

TLP719

Digital logic ground isolation

Line receivers

Microprocessor system interfaces

Switching power supply feedback control

Transistor invertors

The TOSHIBA TLP719 consists of a GaAlAs high-output light-emitting diode and a high-speed detector.

This unit is a 6-lead SDIP. The TLP719 is 50% smaller than the 8-pin DIP and meets the reinforced insulation class requirements of international safety standards. Therefore the mounting area can be reduced in equipment requiring safety standard certification.

The TLP719 has a Faraday shield integrated on the photodetector chip to provide an effective common mode noise transient immunity. Therefore this product is suitable for application in noisy environmental conditions.

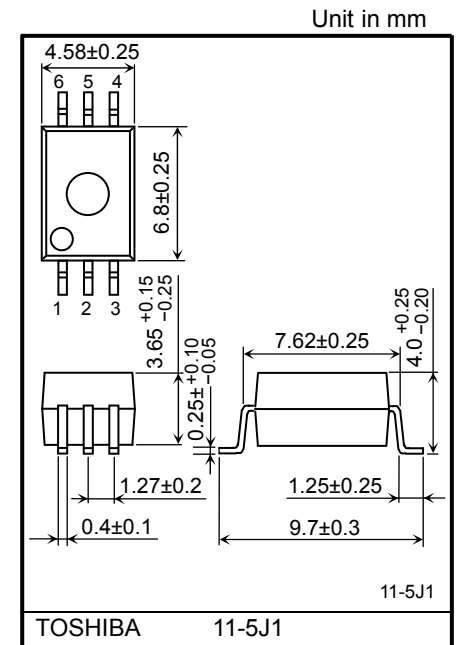
- Open collector
- Package type : SDIP6
- Isolation voltage : 5000 Vrms (min)
- Common mode transient immunity : ± 10 kV/us(min) @ $V_{CM} = 400$ V
- Switching speed : $t_{pHL}/t_{pLH} = 0.8$ μ s (max)
@ $I_F = 16$ mA, $V_{CC} = 5$ V,
 $R_L = 1.9$ k Ω , $T_a = 25$ °C

- TTL compatible
- Construction mechanical rating

	7.62-mm pitch standard type	10.16-mm pitch TLPXXXXF type
Creepage Distance	7.0 mm (min)	8.0 mm (min)
Clearance	7.0 mm (min)	8.0 mm (min)
Insulation Thickness	0.4 mm (min)	0.4 mm (min)

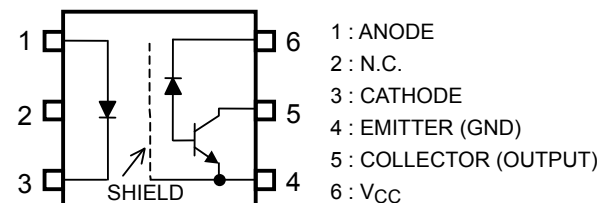
- UL recognized : UL1577, File No. E67349
 - Option (D4)
TÜV approved : EN60747-5-2
Certificate No. R50033433
- Maximum operating insulation voltage : 890 Vpk
Highest permissible over voltage : 8000 Vpk

**(Note) When a EN60747-5-2 approved type is needed,
please designate the "Option(D4)"**

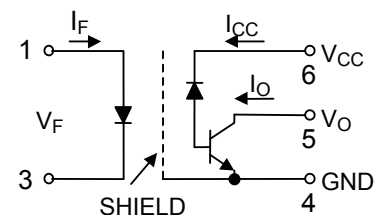


Weight : 0.26 g (typ.)

PIN CONFIGURATION (Top View)



SCHEMATIC



A 0.1- μ F bypass capacitor must be connected between pins 4 and 6.
(See Note 7.)

