

(TLP121)

OFFICE MACHINE

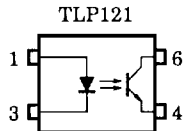
PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

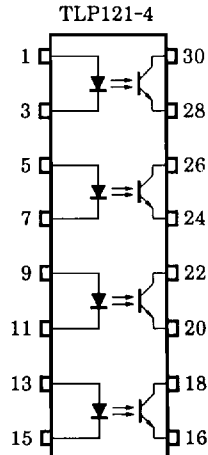
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP121 and TLP121-4 is a small outline coupler, suitable for surface mount assembly. TLP121 and TLP121-4 consists of a photo transistor, optically coupled to a gallium arsenide infrared emitting diode. The TLP121-4 provides four isolated channels in a plastic DIP package.

PIN CONFIGURATIONS (TOP VIEW)

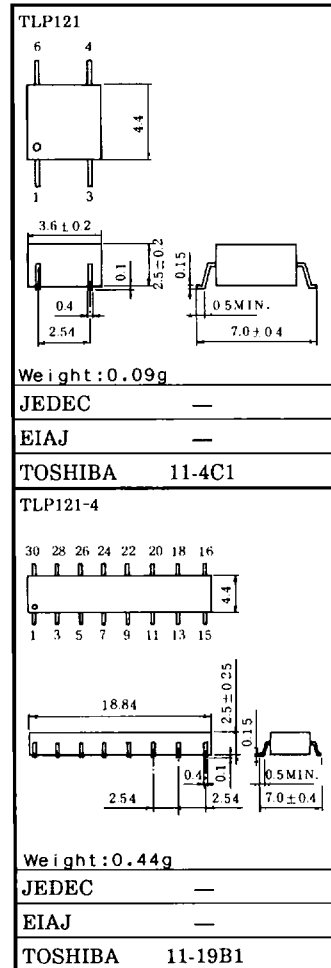


1 : ANODE
3 : CATHODE
4 : EMITTER
6 : COLLECTOR



1, 5, 9, 13 : ANODE
3, 7, 11, 15 : CATHODE
16, 20, 24, 28 : EMITTER
18, 22, 26, 30 : COLLECTOR

Unit in mm



TLP121, -4

(TLP121)

CURRENT TRANSFER RATIO

TYPE	CLASSIFICATION *1	CURRENT TRANSFER RATIO (%) (I_C / I_F)		MARKING OF CLASSIFICATION
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
		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
TLP121-4	(None)	50	600	BLANK, GB
	Rank GB	100	600	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

TLP121-4 (GB) : TLP121-4

(TLP121)

- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 50% (Min.)
Rank GB : 100% (Min.)
- Isolation Voltage : 3750Vrms (Min.)
- UL Recognized : File No. E67349
- Option (D4) type
TUV Approved : DIN VDE0884/08.87, Certificate No. R9351166
Maximum Operating Insulation Voltage : 400Vpk
Highest Permissible Over Voltage : 4000Vpk

(Note) When a VDE0884 approved type is needed, please designate the "Option D4"

- Creepage Distance : 4.0mm (Min.)
Clearance : 4.0mm (Min.)
Insulation Thickness : 0.4mm (Min.)



TLP121, -4

(TLP121)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP121	TLP121-4	
LED	Forward Current	I _F	50		mA
	Forward Current Derating	ΔI _F / °C	-0.7 (Ta ≥ 53°C)	-0.5 (Ta ≥ 25°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 (1 Circuit)	P _C	150	100	mW
	Collector Power Dissipation Derating (1 Circuit Ta ≥ 25°C)	ΔP _C / °C	-1.5	-1.0	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, 1 min., RH ≤ 60%)		V _{rms}	

Note 1 Device considered a two terminal device : Pins 1, 3 shorted together and pins 4, 6 shorted together

(TLP121)

