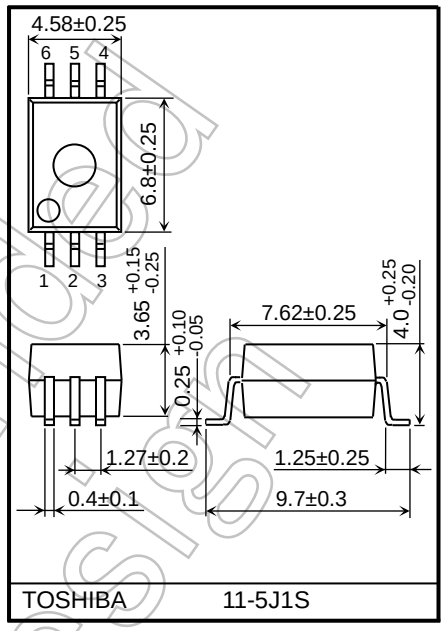
TOSHIBA Photocoupler IRED & Photo-IC

TLP716

Unit: mm



Weight: 0.26 g (typ.)

Plasma display panel

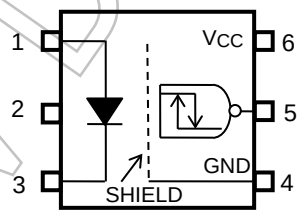
High Speed Interface

Factory Automation

The TOSHIBA TLP716 consists of an infrared emitting diode and a high speed photodetector. This unit is 6-lead SDIP. TLP716 is 50% smaller than 8PIN DIP and has suited the safety standard reinforced insulation class. So, mounting area in safety standard required equipment can be reduced.

- Inverter Logic (totempole output)
- Package Type : SDIP6
- Guaranteed Performance Over Temperature : -40 to 100°C
- Power Supply Voltage: 4.5 to 5.5 V
- Input Thresholds Current: I_{FHL} = 6.5 mA (max)
- Propagation delay Time (t_{pHL}/t_{pLH}): 75 ns (max)
- Switching speed: 15 MBd (typ.)
- Common mode transient immunity: ±10 kV/μs (min)
- Isolation voltage: 5000 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
  File No.E67349
- VDE-approved : EN 60747-5-5 , EN 62368-1 (Note 1)

Pin Configuration (Top View)



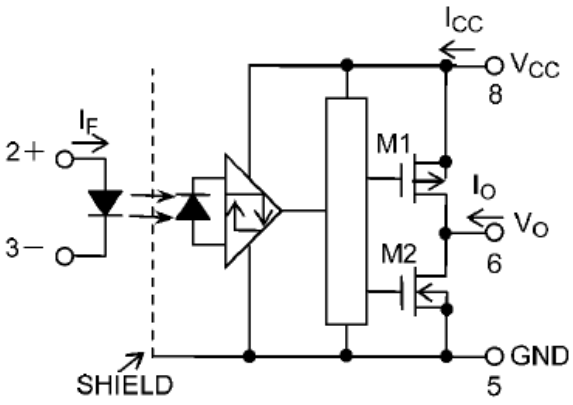
1: ANODE
2: N.C.
3: CATHODE
4: GND
5: VO
6: VCC

Note 1: When a VDE approved type is needed,
please designate the **Option(D4)**.

- Construction Mechanical Rating

Creepage Distance	7.0 mm (min)
Clearance	7.0 mm (min)
Insulation Thickness	0.4 mm (min)

Schematic



Note: 0.1 μF bypass capacitor must be connected between pins 6 and 4.

