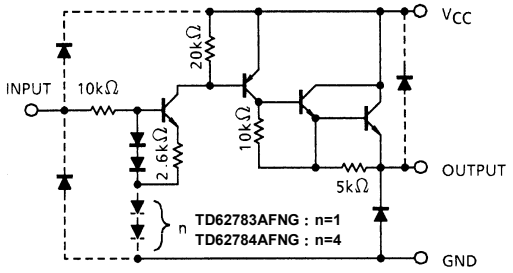
- Package Type : SSOP18 pin (0.65 mm pitch)
- High Ouptut Voltage : $V_{CE\ (SUS)}$ = 50 V (MIN)
- Output Current (Single Output) : I_{OUT} = −500 mA (MAX)
- Output Clamp Diodes
- Single Supply Voltage
- Input Compatible with Various Types of Logic

TYPE	DESIGNATION
TD62783AFNG	TTL, 5 V CMOS
TD62784AFNG	6~15 V PMOS, CMOS

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}	50	V
Output Current	I_{OUT}	−500	mA / ch
Input Voltage	V_{IN} (Note 1)	15	V
	V_{IN} (Note 2)	30	
Clamp Diode Reverse Voltage	V_R	50	V
Clamp Diode Forward Current	I_F	500	mA
Power Dissipation	P_D (Note 3)	0.96	W
Operating Temperature	T_{opr}	−40~85	°C
Storage Temperature	T_{stg}	−55~150	°C

Note 1: TD62783AFNG
Note 2: TD62784AFNG
Note 3: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 40%)

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

CHARACTERISTIC			SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT
Supply Voltage			V_{CC}			—	—	50	V
Output Current		(Note 3)	I_{OUT}	DC 1 Circuit		—	—	−350	mA / ch
				T_{pw} = 25 ms, T_j = 120°C Ta = 85°C, 8 Circuits	Duty = 10 %	—	—	−180	
					Duty = 50 %	—	—	−38	
Input Voltage		(Note 1)	V_{IN}			—	—	12	V
		(Note 2)				—	—	24	
Input Voltage	Output ON	(Note 1)	$V_{IN\ (ON)}$			2.0	5.0	15	V
		(Note 2)				4.5	12.0	30	
	Output OFF	(Note 1)	$V_{IN(OFF)}$			0	—	0.8	
		(Note 2)				0	—	2.0	
Clamp Diode Reverse Voltage			V_R			—	—	50	V
Clamp Diode Forward Current			I_F			—	—	400	mA
Power Dissipation		(Note 3)	P_D			—	—	0.4	W

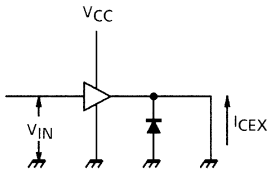
Note 1: TD62783AFNG
Note 2: TD62784AFNG
Note 3: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 40%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

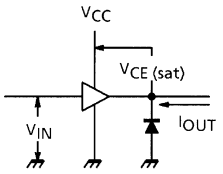
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		I_{CEX}	1	V_{CC} = V_{CC} MAX, V_{IN} = 0.4 V Ta = 25°C	—	—	100	μA
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{IN} = $V_{IN\ (ON)}$, I_{OUT} = −350 mA	—	—	2.0	V
				V_{IN} = $V_{IN\ (ON)}$, I_{OUT} = −225 mA	—	—	1.9	
				V_{IN} = $V_{IN\ (ON)}$, I_{OUT} = −100 mA	—	—	1.8	
Input Current	TD62783AFNG	$I_{IN\ (ON)}$	3	V_{IN} = 2.4 V	—	36	52	μA
				V_{IN} = 3.85 V	—	180	260	
	TD62784AFNG			V_{IN} = 5 V	—	92	130	
				V_{IN} = 12 V	—	790	1130	
Input Voltage	TD62783AFNG	$V_{IN\ (ON)}$	4	V_{CE} = 2.0 V	—	—	2.0	V
	TD62784AFNG			I_{OUT} = −350 mA	—	—	4.5	
	TD62783AFNG	$V_{IN\ (OFF)}$		I_{OUT} = −500 μA	0.8	—	—	
	TD62784AFNG				2.0	—	—	
Supply Current		$I_{CC\ (ON)}$	3	V_{IN} = $V_{IN\ (ON)}$, V_{CC} = −50 V	—	—	2.5	mA / ch
Clamp Diode Reverse Current		I_R	5	V_R = 50 V	—	—	50	μA
Clamp Diode Forward Voltage		V_F	6	I_F = 350 mA	—	—	2.0	V
Turn−On Delay		t_{ON}	7	V_{CC} = V_{CC}MAX, R_L = 125 Ω C_L = 15 pF	—	0.15	—	μs
Turn−Off Delay		t_{OFF}			—	3.0	—	

