

TLP557

TRANSISTOR INVERTOR
INVERTER FOR AIR CONDITIONOR
POWER TRANSISTOR BASE DRIVE

The TOSHIBA TLP557 consists of a GaAlAs light emitting diode and a integrated photodetector.

This unit is 8-lead DIP package.

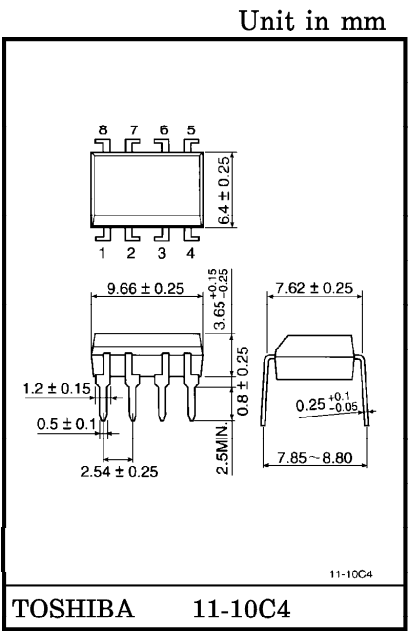
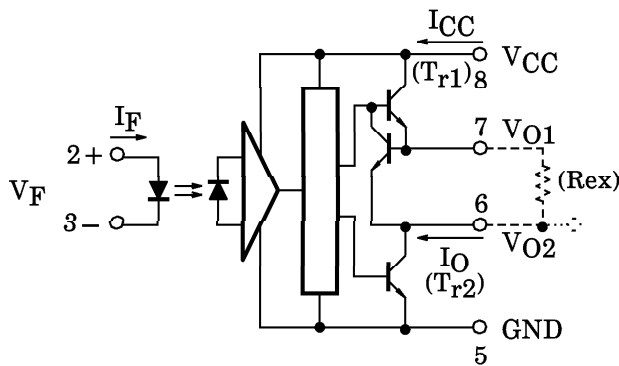
TLP557 is suitable for base driving circuit of power transistor module up to 20A.

External resistor needs to connect between pin 6 and pin 7.

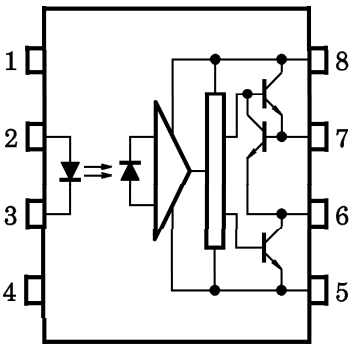
This is for constant current driving.

- Input Threshold Current : $I_F=5\text{mA}$ (Max.)
- Guaranteed Performance Temperature Range : $-30\sim70^{\circ}\text{C}$
- Supply Voltage : 16V (Max.)
- Output Current : $\pm 0.3\text{A}$ (Max.)
- Switching Time (t_{pLH}/t_{pHL}) : $5\mu\text{s}$ (Max.)
- Isolation Voltage : $2500\text{V}_{\text{rms}}$ (Min.)
- UL Recognized : UL1577, File No. E67349

SCHMATIC



Weight : 0.54g
PIN CONFIGURATION (TOP VIEW)



