

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

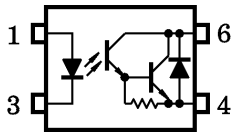
# TLP127

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  $V_{CEO}$ .

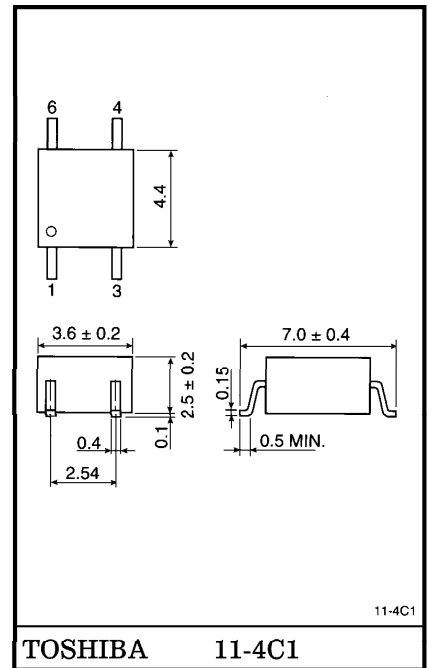
- Collector-Emitter Voltage : 300V (Min.)
- Current Transfer Ratio : 1000% (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)



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

Unit in mm



Weight : 0.09g

## 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%)	V <sub>rms</sub>	

(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	—	—	$V_{rms}$
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

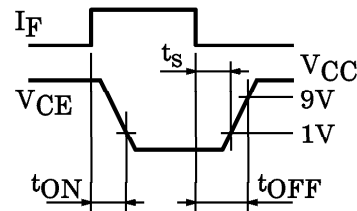
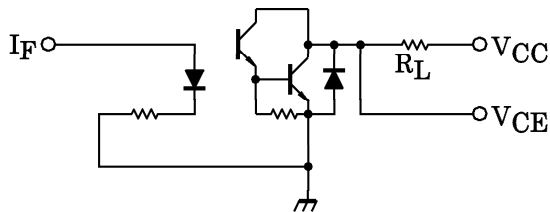
SWITCHING CHARACTERISTICS (Ta = 25°C)

