

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

# TLP127

PROGRAMMABLE CONTROLLERS

DC-OUTPUT MODULE

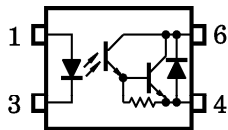
TELECOMMUNICATION

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  $V_{CEO}$ .

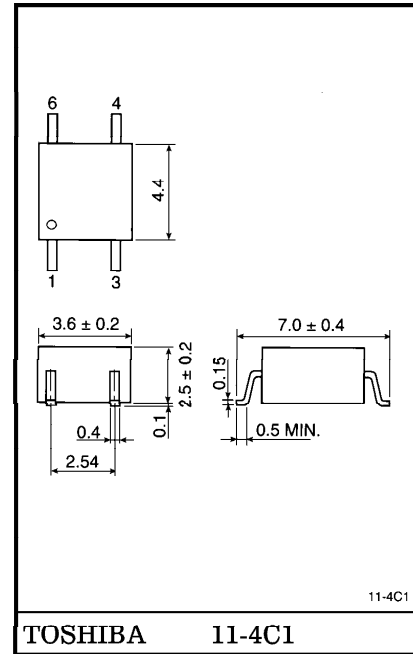
- Collector-Emitter Voltage : 300V (Min.)
- Current Transfer Ratio : 1000% (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)



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

Unit in mm



TOSHIBA 11-4C1

Weight : 0.09g

961001EBC2

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- 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.
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## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating	ΔI <sub>F</sub> /°C	-0.7 (Ta ≥ 53°C)	mA/°C
	Pulse Forward Current	I <sub>FP</sub>	1 (100μs pulse, 100pps)	A
	Reverse Voltage	V <sub>R</sub>	5	V
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Collector-Emitter Voltage	V <sub>CEO</sub>	300	V
	Emitter-Collector Voltage	V <sub>ECO</sub>	0.3	V
	Collector Current	I <sub>C</sub>	150	mA
	Collector Power Dissipation	P <sub>C</sub>	150	mW
	Collector Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>C</sub> /°C	-1.5	mW/°C
	Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range		T <sub>stg</sub>	-55~125	°C
Operating Temperature Range		T <sub>opr</sub>	-55~100	°C
Lead Soldering Temperature		T <sub>sol</sub>	260 (10s)	°C
Total Package Power Dissipation		P <sub>T</sub>	200	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP <sub>T</sub> /°C	-2.0	mW/°C
Isolation Voltage (Note 1)		BV <sub>S</sub>	2500 (AC, 1min., R.H. ≤ 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

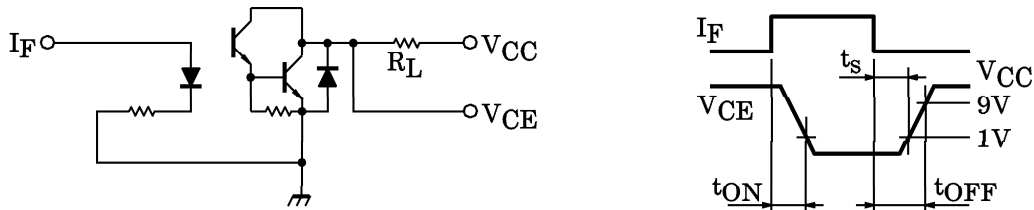
SWITCHING CHARACTERISTICS (Ta = 25°C)

