

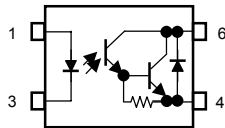
# TLP127

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 VCEO.

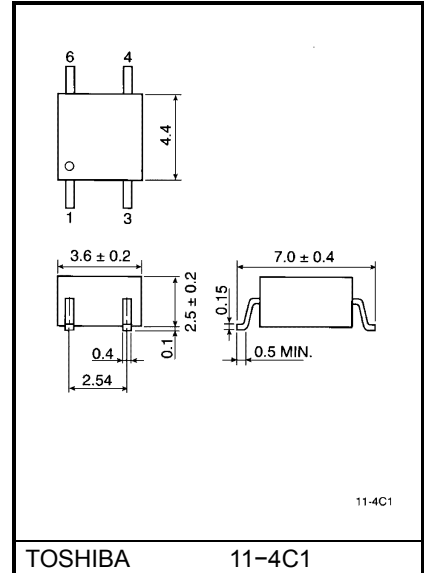
- Collector-emitter voltage: 300 V (min.)
- Current transfer ratio: 1000% (min.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file no. E67349

### Pin Configurations (top view)



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

Unit in mm



TOSHIBA 11-4C1

Weight: 0.09 g

## 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 (100µs 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	$I_C / I_F (\text{sat})$	$I_F = 10 \text{ mA}, V_{CE} = 1 \text{ V}$	500	—	—	%
Collector-emitter saturation voltage	$V_{CE (\text{sat})}$	$I_C = 10 \text{ mA}, I_F = 1 \text{ mA}$	—	—	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	—	—	$V_{\text{rms}}$
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	$V_{\text{dc}}$

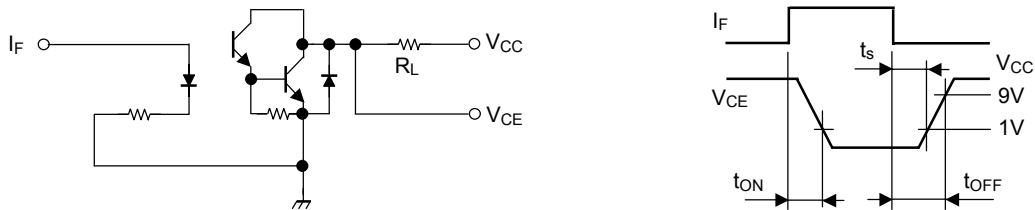
**Switching Characteristics (Ta = 25°C)**