Truth Table

Input	LED	M1	M2	Output
H	ON	OFF	ON	L
L	OFF	ON	OFF	H

Start of commercial production
2006-06

Absolute Maximum Ratings (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Ta ≤ 85°C)	I_F	20	mA
	Forward Current Derating (Ta > 85°C)	$\Delta I_F/\Delta Ta$	-0.5	mA/°C
	Peak Transient Forward Current (Note1)	I_{FPT}	1	A
	Reverse Voltage	V_R	5	V
	Diode power dissipation	P_D	40	mW
	Diode power dissipation derating (Ta >85°C)	$\Delta P_D/\Delta Ta$	-1.0	mW/°C
	Junction Temperature	T_j	125	°C
DETECTOR	Output Current (Ta ≤ 85°C)	I_O	10	mA
	Output Current Derating (Ta > 85°C)	$\Delta I_O/\Delta Ta$	-0.25	mA/°C
	Output Voltage ($V_O \leq V_{CC}$)	V_O	-0.5 to 6	V
	Supply Voltage	V_{CC}	-0.5 to 6	V
	Power Dissipation (Ta ≤ 85°C)	P_C	40	mW
	Power Dissipation Derating (Ta > 85°C)	$\Delta P_C/\Delta Ta$	-1.0	mW/°C
	Junction Temperature	T_j	125	°C
Operating Temperature Range		T_{opr}	-40 to 100	°C
Storage Temperature Range		T_{stg}	-55 to 125	°C
Lead Solder Temperature(10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 60 s, R.H. ≤ 60 %) (Note2)		BVS	5000	Vrms

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Note 1: Pulse width PW ≤ 1 μs, 300 pps.

Note 2: Device Considered a two terminal device: pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Input Current, ON	I_F(ON)	8	12	18	mA
Input Voltage, OFF	V_F(OFF)	0	—	0.8	V
Supply Voltage (Note1)(Note2)(Note 3)	V_{CC}	4.5	5	5.5	V

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Note 1: This item denotes operating ranges, not meaning of recommended operating conditions.

Note 2: The detector of this product requires a power supply voltage (V_{CC}) of 4.5 V or higher for stable operation. If the V_{CC} is lower than this value, an I_{CC} may increase, or an output may be unstable. Be sure to use the product after checking the supply current, and the operation of a power-on/-off.

Note 3: A ceramic capacitor (0.1 μF) should be connected from pin 6 to pin 4 to stabilize the operation of the high gain linear amplifier. Failure to provide the bypassing may impair the switching property. The total lead length between capacitor and coupler should not exceed 1 cm.

The correlation between input current and switching speed and drive circuit (reference information)

Input Current (I_F)	TEST CIRCUIT (Psge 4)	Typical Switching Speed
12mA	1	14 – 16 MBd
8mA	1	11 – 13 MBd
8mA	2 (with Speed up capacitor)	16 – 20 MBd

Electrical Characteristics

(Unless otherwise specified, Ta = -40 to 100°C, V_{CC} = 4.5 to 5.5 V)

CHARACTERISTIC	SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Input Forward Voltage	V_F	I_F = 10 mA, Ta = 25 °C	—	1.65	1.8	V
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta Ta$	I_F = 10 mA	—	-2.0	—	mV/°C
Input Reverse Current	I_R	V_R = 5 V, Ta = 25 °C	—	—	10	μA
Input Capacitance	C_T	V = 0 V, f = 1 MHz, Ta = 25 °C	—	45	—	pF
Logic Low Output Voltage	V_{OL}	I_{OL} = 1.6 mA, I_F = 12 mA V_{CC} = 5 V	—	—	0.4	V
Logic High Output Voltage	V_{OH}	I_{OH} = -0.02 mA, V_F = 1.05 V V_{CC} = 5 V	4.0	—	—	V
Logic Low Supply Current	I_{CCL}	I_F = 12 mA	—	—	5.0	mA
Logic High Supply Current	I_{CCH}	V_F = 0 V	—	—	5.0	mA
Input Current Logic Low Output	I_{FHL}	I_O = 1.6 mA, V_O < 0.4 V	—	—	6.5	mA
Input Voltage Logic High Output	V_{FLH}	I_O = -0.02 mA, V_O > 4.0 V	0.8	—	—	V

Note: All typical values are at Ta = 25°C, V_{CC} = 5 V, $I_{F(ON)}$ = 12 mA unless otherwise specified

Isolation Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance input to output	C_S	V_S = 0 V , f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	R.H. ≤ 60 %, V_S = 500 V	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 60 s	5000	—	—	Vrms

Note : Device Considered a two terminal device: pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

