

(TLP130)

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

TELECOMMUNICATION

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

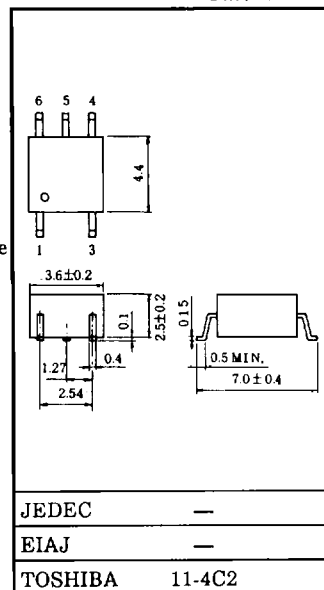
TLP130 consists of a photo transistor, optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel, and operate directly by AC input current.

- 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

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

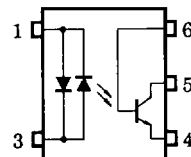
Note : Application type name for certification test,
please use standard product type name, i.e.
TLP130 (GB) : TLP130

Unit in mm



Weight : 0.09g

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 μ s 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 (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 pins 4, 5 and 6 shorted together.

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INDIVIDUAL ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

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-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}$	80	—	—	V
	Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}$	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
	Collector Dark Current	I_{CER}	$V_{CE} = 48\text{V}, T_a = 85^\circ\text{C}$ $R_{BE} = 1\text{M}\Omega$	—	0.5	10	μA
	Collector Dark Current	I_{CBO}	$V_{CB} = 10\text{V}$	—	0.1	—	nA
	DC Forward Current Gain	h_{FE}	$V_{CE} = 5\text{V}, I_C = 0.5\text{mA}$	—	400	—	—
	Capacitance Collector to Emitter	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF

COUPLED ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_{F(\text{sat})}$	$I_F = \pm 1\text{mA}, V_{CE} = 0.4\text{V}$ Rank GB	—	60	—	%
			30	—	—	
Base Photo-Current	I_{PB}	$I_F = \pm 5\text{mA}, V_{CB} = 5\text{V}$	—	10	—	μA
Collector-Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 2.4\text{mA}, I_F = \pm 8\text{mA}$	—	—	0.4	V
		$I_C = 0.2\text{mA}, I_F = \pm 1\text{mA}$ Rank GB	—	0.2	—	
			—	—	0.4	
Off-State Collector Current	$I_{C(\text{off})}$	$I_F = \pm 0.7\text{mA}, V_{CE} = 48\text{V}$	—	1	10	μA
CTR Symmetry	$I_{C(\text{ratio})}$	$I_C (I_F = -5\text{mA}) / I_C (I_F = 5\text{mA})$	0.33	—	3	—

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ISOLATION CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500\text{V}$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	3750	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

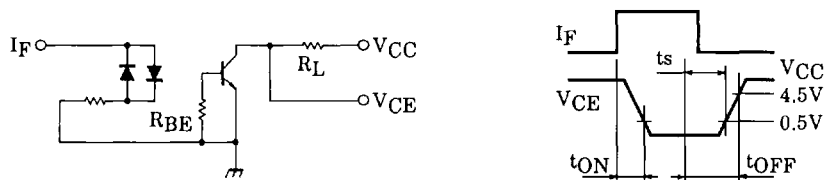
SWITCHING CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega$	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-on Time	t_{on}		—	3	—	
Turn-off Time	t_{off}		—	3	—	
Turn-on Time	t_{ON}	$R_L = 1.9\text{k}\Omega$ (Fig.1) $R_{BE} = \text{OPEN}$ $V_{CC} = 5\text{V}, I_F = \pm 16\text{mA}$	—	2	—	μs
Storage Time	t_S		—	25	—	
Turn-off Time	t_{OFF}		—	40	—	
Turn-on Time	t_{ON}	$R_L = 1.9\text{k}\Omega$ (Fig.1) $R_{BE} = 220\text{k}\Omega$ $V_{CC} = 5\text{V}, I_F = \pm 16\text{mA}$	—	2	—	μs
Storage Time	t_S		—	20	—	
Turn-off Time	t_{OFF}		—	30	—	

