TOSHIBA Photocoupler GaAs Ired & Photo−Transistor

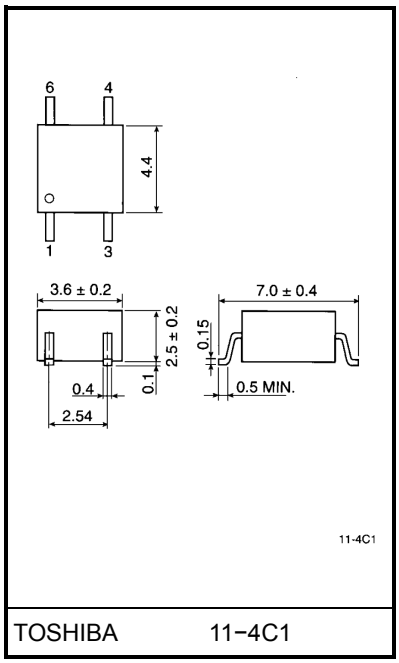
TLP126

Programmable Controllers

AC / DC−Input Module

Telecommunication

Unit in mm



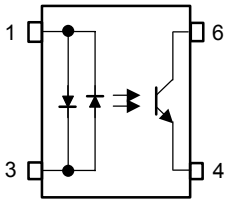
TOSHIBA 11−4C1

Weight: 0.09 g

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

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	ΔI_F / °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)	ΔP_C / °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)		ΔP_T / °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 = ±10 mA	1.0	1.15	1.3	V
	Capacitance	C_T	V = 0, f = 1 MHz	—	60	—	pF
Detector	Collector−emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = 0.5 mA	80	—	—	V
	Emitter−collector breakdown voltage	$V_{(BR)\ ECO}$	I_E = 0.1 mA	7	—	—	V
	Collector dark current	I_{CEO}	V_{CE} = 48 V	—	10	100	nA
			V_{CE} = 48 V, Ta = 85°C	—	2	50	μA
	Capacitance collector to emitter	C_{CE}	V = 0, f = 1 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 mA, V_{CE} = 0.5 V	100	—	1200	%
Low input CTR	I_C / $I_{F\ (low)}$	IF = ±0.5 mA, V_{CE} = 1.5 V	50	—	—	%
Collector−emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 0.5 mA, I_F = ±1 mA	—	—	0.4	V
		I_C = 1 mA, I_F = ±1 mA	—	0.2	—	
Off−state collector current	$I_{C(off)}$	V_F = ± 0.7V, V_{CE} = 48 V	—	1	10	μA
CTR symmetry	$I_{C\ (ratio)}$	I_C (I_F = −1mA) / I_C (I_F = 1mA)	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 mA, V_{CE} = 0.5 V	50	—	—	%
Low input CTR	I_C / $I_{F\ (low)}$	IF = 0.5 mA, V_{CE} = 1.5 V	—	50	—	%

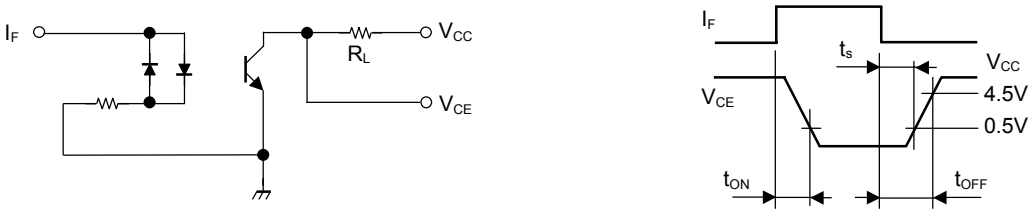
Isolation characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 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

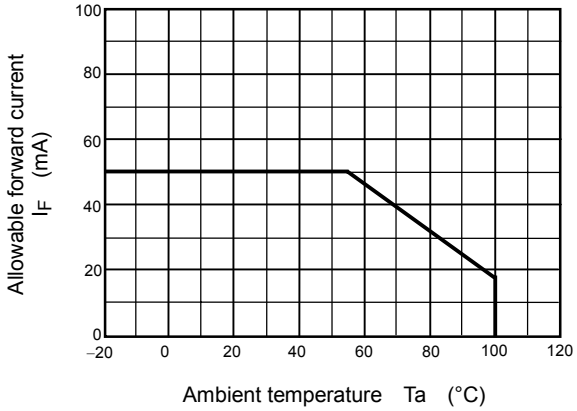
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	V_{CC} = 10 V, I_C = 2 mA R_L = 100Ω	—	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 kΩ (Fig.1) V_{CC} = 5 V, I_F = ±1.6 mA	—	10	—	μs
Storage time	t_S		—	50	—	
Turn−off time	t_{OFF}		—	300	—	