TEST CIRCIT

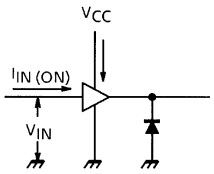
1. I_{CEX}



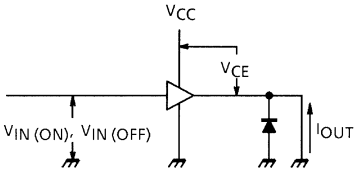
2. $V_{CE\ (sat)}$



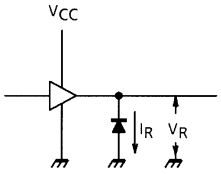
3. $I_{IN\ (ON)}$, I_{CC}



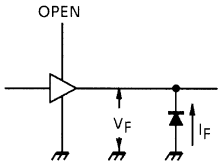
4. $V_{IN\ (ON)}$, $V_{IN\ (OFF)}$



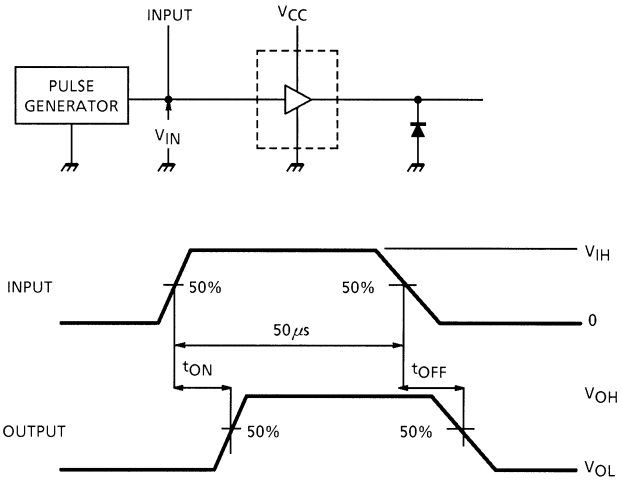
5. I_R



6. V_F



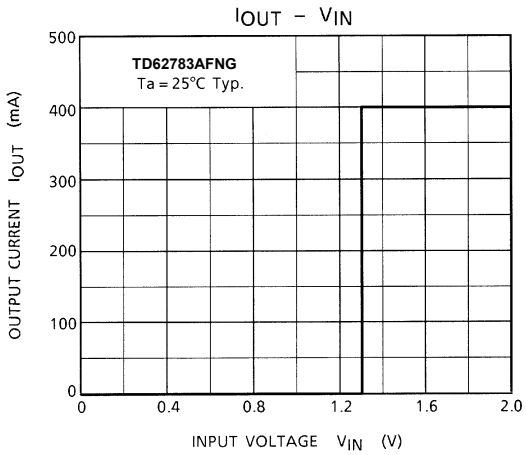
7. t_{ON}, t_{OFF}

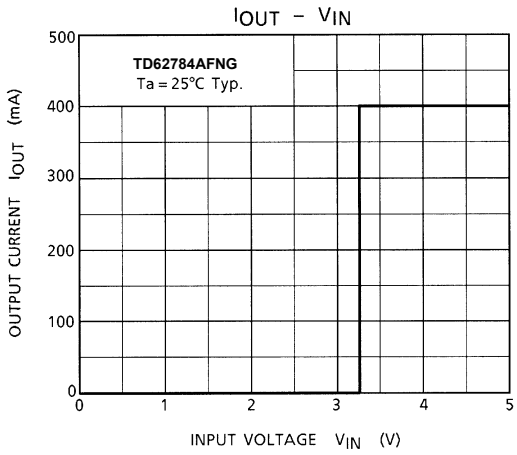


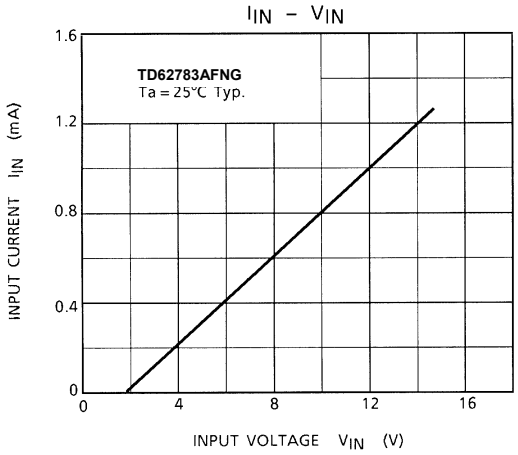
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Ouptut Impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns