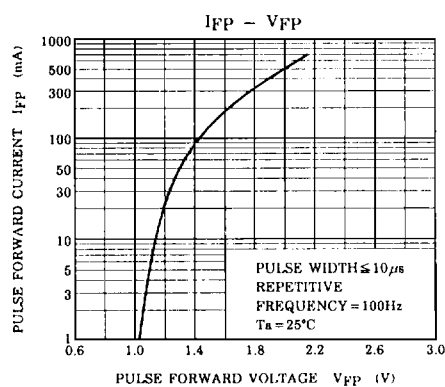
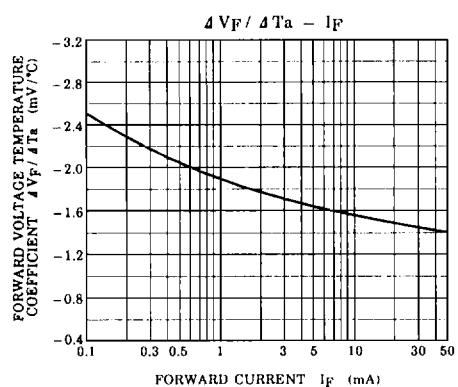
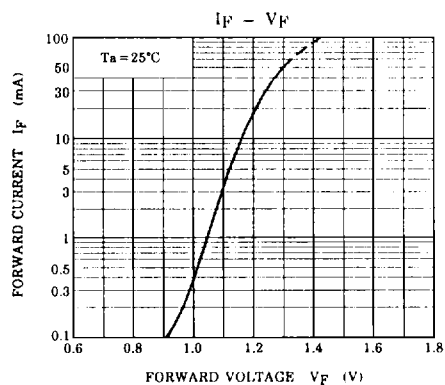
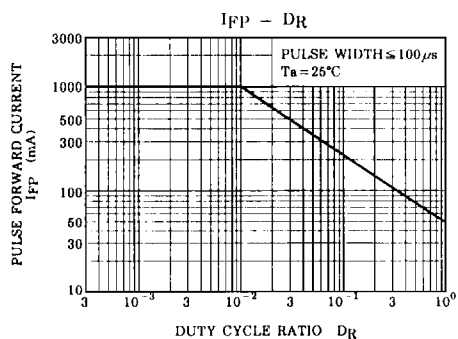
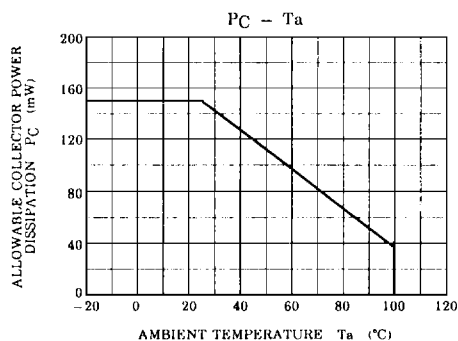
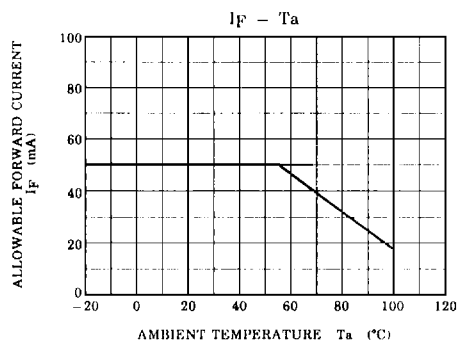
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	48	V
Forward Current	$I_F(\text{RMS})$	—	16	25	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	85	$^\circ\text{C}$

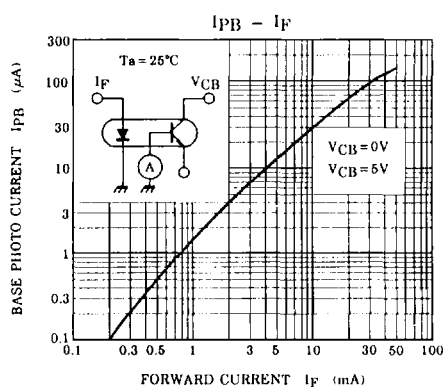
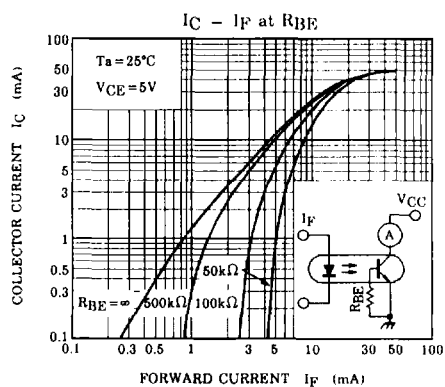
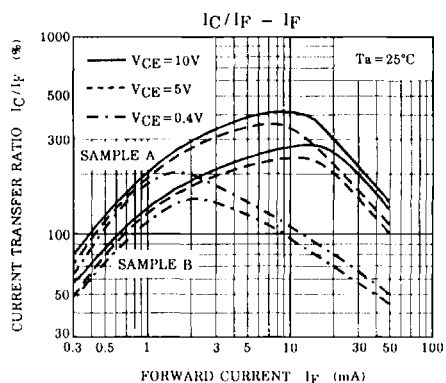
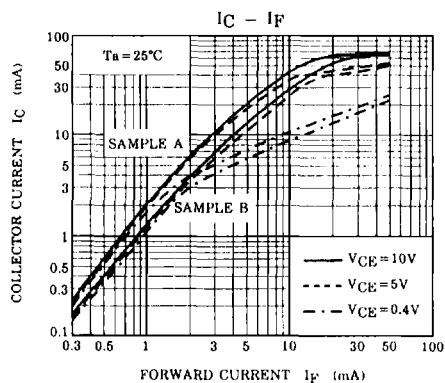
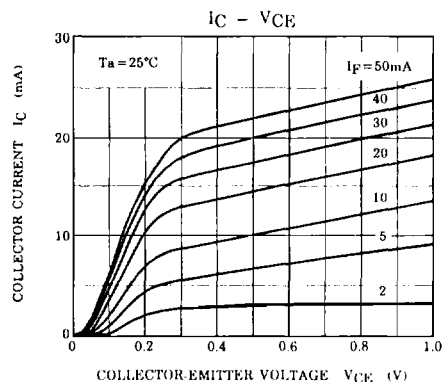
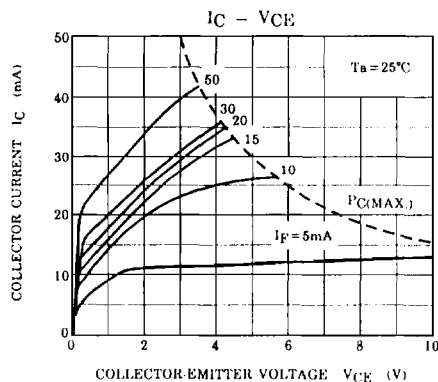
Fig.1 SWITCHING TIME TEST CIRCUIT



