TOSHIBA Photocoupler GaAs IRed & Photo-Transistor

TLP630

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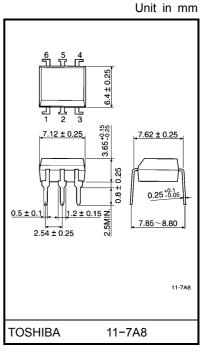
Programmable Controllers
AC / DC-Input Module
Telecommunication

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.

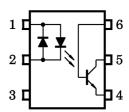
Rank GB: 100% min.

- Isolation voltage: 5000Vrms min.
- UL recognized: UL1577 file no. E67349



Weight: 0.4g

Pin Configurations(top view)



1 : ANODE, CATHODE 2 : CATHODE, ANODE

3 : N.C.

4 : EMITTER5 : COLLECTOR

6:BASE

Maximum Ratings (Ta = 25°C)

	Characteristic	Cuma la al	Detina	Unit	
Gharacteristic		Symbol	Rating	Unit	
٥	Forward current	I _{F(RMS)}	60	mA	
IEI	Forward current derating (Ta ≥ 39°C)	ΔI _F / °C	-0.7	mA / °C	
	Peak forward current (100µs pulse,100pps)	I _{FPT}	±1	А	
	Collector-emitter voltage	V _{CEO}	55	V	
	Collector-base voltage	V _{CBO}	80	V	
ctor	Emitter-collector voltage	V _{ECO}	7	V	
Detector	Emitter-base voltage	V _{EBO}	7	V	
	Collector current	Ic	50	mA	
	Power dissipation	PC	150	mW	
	Power dissipation derating (Ta ≥ 25°C)	ΔP _C / °C	-1.5	mW / °C	
Operating temperature range		T _{opr}	-55~100	°C	
Sto	rage temperature range	T _{stg}	-55~125	°C	
Lead soldering temperature nction temperature		T _{sol}	260(10s)	°C	
Junction temperature		Tj	125	°C	
Total package power dissipation		PT	250	mW	
Total package power dissipation derating		ΔP _T / °C	-2.5	mW / °C	
Isolation voltage (AC, 1 min., R.H. ≤ 60%)		BVS	5000	Vrms	

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Recommended Operating Conditions

Characteristic	Symbol	Min.	Тур.	Max.	Unit
Supply voltage	V _{CC}	_	5	24	V
Forward current	I _{F(RMS)}	_	16	25	mA
Collector current	Ic	_	1	10	mA
Operating temperature	T _{opr}	-25	_	85	°C

Individual Electrical Characteristics (Ta = 25°C)

	Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
	Forward voltage	V _F	I _F = 10mA	1.0	1.15	1.3	V
LED	Forward current	l _F	V _F = 0.7V	_	2.5	10	μΑ
	Capacitance	C _T	V = 0, f = 1MHz	_	60	_	pF
	Collector–emitter breakdown voltage	V _{(BR)CEO}	I _C = 0.5mA	55	1	ı	V
Detector	Emitter–collector breakdown voltage	V _{(BR)ECO}	I _E = 0.1mA	7	-	1	V
	Collector-base breakdown voltage	V _{(BR)CBO}	I _C = 0.1mA	80	ı	ı	V
	Emitter-base breakdown voltage	V _{(BR)EBO}	I _E = 0.1mA	7	1	l	V
	Collector dark current I _D (I _{CEO})	I- (I)	V _{CE} = 24V	_	10	100	nA
		V _{CE} = 24V, Ta = 85°C	_	2	50	μΑ	
	Collector dark current	I _{CBO}	V _{CB} = 10V	_	0.1	_	nA
	Capacitance (collector to emitter)	C _{CE}	V = 0, f = 1MHz	_	10		pF

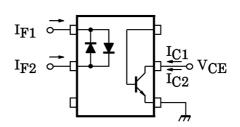
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Current transfer ratio	I _C / I _E	$I_F = \pm 5$ mA, $V_{CE} = 5$ V Rank GB	50	_	600	%
Current transfer fatto	IC / IF		100	_	600	
Saturated CTR	lo/le/ »	$I_C / I_{F(sat)}$ $I_F = \pm 1 \text{mA}, V_{CE} = 0.4 \text{V}$ Rank GB	_	60	_	%
	IC / IF(sat)		30	_	_	
Base photo-current	I _{PB}	$I_F = \pm 5$ mA, $V_{CB} = 5$ V	_	10	_	μΑ
Collector–emitter saturation voltage	V _{CE(sat)}	I _C = 2.4mA, I _F = ±8mA	_	_	0.4	V
Off-state collecter current	I _{C(off)}	$V_F = \pm 0.7 V$, $V_{CE} = 24 V$	_	1	10	μΑ
CTR symmetry	I _{C(ratio)}	$I_{C}(I_{F} = -5mA) / I_{C}(I_{F} = +5mA)$ (Note 1)	0.33	1	3	_

