

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP124

OFFICE MACHINE

PROGRAMMABLE CONTROLLERS

AC/DC - INPUT MODULE

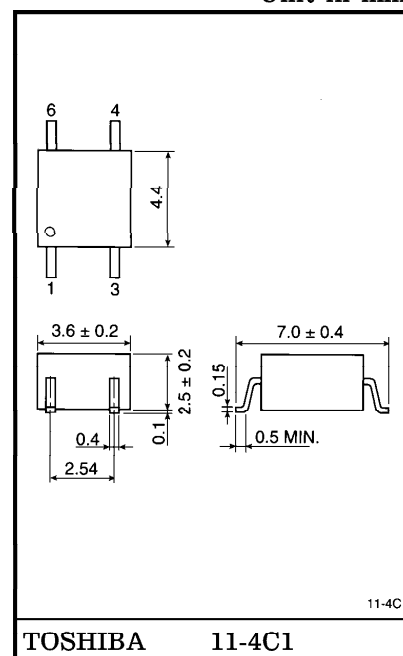
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP124 is a small outline coupler, suitable for surface mount assembly.

TLP124 consists of a photo transistor optically coupled to a gallium arsenide infrared emitting diode.

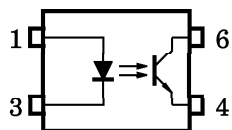
- Collector-Emitter Voltage : 80V Min.
- Current Transfer Ratio : 100% Min.
- Rank BV : 200% Min.
- Isolation Voltage : 3750 Vrms Min.
- UL Recognized : UL1577 File No. E67349

Unit in mm



Weight : 0.09g

PIN CONFIGURATIONS (TOP VIEW)



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

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CURRENT TRANSFER RATIO

CLASSIFI- CATION	CURRENT TRANSFER RATIO (Min.)			MARKING OF CLASSIFI- CATION
	Ta = 25°C		Ta = -25~75°C	
	I _F = 1mA V _{CE} = 0.5V	I _F = 0.5mA V _{CE} = 1.5V	I _F = 1mA V _{CE} = 0.5V	
Rank BV	200%	100%	100%	BV
Standard	100%	50%	50%	BV, Blank

(Note) Application type name for certification test, please
use standard product type name, i. e.
TLP124 (BV) : TLP124

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
	Peak Forward Current (100μs pulse, 100pps)	I _{FP}	1	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
	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	mA / °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 (10s)		T _{sol}	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., R.H. ≤ 60%) (Note 1)		BVS	3750	V _{rms}

(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	—	1.6	20	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	75	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

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	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	30	—	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_D	$V_{CE} = 48\text{V}$	—	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 ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	100	—	1200	%
			200	—	1200	
Low Input CTR	$I_C / I_{F(\text{low})}$	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Collector - Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 0.5\text{mA}, I_F = 1\text{mA}$	—	—	0.4	V
		$I_C = 1\text{mA}, I_F = 1\text{mA}$ Rank BV	—	0.2	—	
			—	—	0.4	
Off-State Collector Current	$I_{C(\text{off})}$	$V_F = 0.7\text{V}, V_{CE} = 48\text{V}$	—	—	10	μA

COUPLED ELECTRICAL CHARACTERISTICS ($T_a = -25 \sim 75^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Low Input CTR	$I_C / I_{F(\text{low})}$	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	—	50	—	%
			—	100	—	

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	$V_S=500\text{V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1minute	3750	—	—	V_{rms}
		AC, 1s, in oil	—	10000	—	
		DC, 1minute, 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}	$R_L=4.7\text{k}\Omega$ (Fig.1) $V_{CC}=5\text{V}, I_F=1.6\text{mA}$	—	10	—	μs
Storage Time	t_s		—	50	—	
Turn - off Time	t_{OFF}		—	300	—	

Fig. 1 SWITCHING TIME TEST CIRCUIT

