

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP371, TLP372

OFFICE MACHINE

HOUSEHOLD USE EQUIPMENT

TELECOMMUNICATION

SOLID STATE RELAY

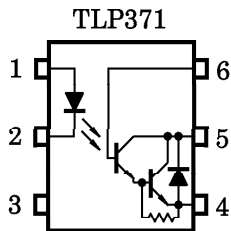
PROGRAMMABLE CONTROLLERS

The TOSHIBA TLP371 and TLP372 consists of a gallium arsenide infrared emitting diode optically coupled to a darlington connected photo-transistor which has an integrated base-emitter resistor to optimize switching speed and elevated temperature characteristics in a six lead plastic DIP package.

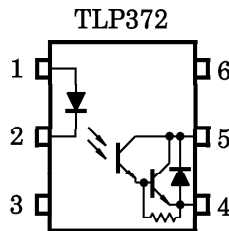
TLP372 is no-base internal connection for high-EMI environments.

- Current Transfer Ratio : 1000% (Min.) ($I_F = 1\text{mA}$)
- Isolation Voltage : 5000Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)

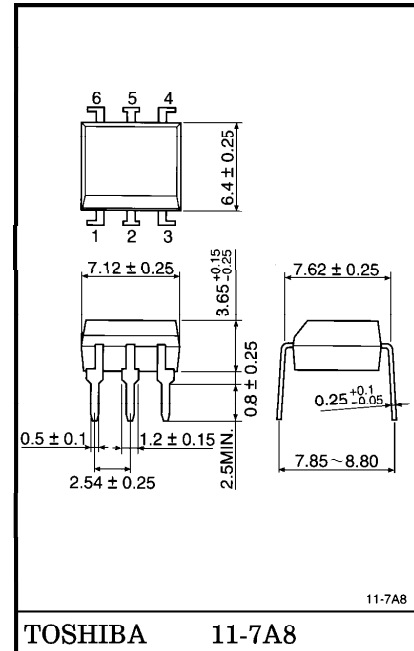


- 1 : ANODE
2 : CATHODE
3 : NC
4 : EMITTER
5 : COLLECTOR
6 : BASE



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Unit in mm



TOSHIBA 11-7A8

Weight : 0.4g

961001EBC2

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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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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	60	mA
	Forward Current Derating (Ta ≥ 39°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / °C
	Peak Forward Current (100μs pulse, 100pps)	I_{FP}	1	A
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	300	V
	Collector-Base Voltage (TLP371)	V_{CBO}	300	V
	Emitter-Collector Voltage	V_{ECO}	0.3	V
	Emitter-Base Voltage (TLP371)	V_{EBO}	7	V
	Collector Current	I_C	150	mA
	Power Dissipation	P_C	300	mW
	Power Dissipation Derating (Ta ≥ 25°C)	$\Delta P_C / ^\circ\text{C}$	-3.0	mW / °C
	Junction Temperature	T_j	125	°C
Storage Temperature Range		T_{stg}	-55~125	°C
Operating Temperature Range		T_{opr}	-55~100	°C
Lead Soldering Temperature (10sec.)		T_{sold}	260	°C
Total Package Power Dissipation		P_T	350	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		$\Delta P_T / ^\circ\text{C}$	-3.5	mW / °C
Isolation Voltage (AC, 1 min., RH ≤ 60%) (Note 1)		BV_S	5000	Vrms

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

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	—	200	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	—	120	mA
Operating Temperature	T_{opr}	-25	—	85	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 0.1\text{mA}$	300	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 0.1\text{mA}$	0.3	—	—	V
	Collector-Base Breakdown Voltage (TLP371)	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}$	300	—	—	V
	Emitter-Base Breakdown Voltage (TLP371)	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 200\text{V}$	—	10	200	nA
			$V_{CE} = 200\text{V}$ $T_a = 85^\circ\text{C}$	—	—	20	μA
	Collector Dark Current (TLP371)	I_{CER}	$V_{CE} = 200\text{V}$ $T_a = 85^\circ\text{C}$, $R_{BE} = 10\text{M}\Omega$	—	0.5	10	μA
	Collector Dark Current (TLP371)	I_{CBO}	$V_{CE} = 200\text{V}$	—	0.1	—	nA
	DC Forward Current Gain (TLP371)	h_{FE}	$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	—	7000	—	—
	Capacitance (Collector to Emitter)	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}$, $V_{CE} = 1\text{V}$	1000	4000	—	%
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 10\text{mA}$, $V_{CE} = 1\text{V}$	500	—	—	%
Base Photo-Current (TLP371)	I_{PB}	$I_F = 1\text{mA}$, $V_{CB} = 1\text{V}$	—	6	—	μA
Collector-Emitter Saturation Voltage	$V_{CE (\text{sat})}$	$I_C = 10\text{mA}$, $I_F = 1\text{mA}$	—	—	1.0	V
		$I_C = 100\text{mA}$, $I_F = 10\text{mA}$	0.3	—	0.2	

ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	CS	VS=0, f=1MHz	—	0.8	—	pF
Isolation Resistance	RS	VS=500V	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BVS	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	tr	VCC=10V IC=10mA RL=100Ω	—	40	—	μs
Fall Time	tf		—	15	—	
Turn-on Time	ton		—	50	—	
Turn-off Time	toff		—	15	—	
Turn-on Time	tON	RL=180Ω (Fig.1)	—	3	—	μs
Storage Time	ts	RBE=OPEN	—	45	—	
Turn-off Time	tOFF	VCC=10V, IF=16mA	—	90	—	
Turn-on Time	tON	RL=180Ω (Fig.1)	—	5	—	μs
Storage Time	ts	RBE=10MΩ (TLP371)	—	40	—	
Turn-off Time	tOFF	VCC=10V, IF=16mA	—	80	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