Note 2: CL includes probe and jig capacitance.

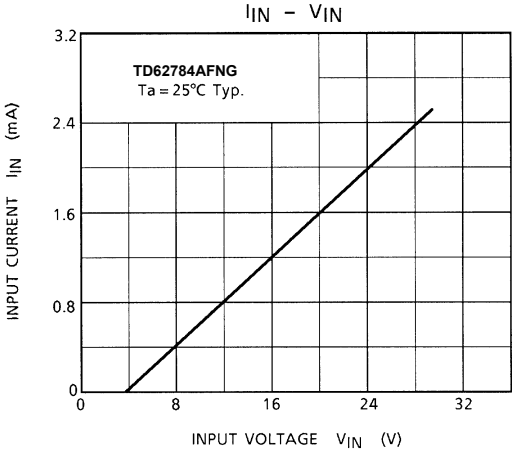
PRECAUTIONS for USING

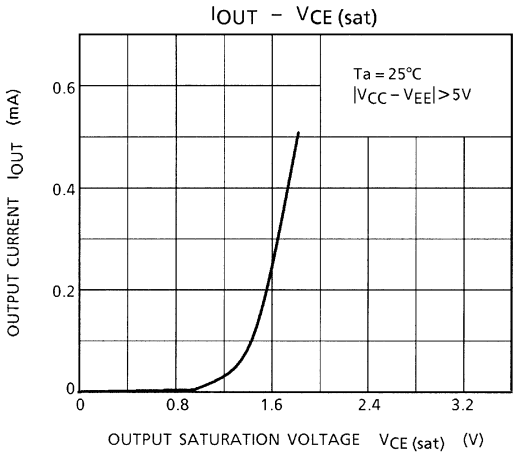
This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.
Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

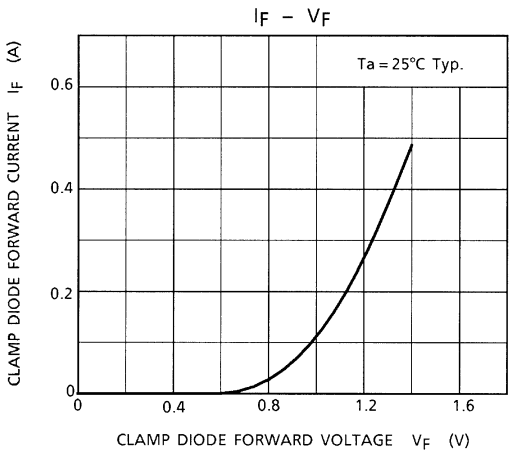

I_{OUT} – V_{IN}
TD62783AFNG
Ta = 25°C Typ.
OUTPUT CURRENT I_{OUT} (mA)
500
400
300
200
100
0
0
0.4
0.8
1.2
1.6
2.0
INPUT VOLTAGE V_{IN} (V)

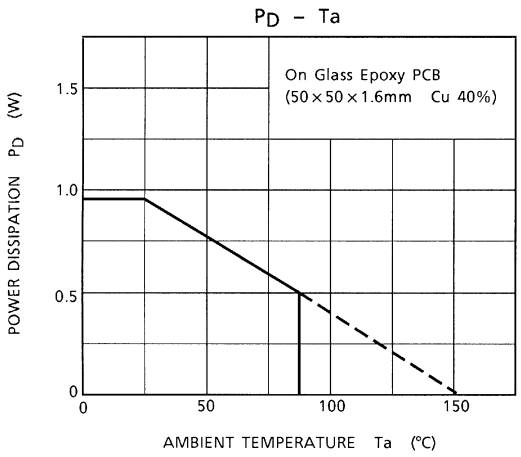

I_{OUT} – V_{IN}
TD62784AFNG
Ta = 25°C Typ.
OUTPUT CURRENT I_{OUT} (mA)
500
400
300
200
100
0
0
1
2
3
4
5
INPUT VOLTAGE V_{IN} (V)


