

TENTATIVE

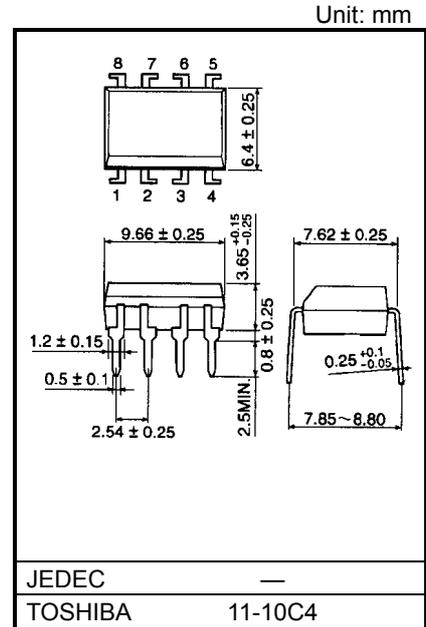
TOSHIBA PHOTOCOUPLER GaAIAs IRED & PHOTO-IC

TLP351

INVERTER FOR AIR CONDITIONOR
 IGBT/Power MOS FET GATE DRIVE
 INDUSTRIAL INVERTER

The TOSHIBA TLP351 consists of a GaAIAs light emitting diode and a integrated photodetector.
 This unit is 8-lead DIP package.
 TLP351 is suitable for gate driving circuit of IGBT or power MOS FET. Especially TLP351 is capable of "direct" gate drive of lower Power IGBTs.

- Peak Output Current : $\pm 0.6A(\text{Max.})$
- Guaranteed Performance Over Temperature : $-40\sim 100^{\circ}\text{C}$
- Supply Current : $2\text{mA}(\text{Max.})$
- Power Supply Voltage : $10\sim 30\text{V}$
- Threshold Input Current : $I_F=5\text{mA}(\text{Max.})$
- Switching Time (tpLH/tpHL) : $700\text{ns}(\text{Max.})$
- Common mode transient immunity : $10\text{kV}/\mu\text{s}$
- Isolation Voltage : 3750Vrms

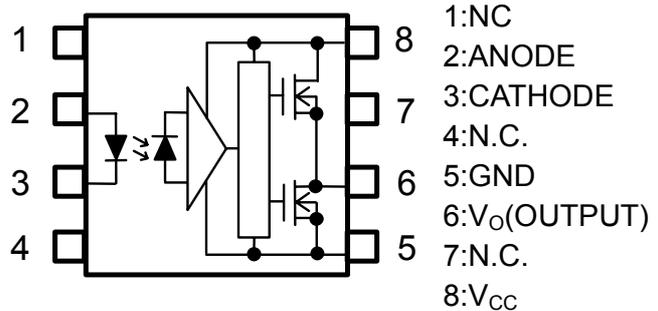


Weight: 0.54 g

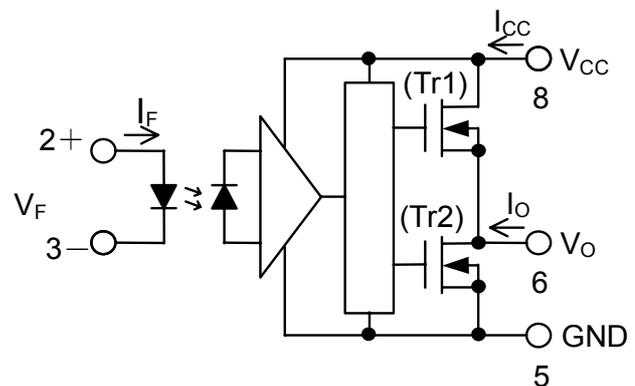
TRUTH TABLE

Input	LED	Tr1	Tr2	Output
H	ON	ON	OFF	H
L	OFF	OFF	ON	L

PIN CONFIGURATION (TOP VIEW)



SCHEMATIC



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I _F	20	mA
	Forward Current Derating (@Ta≥85°C)	ΔI _F /ΔT _a	-0.54	mA/°C
	Peak Transient Forward Current (Note 1)	I _{FP}	1	A
	Reverse Voltage	V _R	5	V
	Junction Temperature	T _j	125	°C
DETECTOR	"H"Peak Output Current (Note 2)	I _{OPH}	-0.6	A
	"L"Peak Output Current (Note 2)	I _{OPL}	0.6	A
	Output Voltage	V _O	35	V
	Supply Voltage	V _{CC}	35	V
	Junction Temperature	T _j	125	°C
Operating Frequency (Note 3)	f	25	kHz	
Storage Temperature Range	T _{stg}	-55~125	°C	
Operating Temperature Range	T _{opr}	-40~100	°C	
Lead Soldering Temperature (10 s) (Note 4)	T _{sol}	260	°C	
Isolation Voltage (AC, 1 minute, R.H.≤ 60%) (Note 5)	BV _S	3750	Vrms	

(Note 1) : Pulse width P_w≤1μs,300pps

(Note 2) : Exponential Waveform Pulse width P_w≤10μs , f≤15kHz

(Note 3) : Exponential Waveform I_{OPH}≤-0.4A(≤2.0μs) , I_{OPL}≤+0.4A(≤2.0μs),Ta=100°C

(Note 4) : It is 2mm or more from a lead root.