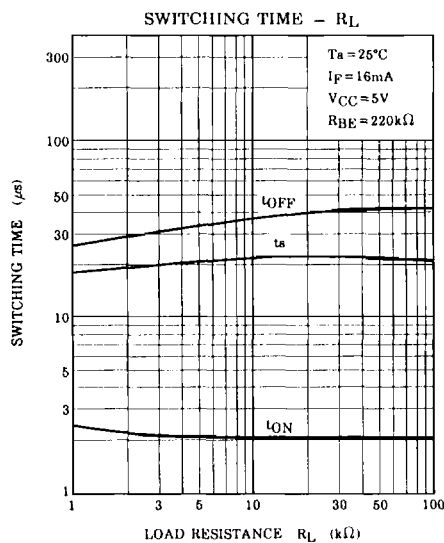
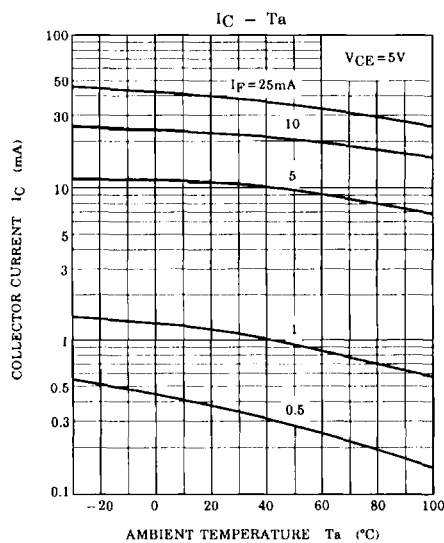
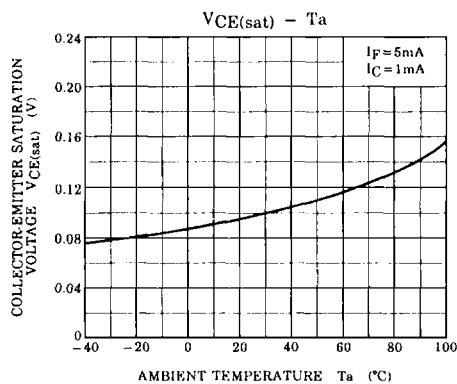
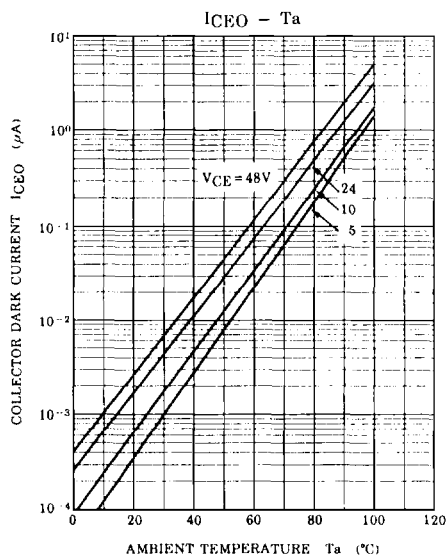
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