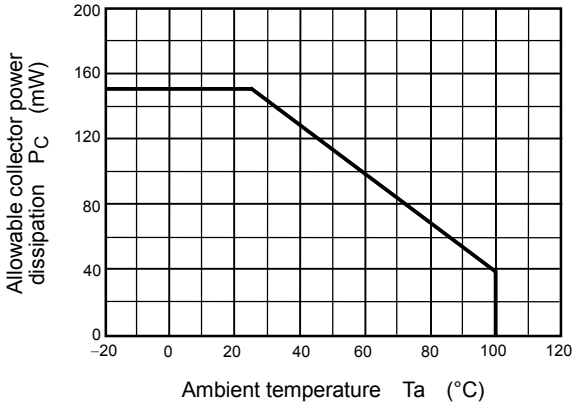
Fig. 1 Switching time test circuit



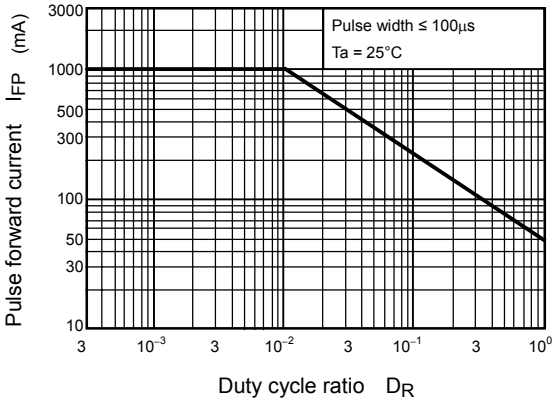
I_F – Ta



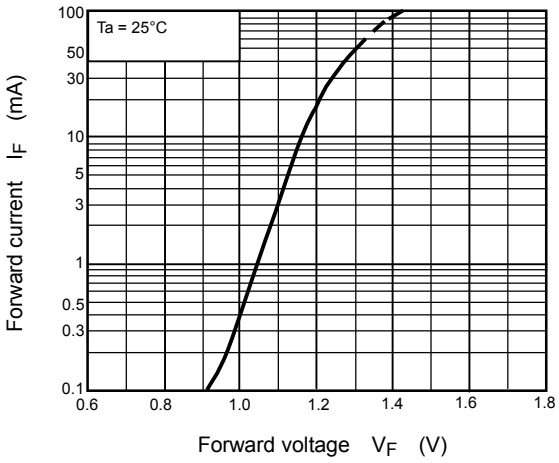
P_C – Ta



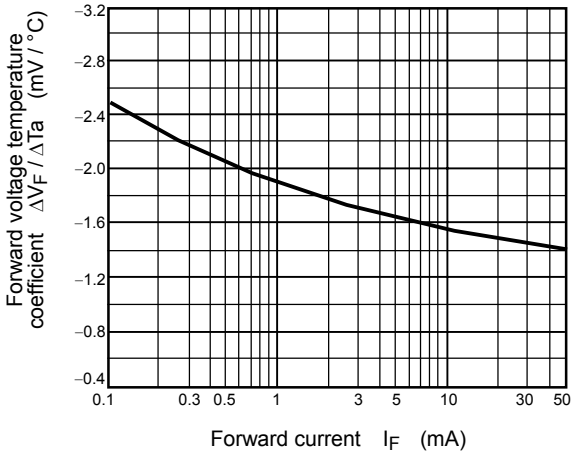
I_{FP} – D_R



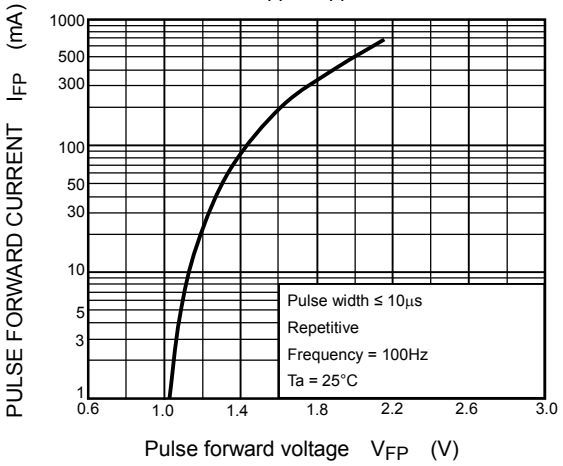
I_F – V_F



