

# TLP130

## PHOTOCOUPLER GaAlAs IRED & PHOTO-TRANSISTOR

TENTATIVE DATA

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.

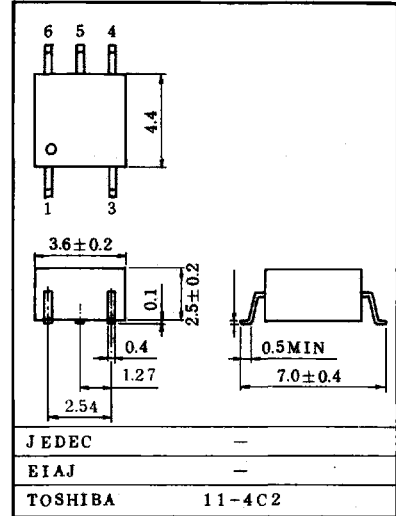
- . Collector-Emitter Voltage : 80V Min.
- . Current Transfer Ratio : 50% Min.  
Rank GB : 100% Min.
- . Isolation Voltage : 3750V<sub>rms</sub> Min.
- . Current Transfer Ratio

CLASSI- FICATION	CURRENT TRANSFER RATIO		MARKING OF CLASSIFICATION
	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V, T <sub>a</sub> =25°C		
	MIN.	MAX.	
Standard	50	600	Blank, Y, GR, BL, GB
Rank GB	100	600	GB, BL, GR

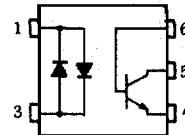
Note: Application type name for certification test,  
please use standard product type name, i.e.

TLP130(GB) : TLP130

Unit in mm



PIN CONFIGURATIONS (TOP VIEW)



1. ANODE CATHODE
3. CATHODE ANODE
4. EMITTER
5. COLLECTOR
6. BASE

**MAXIMUM RATINGS (Ta=25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub> (RMS)	50	mA
	Forward Current Derating (Ta ≥ 53°C)	ΔI <sub>F</sub> /°C	-0.7	mA/°C
	Peak Forward Current (100μs pulse, 100pps)	I <sub>FP</sub>	1	A
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Collector-Emitter Voltage	V <sub>CEO</sub>	80	V
	Collector-Base Voltage	V <sub>CB0</sub>	80	V
	Emitter-Collector Voltage	V <sub>ECO</sub>	7	V
	Emitter-Base Voltage	V <sub>EB0</sub>	7	V
	Collector Current	I <sub>C</sub>	50	mA
	Peak Collector Current (10ms pulse, 100pps)	I <sub>CP</sub>	100	mA
	Power Dissipation	P <sub>C</sub>	150	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>C</sub> /°C	-1.5	mW/°C
	Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range		T <sub>stg</sub>	-55-125	°C
Operating Temperature Range		T <sub>opr</sub>	-55-100	°C
Lead Soldering Temperature (10 sec.)		T <sub>sold</sub>	260	°C
Total Package Power Dissipation		P <sub>T</sub>	200	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP <sub>T</sub> /°C	-2.0	mW/°C
Isolation Voltage (AC, 1 min., RH ≤ 60%)		BV <sub>S</sub>	3750	V <sub>rms</sub>

# TLP130

## INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =±10mA	1.0	1.15	1.3	V
	Capacitance	C <sub>T</sub>	V=0, f=1MHz	-	60	-	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> =0.5mA	80	-	-	V
	Emitter-Collector Breakdown Voltage	V(BR)ECO	I <sub>E</sub> =0.1mA	7	-	-	V
	Collector-Base Breakdown Voltage	V(BR)CBO	I <sub>C</sub> =0.1mA	80	-	-	V
	Emitter-Base Breakdown Voltage	V(BR)EBO	I <sub>E</sub> =0.1mA	7	-	-	V
	Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> =48V	-	10	100	nA
			V <sub>CE</sub> =48V, Ta=85°C	-	2	50	μA
	Collector Dark Current	I <sub>CER</sub>	V <sub>CE</sub> =48V, Ta=85°C R <sub>BE</sub> =1MΩ	-	0.5	10	μA
	Collector Dark Current	I <sub>CBO</sub>	V <sub>CB</sub> =10V	-	0.1	-	nA
	DC Forward Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =0.5mA	-	400	-	-
Capacitance Collector to Emitter	C <sub>CE</sub>	V=0, f=1MHz	-	10	-	pF	

## COUPLED ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I <sub>C</sub> /I <sub>F</sub>	I <sub>F</sub> =±5mA, V <sub>CE</sub> =5V Rank GB	50	-	600	%
			100	-	600	
Saturated CTR	I <sub>C</sub> /I <sub>F</sub> (sat)	I <sub>F</sub> =±1mA, V <sub>CE</sub> =0.4V Rank GB	-	60	-	%
			30	-	-	
Base Photo-Current	I <sub>PB</sub>	I <sub>F</sub> =±5mA, V <sub>CB</sub> =5V	-	10	-	μA
Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> =2.4mA, I <sub>F</sub> =±8mA Rank GB	-	-	0.4	V
			-	0.2	-	
			-	-	0.4	
Off-State Collector Current	I <sub>C</sub> (off)	V <sub>F</sub> =±0.7V, V <sub>CE</sub> =48V	-	1	10	μA
CTR Symmetry	I <sub>C</sub> (ratio)	I <sub>C</sub> (I <sub>F</sub> =-5mA)/I <sub>C</sub> (I <sub>F</sub> =5mA)	0.33	-	3	-

ISOLATION CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> =0, f=1MHz	-	0.8	-	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> =500V	5×10 <sup>10</sup>	10 <sup>11</sup>	-	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 1 minute	3750	-	-	V <sub>rms</sub>
		AC, 1 second, in oil	-	10000	-	
		DC, 1 minute, in oil	-	10000	-	V <sub>dc</sub>

SWITCHING CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t <sub>r</sub>	V <sub>CC</sub> =10V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω	-	2	-	μs
Fall Time	t <sub>f</sub>		-	3	-	
Turn-on Time	t <sub>on</sub>		-	3	-	
Turn-off Time	t <sub>off</sub>		-	3	-	
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> =1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	t <sub>s</sub>	R <sub>BE</sub> =OPEN	-	25	-	
Turn-off Time	t <sub>OFF</sub>	V <sub>CC</sub> =5V, I <sub>F</sub> =±16mA	-	40	-	
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> =1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	t <sub>s</sub>	R <sub>BE</sub> =220kΩ	-	20	-	
Turn-off Time	t <sub>OFF</sub>	V <sub>CC</sub> =5V, I <sub>F</sub> =±16mA	-	30	-	

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>	-	5	48	V
Forward Current	I <sub>F</sub> (RMS)	-	16	25	mA
Collector Current	I <sub>C</sub>	-	1	10	mA
Operating Temperature	T <sub>opr</sub>	-25	-	85	°C

Fig. 1 SWITCHING TIME TEST CIRCUIT