I_{IN} – V_{IN}
TD62783AFNG
Ta = 25°C Typ.
INPUT CURRENT I_{IN} (mA)
1.6
1.2
0.8
0.4
0
0
4
8
12
16
INPUT VOLTAGE V_{IN} (V)


I_{IN} – V_{IN}
TD62784AFNG
Ta = 25°C Typ.
INPUT CURRENT I_{IN} (mA)
3.2
2.4
1.6
0.8
0
0
8
16
24
32
INPUT VOLTAGE V_{IN} (V)

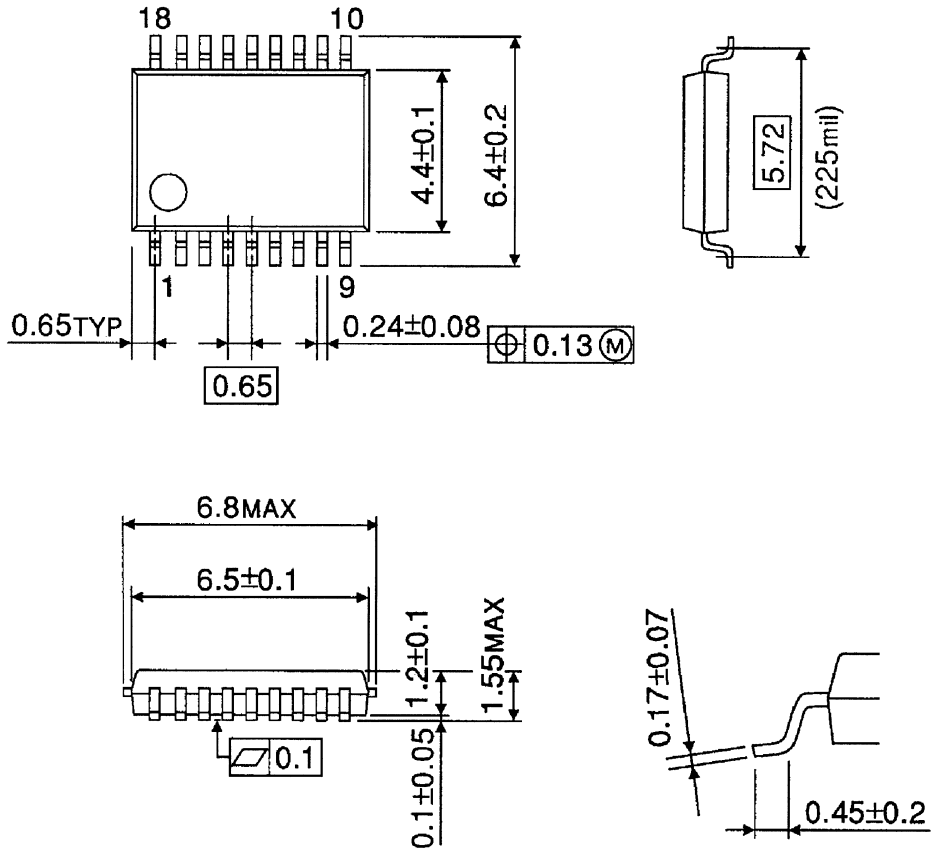

I_{OUT} – $V_{CE\,(sat)}$
Ta = 25°C
$|V_{CC} - V_{EE}| > 5V$
OUTPUT CURRENT I_{OUT} (mA)
0.6
0.4
0.2
0
0
0.8
1.6
2.4
3.2
OUTPUT SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)


I_F – V_F
Ta = 25°C Typ.
CLAMP DIODE FORWARD CURRENT I_F (A)
0.6
0.4
0.2
0
0
0.4
0.8
1.2
1.6
CLAMP DIODE FORWARD VOLTAGE V_F (V)


P_D – Ta
On Glass Epoxy PCB
(50 × 50 × 1.6mm Cu 40%)
POWER DISSIPATION P_D (W)
1.5
1.0
0.5
0
0
50
100
150
AMBIENT TEMPERATURE Ta (°C)

PACKAGE DIMENSIONS

SSOP18−P−225−0.65 Unit: mm



Weight: 0.09 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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