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V _F	I _F = 10mA	1.0	1.15	1.3	V
	Reverse Current	I _R	V _R = 5V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = 0.5mA	80	—	—	V
	Emitter-Collector Breakdown Voltage	V _{(BR)ECO}	I _E = 0.1mA	7	—	—	V
	Collector Dark Current	I _{CEO}	V _{CE} = 48V	—	10	100	nA
			V _{CE} = 48V, Ta = 85°C	—	2	50	μA
	Capacitance (Collector to Emitter)	C _{CE}	V = 0, f = 1MHz	—	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 = 5mA, V _{CE} = 5V Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I _C / I _{F(sat)}	I _F = 1mA, V _{CE} = 0.4V Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _C = 2.4mA, I _F = 8mA	—	—	0.4	V
		I _C = 0.2mA, I _F = 1mA Rank GB	—	0.2	—	
			—	—	0.4	
Off-State Collector Current	I _{C(off)}	V _F = 0.7V, V _{CE} = 48V	—	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 = 1MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S = 500V	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	B _{V_S}	AC, 1 minute	3750	—	—	V _{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V _{dc}

(TLP121)

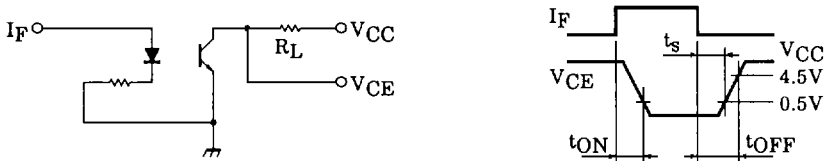
SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10V, I_C = 2mA$ $R_L = 100\Omega$	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-on Time	t_{on}		—	3	—	
Turn-off Time	t_{off}		—	3	—	
Turn-on Time	t_{ON}	$R_L = 1.9k\Omega$ (Fig.1) $V_{CC} = 5V, I_F = 16mA$	—	2	—	μs
Storage Time	t_s		—	25	—	
Turn-off Time	t_{OFF}		—	40	—	

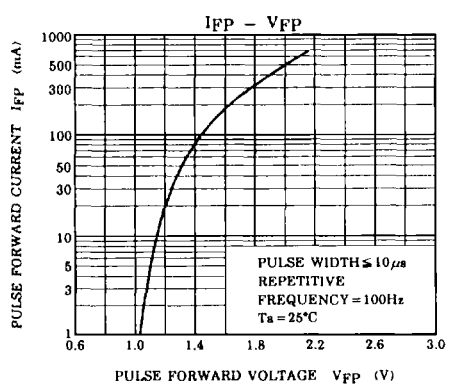
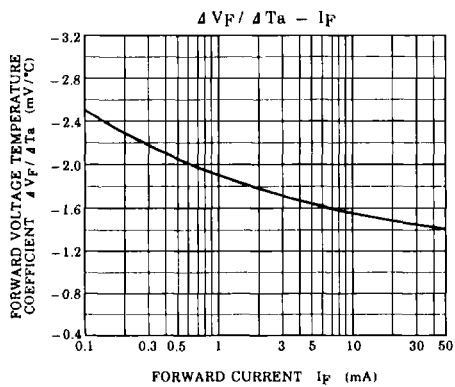
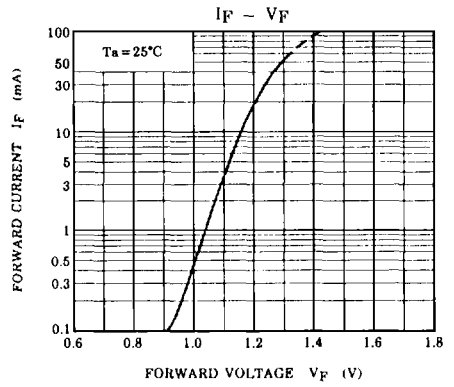
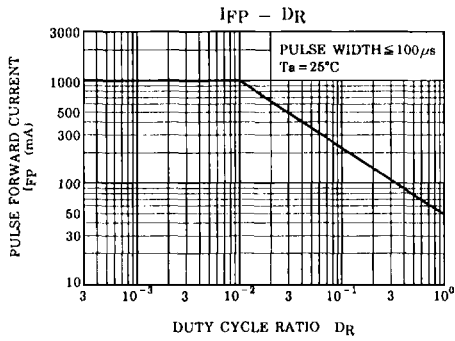
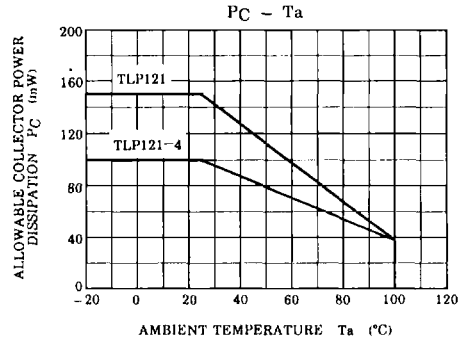
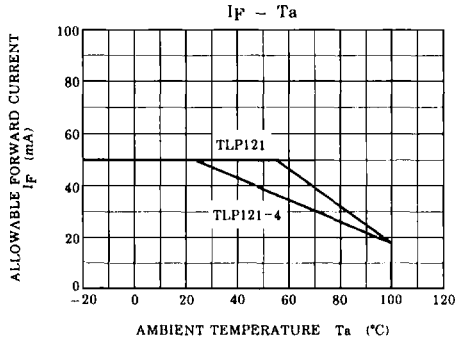
RECOMMENDED OPERATING CONDITIONS

