

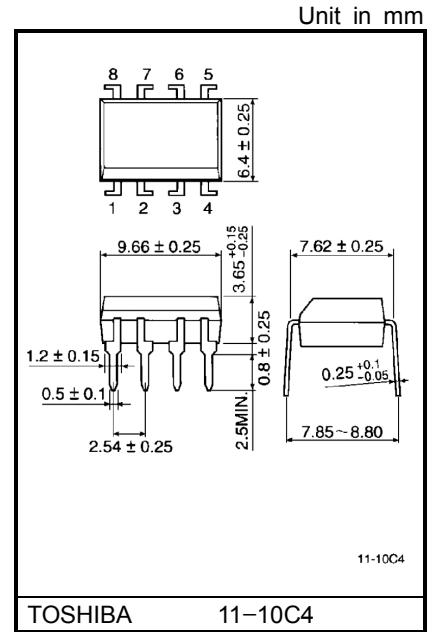
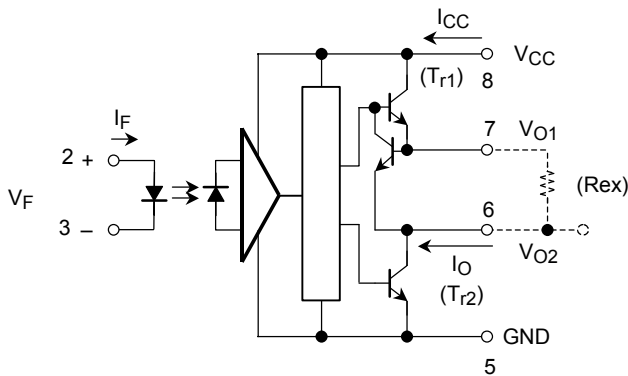
TLP557

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.

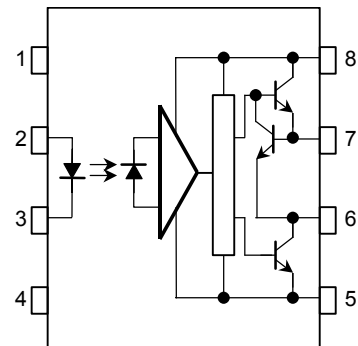
- Input threshold current: $I_F=5\text{mA}(\text{max.})$
- Guaranteed performance temperature range: $-30\sim 70^\circ\text{C}$
- Supply voltage: $16\text{V}(\text{max.})$
- Output current: $\pm 0.3\text{A}(\text{max.})$
- Switching time (t_{pLH} / t_{pHL}): $5\mu\text{s}(\text{max.})$
- Isolation voltage: $2500V_{\text{rms}}(\text{min.})$
- UL recognized: UL1577, file No. E67349

Schematic



Weight: 0.54g

Pin Configuration (top view)



- 1 : N.C.
- 2 : Anode
- 3 : Cathode
- 4 : N.C.
- 5 : GND
- 6 : $V_{O2}(\text{Output})$
- 7 : $V_{O1}(\text{Rex Terminal})$
- 8 : V_{CC}

Truth Table

		Tr1	Tr2
		Input	On
LED	On	On	Off
	Off	Off	On

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 ≤ 5kHz, Duty ≤ 50%)	I_O	+0.32 / -0.32	A
	Peak output current ($P_W \leq 10\mu s$, f ≤ 5kHz)	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 (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 min., R.H. ≤ 60%, Ta=25°C) (Note 4)		BV_S	2500	Vrms

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

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

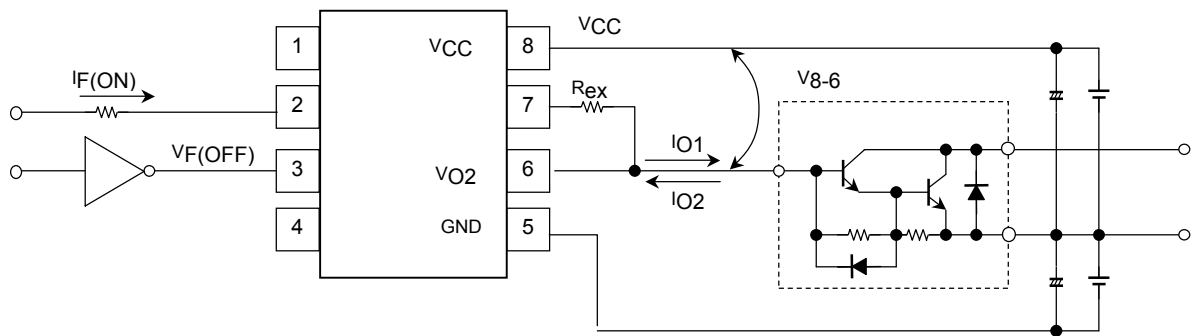
(Note 3) $\Delta P_{OT} / ^\circ C = -7.4mW / ^\circ C$ ($T_a \geq 50^\circ C$)

(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.