- 1 : N.C.
- 2 : ANODE
- 3 : CATHODE
- 4 : N.C.
- 5 : GND
- 6 : V_{O2} (OUTPUT)
- 7 : V_{O1} (Rex TERMINAL)
- 8 : V_{CC}

TRUTH TABLE

		Tr1	Tr2
Input LED	ON	ON	OFF
	OFF	OFF	ON

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MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	25	mA
	Peak Transient Forward Current (Note 1)	I_{FPT}	1	A
	Reverse Voltage	V_R	5	V
	Junction Temperature	(T_j)	125	°C
DETECTOR	Output Current ($f \leq 5\text{kHz}$, Duty $\leq 50\%$)	I_O	+0.32 / -0.32	A
	Peak Output Current ($P_W \leq 10\mu\text{s}$, $f \leq 5\text{kHz}$)	I_{OP}	+2 / -0.5	A
	Output Voltage	V_O	16	V
	Supply Voltage	V_{CC}	16	V
	O ₁ Terminal to O ₂ Terminal (Pin 7 – Pin 6) Voltage	V_{1-2}	1.5	V
	O ₂ Terminal to O ₁ Terminal (Pin 6 – Pin 7) Voltage	V_{2-1}	5	V
	Power Dissipation (Note 2)	P_o	0.5	W
	Junction Temperature	(T_j)	125	°C
Total Package Power Dissipation (Note 3)		P_{OT}	0.55	W
Operating Temperature Range		T_{opr}	-30~70	°C
Storage Temperature Range		T_{stg}	-55~125	°C
Lead Solder Temperature (10s)		T_{sol}	260	°C
Isolation Voltage (AC, 1min., R.H. $\leq 60\%$, $T_a = 25^\circ\text{C}$) (Note 4)		BVS	2500	Vrms

(Note 1) Pulse width $PW \leq 1\mu\text{s}$, 300pps

(Note 2) $\Delta P_o / ^\circ\text{C} = -6.7\text{mW} / ^\circ\text{C}$ ($T_a \geq 50^\circ\text{C}$)

(Note 3) $\Delta P_{OT} / ^\circ\text{C} = -7.4\text{mW} / ^\circ\text{C}$ ($T_a \geq 50^\circ\text{C}$)

(Note 4) Device considered a two terminal device : pins 1, 2, 3 and 4 shorted together, and pins 5, 6, 7 and 8 shorted together.

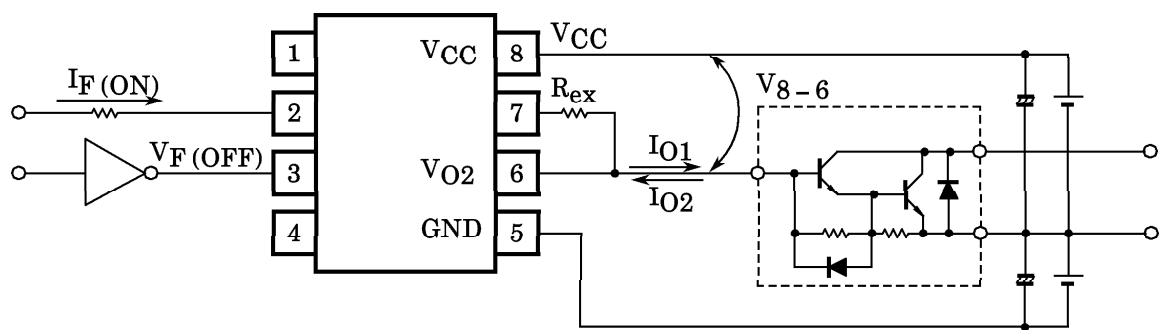
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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
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RECOMMENDED OPERATING CONDITION

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input Current ON	$I_F(\text{ON})$	7	8	20	mA
Input Voltage OFF	$V_F(\text{OFF})$	0	—	0.8	V
Supply Voltage	V_{CC}	5	6	13	V
I_{B1} Drive Current	I_{O1}	—	0.15	0.25	A
I_{B2} Drive Current	I_{O2}	—	—	0.5	A
External Resistance	R_{ex}	2.7	4.3	—	Ω
$V_{CC} - V_{O2}$ (Pin 8 – Pin 6) ON Voltage	V_{8-6}	2.3	3 ($I_{O1}=0.15\text{A}$)	2.5 ($I_{O1}=0.25\text{A}$)	V
Operating Temperature	T_{opr}	−30	25	70	°C

(R_{ex} is for constant current driving)