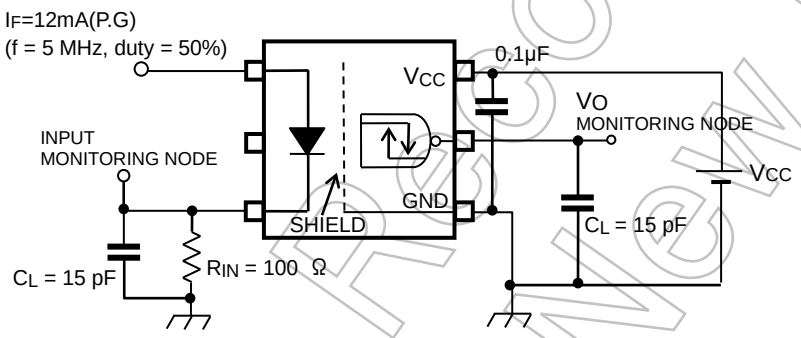
Switching Characteristics
(Unless otherwise specified, Ta = -40 to 100°C, V_{CC} = 4.5 to 5.5 V)

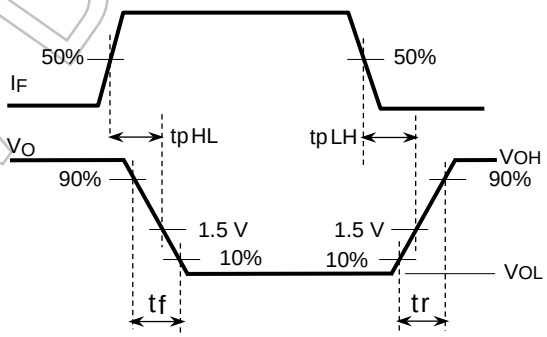
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	CONDITION		MIN	TYP.	MAX	UNIT
propagation Delay Time to Logic Low output	tpHL	1	I_F = 0→12 mA	R_{IN} = 100 Ω, C_L=15 pF (Note 1)	—	—	75	ns
propagation Delay Time to Logic High output	tpLH		I_F = 12→0 mA		—	—	75	ns
propagation Delay Time to Logic Low output	tpHL	2	V_{IN} = 0→5 V (I_F = 0→8 mA)	R_{IN} = 430 Ω, C_{IN} = 33 pF, C_L = 15 pF (Note 1)	—	—	65	ns
propagation Delay Time to Logic High output	tpLH		V_{IN} = 5→0 V (I_F = 8→0 mA)		—	—	65	ns
Switching Time Dispersion between ON and OFF	| tpLH - tpHL |	1	I_F = 12 mA, R_{IN} = 100 Ω, C_L = 15 pF (Note 1)		—	—	45	ns
Output Fall Time (90 to 10%)	t_f		I_F = 0→12 mA	R_{IN} = 100 Ω, C_L = 15 pF (Note 1)	—	15	—	ns
Output Rise Time (10 to 90%)	t_r		I_F = 12→0 mA		—	15	—	ns
Common Mode transient Immunity at High Level Output	CM_H	3	V_{CM} = 1000 Vp-p, I_F = 0 mA, $V_{O(Min)}$ = 4 V, Ta = 25 °C		10000	—	—	V/μs
Common Mode transient Immunity at Low Level Output	CM_L		V_{CM} = 1000 Vp-p, I_F = 12 mA, $V_{O(Max)}$ = 0.4 V, Ta = 25 °C		-10000	—	—	V/μs

Note: All typical values are at Ta = 25 °C

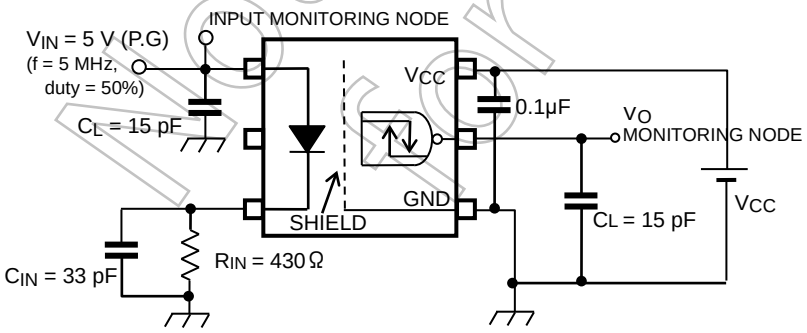
Note 1: C_L is approximately 15 pF which includes probe and Jig/stray wiring capacitance.