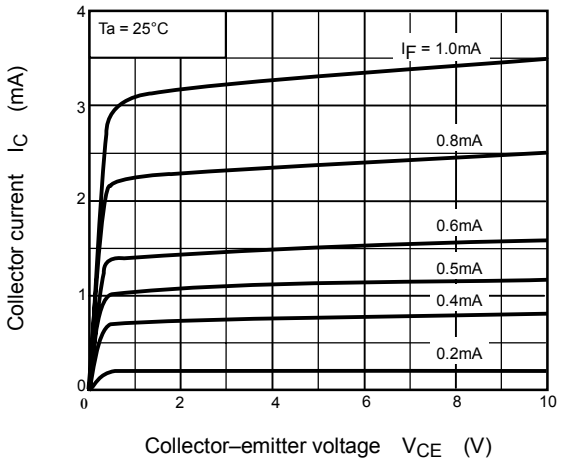
$\Delta V_F / \Delta Ta$ – I_F



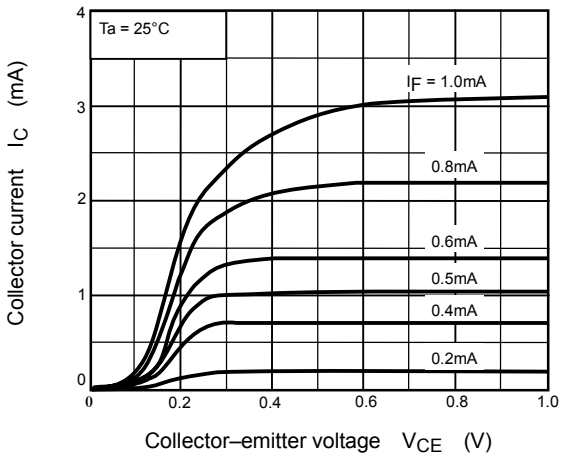
I_{FP} – V_{FP}



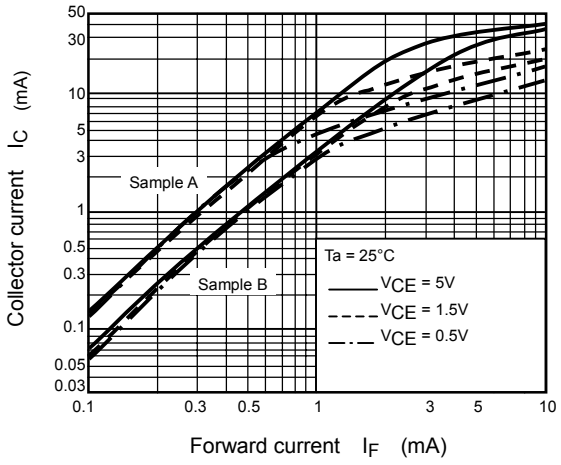
$I_C - V_{CE}$



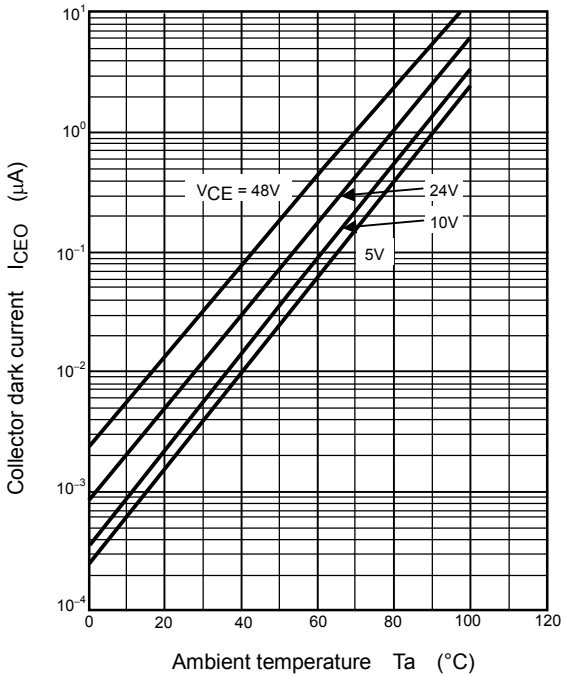
$I_C - V_{CE}$



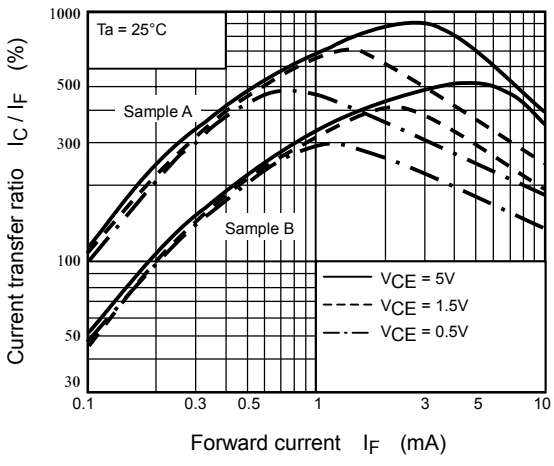
