

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP126

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

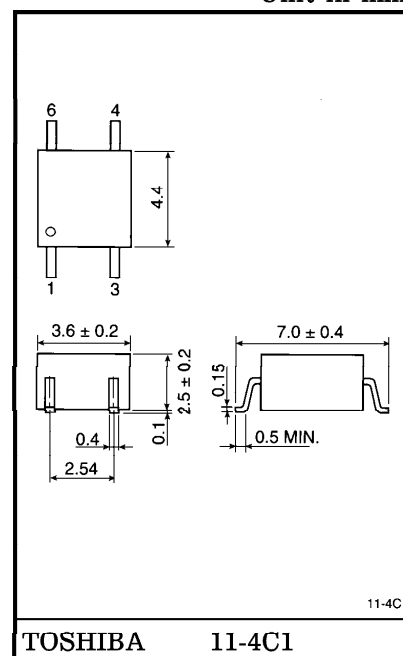
TELECOMMUNICATION

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.

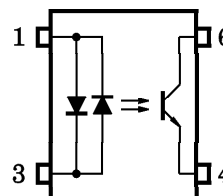
- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 100% (Min.)
- Isolation Voltage : 3750Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 0.09g

PIN CONFIGURATIONS (TOP VIEW)



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

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MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	$I_{F(RMS)}$	50	mA
	Forward Current Derating ($T_a \geq 53^\circ\text{C}$) Δ	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
	Peak Forward Current (100 μs pulse, 100pps)	I_{FP}	1	A
	Junction Temperature	T_j	125	$^\circ\text{C}$
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 ($T_a \geq 25^\circ\text{C}$)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / $^\circ\text{C}$
	Junction Temperature	T_j	125	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55~125	$^\circ\text{C}$
Operating Temperature Range		T_{opr}	-55~100	$^\circ\text{C}$
Lead Soldering Temperature (10 sec.)		T_{sold}	260	$^\circ\text{C}$
Total Package Power Dissipation		P_T	200	mW
Total Package Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.0	mW / $^\circ\text{C}$
Isolation Voltage (AC, 1 min., $RH \leq 60\%$) (Note 1)		BV_S	3750	V_{rms}

(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	$^\circ\text{C}$

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	CS	VS=0, f=1MHz	—	0.8	—	pF
Isolation Resistance	RS	VS=500V	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BVS	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	tr	VCC=10V, IC=2mA RL=100Ω	—	8	—	μs
Fall Time	tf		—	8	—	
Turn-on Time	ton		—	10	—	
Turn-off Time	toff		—	8	—	
Turn-on Time	tON	RL=4.7kΩ (Fig.1) VCC=5V, IF=±1.6mA	—	10	—	μs
Storage Time	tS		—	50	—	
Turn-off Time	tOFF		—	300	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

