

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP121

Office Machine

Programmable Controllers

AC / DC-Input Module

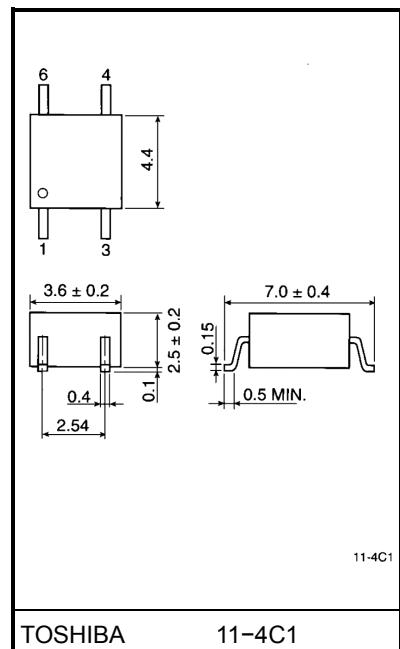
Telecommunication

The TOSHIBA mini flat coupler TLP121 is a small outline coupler, suitable for surface mount assembly.

TLP121 consists of a photo transistor, optically coupled to a gallium arsenide infrared emitting diode.

- Collector-emitter voltage: 80V (min.)
- Current transfer ratio: 50% (min.)
Rank GB: 100% (min.)
- Isolation voltage: 3750Vrms (min.)
- UL recognized: UL1577, file no. E67349

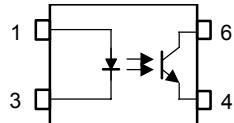
Unit in mm



TOSHIBA

11-4C1

Weight: 0.09g



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

Current Transfer Ratio

Type	Classification *1	Current Transfer Ratio (%) (I_C / I_F)		Marking Of Classification	
		$I_F = 5mA, V_{CE} = 5V, Ta = 25^\circ C$			
		Min.	Max.		
TLP121	(None)	50	600	BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB	
	Rank Y	50	150	Y, Y [■]	
	Rank GR	100	300	G, G [■]	
	—	200	600	B, B [■]	
	Rank GB	100	600	G, G [■] , B, B [■] , GB	

*1: Ex, rank GB: TLP121 (GB)

Note: Application type name for certification test, please use standard product type name, i, e.
TLP121 (GB): TLP121

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I _F	50	mA
	Forward current derating	ΔI _F / °C	-0.7 (Ta ≥ 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}	80	V
	Emitter-collector voltage	V _{ECO}	7	V
	Collector current	I _C	50	mA
	Collector power dissipation	P _C	150	mW
	Collector 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		T _{sol}	260 (10s)	°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 (Note 1)	BV _S	3750 (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

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{CC}	—	5	48	V
Forward current	I _F	—	16	20	mA
Collector current	I _C	—	1	10	mA
Operating temperature	T _{opr}	-25	—	85	°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
	Reverse current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1 MHz	—	30	—	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	—	10	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current transfer ratio	I _C / I _F	I _F = 5 mA, V _{CE} = 5 V Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I _C / I _F (sat)	I _F = 1 mA, V _{CE} = 0.4 V Rank GB	—	60	—	%
			30	—	—	
Collector-emitter saturation voltage	V _{CE} (sat)	I _C = 2.4 mA, I _F = 8 mA	—	—	0.4	V
		I _C = 0.2 mA, I _F = 1 mA Rank GB	—	0.2	—	
			—	—	0.4	
Off-state collector current	I _C (off)	V _F = 0.7V, V _{CE} = 48 V	—	1	10	μA

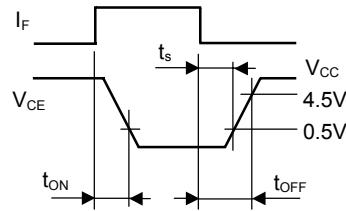
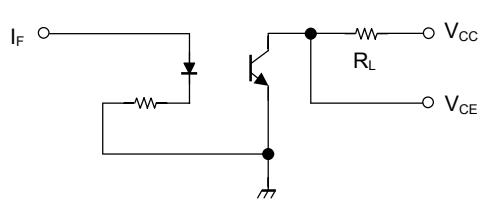
Isolation Characteristics (Ta = 25°C)