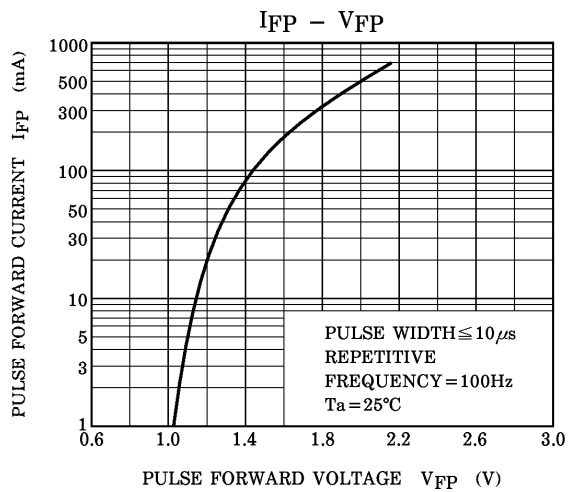
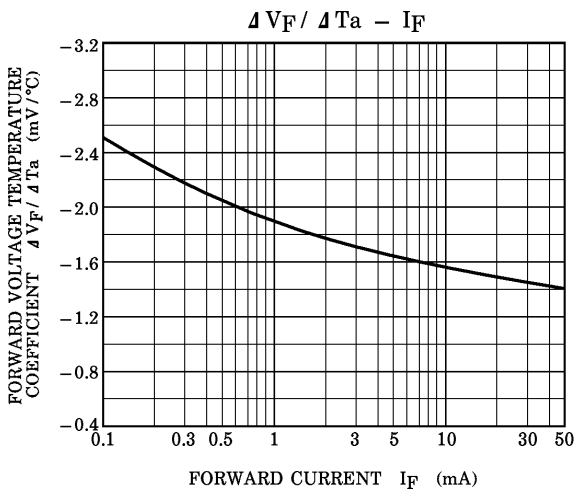
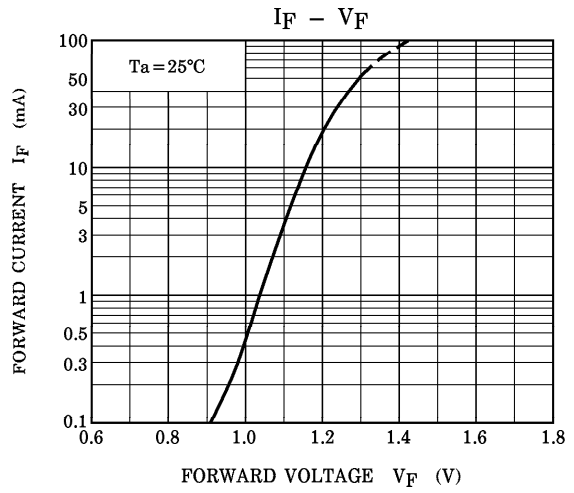
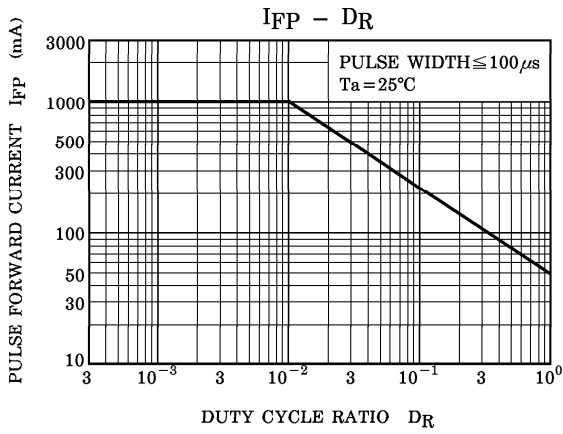
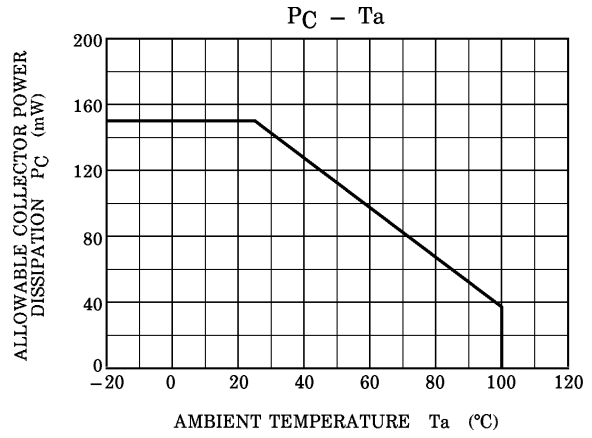
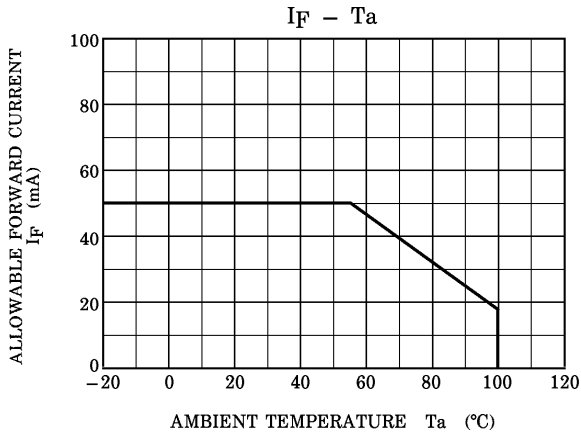
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	$t_r$	$V_{CC} = 10V, I_C = 10mA$ $R_L = 100\Omega$	—	40	—	$\mu S$
Fall Time	$t_f$		—	15	—	
Turn-on Time	$t_{on}$		—	50	—	
Turn-off Time	$t_{off}$		—	15	—	
Turn-on Time	$t_{ON}$	$R_L = 180\Omega$ (Fig.1) $V_{CC} = 10V, I_F = 16mA$	—	5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

