

TOSHIBA Photocoupler GaA As Ired & Photo-IC

TLP109(IGM)

Intelligent Power Module (IPM)

Digital Logic Isolation

Industrial Inverters

Electrical Characteristics (Ta = 25°C)

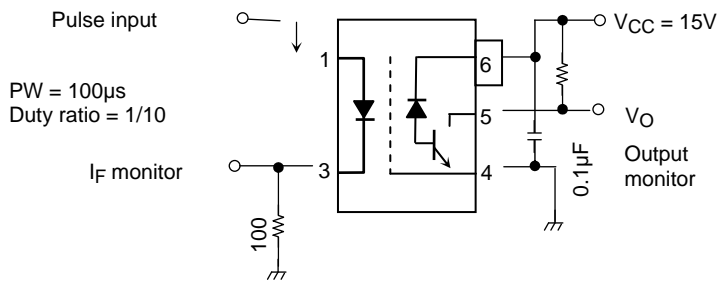
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V_F	$I_F = 16 \text{ mA}$	1.50	1.64	1.85	V
Forward voltage temperature coefficient	V_F / T_a	$I_F = 16 \text{ mA}$		-1.8		mV / °C
Reverse current	I_R	$V_R = 3 \text{ V}$			10	μA
Capacitance between terminals	C_T	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$		60		pF
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}	$I_F = 0 \text{ mA}, V_{CC} = 30 \text{ V}, V_O = 20 \text{ V}, T_a = 100^\circ\text{C}$			50	

Switching Characteristics (Ta = 25°C, VCC = 15 V)

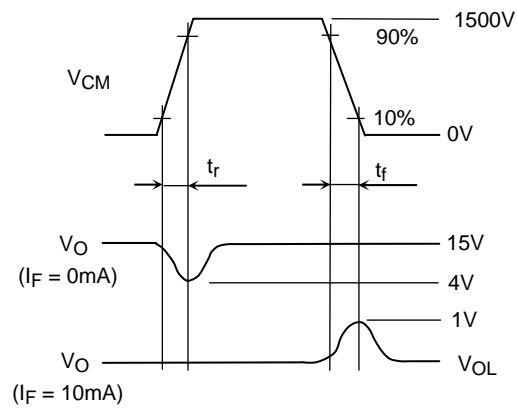
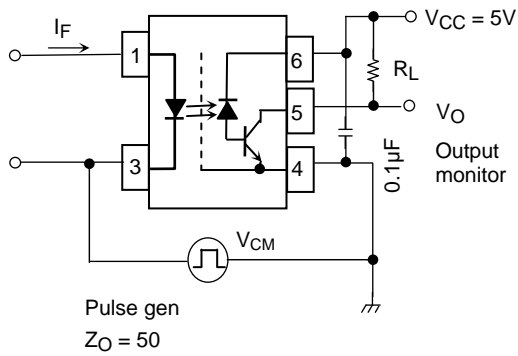
Characteristic	Symbol	Test Cir-Cuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H → L) Propagation delay time (L → H)	t _{pHL} t _{pLH}	1	I _F =10 mA, R _L =20 k	0.1	0.45	0.8	μs
			I _F =10 mA, R _L =20 k Ta=0 to 85°C	0.1	0.45	0.9	
			I _F =10 mA, R _L =20 k Ta=-25~100°C	0.1	0.45	1.0	
Switching time dispersion between on and off	t _{pLH} -t _{pHL}	1	I _F =10 mA, R _L =20 k		0.15	0.7	μs
			I _F =10 mA, R _L =20 k Ta=0 to 85°C		0.25	0.8	
			I _F =10 mA, R _L =20 k Ta=-25 to 100°C		0.25	0.9	
Common mode transient immunity at logic high output (Note 6)	CM _H	2	I _F =0 mA, V _{CM} =1500 V _{p-p} R _L =20 k	10000	15000		V / μs
Common mode transient immunity at logic low output (Note 6)	CM _L		I _F =10 mA, V _{CM} =1500 V _{p-p} R _L =20 k	-10000	-15000		V / μs

(Note 6) 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 < 1 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 > 4 V).