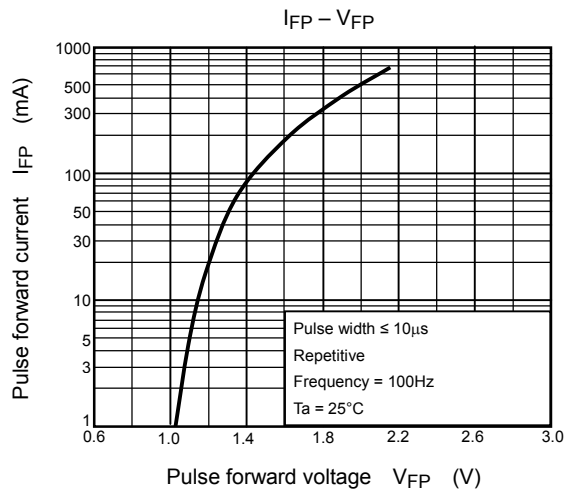
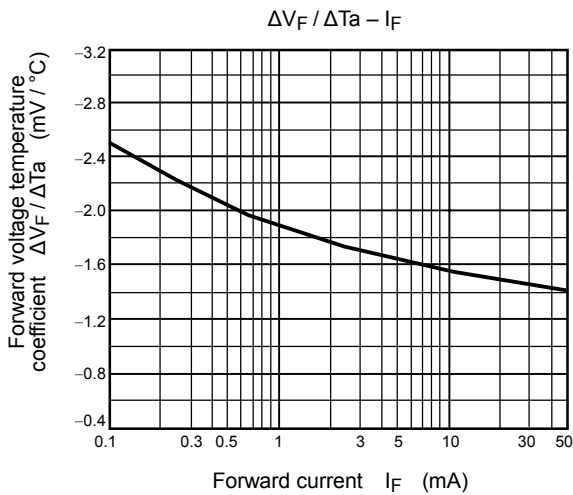
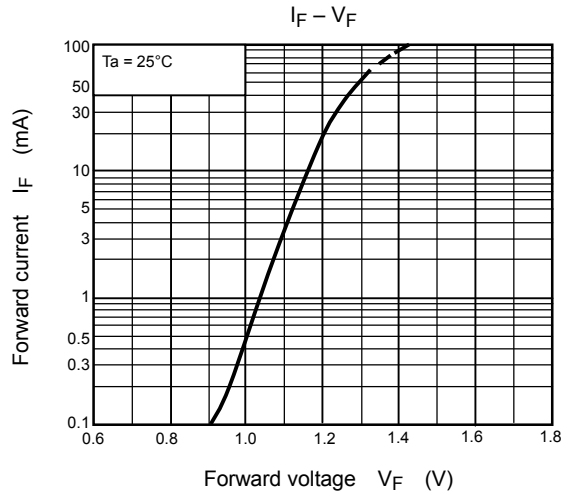
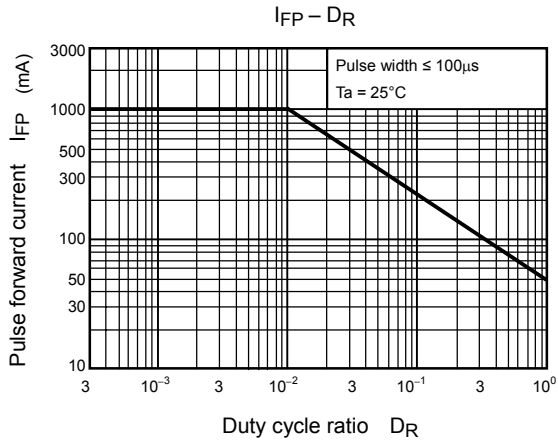
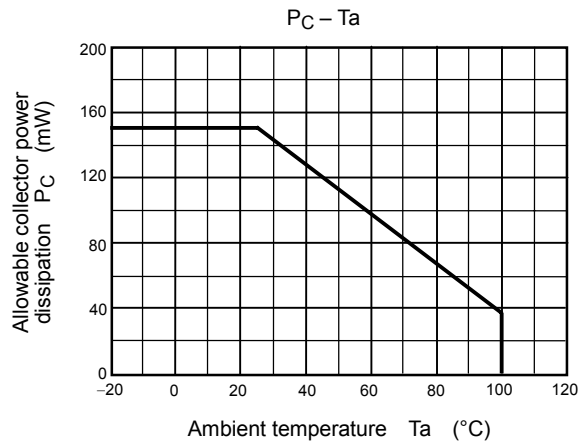
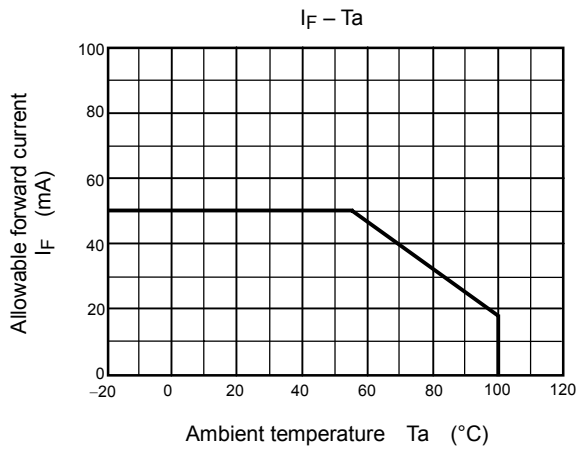
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	$t_r$	$V_{CC} = 10\text{ V}, I_C = 10\text{ mA}$ $R_L = 100\ \Omega$	—	40	—	$\mu\text{s}$
Fall time	$t_f$		—	15	—	
Turn-on time	$t_{on}$		—	50	—	
Turn-off time	$t_{off}$		—	15	—	
Turn-on time	$t_{ON}$	$R_L = 180\ \Omega$ $V_{CC} = 10\text{ V}, I_F = 16\text{ mA}$ (Fig.1)	—	5	—	$\mu\text{s}$
Storage time	$t_s$		—	40	—	
Turn-off time	$t_{OFF}$		—	80	—	