Absolute Maximum Ratings (Ta = 25 °C)

Characteristic		Symbol	Rating	Unit
LED	Forward current (Note 1)	I _F	25	mA
	Pulse forward current (Note 2)	I _{FP}	50	mA
	Peak transient forward current (Note 3)	I _{FPT}	1	A
	Reverse voltage	V _R	5	V
	Diode power dissipation (Note 4)	P _D	45	mW
	Junction temperature	T _j	125	°C
Detector	Output current	I _O	8	mA
	Peak output current	I _{OP}	16	mA
	Output voltage	V _O	-0.5~20	V
	Supply voltage	V _{CC}	-0.5~30	V
	Output power dissipation (Note 5)	P _O	100	mW
	Junction Temperature	T _j	125	°C
Operating temperature range		T _{opr}	-55~100	°C
Storage temperature range		T _{stg}	-55~125	°C
Lead soldering temperature (10 s)		T _{sol}	260	°C
Isolation voltage (AC, 1 minute, R.H.≤ 60 %)		BV _S	5000	V _{rms}

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.

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: Derate 0.45 mA / °C above 70 °C.

Note 2: 50% duty cycle, 1 ms pulse width.
Derate 0.9 mA / °C above 70 °C.

Note 3: Pulse width ≤ 1 μs, 300 pps.

Note 4: Derate 0.8 mW / °C above 70 °C.

Note 5: Derate 1.8 mW / °C above 70 °C.

Note 6: Device considered a two-terminal device: pins 1, 2 and 3 paired with pins 4, 5 and 6 respectively.

Note 7: 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.

Electrical Characteristics (Ta = 25 °C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F = 16 \text{ mA}$		1.65	1.85	V
	Forward voltage Temperature coefficient	$\Delta V_F / \Delta T_a$	$I_F = 16 \text{ mA}$	—	-2	—	mV / °C
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance between terminals	C_T	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	45	—	pF
Detector	HIGH-level output current	$I_{OH(1)}$	$I_F = 0 \text{ mA}, V_{CC} = V_O = 5.5 \text{ V}$	—	3	500	nA
		$I_{OH(2)}$	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$ $V_O = 20 \text{ V}$	—	—	5	μA
		I_{OH}	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$ $V_O = 20 \text{ V}, T_a = 70 \text{ °C}$	—	—	50	
	HIGH-level supply current	I_{CCH}	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}$	—	0.01	1	μA
	Supply voltage	V_{CC}	$I_{CC} = 0.01 \text{ mA}$	30	—	—	V
	Output voltage	V_O	$I_O = 0.5 \text{ mA}$	20	—	—	V

Coupled Electrical Characteristics (Ta = 25 °C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current transfer ratio	I_O / I_F	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}$ $V_O = 0.4 \text{ V}$	20	—	—	%
LOW-level output voltage	V_{OL}	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}$ $I_O = 2.4 \text{ mA}$	—	—	0.4	V

Isolation Characteristics (Ta = 25 °C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	$V = 0 \text{ V}, f = 1 \text{ MHz}$ (Note 6)	—	0.8	—	pF
Isolation resistance	R_S	R.H. $\leq 60\%$, $V_S = 500 \text{ V}$ (Note 6)	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	5000	—	—	V_{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

Switching Characteristics (Ta = 25 °C, VCC = 5 V)

Characteristic	Symbol	Test Cir- cuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H→L)	t_{pHL}	Fig1	$I_F = 0 \rightarrow 16 \text{ mA}$ $R_L = 1.9 \text{ k}\Omega$	—	—	0.8	μs
Propagation delay time (L→H)	t_{pLH}		$I_F = 16 \rightarrow 0 \text{ mA}$ $R_L = 1.9 \text{ k}\Omega$	—	—	0.8	μs
Common mode transient immunity at logic HIGH output (Note 8)	CM_H	Fig2	$I_F = 0 \text{ mA}$ $V_{CM} = 400 \text{ Vp-p}$ $R_L = 1.9 \text{ k}\Omega$	10000	—	—	$\text{V} / \mu\text{s}$
Common mode transient immunity at logic LOW output (Note 8)	CM_L		$I_F = 16 \text{ mA}$ $V_{CM} = 400 \text{ Vp-p}$ $R_L = 1.9 \text{ k}\Omega$	-10000	—	—	$\text{V} / \mu\text{s}$

Note 8 : CM_L is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic LOW state ($V_O < 0.8 \text{ V}$).

CM_H is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic HIGH state ($V_O > 2 \text{ V}$).