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	$^{\circ}\text{C}$

(R_{ex} is for constant current driving)



Electrical Characteristics (Ta = -30~70°C , unless otherwise specified)

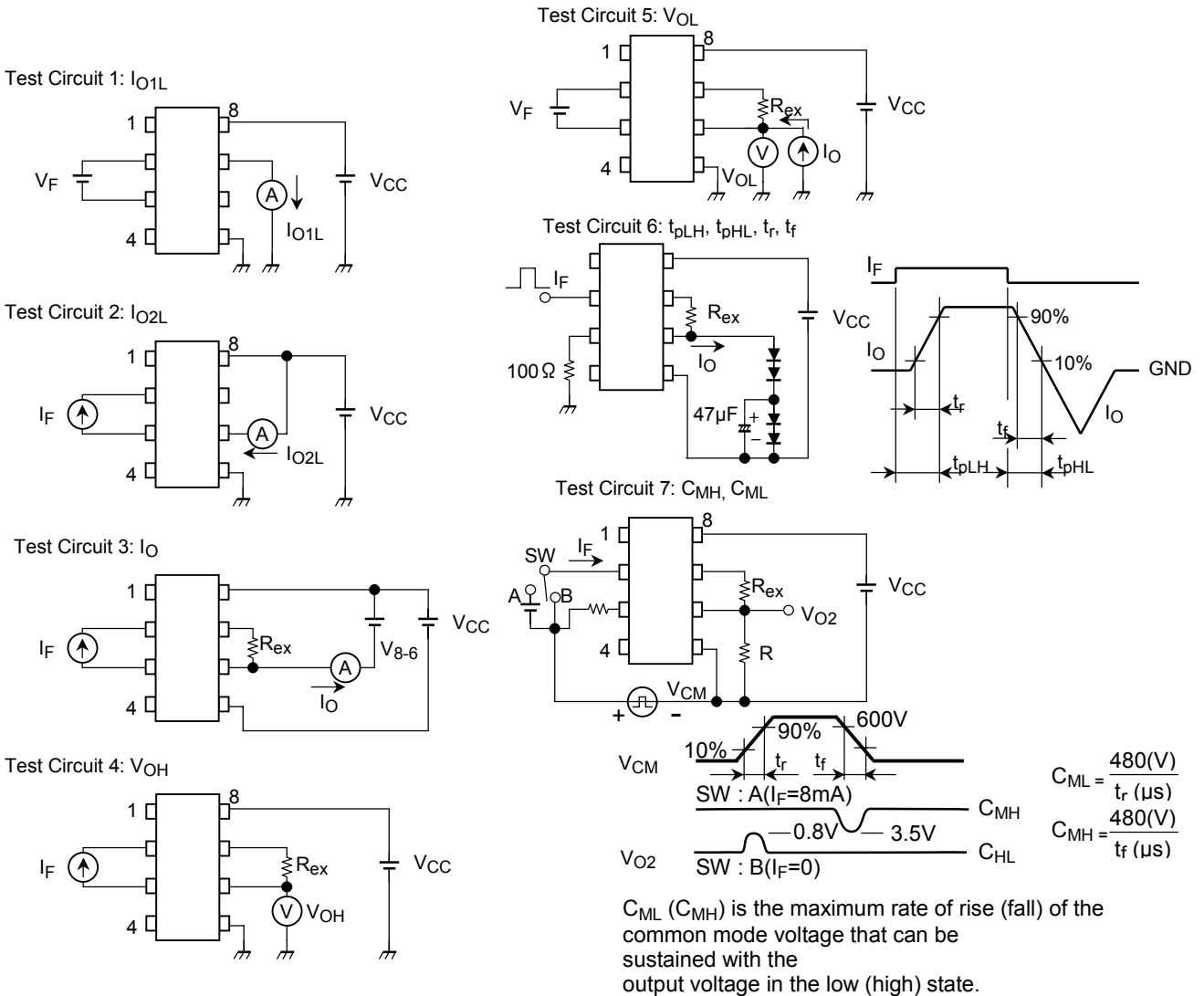
Characteristic	Symbol	Test Condition	Min.	Typ.*	Max.	Unit	Test Circuit	
Input forward voltage	V_F	$I_F = 5\text{mA}$, $T_a = 25^\circ\text{C}$	—	1.55	1.7	V		
Temperature coefficient of forward voltage	$\Delta V_F / \Delta T_a$	$I_F = 5\text{mA}$	—	-2.0	—	mV / °C		
Input reverse current	I_R	$V_R = 5\text{V}$, $T_a = 25^\circ\text{C}$	—	—	10	μA		
Input capacitance	C_T	$V = 0$, $f = 1\text{MHz}$, $T_a = 25^\circ\text{C}$	—	—	250	pF		
O ₁ Output leakage current	I_{O1L}	$V_{CC} = 16\text{V}$, $V_{O1} = 0$, $V_F = 0.8\text{V}$	—	0.01	200	μA	1	
O ₂ Output leakage current	I_{O2L}	$V_{CC} = 16\text{V}$, $V_{O2} = 16\text{V}$, $I_F = 5\text{mA}$	—	0.2	200	μA	2	
O ₁ Output current	I_O	$V_{8-6} = 2.3\text{V}$ $R_{ex} = 2.7\Omega$ $I_F = 5\text{mA}$, $T_a = 25^\circ\text{C}$	$V_{CC} = 6\text{V}$	0.22	0.27	0.32	A	3
			$V_{CC} = 16\text{V}$	0.22	0.27	0.32		
O ₂ High level output voltage	V_{OH}	$V_{CC} = 6\text{V}$, $R_{ex} = 2.7\Omega$ $I_F = 5\text{mA}$	3.5	5.5	—	V	4	
O ₂ Low level output voltage	V_{OL}	$V_F = 0.8\text{V}$, $R_{ex} = 2.7\Omega$ $I_O = 0.25\text{A}$, $T_a = 25^\circ\text{C}$	$V_{CC} = 6\text{V}$	—	0.2	0.4	V	5
			$V_{CC} = 16\text{V}$	—	0.2	0.4		