Test Circuit 1: Switching Time Test Circuit



Test Circuit 2: Common Mode Transient Immunity Test Circuit



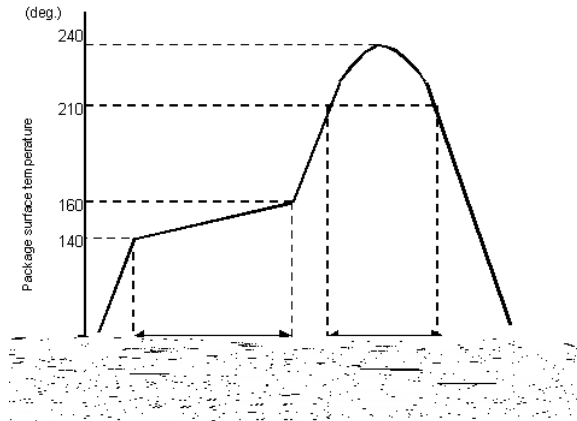
$$CM_H = \frac{1200(V)}{t_r(\mu s)}, CM_L = \frac{1200(V)}{t_f(\mu s)}$$

PRECAUTIONS OF SURFACE MOUNTING TYPE PHOTOCOUPLER SOLDERING & GENERAL STORAGE

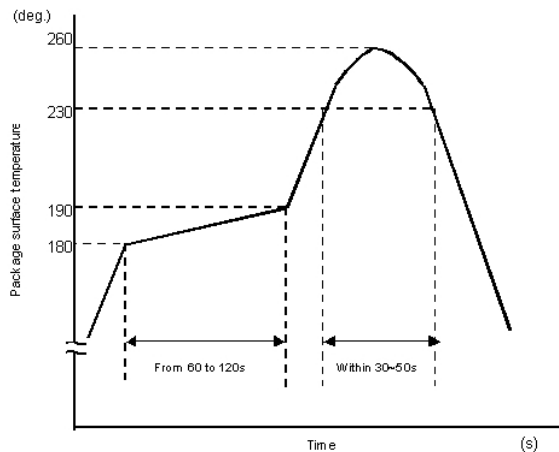
(1) Precautions for Soldering

1) When Using Soldering Reflow

- An example of a temperature profile when Sn-Pb eutectic solder is used:



- An example of a temperature profile when lead(Pb)-free solder is used:



- Reflow soldering must be performed once or twice.
- The mounting should be completed with the interval from the first to the last mountings being 2 weeks.

2) When using soldering flow (Applicable to both eutectic solder and Lead(Pb)-Free solder)

- Apply preheating of 150 deg.C for 60 to 120 seconds.
- Mounting condition of 260 deg.C or less within 10 seconds is recommended.
- Flow soldering must be performed once.

3) When using soldering iron (Applicable to both eutectic solder and Lead(Pb)-Free solder)

- Complete soldering within 10 seconds for lead temperature not exceeding 260 deg.C or within 3 seconds not exceeding 350 deg.C.
- Heating by soldering iron must be only once per lead.

(2) Precautions for General Storage

- 1) Do not store devices at any place where they will be exposed to moisture or direct sunlight.
- 2) When transportation or storage of devices, follow the cautions indicated on the carton box.
- 3) The storage area temperature should be kept within a temperature range of 5 degree C to 35 degree C, and relative humidity should be maintained at between 45% and 75%.
- 4) Do not store devices in the presence of harmful (especially corrosive) gases, or in dusty conditions.
- 5) Use storage areas where there is minimal temperature fluctuation. Because rapid temperature changes can cause condensation to occur on stored devices, resulting in lead oxidation or corrosion, as a result, the solderability of the leads will be degraded.
- 6) When repacking devices, use anti-static containers.
- 7) Do not apply any external force or load directly to devices while they are in storage.
- 8) If devices have been stored for more than two years, even though the above conditions have been followed, it is recommended that solderability of them should be tested before they are used.

Specification for Embossed-Tape Packing (TPL)(TPR) for SO6 Coupler

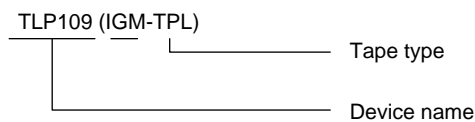
1. Applicable Package

Package	Product Type
SO6	Mini-flat coupler

2. Product Naming System

Type of package used for shipment is denoted by a symbol suffix after a product number. The method of classification is as below.

(Example)



3. Tape Dimensions

3.1 Specification Classification Are as Shown in Table 1

Table 1 Tape Type Classification

Tape type	Classification	Quantity (pcs / reel)
TPL	L direction	3000
TPR	R direction	3000

3.2 Orientation of Device in Relation to Direction of Tape Movement

Device orientation in the recesses is as shown in Figure 1.