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	—	

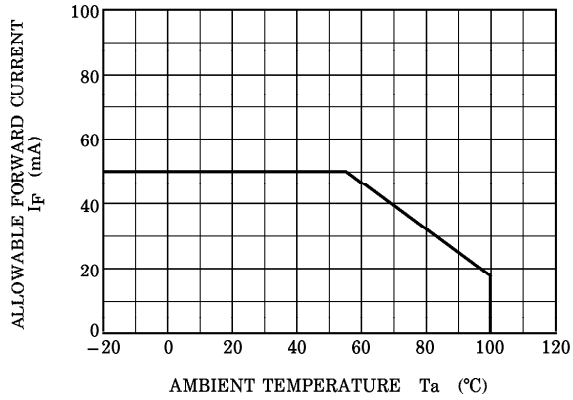
RECOMMENDED OPERATING CONDITIONS

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

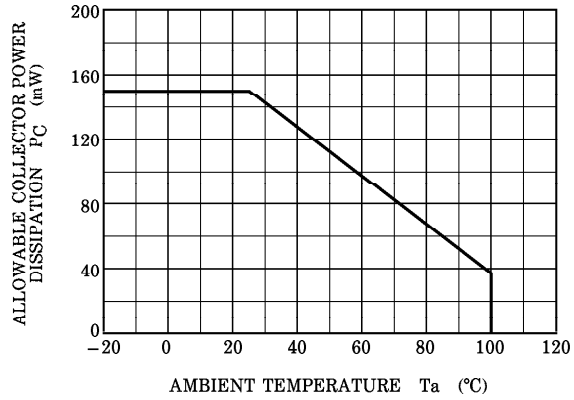
Fig.1 SWITCHING TIME TEST CIRCUIT



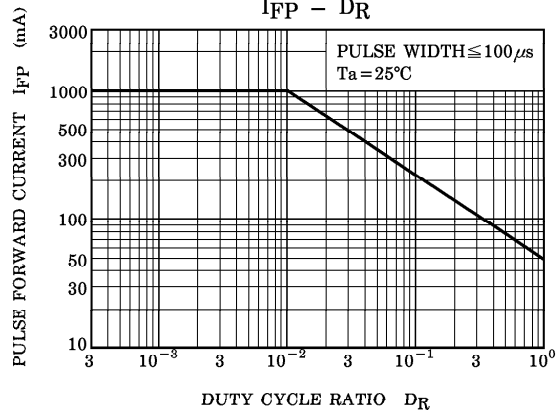
$I_F - T_a$



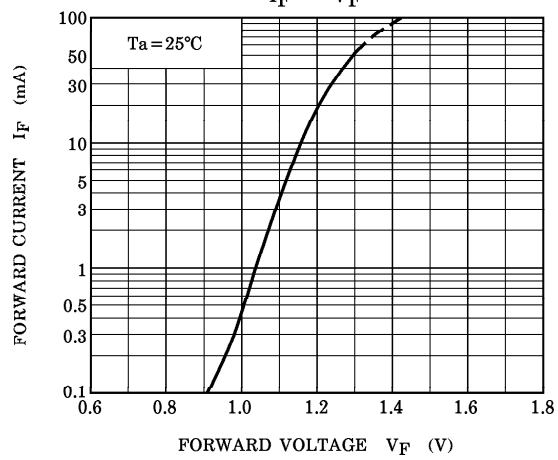
$P_C - T_a$



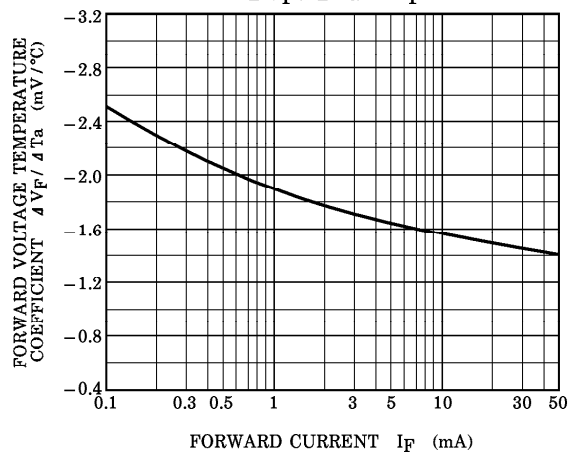
$I_{FP} - D_R$



$I_F - V_F$



$\Delta V_F / \Delta T_a - I_F$



$I_{FP} - V_{FP}$