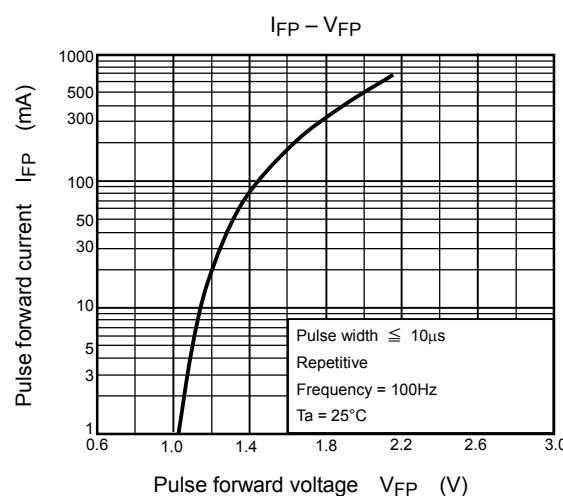
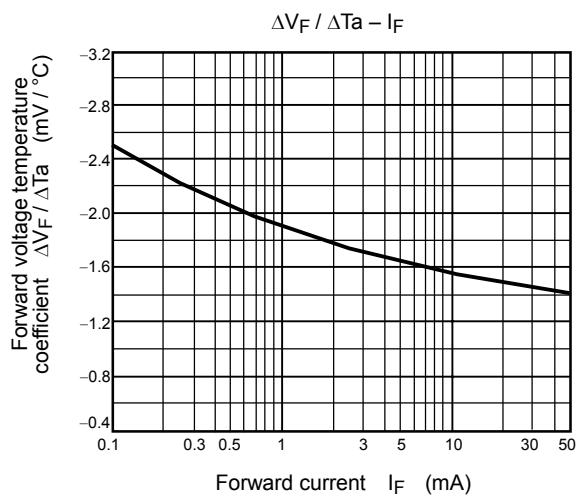
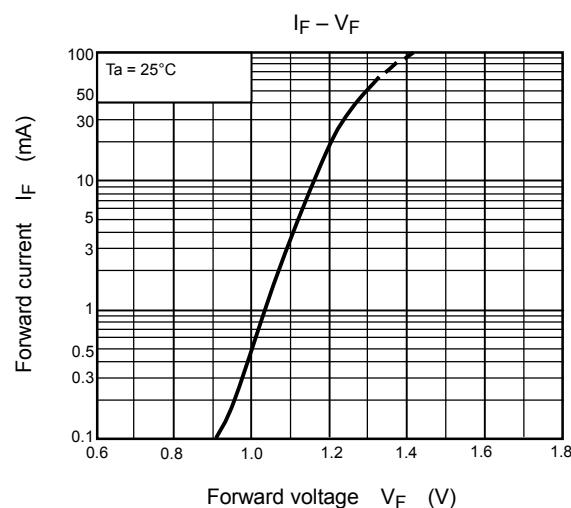
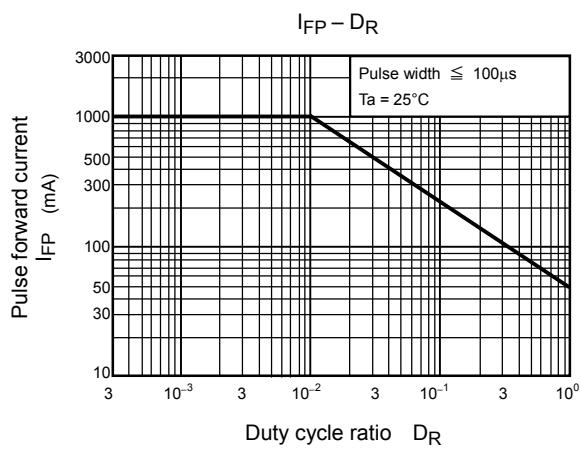
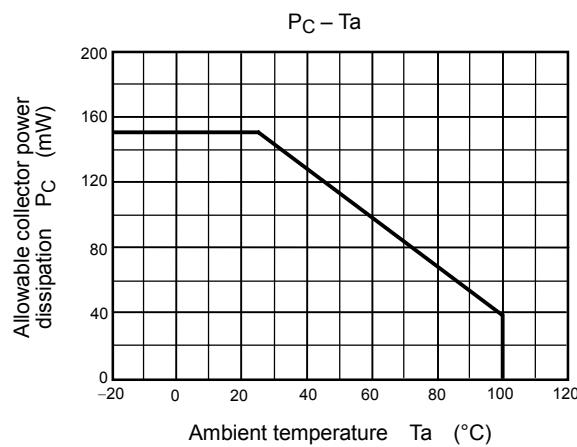
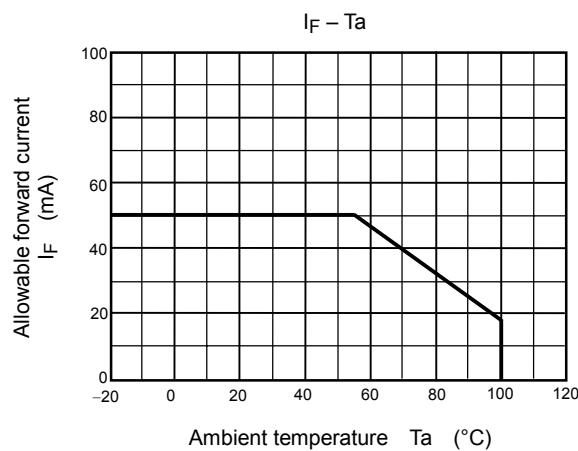
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C _S	V _S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BV _S	AC, 1 minute	3750	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

