

TLP172AM

1. Applications

- Security Systems
- Factory Automation (FA)
- Measuring Instruments
- Battery Management System (BMS)
- Programmable Logic Controllers (PLCs)
- Mechanical relay replacements

2. General

The Toshiba TLP172AM consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SO6 package. This photorelay has higher output current rating than phototransistor-type photocoupler; hence, it is suitable for use as On/Off control for high current.

3. Features

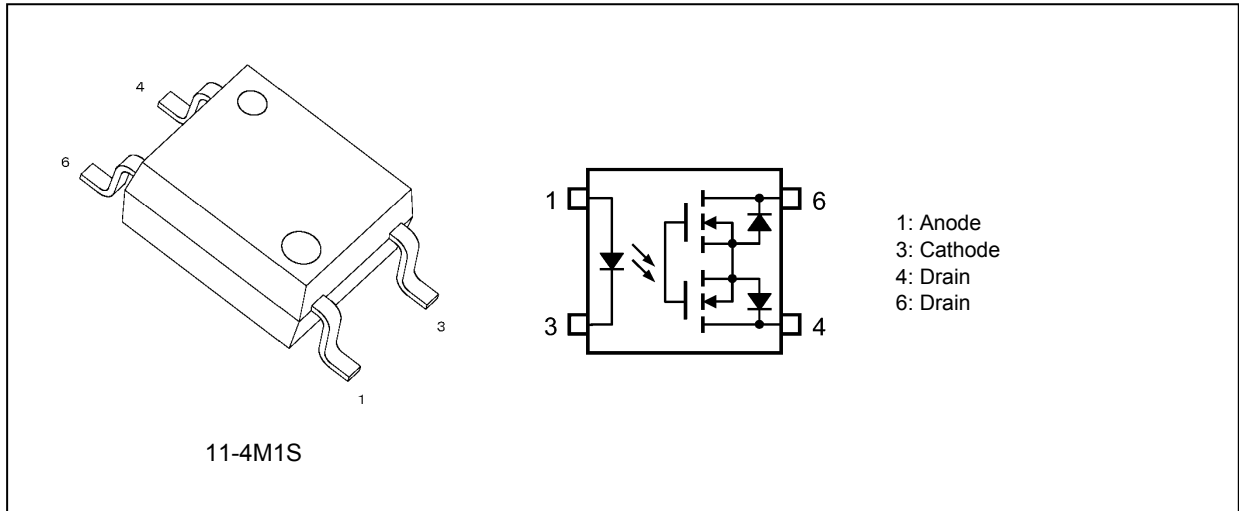
- (1) Halogen-free
 - (2) Operating temperature range: 110°C(max)
 - (3) Normally opened (1-Form-A)
 - (4) OFF-state output terminal voltage: 60 V (min)
 - (5) Trigger LED current: 3 mA (max)
 - (6) ON-state current: 500 mA (max)
 - (7) ON-state resistance: 2 Ω (max)
 - (8) Isolation voltage: 3750 Vrms (min)
- UL-approved: UL1577, File No.E67349 (Pending)

Note: Plan to be approved in May/2016

Table 3.1 Mechanical Parameters

Characteristics	TLP172AM	Unit
Creepage distances	5.0 (min)	mm
Clearance distances	5.0 (min)	
Internal isolation thickness	0.2 (min)	

4. Packaging and Pin Assignment



5. Internal Circuit

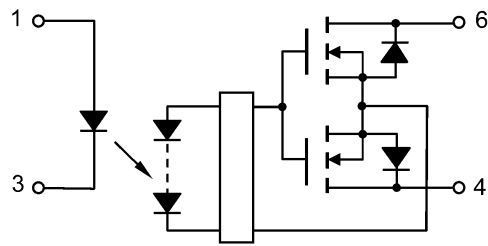


Fig. 5.1 Internal Circuit

6. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25°C)

