

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP126

Programmable Controllers

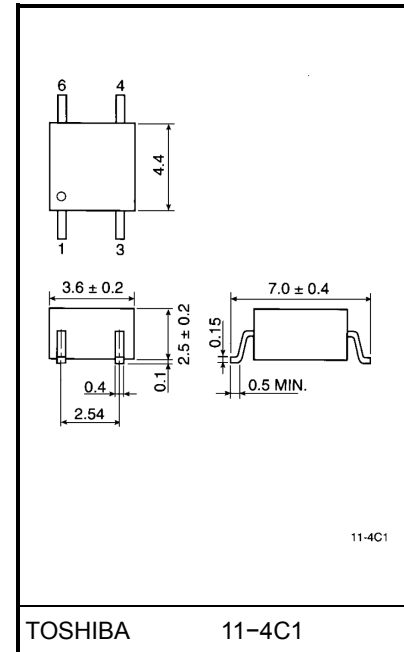
AC / DC-Input Module

Telecommunication

The TOSHIBA mini flat coupler TLP126 is a small outline coupler, suitable for surface mount assembly. TLP126 consists of a photo transistor, optically coupled to a gallium arsenide infrared emitting diode connected inverse parallel, and provides high CTR at low AC input current.

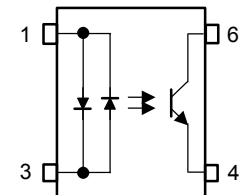
- Collector-emitter voltage: 80 V (min.)
- Current transfer ratio: 100% (min.)
- Isolation voltage: 3750Vrms (min.)
- UL recognized: UL1577, file No. E67349

Unit in mm



Weight: 0.09 g

Pin Configurations (top view)



- 1 : Anode, Cathode
- 3 : Cathode, Anode
- 4 : Emitter
- 6 : Collector

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	$I_{F(RMS)}$	50	mA
	Forward current derating (Ta ≥ 53°C) Δ	$\Delta I_F / ^\circ C$	-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}	80	V
	Emitter-collector voltage	V_{ECO}	7	V
	Collector current	I_C	50	mA
	Peak collector current(10ms pulse,100pps)	I_{CP}	100	mA
	Power dissipation	P_C	150	mW
	Power dissipation derating (Ta ≥ 25°C)	$\Delta P_C / ^\circ C$	-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	200	mW
Total package power dissipation derating (Ta ≥ 25°C)		$\Delta P_T / ^\circ C$	-2.0	mW / °C
Isolation voltage (AC, 1min., RH ≤ 60%) (Note 1)		BV_S	3750	Vrms

(Note 1) Device considered a two terminal device: Pins1, and 3 shorted together and 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	—	5	48	V
Forward current	$I_{F(RMS)}$	—	1.6	20	mA
Collector current	I_C	—	1	10	mA
Operating temperature	T_{opr}	-25	—	75	°C

Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test 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	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	80	—	—	V
	Emitter–collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector dark current	I_{CEO}	$V_{CE} = 48 \text{ V}$	—	10	100	nA
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	μA
	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	$I_F = \pm 1 \text{ mA}, V_{CE} = 0.5 \text{ V}$	100	—	1200	%
Low input CTR	$I_C / I_F (\text{low})$	$I_F = \pm 0.5 \text{ mA}, V_{CE} = 1.5 \text{ V}$	50	—	—	%
Collector–emitter saturation voltage	$V_{CE} (\text{sat})$	$I_C = 0.5 \text{ mA}, I_F = \pm 1 \text{ mA}$	—	—	0.4	V
		$I_C = 1 \text{ mA}, I_F = \pm 1 \text{ mA}$	—	0.2	—	
Off–state collector current	$I_{C(\text{off})}$	$V_F = \pm 0.7 \text{ V}, V_{CE} = 48 \text{ V}$	—	1	10	μA
CTR symmetry	$I_C (\text{ratio})$	$I_C (I_F = -1 \text{ mA}) / I_C (I_F = 1 \text{ mA})$	0.3	—	3	—