		$V_F = 0.8\text{V}$, $R_{ex} = 2.7\Omega$ $I_O = 0.5\text{A}$ (*1) $T_a = 25^\circ\text{C}$	$V_{CC} = 6\text{V}$	—	0.4	—	V	
			$V_{CC} = 16\text{V}$	—	0.4	—		
High level supply current	I_{CCH}	$V_{CC} = 6\text{V}$, $I_F = 5\text{mA}$ $R_{ex} = 2.7\Omega$, $T_a = 25^\circ\text{C}$	—	3.8	10	mA		
		$V_{CC} = 6\text{V}$, $I_F = 5\text{mA}$, $R_{ex} = 2.7\Omega$	—	—	13			
		$V_{CC} = 16\text{V}$, $I_F = 5\text{mA}$, $R_{ex} = 2.7\Omega$	—	5.2	17			
Low level supply current	I_{CCL}	$V_{CC} = 6\text{V}$, $I_F = 0\text{mA}$ $R_{ex} = 2.7\Omega$, $T_a = 25^\circ\text{C}$	—	11	17	mA		
		$V_{CC} = 6\text{V}$, $I_F = 0\text{mA}$, $R_{ex} = 2.7\Omega$	—	—	22			
		$V_{CC} = 16\text{V}$, $I_F = 0\text{mA}$, $R_{ex} = 2.7\Omega$	—	13	25			
“Output L→H” threshold input current	I_{FLH}	$R_{ex} = 2.7\Omega$ $I_O = 0.25\text{A}$ $V_{O2} > 3\text{V}$	$V_{CC} = 6\text{V}$	—	2.5	5	mA	
			$V_{CC} = 16\text{V}$	—	—	5		
“Output H→L” threshold input current	V_{FHL}	$R_{ex} = 2.7\Omega$ $I_O = 0.25\text{A}$ $V_{O2} < 0.4\text{V}$	$V_{CC} = 6\text{V}$	0.8	—	—	V	
			$V_{CC} = 16\text{V}$	0.8	—	—		
Input current hysteresis	I_{HYS}	$V_{CC} = 6\text{V}$, $R_{ex} = 2.7\Omega$, $T_a = 25^\circ\text{C}$	—	0.05	—	mA		
Supply voltage	V_{CC}		5	—	16	V		
Capacitance (input-output)	C_S	$V_S = 0$, $f = 1\text{MHz}$, $T_a = 25^\circ\text{C}$	—	1.0	2.0	pF		
Resistance (input-output)	R_S	$V_S = 500\text{V}$, $T_a = 25^\circ\text{C}$, R.H. ≤ 60%	5×10^{10}	10^{12}	—	Ω		