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

(Note 6) : A ceramic capacitor(0.1μF) should be connected from pin 8 to pin 5 to stabilize the operation of the high gain linear amplifier.Failure to provide the bypassing may impair the switching property. The total lead length between capacitor and coupler should not exceed 1cm.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input Current, ON (Note 7)	I _{F(ON)}	7.5	—	10	mA
Input Voltage, OFF	V _{F(OFF)}	0	—	0.8	V
Supply Voltage	V _{CC}	10	—	30	V
Peak Output Current	I _{OPH} /I _{OPL}	—	—	±0.2	A
Operating Temperature	T _{opr}	-40	—	100	°C

(Note 7) : Input signal rise time(fall time)<0.5μs.

ELECTRICAL CHARACTERISTICS (Ta = -40~100°C, Unless otherwise specified)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.*	MAX.	UNIT
Forward Voltage		V _F	—	I _F = 5 mA , Ta=25°C			1.55	1.70	V
Temperature Coefficient of Forward Voltage		ΔV _F /ΔT _a	—	I _F = 5 mA ,		—	-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		—	45	—	pF
Output Current (Note 8)	“H” Level	I _{OPH1}	1	V _{CC} =15V	I _F =5mA	V ₈₋₆ =4V	-0.2	-0.4	—
		I _{OPH2}				V ₈₋₆ =10V	-0.4	-0.67	
	“L” Level	I _{OPL1}	2		I _F =0mA	V ₆₋₅ =2V	0.2	0.35	—
		I _{OPL2}				V ₆₋₅ =10V	0.4	0.63	
Output Voltage	“H” Level	V _{OH}	3	V _{CC} =10V	I _O =-100mA , I _F =5mA		6.0	8.5	—
	“L” Level	V _{OL}			4	I _O =100mA , V _F =0.8V		—	
Supply Current	“H” Level	I _{CCH}	5	V _{CC} =10~30V V _O Open		I _F =10mA		—	1.4
	“L” Level	I _{CCL}			6	I _F =0mA		—	1.3
Threshold Input Current	“Output L→H”	I _{FLH}	—	V _{CC} =15V , V _O >1V		—	2.5	5	mA
Threshold Input Voltage	“Output H→L”	V _{FHL}	—	V _{CC} =15V , V _O <1V		0.8	—	—	V
Supply Voltage		V _{CC}	—	—		10	—	30	V
Capacitance (Input-Output)		C _S	—	V _S =0 , f=1MHz , Ta=25°C		—	1.0	—	pF
Resistance (Input-Output)		R _S	—	V _S =500V , Ta=25°C , R.H. ≤60%		1X10 ¹²	10 ¹⁴	—	Ω

*All typical values are at Ta=25°C

(Note 8) : Duration of I_O time ≤ 50μs

(Note 9) : This product is more sensitive than the conventional product to static electricity(ESD) because of a lowest power consumption design.

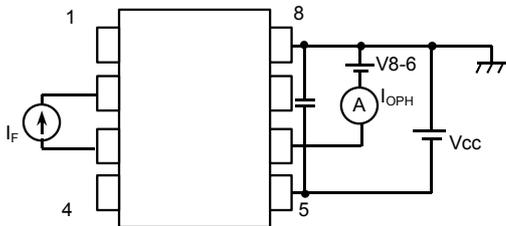
General precaution to static electricity(ESD) is necessary for handling this component.

SWITCHING CHARACTERISTICS (Ta = -40~100°C, Unless otherwise specified)

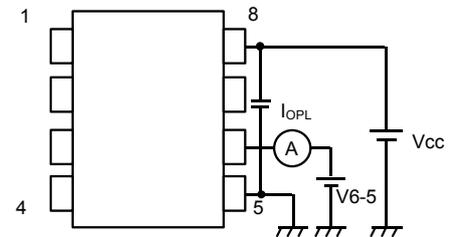
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.*	MAX.	UNIT	
Propagation Delay Time	L→H	tpLH	V _{CC} =30V R _g =47, C _g =3nF	I _F =0→5mA	100	—	700	ns
	H→L	tpHL		I _F =5→0mA	100	—	700	
Propagation Delay Difference Between Any Two Parts or Channels	PDD (tpHL-tpLH)	7	V _{CC} =30V ,R _g =47Ω ,C _g =3nF	-500	—	500	ns	
Output Rise Time(10-90%)	tr	8	I _F =5→0/0→5mA, V _{CC} =30V R _g =47Ω ,C _g =3nF	—	50	—	ns	
Output Fall Time(90-10%)	tf			—	50	—		
Common Mode Transient Immunity at High Level Output	CM _H	8	V _{CM} =1000Vp-p V _{CC} =30V Ta=25°C	I _F =5mA V _O (Min)=26V	-10000	—	V/μs	
Common Mode Transient Immunity at Low Level Output	CM _L			I _F =0mA V _O (Max)=1.0V	10000	—		—