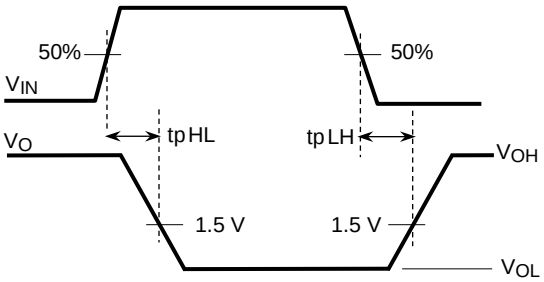
TEST CIRCUIT 1: tpLH, tpHL





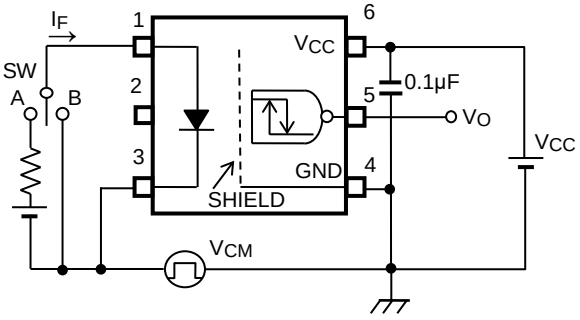
TEST CIRCUIT 2: tpLH, tpHL

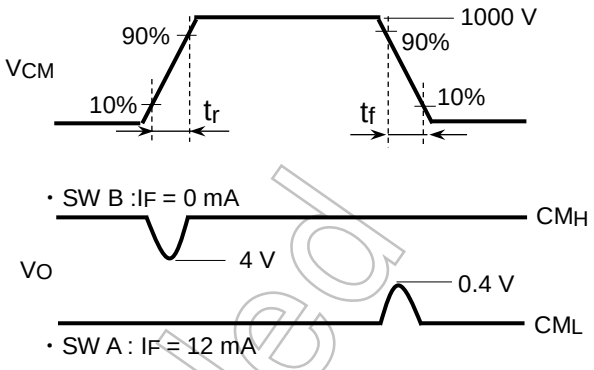




The PROBE and JIG capacitances are included in C_L.
(P.G) : Pulse Generatior

TEST CIRCUIT 3: Common-Mode Transient Immunity Test Circuit





$$CM_H = \frac{800(V)}{tr(\mu s)} \qquad CM_L = -\frac{800(V)}{tf(\mu s)}$$

Note: CM_L (CM_H) is the maximum rate of fall (rise) of the common mode voltage that can be sustained with the output voltage in the low (high) state.

RESTRICTIONS ON PRODUCT USE

Toshiba Corporation and its subsidiaries and affiliates are collectively referred to as “TOSHIBA”.
Hardware, software and systems described in this document are collectively referred to as “Product”.

- TOSHIBA reserves the right to make changes to the information in this document and related Product without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, lifesaving and/or life supporting medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, and devices related to power plant. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- GaAs (Gallium Arsenide) is used in Product. GaAs is harmful to humans if consumed or absorbed, whether in the form of dust or vapor. Handle with care and do not break, cut, crush, grind, dissolve chemically or otherwise expose GaAs in Product.
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for High Speed Optocouplers ***category:***

Click to view products by Toshiba ***manufacturer:***

Other Similar products are found below :

HCPL-2201-300 TLP558(F) JAN4N24 610737H HCPL2630M HCPL2731SM HCPL2630SM PS9817A-1-F3-AX TLP2766A(E EL816S2(C)(TU)-F TLP281-4 PS9121-F3-AX PS9123-F3-AX HCPL2531S HCPL2631SD HCPL-4661-500E TLP118(TPL,E) TLP521-2XGB TLP621-2XGB 4N46-300E JANTXV4N24U SFH6318T 6N135-300E TIL198 TLP2309(TPL,E) TLP2355(TPL,E TLP521-4GR TLP521-4XGB TLP621-4X TLP621XSM IS281-4GB IS181GR ICPL2631 ICPL2630 ICPL2601 TLP714(F) TLP754(F) FOD260LSDV ACPL-M21L-500E ACPL-064L-500E PS2501-1XSM PS2505-1 PS2561L2-1-F3-A PS2913-1-F3-AX PS9821-2-F3-AX FOD0721R2 FODM8061R2V 6N135SDM 6N137SDM 6N138-000E