

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP630

PROGRAMMABLE CONTROLLERS

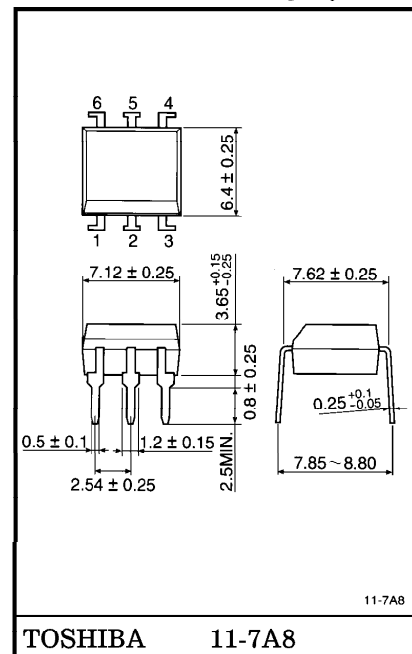
AC/DC-INPUT MODULE

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.

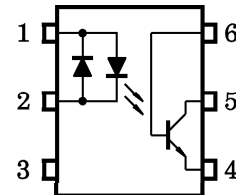
- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio : 50% Min.
Rank GB : 100% Min.
- Isolation Voltage : 5000Vrms Min.
- UL Recognized : UL1577 File No. E67349

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

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

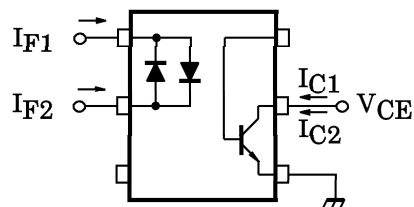
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Forward Current	I_F	$V_F = 0.7\text{V}$	—	2.5	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	60	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 0.5\text{mA}$	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