*All typical values are at Ta=25°C

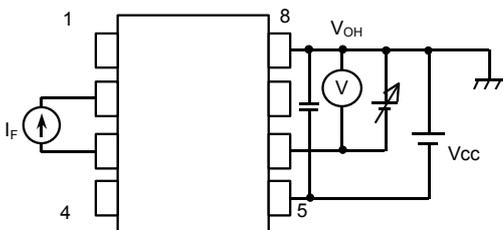
TEST CIRCUIT 1 : I_{OPH}



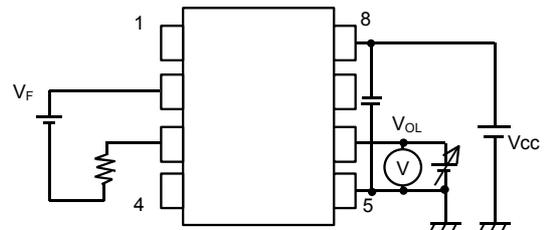
TEST CIRCUIT 2 : I_{OPL}



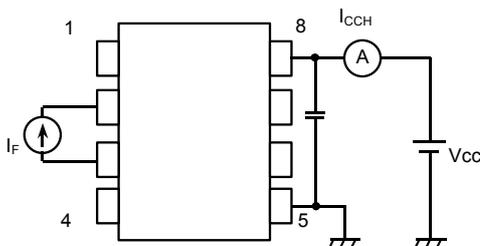
TEST CIRCUIT 3 : V_{OH}



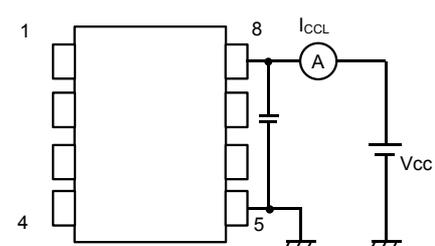
TEST CIRCUIT 4 : V_{OL}



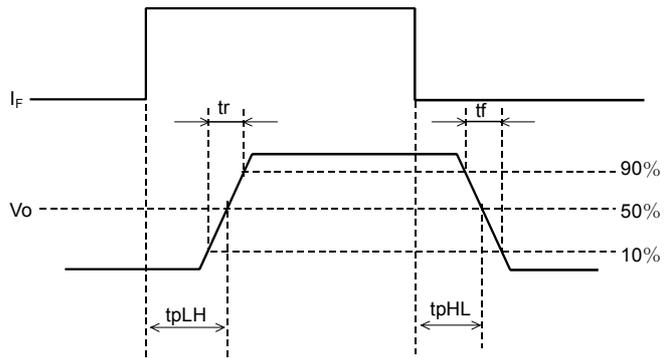
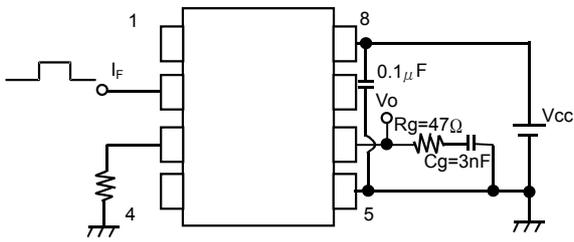
TEST CIRCUIT 5 : I_{CCH}



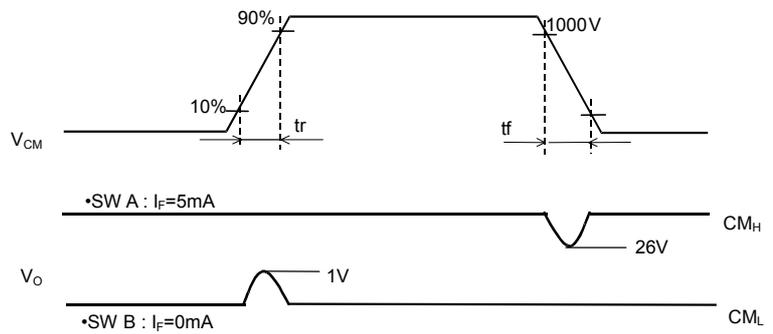
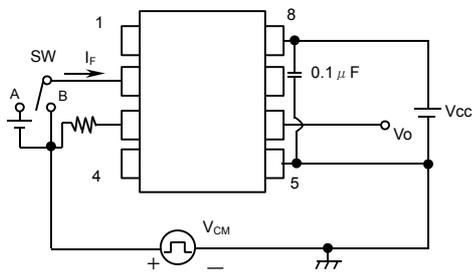
TEST CIRCUIT 6 : I_{CCL}



TEST CIRCUIT 7 : tpLH,tpHL,tr,tf,PDD



TEST CIRCUIT 8 : CM_H,CM_L



$$CM_L = \frac{800V}{tf(\mu s)}$$

$$CM_H = \frac{800V}{tr(\mu s)}$$

CM_L(CM_H) 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.

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