Coupled Electrical Characteristics (Ta = –25–75°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current transfer ratio	I_C / I_F	$I_F = 1 \text{ mA}, V_{CE} = 0.5 \text{ V}$	50	—	—	%
Low input CTR	$I_C / I_F (\text{low})$	$I_F = 0.5 \text{ mA}, V_{CE} = 1.5 \text{ V}$	—	50	—	%

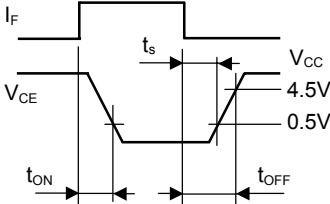
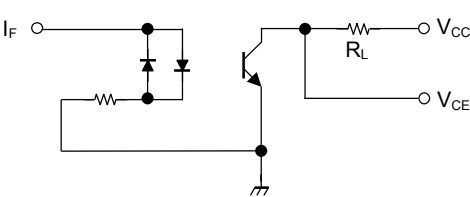
Isolation characteristics (Ta = 25°C)

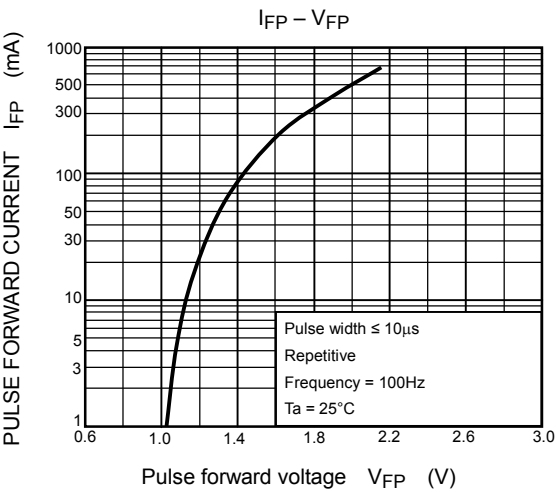
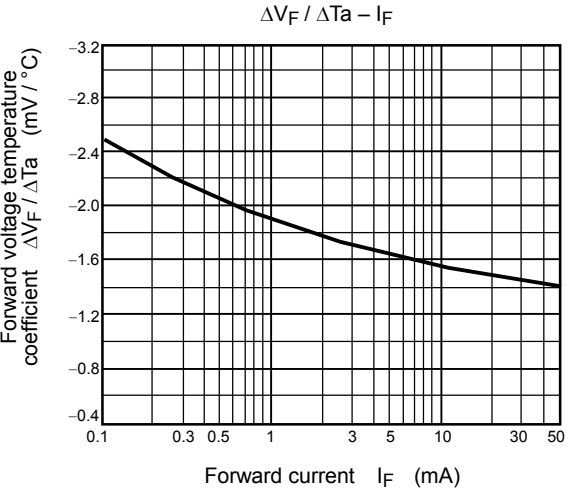
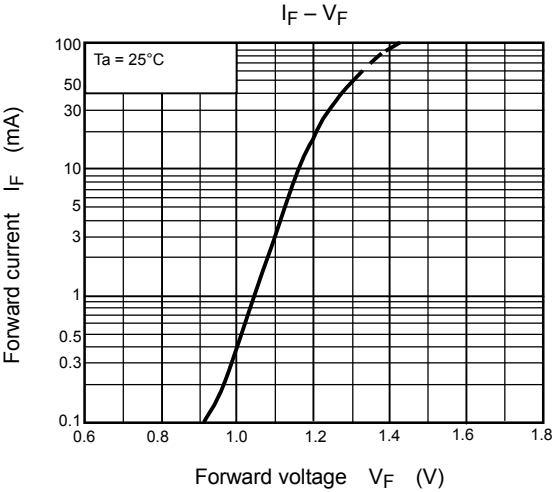
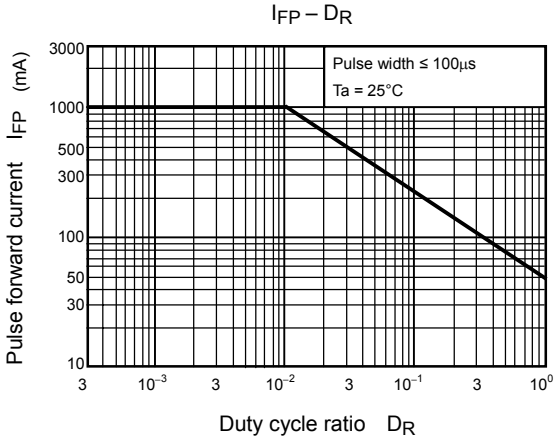
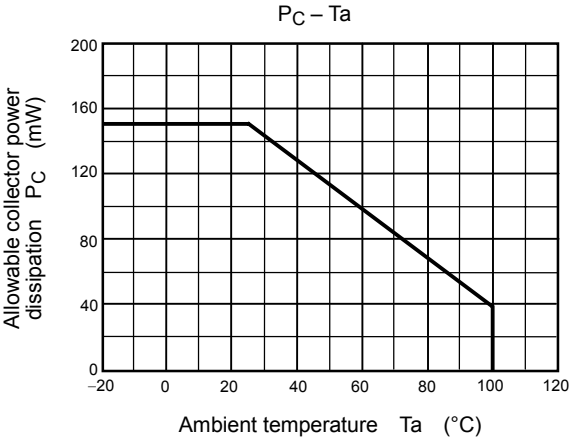
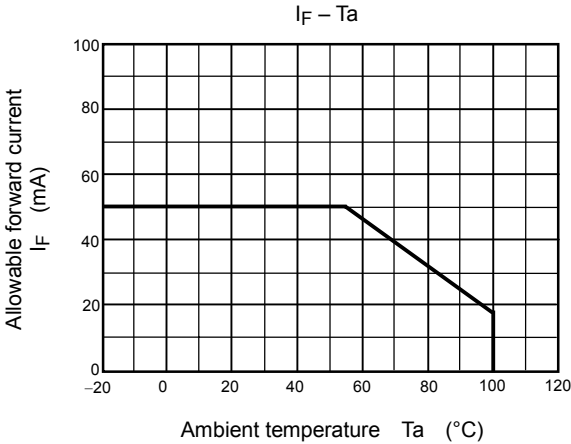
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	3750	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