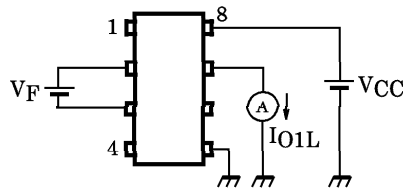
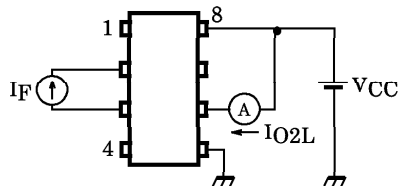
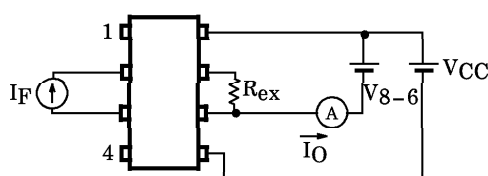
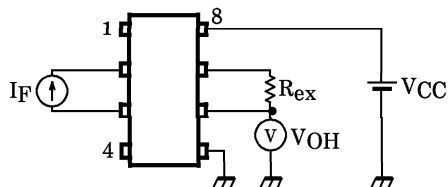
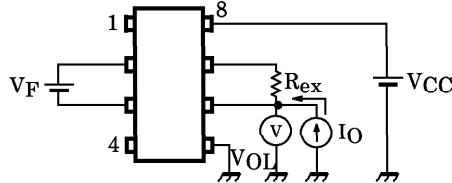
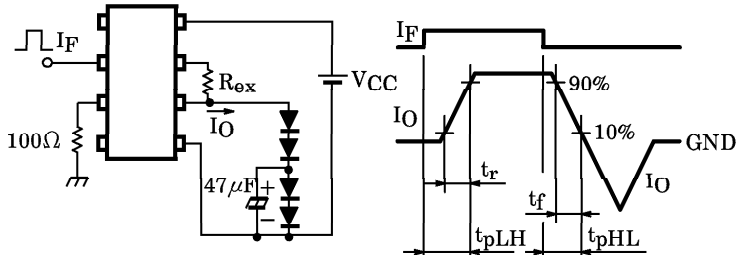
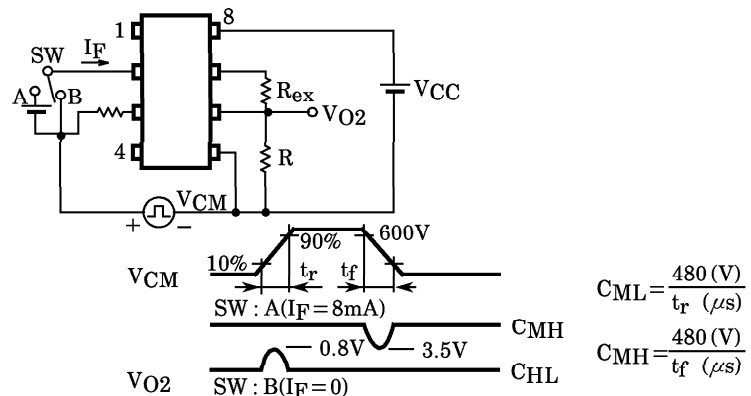
ELECTRICAL CHARACTERISTICS (Ta = -30~70°C, Unless otherwise specified)