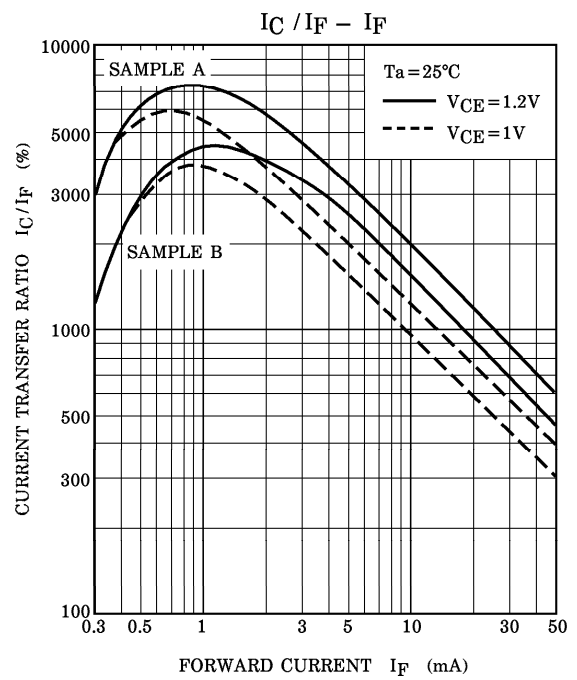
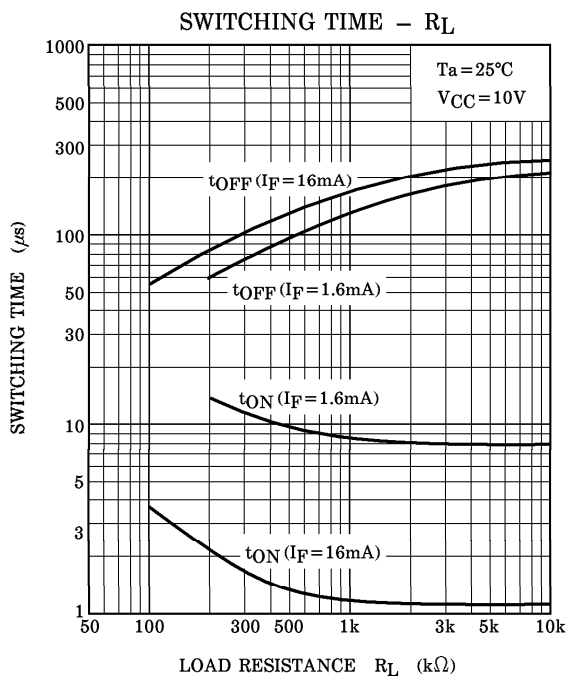
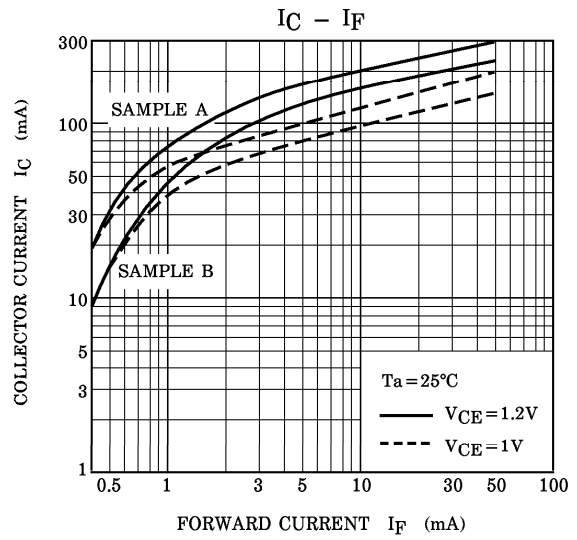
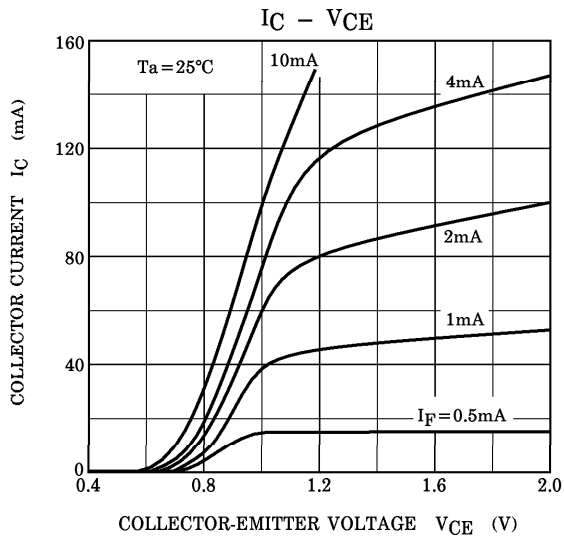
RECOMMENDED OPERATING CONDITIONS