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(Note 1)

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



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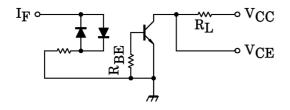
Isolation Characteristics (Ta = 25°C)

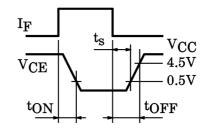
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Capacitance (input to output)	CS	V _S = 0, f = 1MHz	_	0.8	_	pF
Isolation resistance	R _S	V _S = 500V, R.H. ≤ 60%	5×10 ¹⁰	10 ¹⁴	_	Ω
		AC, 1 minute	5000	_	_	Vrms
Isolation voltage	BV_S	AC, 1 second, in oil	_	10000	_	VIIIIS
		DC, 1 minute, in oil	_	10000	_	Vdc

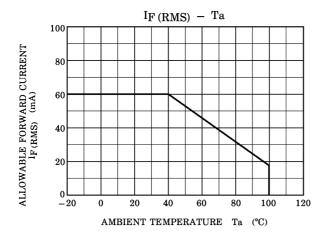
Switching Characteristics (Ta = 25°C)

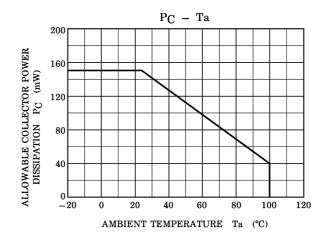
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Rise time	t _r	$V_{CC} = 10V, I_{C} = 2mA$ $R_{L} = 100\Omega$	_	2	_	
Fall time	t _f		_	3	_	lie.
Turn-on time	t _{ON}		_	3	_	μs
Turn-off time	t _{OFF}		_	3	_	
Turn-on time	t _{ON}	$R_L = 1.9 \text{ k}\Omega$ (Note 2) - $R_{BE} = \text{OPEN}$ $V_{CC} = 5 \text{ V}, I_F = \pm 16 \text{mA}$	_	2	_	
Storage time	t _S		_	15	_	μs
Turn-off time	t _{OFF}		_	25	_	
Turn-on time	t _{ON}	$R_{L} = 1.9k\Omega$ (Note 2) $R_{BE} = 220k\Omega$, $V_{CC} = 5 V$ $I_{F} = \pm 16mA$	_	2	_	
Storage time	t _S		_	12	_	μs
Turn-off time	t _{OFF}		_	20	_	