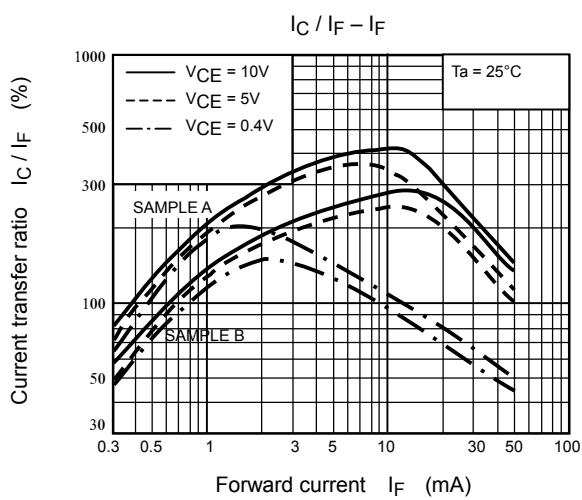
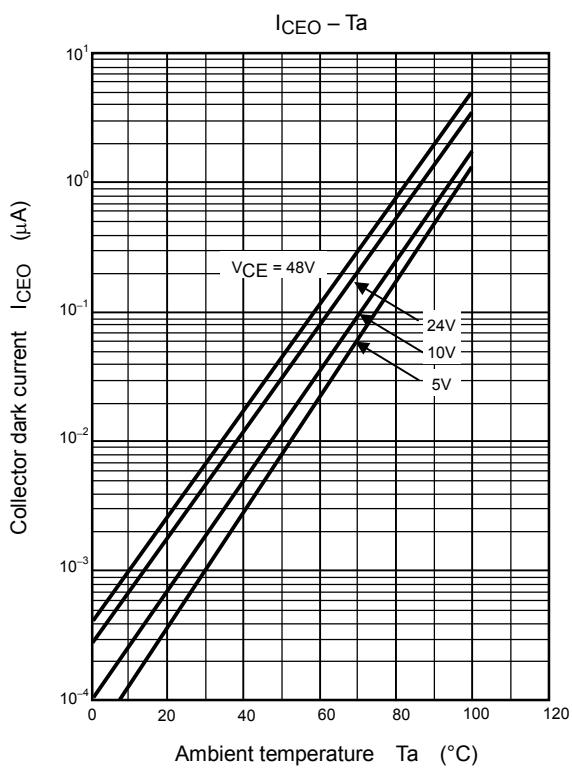
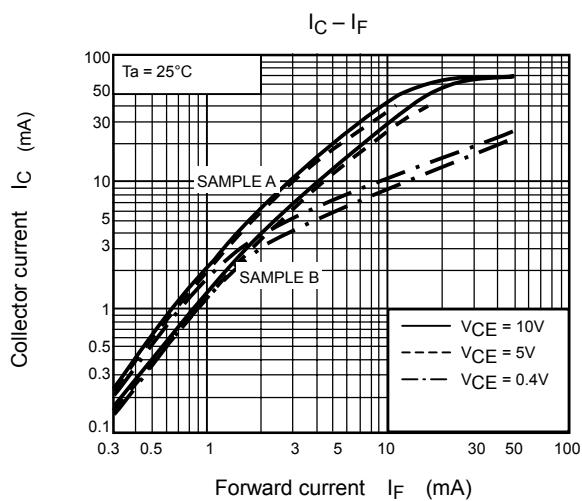
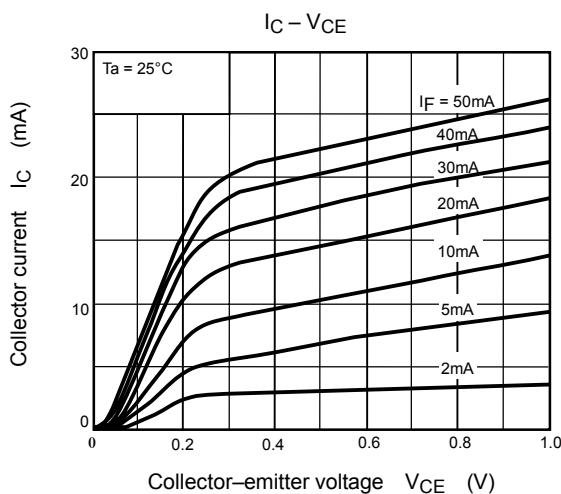
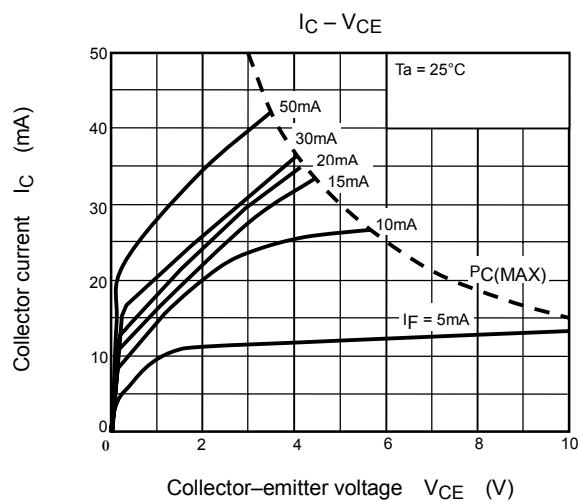
Switching Characteristics ($T_a = 25^\circ\text{C}$)

