

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP126

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

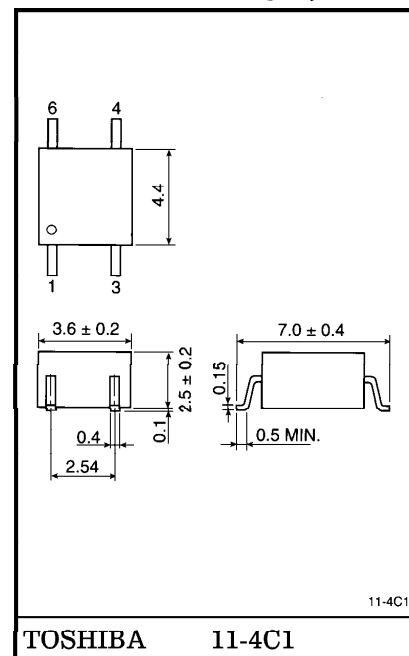
TELECOMMUNICATION

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.

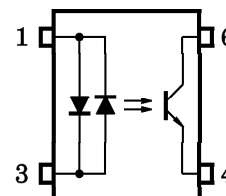
- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 100% (Min.)
- Isolation Voltage : 3750Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 0.09g

PIN CONFIGURATIONS (TOP VIEW)



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

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● Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.

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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, 1 min., RH ≤ 60%) (Note 1)		BV_S	3750	Vrms

(Note 1) Device considered a two terminal device : Pins 1 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=1MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S =500V	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 1 minute	3750	—	—	V _{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V _{dc}

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 =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 =4.7kΩ (Fig.1) V _{CC} =5V, I _F =±1.6mA	—	10	—	μs
Storage Time	t _S		—	50	—	
Turn-off Time	t _{OFF}		—	300	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

