

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP131

OFFICE MACHINE

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

TELECOMMUNICATION

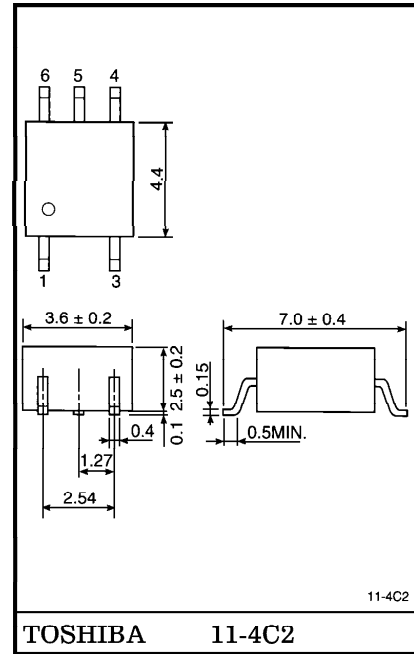
The TOSHIBA MINI FLAT COUPLER TLP131 is a small outline coupler, suitable for surface mount assembly.

TLP131 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

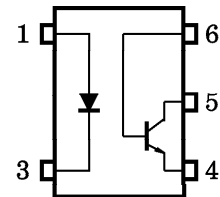
TLP131 base terminal is for the improvement of speed, reduction of dark current, and enable operation.

Unit in mm



Weight : 0.09g

PIN CONFIGURATIONS (TOP VIEW)



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

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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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CURRENT TRANSFER RATIO

TYPE	CLASSIFICATION	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.	
TLP131	(None)	50	600	BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB
	Rank Y	50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB

Note : Application type name for certification test, please use standard product type name, i.e. TLP131 (GB) : TLP131

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	50	mA
	Forward Current Derating ($T_a \geq 53^\circ\text{C}$)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
	Peak Forward Current (100 μs pulse, 100pps)	I_{FP}	1	A
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	$^\circ\text{C}$
DETECTOR	Collector-Emitter Voltage	V_{CEO}	80	V
	Collector-Base Voltage	V_{CBO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Emitter-Base Voltage	V_{EBO}	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 (10s)		T_{sol}	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	Vrms

(Note 1) Device considered a two terminal device : Pins 1 and 3 shorted together, and pins 4, 5 and 6 shorted together.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{CC}	—	5	48	V
Forward Current	I _F	—	16	25	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 = 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-Base Breakdown Voltage	V _{(BR)CBO}	I _C = 0.1mA	80	—	—	V
	Emitter-Base Breakdown Voltage	V _{(BR)EBO}	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
	Collector Dark Current	I _{CER}	V _{CE} = 48V, Ta = 85°C R _{BE} = 1MΩ	—	0.5	10	μA
	Collector Dark Current	I _{CBO}	V _{CB} = 10V	—	0.1	—	nA
	DC Forward Current Gain	h _{FE}	V _{CE} = 5V, I _C = 0.5mA	—	400	—	—
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	—	—	
Base Photo-current	I _{PB}	I _F = 5mA, V _{CB} = 5V	—	10	—	μA
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)}	I _F = 0.7mA, 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	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	—	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 =1.9kΩ (Fig.1)	—	2	—	μs
Storage Time	t _S	R _{BE} =OPEN	—	25	—	
Turn-off Time	t _{OFF}	V _{CC} =5V, I _F =16mA	—	40	—	
Turn-on Time	t _{ON}	R _L =1.9kΩ (Fig.1)	—	2	—	μs
Storage Time	t _S	R _{BE} =220kΩ	—	20	—	
Turn-off Time	t _{OFF}	V _{CC} =5V, I _F =16mA	—	30	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