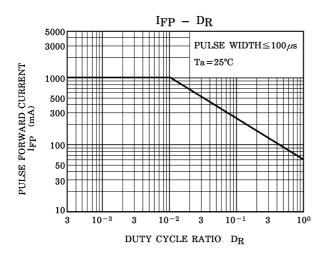
(Note 2) Switching time test circuit

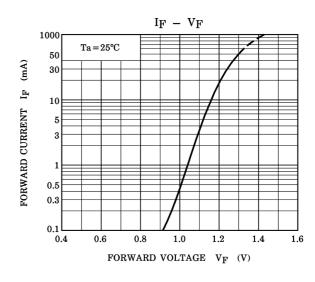


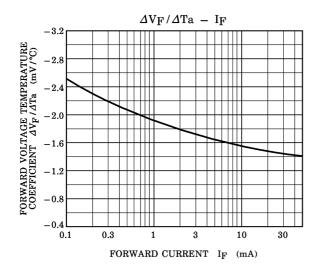


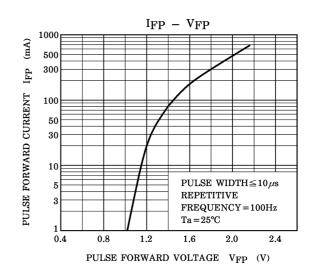


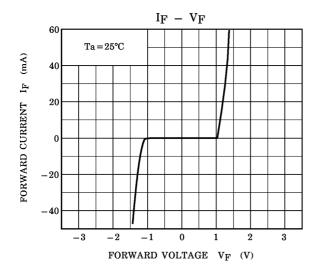


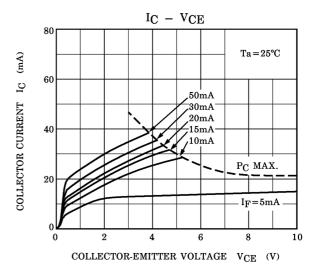


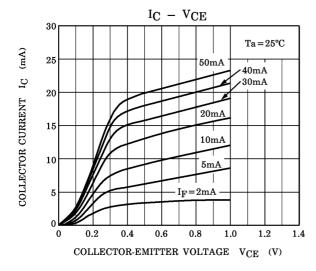


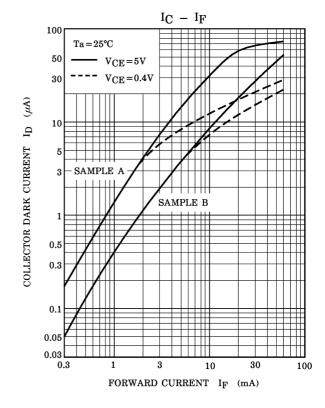


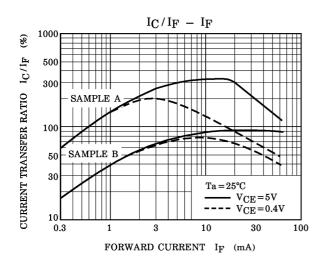




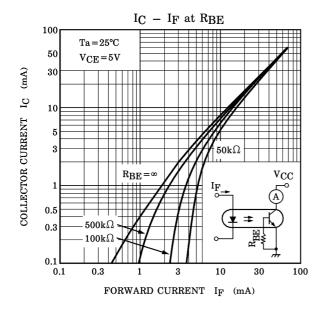


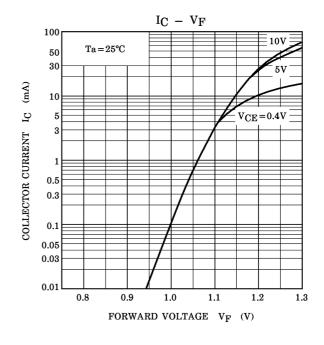


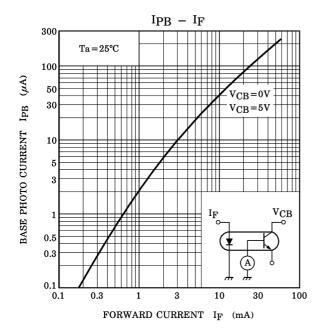


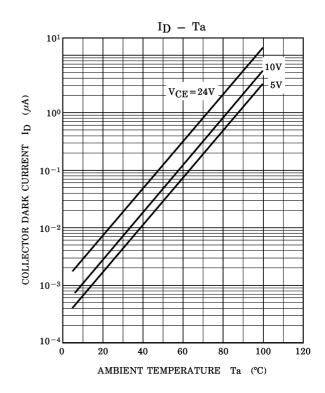


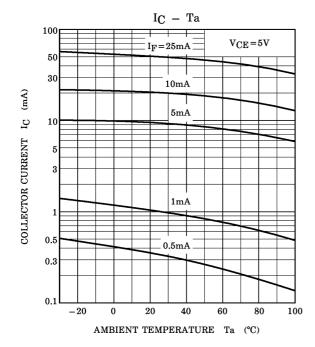
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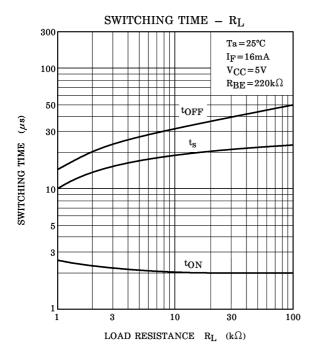


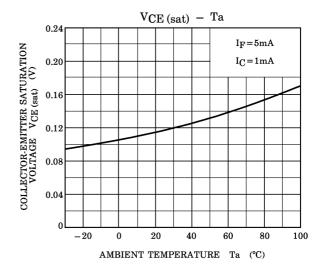


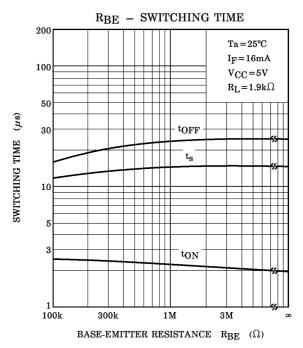


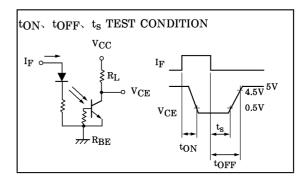












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