

TLP630

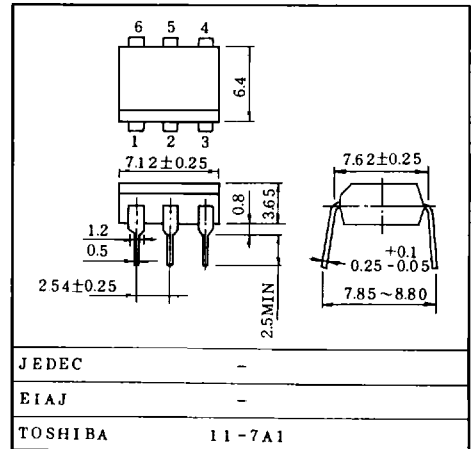
GaAs IRED & PHOTO-TRANSISTOR

PROGRAMMABLE CONTROLLERS
AC/DC-INPUT MODULE
TELECOMMUNICATION

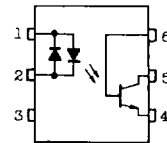
The TOSHIBA TLP630 consists of a photo-transistor optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel in a six lead plastic DIP package.

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

Unit in mm



PIN CONFIGURATIONS (TOP VIEW)



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

MAXIMUM RATINGS (Ta=25°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
LED	Forward Current	I _{F(RMS)}	60	mA
	Forward Current Derating (Ta≥39°C)	I _F /°C	-0.7	mA/°C
	Peak Forward Current (100μs pulse, 100pps)	I _{FP}	±1	A
	Junction Temperature	T _j	125	°C
DETECTOR	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≥25°C)	P _C /°C	-1.5	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 (10 sec.)	T _{sold}	260	°C
	Total Package Power Dissipation	P _T	250	mW
	Total Package Power Dissipation Derating (Ta≥25°C)	ΔP _T /°C	-2.5	mW/°C
	Isolation Voltage (AC, 1 min, RH≤60%)	BV _S	5000	V _{RMS}

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIT		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = \pm 10\text{mA}$	1.0	1.15	1.3	V
	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_{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 (Ta=25°C)

CHARACTERISTITS	SYMBOL	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	$I_C/I_F(\text{sat})$	$I_F = \pm 1\text{mA}, V_{CE}=0.4\text{V}$ 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	$I_C(\text{ratio})$	$I_C(I_F = -5\text{mA}) / I_C(I_F = +5\text{mA})$	0.33	1	3	-

ISOLATION CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C _S	V _S =0, f=1MHz	-	0.8	-	pF
Isolation Resistance	R _S	V _S =500V, R.H.≤60%	5×10 ¹⁰	10 ¹⁴	-	Ω
Isolation Voltage	BV _S	AC, 1 minute	5000	-	-	V _{rms}
		AC, 1 second	-	10000	-	V _{rms}
		DC, 1 minute	-	10000	-	V _{dc}

SWITCHING CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t _r	V _{CC} =10V I _C =2mA R _L =100Ω	-	2	-	μs
Fall Time	t _f		-	3	-	
Turn-on Time	t _{on}		-	3	-	
Turn-off Time	t _{off}		-	3	-	
Turn-on Time	t _{ON}	R _L =1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	t _S	R _{BE} =OPEN	-	15	-	
Turn-off Time	t _{OFF}	V _{CC} =5V, I _F =±16mA	-	25	-	
Turn-on Time	t _{ON}	R _L =1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	t _S	R _{BE} =220kΩ	-	12	-	
Turn-off Time	t _{OFF}	V _{CC} =5V, I _F =±16mA	-	20	-	

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

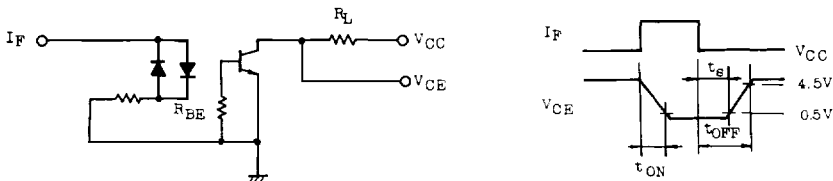
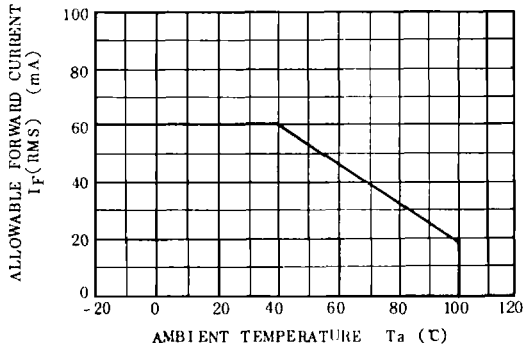
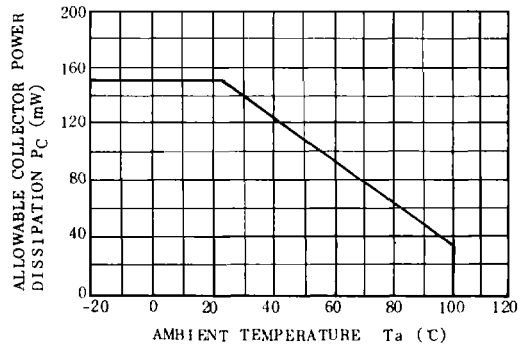


Fig 1 Switching Time Test Circuit

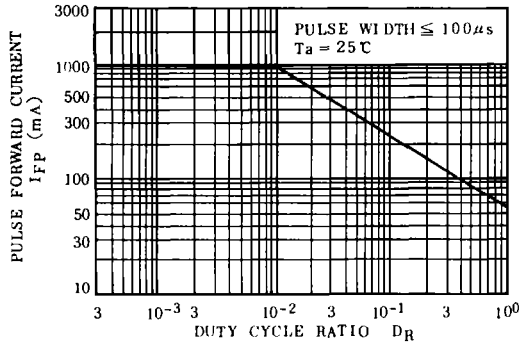
$I_F(\text{RMS}) - T_a$



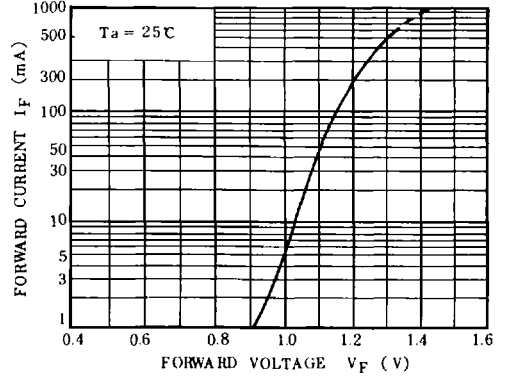
$P_C - T_a$



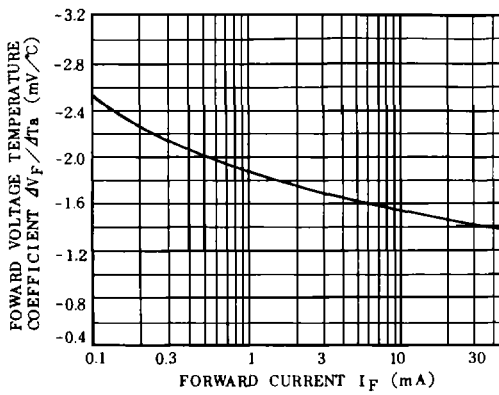
$I_{FP} - D_R$



$I_F - V_F$



$\Delta V_F / \Delta T_a - I_F$



$I_{FP} - V_{FP}$

