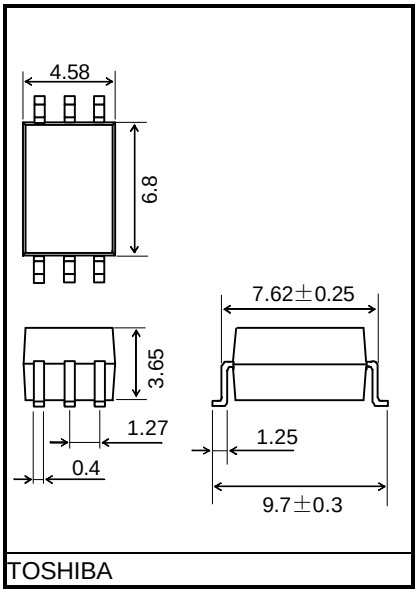
TOSHIBA PHOTOCOUPLER GaAlAs IRED + PHOTO-IC

Preliminary

TLP719

DIGITAL LOGIC GROUND ISOLATION.
LINE RECEIVER.
MICROPROCESSOR SYSTEM INTERFACES.
SWITCHING POWER SUPPLY FEEDBACK CONTROL.
TRANSISTOR INVERTOR.

Unit in mm



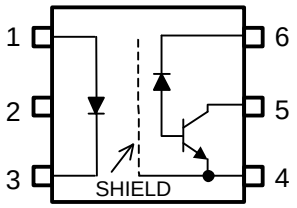
Weight: ---g

The TOSHIBA TLP719 consists of a GaAlAs high-output light emitting diode and a high speed detector.
This unit is 6-lead SDIP. TLP719 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.
TLP719 has a Faraday shield integrated on the photodetector chip provides an effective common mode noise transient immunity.
So this is suitable for application in noisy environmental condition.

- Open Collector
- Package Type : SDIP6
- Isolation voltage : 5000 Vrms (Min.)
- Common mode Transient Immunity
  : ±10kV/us(Min.) @VCM=400V
- Switching speed : t_{pHL} = 0.8μs , t_{pLH} = 0.8μs (Max.)
  @ I_F = 16mA ,V_{CC} = 5V,
  R_L = 1.9kO ,Ta = 25°C
- TTL Compatible
- Construction Mechanical Rating

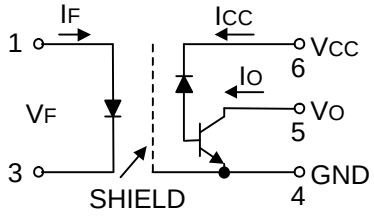
	7.62 mm pich standard type	10.16 mm pich TLPXXXF type
Creepage Distance	7.0 mm (Min)	8.0 mm (Min)
Clearance	7.0 mm (Min)	8.0 mm (Min)
Insulation Thickness	0.4 mm (Min)	0.4 mm (Min)

PIN CONFIGURATION (Top view)



1:ANODE
2:N.C.
3:CATHODE
4:EMITTER(GND)
5:COLLECTOR(OUTPUT)
6:V_{CC}

SCHEMATIC



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

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		Tj	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		Tj	125	°C
Operating temperature range			T_{opr}	−55~100	°C
Storage temperature range			T_{opr}	−55~125	°C
Lead solder temperature (10s)			T_{sol}	260	°C
Isolation voltage (AC, 1min., R.H.= 60%)		(Note 6)	BV_S	5000	Vrms

(Note 1) Derate 0.45mA / °C above 70°C.

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

(Note 3) Pulse width = 1μs, 300pps.

(Note 4) Derate 0.8mW / °C above 70°C.

(Note 5) Derate 1.8mW / °C above 70°C.

(Note 6) Device considered a two terminal device: Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 16mA		1.65	1.85	V
	Forward voltage Temperature coefficient	?V_F / ?Ta	I_F = 16mA	?	−2	?	mV / °C
	Reverse current	I_R	V_R = 5V	?	?	10	μA
	Capacitance between terminal	C_T	V_F = 0V , f = 1MHz	?	45	?	pF
Detector	High level output current	$I_{OH\ (1)}$	I_F = 0mA ,V_{CC} = V_O = 5.5V	?	3	500	nA
		$I_{OH\ (2)}$	I_F = 0mA ,V_{CC} = 30V V_O = 20V	?	?	5	μA
		I_{OH}	I_F = 0mA ,V_{CC} = 30V V_O = 20V,Ta = 70°C	?	?	50	
	High level supply voltage	I_{CCH}	I_F = 0mA ,V_{CC} = 30V	?	0.01	1	μA
	Supply voltage	V_{CC}	I_{CC} = 0.01mA	30	?	?	V
	Output voltage	V_O	I_O = 0.5mA	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 = 16mA ,V_{CC} = 4.5V V_O = 0.4V	20	?	?	%
Low level output voltage	V_{OL}	I_F = 16mA ,V_{CC} = 4.5V I_O = 2.4mA	?	?	0.4	V

Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	V = 0V , f = 1MHz (Note 6)	?	0.8	?	pF
Isolation resistance	R_S	R.H. = 60% ,V_S = 500V (Note 6)	1×10^{12}	10^{14}	?	O
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 = 5V)

Characteristic	Symbol	Test Cir-cuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H? L)	t_{pHL}	Fig1	I_F = 0? 16mA R_L = 1.9kO	?	?	0.8	µs
Propagation delay time (L? H)	t_{pLH}		I_F = 16? 0mA R_L = 1.9kO	?	?	0.8	µs
Common mode transient immunity at logic high output (Note 7)	CM_H	Fig2	I_F = 0mA , V_{CM} = 400V_{p-p} R_L = 1.9kO	10000	?	?	V / µs
Common mode transient immunity at logic low output (Note 7)	CM_L		I_F = 16mA , V_{CM} = 400V_{p-p} R_L = 1.9kO	–10000	?	?	V / µs

(Note 7) : 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 < 0.8V).
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 >2V).

Fig 1.Switching Time Test Circuit

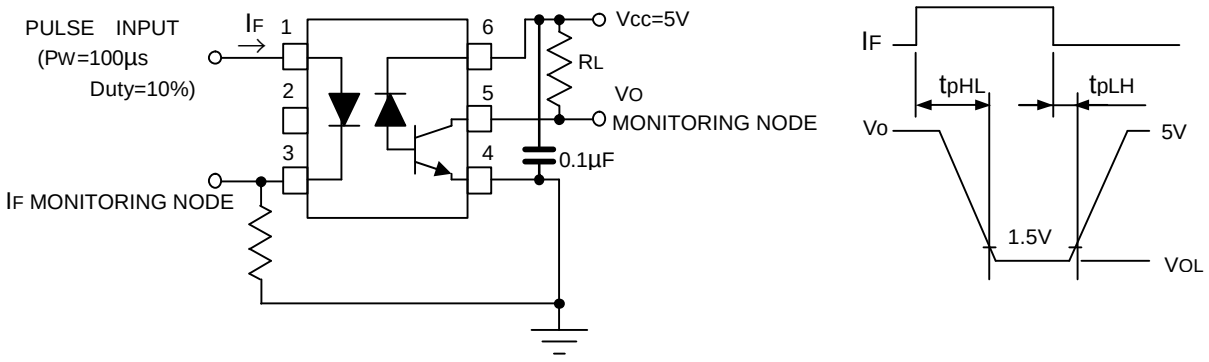
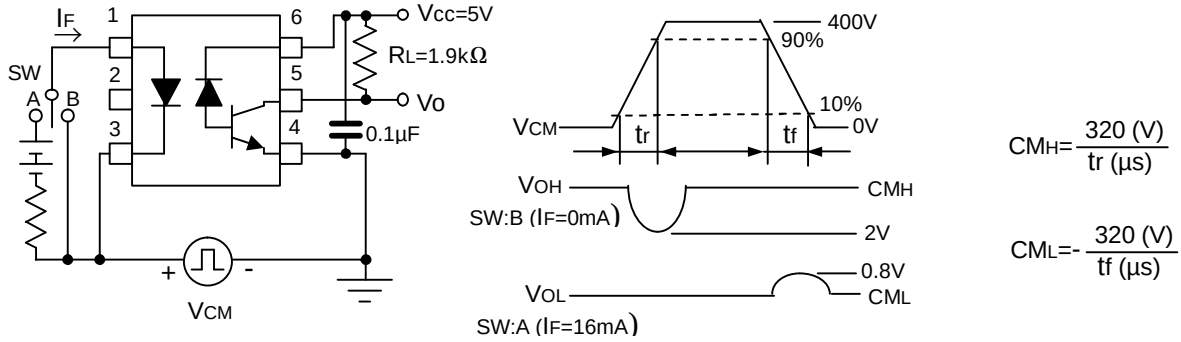


Fig 2.Common Mode Noise Immunity Test Circuit.



$$CM_H = \frac{320\ (V)}{tr\ (\mu s)}$$

$$CM_L = -\frac{320\ (V)}{tf\ (\mu s)}$$

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