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

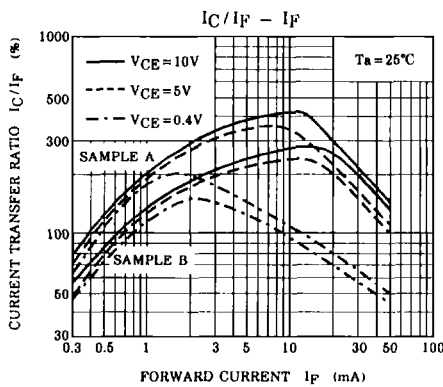
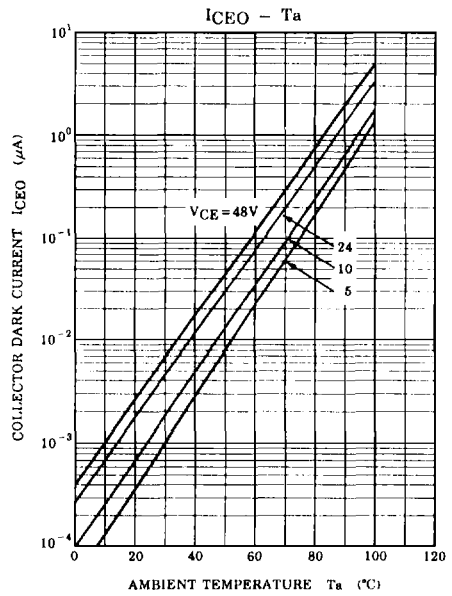
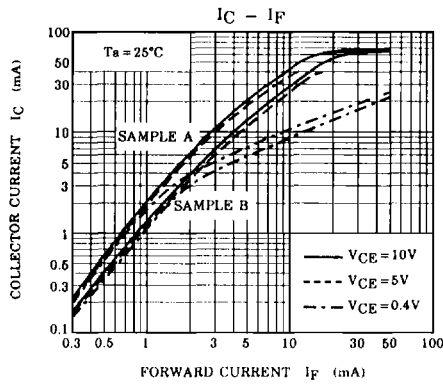
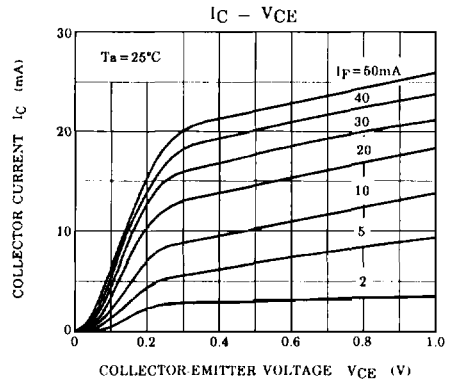
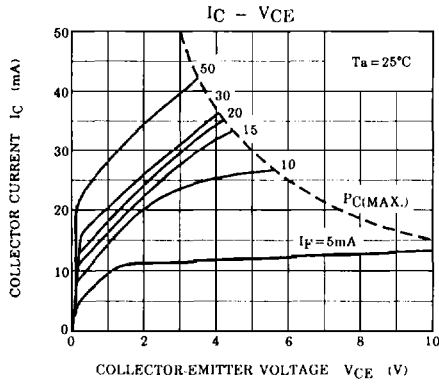
Fig.1 SWITCHING TIME TEST CIRCUIT



(TLP121)



(TLP121)



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