Figure 1. Switching Time Test Circuit

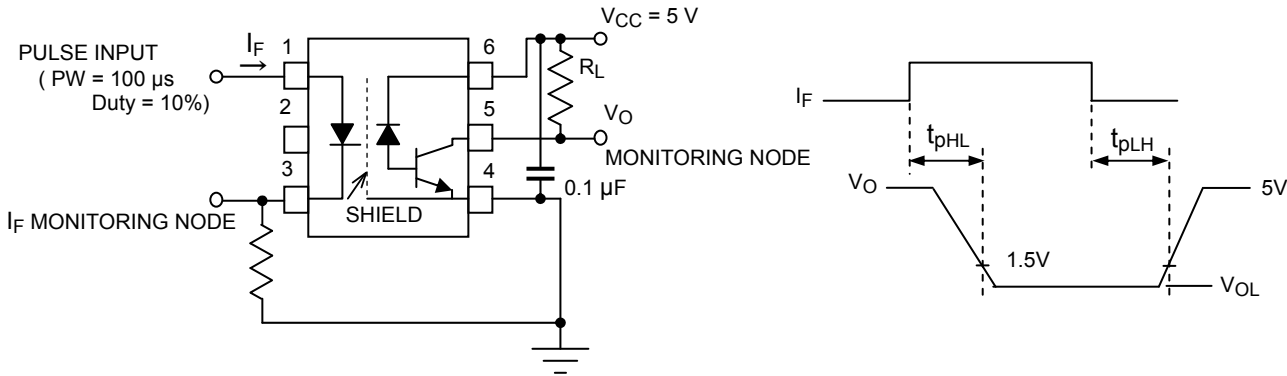
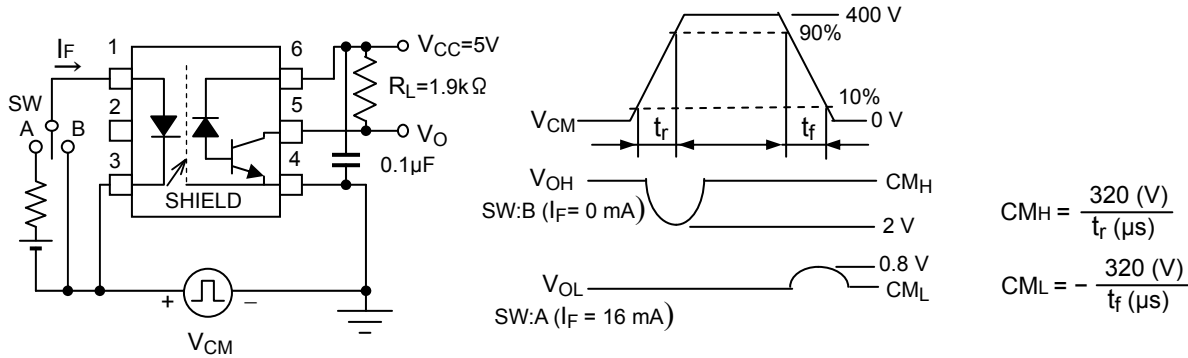
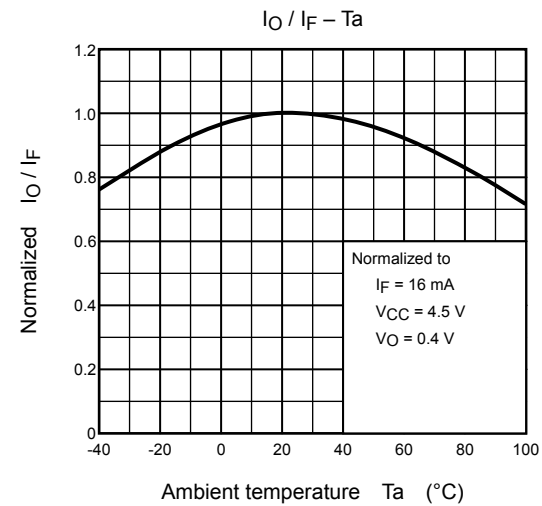
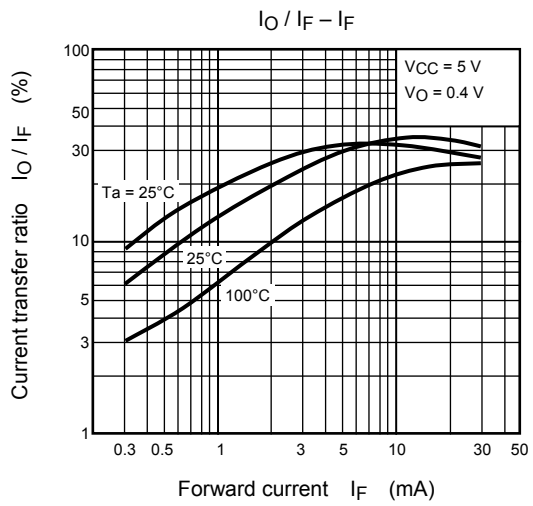
