

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP630

PROGRAMMABLE CONTROLLERS

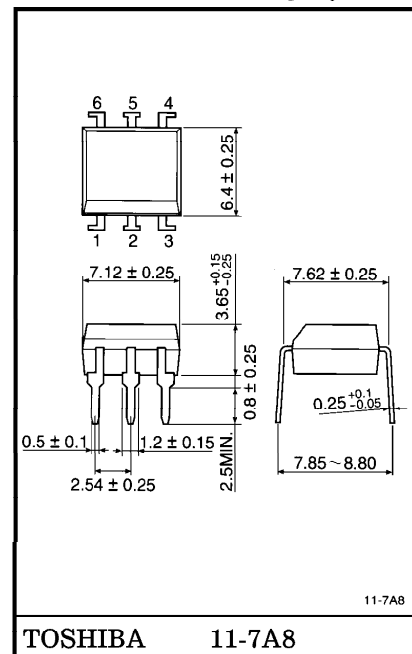
AC/DC-INPUT MODULE

TELECOMMUNICATION

The TOSHIBA TLP630 consists of a photo-transistor optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel in a six lead plastic DIP package.

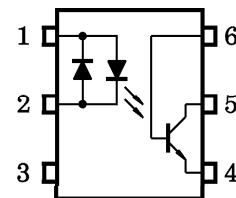
- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio : 50% Min.
Rank GB : 100% Min.
- Isolation Voltage : 5000Vrms Min.
- UL Recognized : UL1577 File No. E67349

Unit in mm



Weight : 0.4g

PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE, CATHODE
2 : CATHODE, ANODE
3 : N.C.
4 : EMITTER
5 : COLLECTOR
6 : BASE

961001EBC2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- 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.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F (RMS)	60	mA
	Forward Current Derating (Ta $\geq$ 39°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / °C
DETECTOR	Peak Forward Current (100 μ s pulse, 100pps)	I_{FPT}	± 1	A
	Collector-Emitter Voltage	V_{CEO}	55	V
	Collector-Base Voltage	V_{CBO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Emitter-Base Voltage	V_{EBO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating (Ta $\geq$ 25°C)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / °C
Operating Temperature Range		T_{opr}	-55~100	°C
Storage Temperature Range		T_{stg}	-55~125	°C
Lead Soldering Temperature nction Temperature		T_{sol}	260 (10s)	°C
Junction Temperature		T_j	125	°C
Total Package Power Dissipation		P_T	250	mW
Total Package Power Dissipation Derating		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / °C
Isolation Voltage (AC, 1 min., R.H. $\leq$ 60%)		BV_S	5000	Vrms

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	24	V
Forward Current	I_F (RMS)	—	16	25	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	85	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

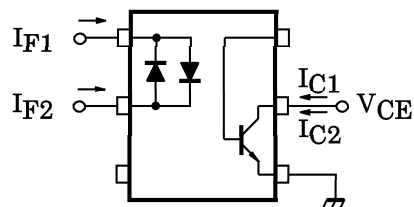
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Forward Current	I_F	$V_F = 0.7\text{V}$	—	2.5	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	60	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 0.5\text{mA}$	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}$	80	—	—	V
	Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector Dark Current	$I_D(I_{CEO})$	$V_{CE} = 24\text{V}$	—	10	100	nA
			$V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	—	2	50	μA
	Collector Dark Current	I_{CBO}	$V_{CB} = 10\text{V}$	—	0.1	—	nA
	Capacitance (Collector to Emitter)	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF

COUPLED ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I_C / I_F (sat)	$I_F = \pm 1\text{mA}, V_{CE} = 0.4\text{V}$ Rank GB	—	60	—	%
			30	—	—	
Base Photo-current	I_{PB}	$I_F = \pm 5\text{mA}, V_{CB} = 5\text{V}$	—	10	—	μA
Collector-Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_C = 2.4\text{mA}, I_F = \pm 8\text{mA}$	—	—	0.4	V
Off-State Collector Current	$I_C(\text{off})$	$V_F = \pm 0.7\text{V}, V_{CE} = 24\text{V}$	—	1	10	μA
CTR Symmetry	$I_C(\text{ratio})$	$I_C(I_F = -5\text{mA}) / I_C(I_F = +5\text{mA})$ (Note 1)	0.33	1	3	—

(Note 1)

$$I_C(\text{ratio}) = \frac{I_{C2}(I_F = I_{F2}, V_{CE} = 5\text{V})}{I_{C1}(I_F = I_{F1}, V_{CE} = 5\text{V})}$$



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, R.H.≤60%	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=2mA RL=100Ω	—	2	—	μs
Fall Time	tf		—	3	—	
Turn-on Time	tON		—	3	—	
Turn-off Time	tOFF		—	3	—	
Turn-on Time	tON	RL=1.9kΩ (Note 2)	—	2	—	μs
Storage Time	ts	RBE=OPEN	—	15	—	
Turn-off Time	tOFF	VCC=5V, IF=±16mA	—	25	—	
Turn-on Time	tON	RL=1.9kΩ (Note 2)	—	2	—	μs
Storage Time	ts	RBE=220kΩ, VCC=5V	—	12	—	
Turn-off Time	tOFF	IF=±16mA	—	20	—	

(Note 2) SWITCHING TIME TEST CIRCUIT