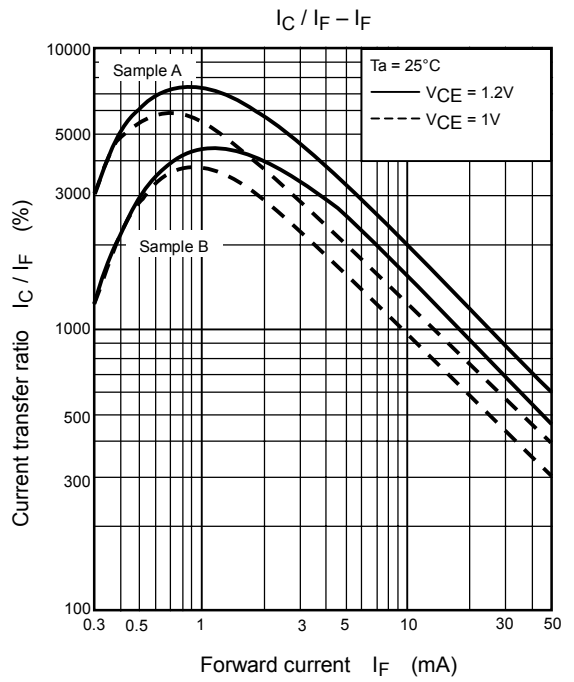
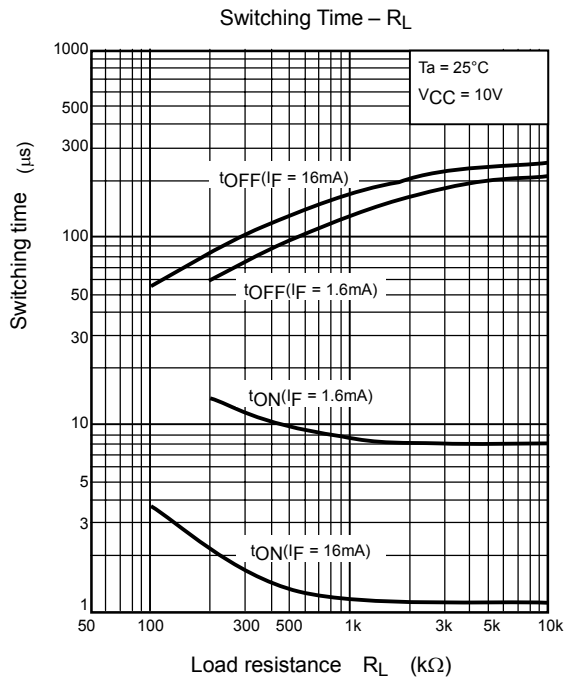
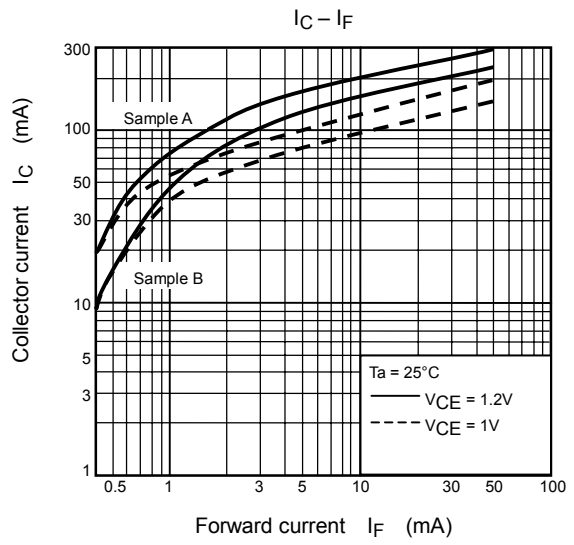
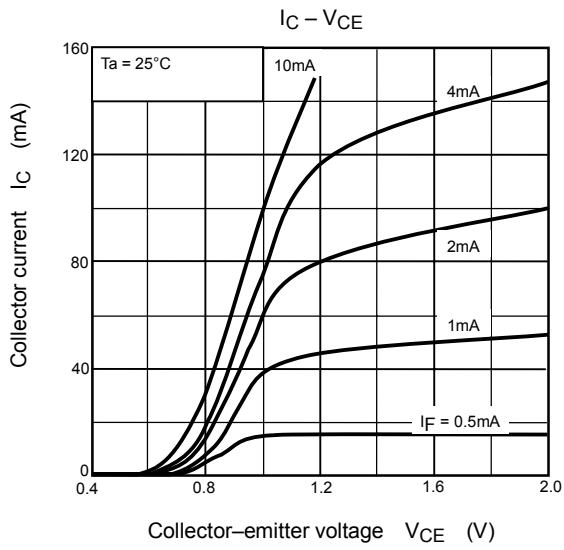
**Recommended Operating Conditions**