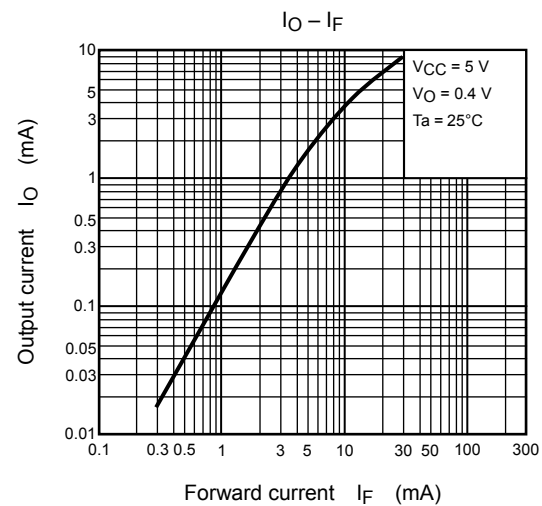
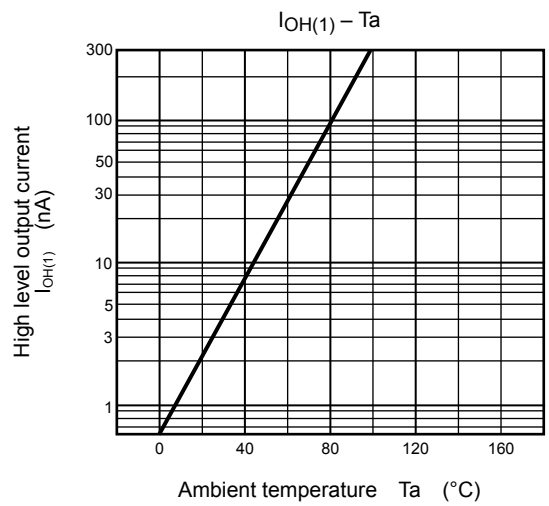
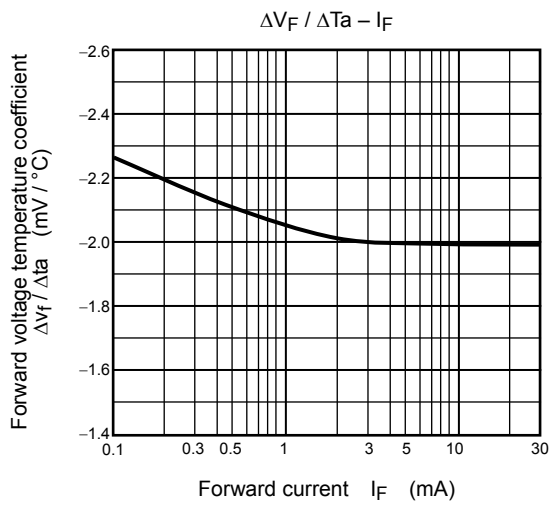
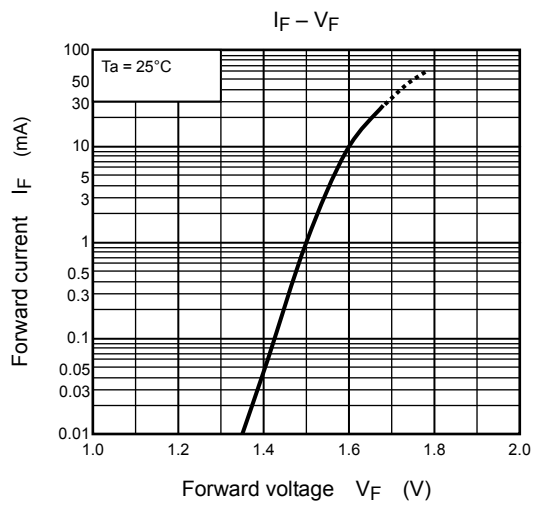
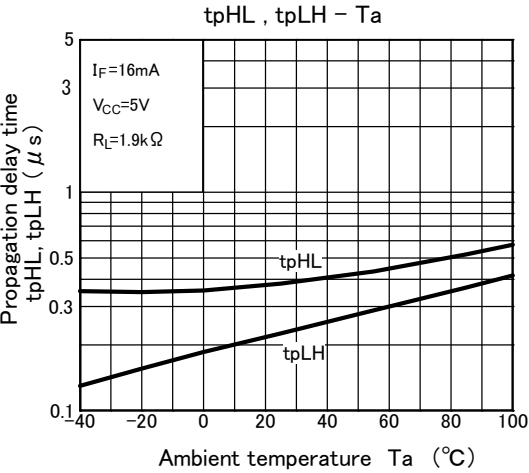
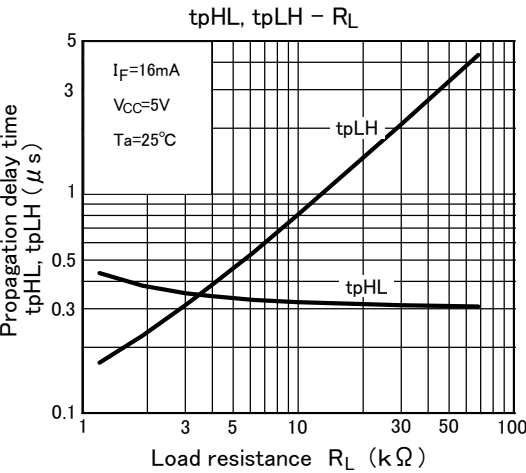
