

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP130

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

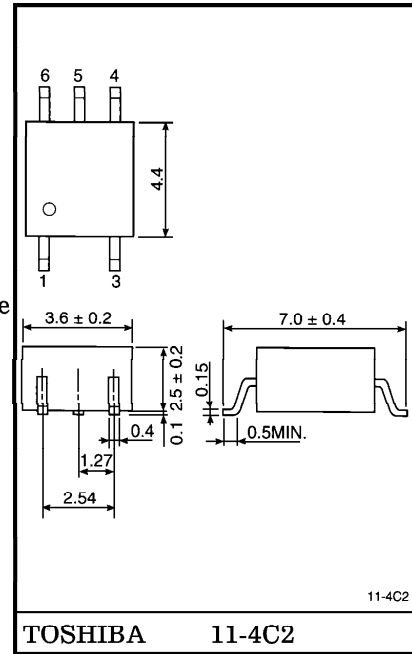
TELECOMMUNICATION

The TOSHIBA MINI FLAT COUPLER TLP130 is a small outline coupler, suitable for surface mount assembly.

TLP130 consists of a photo transistor, optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel, and operate directly by AC input current.

- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 50% (Min.)
 Rank GB : 100% (Min.)
- Isolation Voltage : 3750Vrms (Min.)
- UL Recognized : UL1577, File No. E67349
- Current Transfer Ratio

Unit in mm

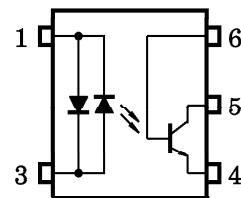


Weight : 0.09g

CLASSIFICATION	CURRENT TRANSFER RATIO		MARKING OF CLASSIFICATION
	$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
	MIN.	MAX.	
Standard	50	600	Blank, Y, GR, GB
Rank GB	100	600	GB, GR

(Note) Application type name for certification test, please use standard product type name, i.e.
 TLP130 (GB) : TLP130

PIN CONFIGURATIONS (TOP VIEW)



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

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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)	$\Delta I_F / ^\circ C$	-0.7	mA / °C
	Peak Forward Current (100 μs pulse, 100pps)	I_{FP}	1	A
	Junction Temperature	T_j	125	°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 (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 (10s)		T_{sol}	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 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	$I_{F(RMS)}$	—	16	25	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	85	°C

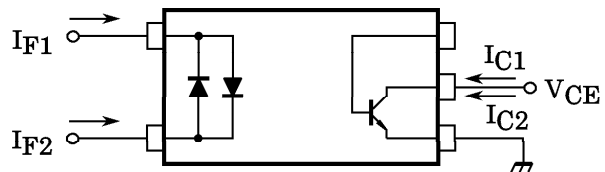
INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V _F	I _F = ±10mA	1.0	1.15	1.3	V
	Capacitance	C _T	V = 0, f = 1MHz	—	60	—	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
			—	0.2	—	
		I _C = 0.2mA, I _F = ±1mA Rank GB	—	—	0.4	
Off-State Collector Current	I _{C(off)}	I _F = ±0.7mA, V _{CE} = 48V	—	1	10	μA
CTR Symmetry	I _{C(ratio)}	I _C (I _F = -5mA) / I _C (I _F = 5mA) (Note 2)	0.33	—	3	—

$$(Note\ 2)\ I_C(ratio) = \frac{I_{C2}(I_F = I_{F2}, V_{CE} = 5V)}{I_{C1}(I_F = I_{F1}, V_{CE} = 5V)}$$



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 SWIRCHING TIME TEST CIRCUIT

