

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

# TLP127

PROGRAMMABLE CONTROLLERS

DC-OUTPUT MODULE

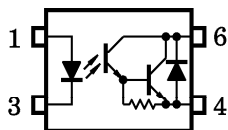
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP127 is a small outline coupler, suitable for surface mount assembly.

TLP127 consists of a gallium arsenide infrared emitting diode, optically coupled to a darlington photo transistor with an integral base-emitter resistor, and provides 300V  $V_{CEO}$ .

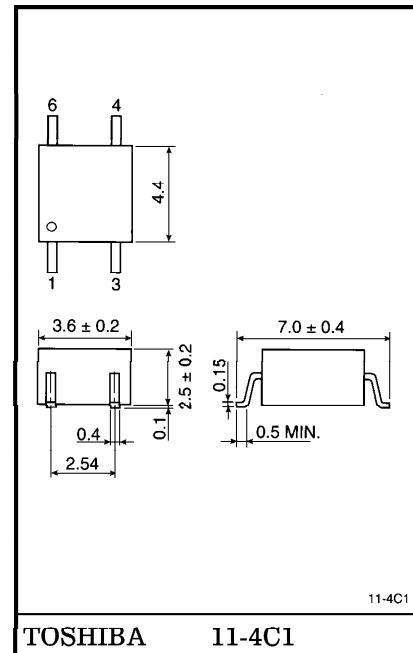
- Collector-Emitter Voltage : 300V (Min.)
- Current Transfer Ratio : 1000% (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE
- 3 : CATHODE
- 4 : EMITTER
- 6 : COLLECTOR

Unit in mm



TOSHIBA 11-4C1

Weight : 0.09g

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	$I_F$	50	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	-0.7 (Ta $\geq$ 53°C)	mA / °C
	Pulse Forward Current	$I_{FP}$	1 (100 $\mu$ s pulse, 100pps)	A
	Reverse Voltage	$V_R$	5	V
	Junction Temperature	$T_j$	125	°C
DETECTOR	Collector-Emitter Voltage	$V_{CEO}$	300	V
	Emitter-Collector Voltage	$V_{ECO}$	0.3	V
	Collector Current	$I_C$	150	mA
	Collector Power Dissipation	$P_C$	150	mW
	Collector Power Dissipation Derating (Ta $\geq$ 25°C)	$\Delta P_C / ^\circ\text{C}$	-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		$T_{sol}$	260 (10s)	°C
Total Package Power Dissipation		$P_T$	200	mW
Total Package Power Dissipation Derating (Ta $\geq$ 25°C)		$\Delta P_T / ^\circ\text{C}$	-2.0	mW / °C
Isolation Voltage (Note 1)		$BV_S$	2500 (AC, 1min., R.H. $\leq$ 60%)	Vrms

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

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	$\mu\text{A}$
	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 Dark Current	$I_{CEO}$	$V_{CE} = 200\text{V}$	—	10	200	nA
			$V_{CE} = 200\text{V}, T_a = 85^\circ\text{C}$	—	—	20	$\mu\text{A}$
Capacitance Collector to Emitter	$C_{CE}$	$V = 0, f = 1\text{MHz}$	—	12	—	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	$I_C / I_{F(sat)}$	$I_F = 10\text{mA}, V_{CE} = 1\text{V}$	500	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_F = 1\text{mA}$	—	—	1.0	V
		$I_C = 100\text{mA}, I_F = 10\text{mA}$	0.3	—	1.2	

ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	$t_r$	$V_{CC} = 10V, I_C = 10mA$ $R_L = 100\Omega$	—	40	—	$\mu s$
Fall Time	$t_f$		—	15	—	
Turn-on Time	$t_{on}$		—	50	—	
Turn-off Time	$t_{off}$		—	15	—	
Turn-on Time	$t_{ON}$	$R_L = 180\Omega$ (Fig.1) $V_{CC} = 10V, I_F = 16mA$	—	5	—	$\mu s$
Storage Time	$t_s$		—	40	—	
Turn-off Time	$t_{OFF}$		—	80	—	

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

Fig.1 SWITCHING TIME TEST CIRCUIT