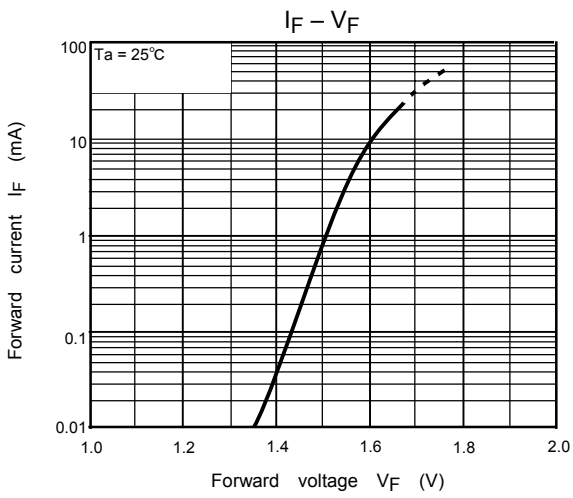
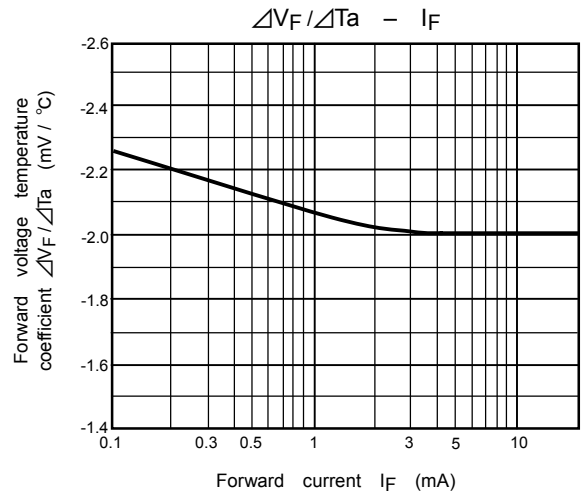
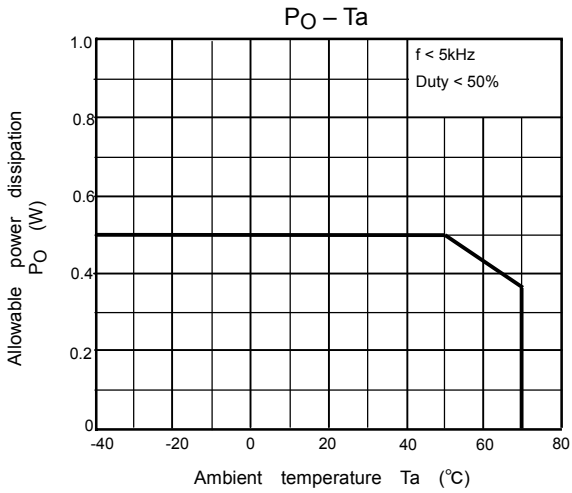
* All typical values are at $T_a = 25^\circ\text{C}$ (*1): Duration of I_O time ≤ 100 μs

Switching Characteristics (Ta = -30~70°C unless otherwise specified)

Characteristic	Symbol	Test Condition	Min.	Typ.*	Max.	Unit	Test Circuit
Propagation delay time, L→H	tpLH	VCC = 6V, IF = 8mA Rex = 2.7Ω f = 5kHz, Duty = 10%	—	1	5	μs	6
Propagation delay time, H→L	tpHL		—	1	5	μs	
Output rise time	tr		—	0.05	—	μs	
Output fall time	tf		—	0.05	—	μs	
Common mode transient immunity at high level output	CMH	VCM = 600V, IF = 8mA VCC = 6V, Rex = 270Ω R = 1kΩ, Ta = 25°C	-2000	—	—	V / μs	7
Common mode transient immunity at low level output	CML	VCM = 600V, IF = 0mA VCC = 6V, Rex = 270Ω R = 1kΩ, Ta = 25°C	2000	—	—	V / μs	7

* All typical values are at Ta = 25°C.





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