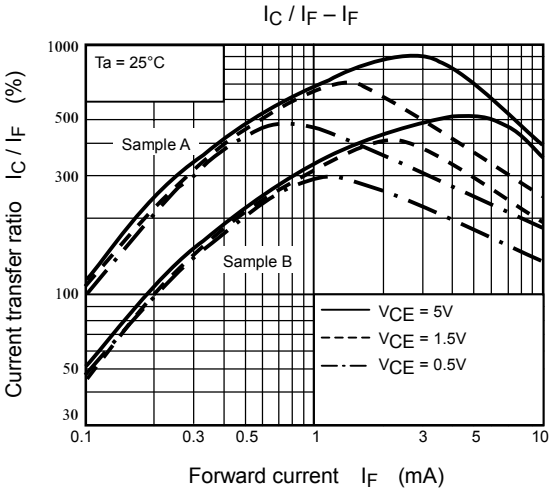
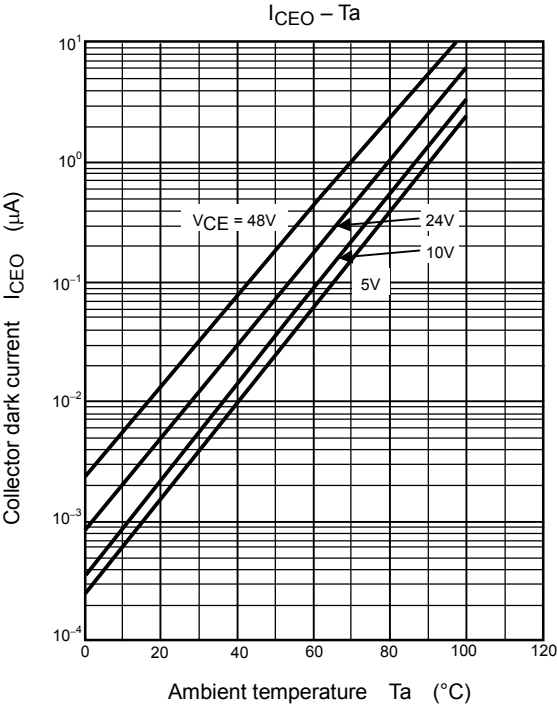
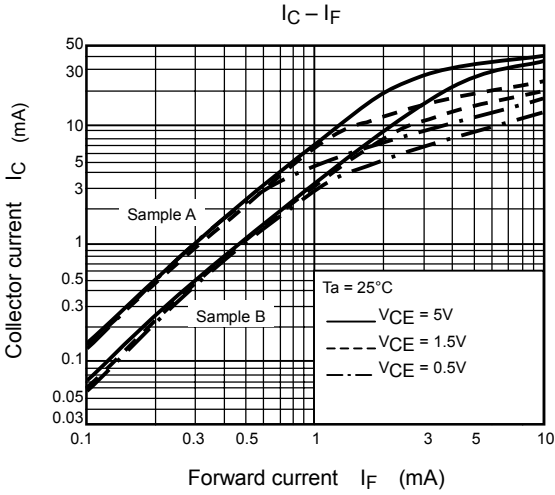
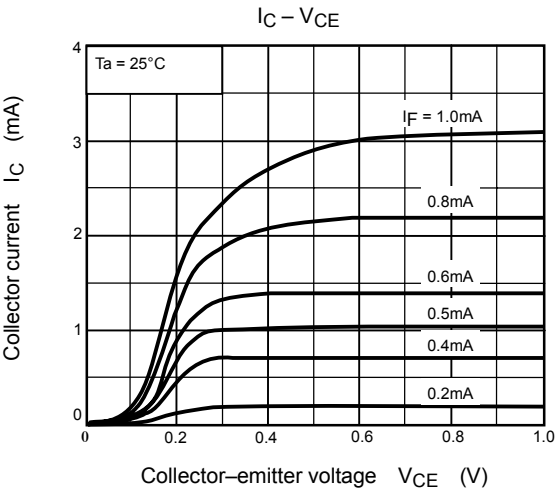
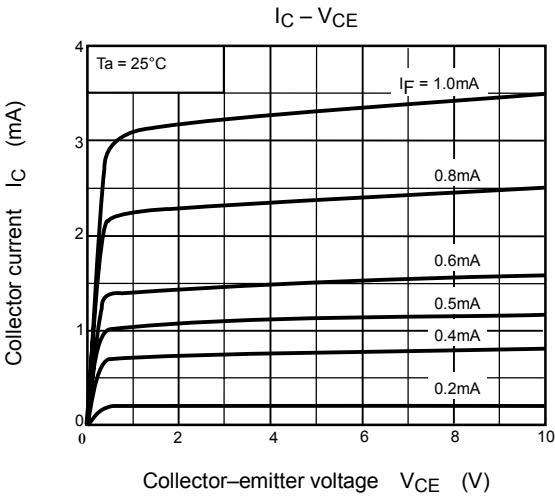
Switching Characteristics (Ta = 25°C)

