

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP721

OFFICE MACHINE
HOUSEHOLD USE EQUIPMENT
SOLID STATE RELAY
SWITCHING POWER SUPPLY

The TOSHIBA TLP721 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP.

- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 50% (Min.)
Rank GB : 100% (Min.)

	MADE IN JAPAN		MADE IN THAILAND	
UL Recognized	E67349	*1	E152349	*1
BSI Approved	7364, 7365	*2	7364, 7365	*2
SEMKO Approved	9325163	*3	9609169	*4
	9522142	*3		

*1 UL1577

*2 BS EN60065 : 1994, BS EN60950 : 1992

*3 SS EN4330784

*4 SS EN60950

- Option (D4) type VDE Approved

	MADE IN JAPAN	MADE IN THAILAND
VDE Approved	74285, 91835	91868
Maximum Operating Insulation Voltage	630, 890Vpk	890Vpk
Highest Permissible Over Voltage	6000, 8000Vpk	8000Vpk

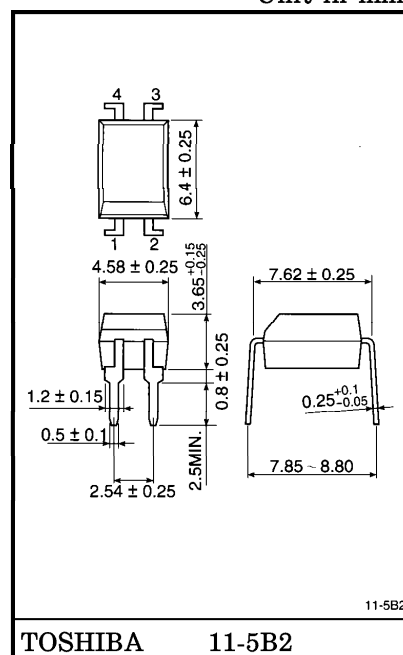
*5 VDE0884 / 06.92

(Note) When a VDE0884 approved type is needed, please designate the "Option (D4)"

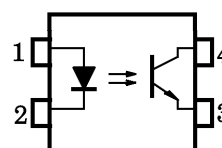
7.62mm pich	10.16mm pich
TLP721 type	TLP721F type

- Creepage Distance : 7.0mm (Min.) 8.0mm (Min.)
Clearance : 7.0mm (Min.) 8.0mm (Min.)
Internal Creepage Path : 4.0mm (Min.) 4.0mm (Min.)
Insulation Thickness : 0.5mm (Min.) 0.5mm (Min.)

Unit in mm



Weight : 0.26g

PIN CONFIGURATIONS
(TOP VIEW)

1 : ANODE

2 : CATHODE

3 : EMITTER

4 : COLLECTOR

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TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

Current Transfer Ratio

TYPE	CLASSI- FICATION *1	CURRENT TRANSFER RATIO (%) (I _C / I _F)		MARKING OF CLASSIFICATION
		I _F =5mA, V _{CE} =5V, Ta=25°C		
		MIN.	MAX.	
TLP721	(None)	50	600	BLANK, Y, Y■, G, G■, B, B■, GB
		50	150	Y, Y■
	Rank GR	100	300	G, G■
		200	600	B, B■
	Rank GB	100	600	G, G■, B, B■, GB

*1 : Ex. Rank GB : TLP721 (GB)

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

TLP721 (GB) : TLP721

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

CHARACTERISTIC		STMBOL	RATING	UNIT
LED	Forward Current	I_F	60	mA
	Forward Current Derating ($T_a \geq 39^\circ\text{C}$)	$\Delta I_F / ^\circ\text{C}$	-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}	55	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	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}	-40~100	$^\circ\text{C}$
Lead Soldering Temperature (10s)		T_{sol}	260	$^\circ\text{C}$
Total Package Power Dissipation		P_T	250	mW
Total Package Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / $^\circ\text{C}$
Isolation Voltage (AC, 1 min., R.H. $\leq 60\%$) (NOTE)		BV_S	4000	Vrms

NOTE. Device considered a two terminal device : pins 1 and 2 shorted together, and pins 3 and 4 shorted together.

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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.
- The products described in this document are subject to foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	24	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 ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR) CEO}$	$I_C = 0.5\text{mA}$	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR) ECO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 24\text{V}$ (Ambient Light Below 1000 lx)	—	0.01 (2)	0.1 (10)	μA
			$V_{CE} = 24\text{V}$ (Ambient Light Below 1000 lx) $T_a = 85^\circ\text{C}$	—	2 (4)	50 (50)	μA
	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	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 1\text{mA}, V_{CE} = 0.4\text{V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 2.4\text{mA}, I_F = 8\text{mA}$	—	—	0.4	V
		$I_C = 0.2\text{mA}, I_F = 1\text{mA}$ Rank GB	—	0.2	—	
			—	—	0.4	

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	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	1×10^{12}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	4000	—	—	V_{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

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

CHARACTERISTICS	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) $V_{CC} = 5\text{V}, I_F = 16\text{mA}$	—	3	—	μs
Storage Time	t_s		—	40	—	
Turn-off Time	t_{OFF}		—	90	—	

Fig.1 Switching Time Test Circuit