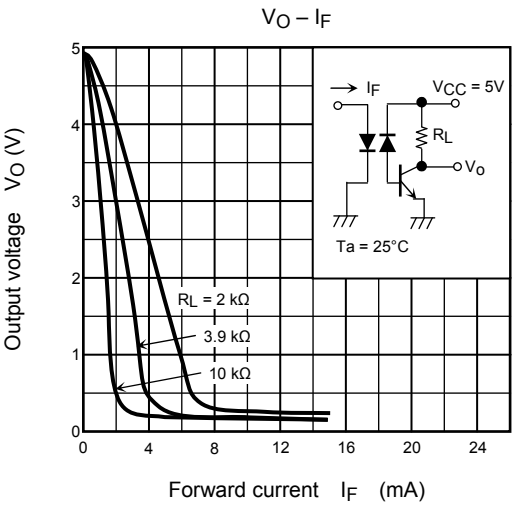
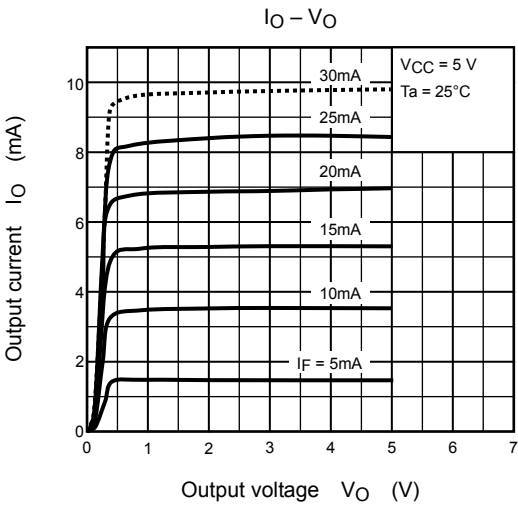


Figure 2. Common Mode Noise Immunity Test Circuit.







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