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.*	MAX.	UNIT	TEST CIR- CUIT
Input Forward Voltage	V _F	I _F =5mA, Ta=25°C		—	1.55	1.7	V	
Temperature Coefficient of Forward Voltage	ΔV _F / ΔTa	I _F =5mA		—	−2.0	—	mV / °C	
Input Reverse Current	I _R	V _R =5V, Ta=25°C		—	—	10	μA	
Input Capacitance	C _T	V=0, f=1MHz, Ta=25°C		—	—	250	pF	
O ₁ Output Leakage Current	I _{O1L}	V _{CC} =16V, V _{O1} =0, V _F =0.8V		—	0.01	200	μA	1
O ₂ Output Leakage Current	I _{O2L}	V _{CC} =16V, V _{O2} =16V, I _F =5mA		—	0.2	200	μA	2
O ₁ Output Current	I _O	V ₈₋₆ =2.3V R _{ex} =2.7Ω I _F =5mA, Ta=25°C	V _{CC} =6V	0.22	0.27	0.32	A	3
			V _{CC} =16V	0.22	0.27	0.32		
O ₂ High Level Output Voltage	V _{OH}	V _{CC} =6V, R _{ex} =2.7Ω I _F =5mA		3.5	5.5	—	V	4
O ₂ Low Level Output Voltage	V _{OL}	V _F =0.8V, R _{ex} =2.7Ω I _O =0.25A, Ta=25°C	V _{CC} =6V	—	0.2	0.4	V	5
			V _{CC} =16V	—	0.2	0.4		
		V _F =0.8V, R _{ex} =2.7Ω I _O =0.5A (*1) Ta=25°C	V _{CC} =6V	—	0.4	—	V	
			V _{CC} =16V	—	0.4	—		
High Level Supply Current	I _{CCH}	V _{CC} =6V, I _F =5mA R _{ex} =2.7Ω, Ta=25°C		—	3.8	10	mA	
		V _{CC} =6V, I _F =5mA, R _{ex} =2.7Ω		—	—	13		
		V _{CC} =16V, I _F =5mA, R _{ex} =2.7Ω		—	5.2	17		
Low Level Supply Current	I _{CCL}	V _{CC} =6V, I _F =0mA R _{ex} =2.7Ω, Ta=25°C		—	11	17	mA	
		V _{CC} =6V, I _F =0mA, R _{ex} =2.7Ω		—	—	22		
		V _{CC} =16V, I _F =0mA, R _{ex} =2.7Ω		—	13	25		
“Output L→H” Threshold Input Current	I _{FLH}	R _{ex} =2.7Ω I _O =0.25A V _{O2} >3V	V _{CC} =6V	—	2.5	5	mA	
			V _{CC} =16V	—	—	5		
“Output H→L” Threshold Input Current	V _{FHL}	R _{ex} =2.7Ω I _O =0.25A V _{O2} <0.4V	V _{CC} =6V	0.8	—	—	V	
			V _{CC} =16V	0.8	—	—		
Input Current Hysterisis	I _{HYS}	V _{CC} =6V, R _{ex} =2.7Ω, Ta=25°C		—	0.05	—	mA	
Supply Voltage	V _{CC}			5	—	16	V	
Capacitance (Input-Output)	C _S	V _S =0, f=1MHz, Ta=25°C		—	1.0	2.0	pF	
Resistance (Input-Output)	R _S	V _S =500V, Ta=25°C, R.H.≤60%		5×10 ¹⁰	10 ¹²	—	Ω	

* All typical values are at Ta=25°C (*1): Duration of I_O time ≤ 100μs

SWITCHING CHARACTERISTICS ($T_a = -30 \sim 70^\circ\text{C}$ Unless otherwise specified)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.*	MAX.	UNIT	TEST CIR- CUIT
Propagation Delay Time, L $\rightarrow$ H	t_{pLH}	$V_{CC}=6\text{V}$, $I_F=8\text{mA}$ $R_{ex}=2.7\Omega$ $f=5\text{kHz}$, Duty = 10%	—	1	5	μs	6
Propagation Delay Time, H $\rightarrow$ L	t_{pHL}		—	1	5	μs	
Output Rise Time	t_r		—	0.05	—	μs	
Output Fall Time	t_f		—	0.05	—	μs	
Common Mode Transient Immunity at High Level Output	C_{MH}	$V_{CM}=600\text{V}$, $I_F=8\text{mA}$ $V_{CC}=6\text{V}$, $R_{ex}=270\Omega$ $R=1\text{k}\Omega$, $T_a=25^\circ\text{C}$	-2000	—	—	$\text{V} / \mu\text{s}$	7
Common Mode Transient Immunity at Low Level Output	C_{ML}	$V_{CM}=600\text{V}$, $I_F=0\text{mA}$ $V_{CC}=6\text{V}$, $R_{ex}=270\Omega$ $R=1\text{k}\Omega$, $T_a=25^\circ\text{C}$	2000	—	—	$\text{V} / \mu\text{s}$	7

* All typical values are at $T_a=25^\circ\text{C}$.TEST CIRCUIT 1 : I_{O1L} TEST CIRCUIT 2 : I_{O2L} TEST CIRCUIT 3 : I_O TEST CIRCUIT 4 : V_{OH} TEST CIRCUIT 5 : V_{OL} TEST CIRCUIT 6 : t_{pLH} , t_{pHL} , t_r , t_f TEST CIRCUIT 7 : C_{MH} , C_{ML} 

C_{ML} (C_{MH}) is the maximum rate of rise (fall) of the common mode voltage that can be sustained with the output voltage in the low (high) state.