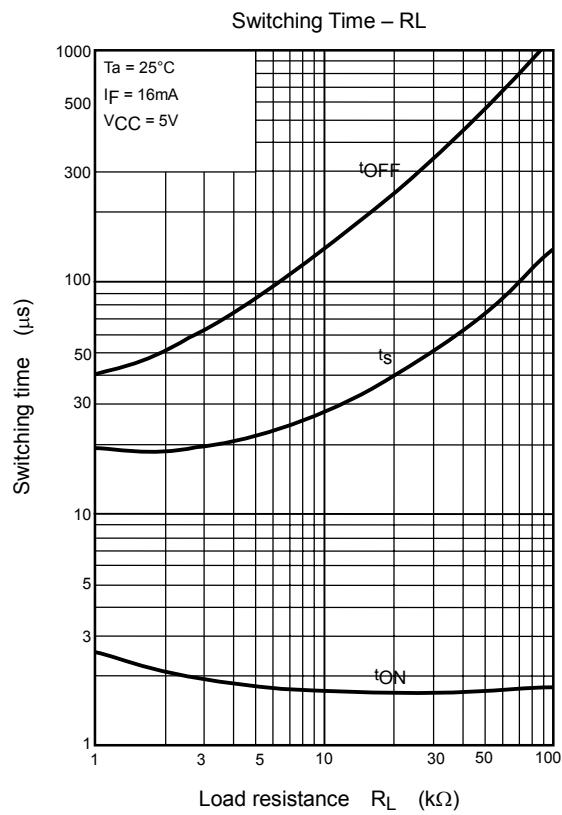
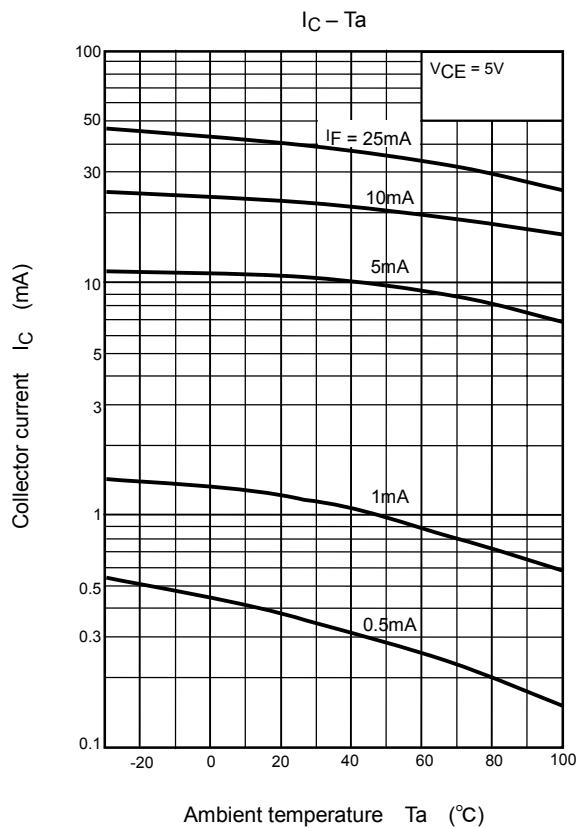
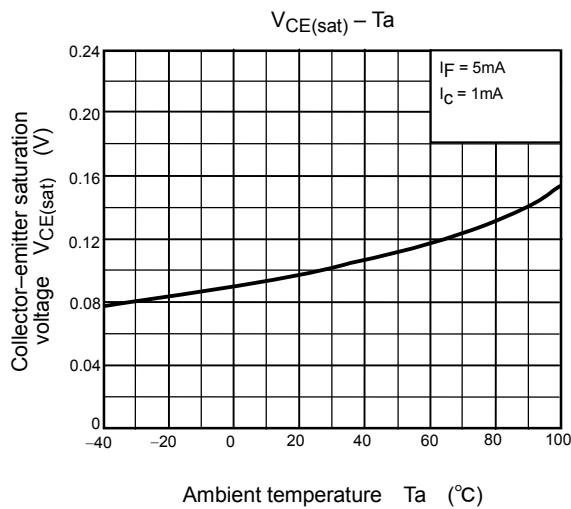
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}$ $R_L = 100\Omega$	—	2	—	μs
Fall time	t_f		—	3	—	
Turn-on time	t_{on}		—	3	—	
Turn-off time	t_{off}		—	3	—	
Turn-on time	t_{ON}	$R_L = 1.9\text{ k}\Omega$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$	—	2	—	μs
Storage time	t_s		—	25	—	
Turn-off time	t_{OFF}		—	40	—	

Fig. 1 Switching time test circuit









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