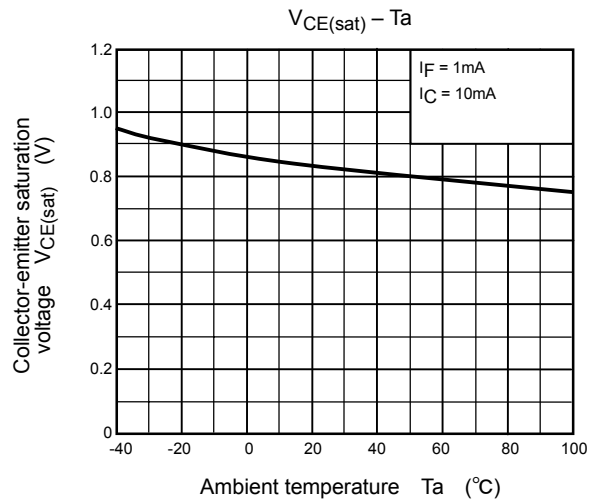
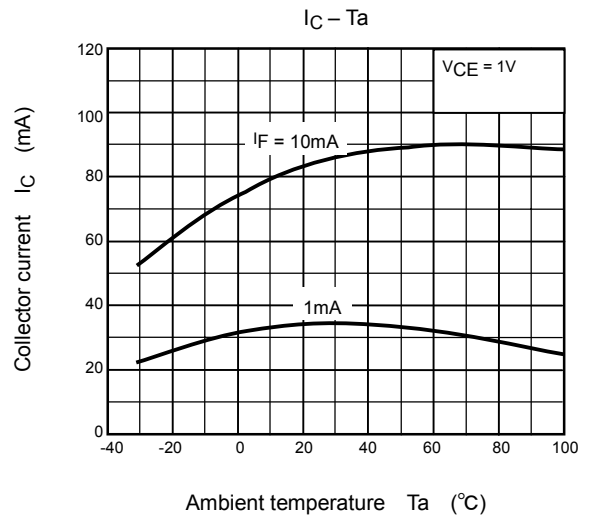
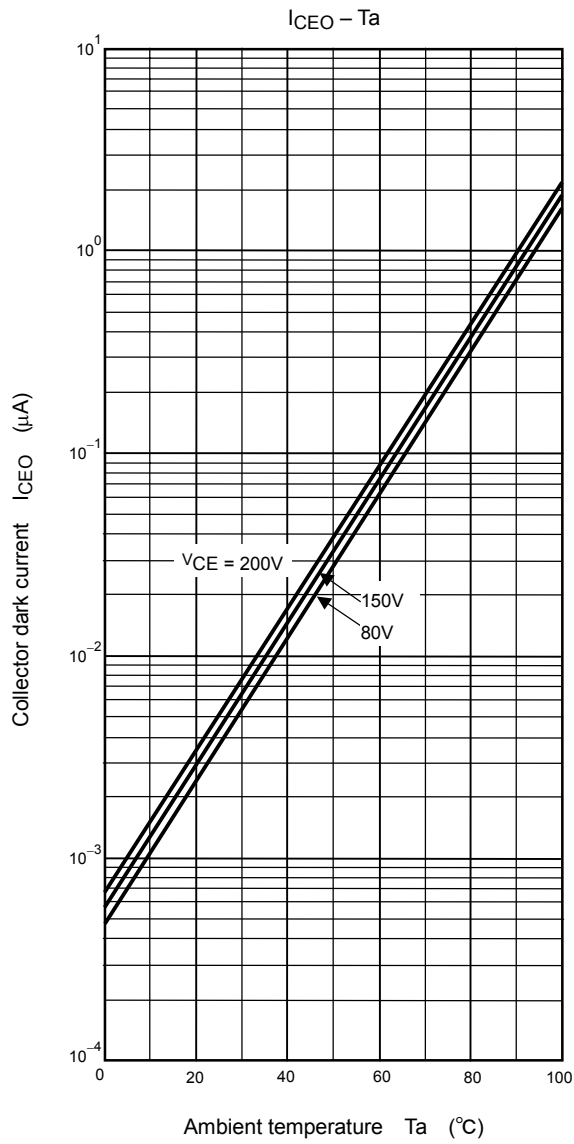
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{CC}$	—	—	200	V
Forward current	$I_F$	—	16	25	mA
Collector current	$I_C$	—	—	120	mA
Operating temperature	$T_{opr}$	-25	—	85	°C

Fig. 1 Switching time test circuit









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