$I_C - I_F$



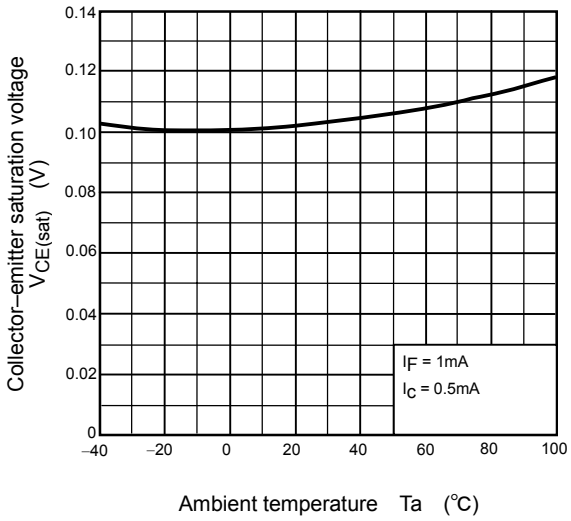
$I_{CEO} - Ta$



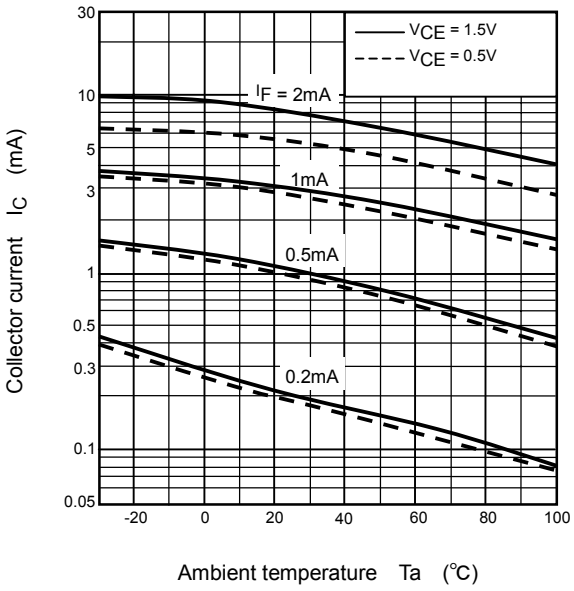
$I_C / I_F - I_F$



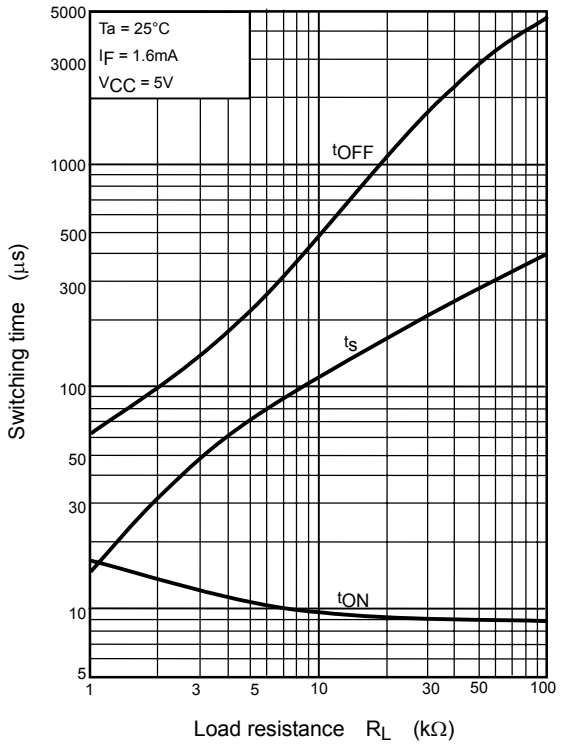
$V_{CE(sat)}$ – Ta



I_C – Ta



Switching Time – RL



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