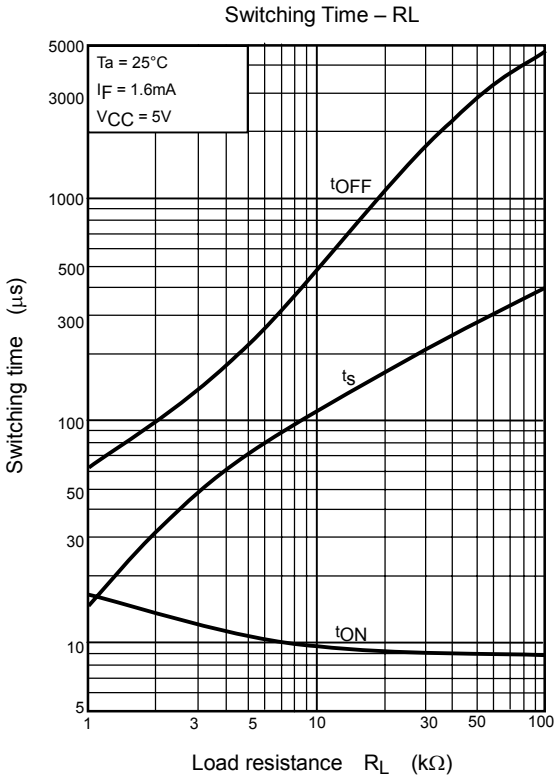
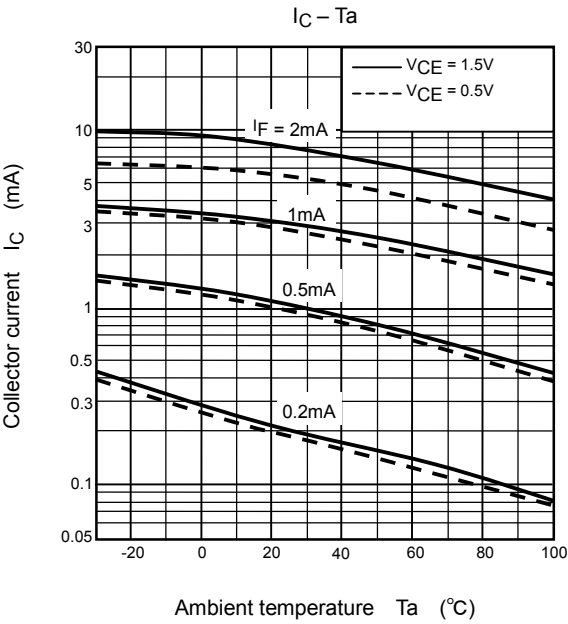
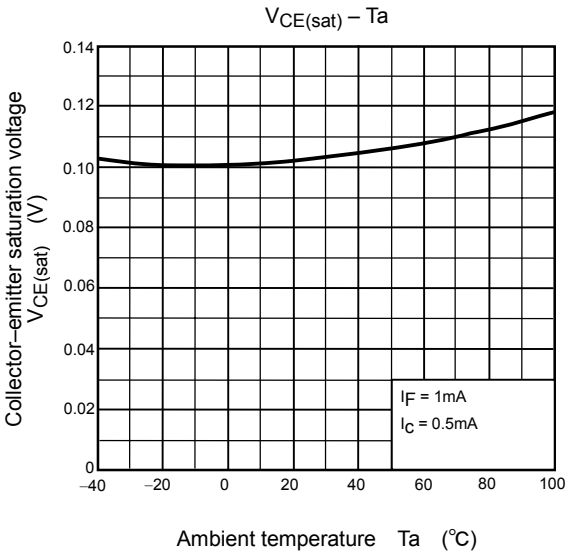
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	8	—	μs
Fall time	t_f		—	8	—	
Turn-on time	t_{on}		—	10	—	
Turn-off time	t_{off}		—	8	—	
Turn-on time	t_{ON}	$R_L = 4.7 \text{ k}\Omega$ $V_{CC} = 5 \text{ V}, I_F = \pm 1.6 \text{ mA}$ (Fig.1)	—	10	—	μs
Storage time	t_s		—	50	—	
Turn-off time	t_{OFF}		—	300	—	

Fig. 1 Switching time test circuit









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