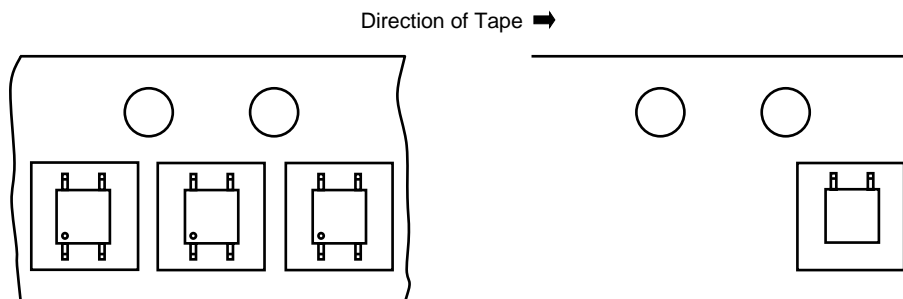


Figure 1 Device Orientation

3.3 Empty Device Recesses Are as Shown in Table 2.

Table 2 Empty Device Recesses

	Standard	Remarks
Occurrences of 2 or more successive empty device recesses	0	Within any given 40-mm section of tape, not including leader and trailer
Single empty device recesses	6 devices (max) per reel	Not including leader and trailer

3.4 Start and End of Tape

The start of the tape has 50 or more empty holes. The end of tape has 50 or more empty holes and two empty turns only for a cover tape.

3.5 Tape Specification

- (1) Tape material: Plastic (protection against electrostatics)
- (2) Dimensions: The tape dimensions are as shown in Figure 2 and Table 3.

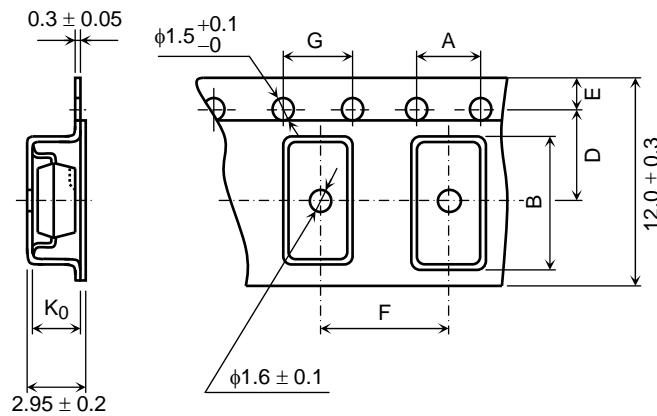


Figure 2 Tape Forms

Table 3 Tape Dimensions

Unit: mm
Unless otherwise specified: ±0.1

Symbol	Dimension	Remark
A	4.0	
B	7.6	
D	5.5	Center line of indented square hole and sprocket hole
E	1.75	Distance between tape edge and hole center
F	8.0	Cumulative error $\begin{matrix} +0.1 \\ -0.3 \end{matrix}$ (max) per 10 feed holes
G	4.0	Cumulative error $\begin{matrix} +0.1 \\ -0.3 \end{matrix}$ (max) per 10 feed holes
K ₀	2.6	Internal space

3.6 Reel

- (1) Material: Plastic
- (2) Dimensions: The reel dimensions are as shown in Figure 3 and Table 4.

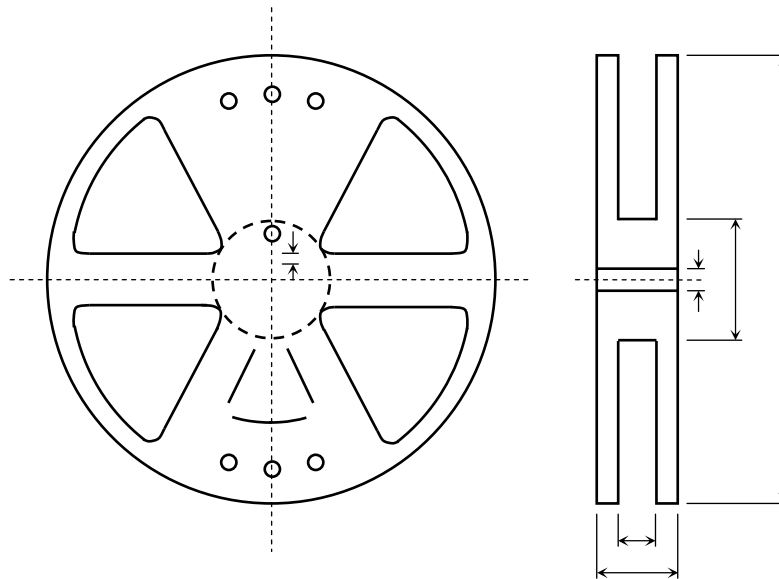


Figure 3 Reel Form

Table 4 Reel Dimensions

Unit: mm

Symbol	Dimension
A	380 ±2
B	80 ±1
C	13 ±0.5
E	2.0 ±0.5
U	4.0 ±0.5
W1	13.5 ±0.5
W2	17.5 ±1.0

4. Packing

Either one reel or five reels of photocoupler are packed in a shipping carton.

5. Label Indication

The carton bears a label indicating the product number, the symbol representing classification of standard, the quantity, the lot number and the Toshiba company name.

6. Ordering Method

When placing an order, please specify the product number, the tape type and the quantity as shown in the following example.

(Example)

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