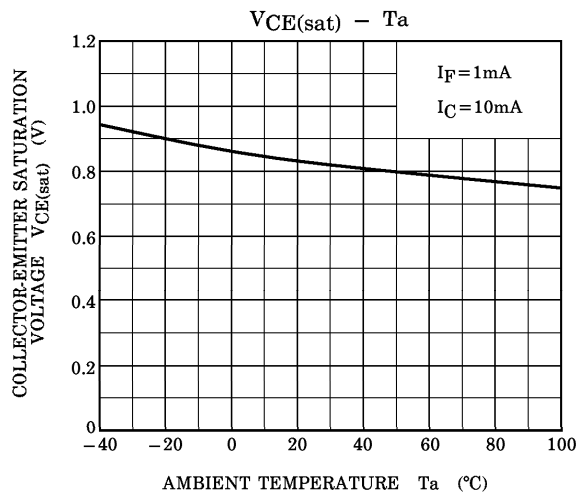
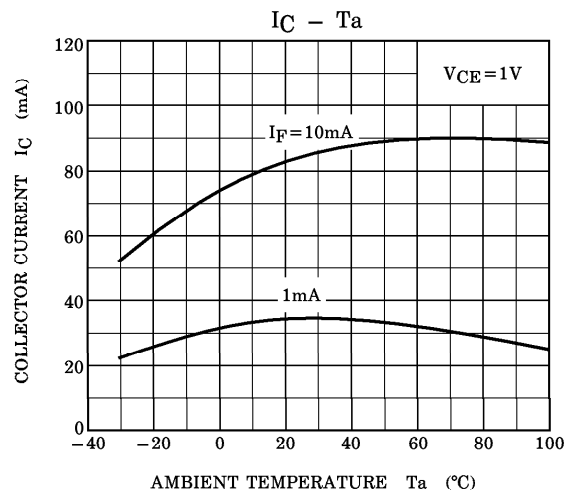
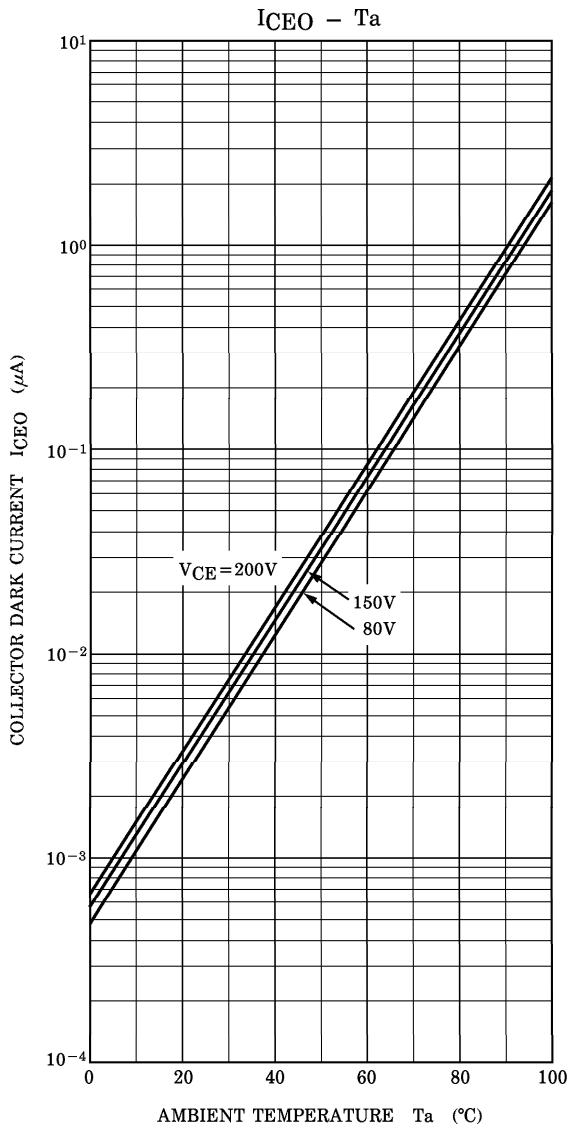
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{CC}$	—	—	200	V
Forward Current	$I_F$	—	16	25	mA
Collector Current	$I_C$	—	—	120	mA
Operating Temperature	$T_{opr}$	-25	—	85	°C

Fig.1 SWITCHING TIME TEST CIRCUIT









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