	Characteristics	Symbol	Note	Rating	Unit
LED	Input forward current	I _F		30	mA
	Input forward current derating (T _a ≥ 25 °C)	ΔI _F /ΔT _a		-0.3	mA/°C
	Input forward current (pulsed) (100 μs pulse, 100 pps)	I _{FP}		1	A
	Input reverse voltage	V _R		6	V
	Input power dissipation	P _D		50	mW
	Junction temperature	T _j		125	°C
Detector	OFF-state output terminal voltage	V _{OFF}		60	V
	ON-state current	I _{ON}		500	mA
	ON-state current derating (T _a ≥ 25 °C)	ΔI _{ON} /ΔT _a		-5.0	mA/°C
	ON-state current (pulsed) (t = 100 ms, Duty = 1/10)	I _{ONP}		1.5	A
	Output power dissipation	P _O		300	mW
	Junction temperature	T _j		125	°C
Common	Storage temperature	T _{stg}		-55 to 125	°C
	Operating temperature	T _{opr}		-40 to 110	
	Lead soldering temperature (10 s)	T _{sol}		260	
	Isolation voltage AC, 60 s, R.H. ≤ 60 %	BV _S	(Note 1)	3750	

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: This device is considered as a two-terminal device: Pins 1 and 3 are shorted together, and pins 4 and 6 are shorted together.

7. Recommended Operating Conditions (Note)

Characteristics	Symbol	Note	Min	Typ.	Max	Unit
Supply voltage	V _{DD}		—	—	48	V
Input forward current	I _F		5	7.5	25	mA
ON-state current	I _{ON}		—	—	500	
Operating temperature	T _{opr}		-20	—	100	°C

Note: The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this datasheet should also be considered.

8. Electrical Characteristics (Unless otherwise specified, T_a = 25°C)

	Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
LED	Input forward voltage	V _F		I _F = 10 mA	1.1	1.27	1.4	V
	Input reverse current	I _R		V _R = 5 V	—	—	10	μA
	Input capacitance	C _t		V = 0 V, f = 1 MHz	—	30	—	pF
Detector	OFF-state current	I _{OFF}		V _{OFF} = 60 V	—	0.0001	1	μA
	Output capacitance	C _{OFF}		V = 0 V, f = 1 MHz	—	130	—	pF

9. Coupled Electrical Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}		$I_{ON} = 500 \text{ mA}$	—	1	3	mA
Return LED current	I_{FC}		$I_{OFF} = 100 \mu\text{A}$	0.1	0.5	—	mA
ON-state resistance	R_{ON}		$I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$	—	1	2	Ω

10. Isolation Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Total capacitance (input to output)	C_S	(Note 1)	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	(Note 1)	$V_S = 500 \text{ V}, \text{R.H.} \leq 60 \%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	(Note 1)	AC, 60 s	3750	—	—	Vrms
			AC, 1 s in oil	—	10000	—	
			DC, 60 s, in oil	—	10000	—	Vdc

Note 1: This device is considered as a two-terminal device: Pins 1 and 3 are shorted together, and pins 4 and 6 are shorted together.

11. Switching Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}		See Fig. 11.1 $R_L = 200 \Omega, V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	—	0.6	2	ms
Turn-off time	t_{OFF}			—	0.1	0.5	

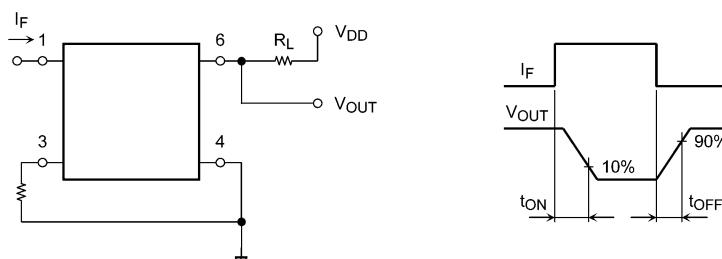


Fig. 11.1 Switching Time Test Circuit

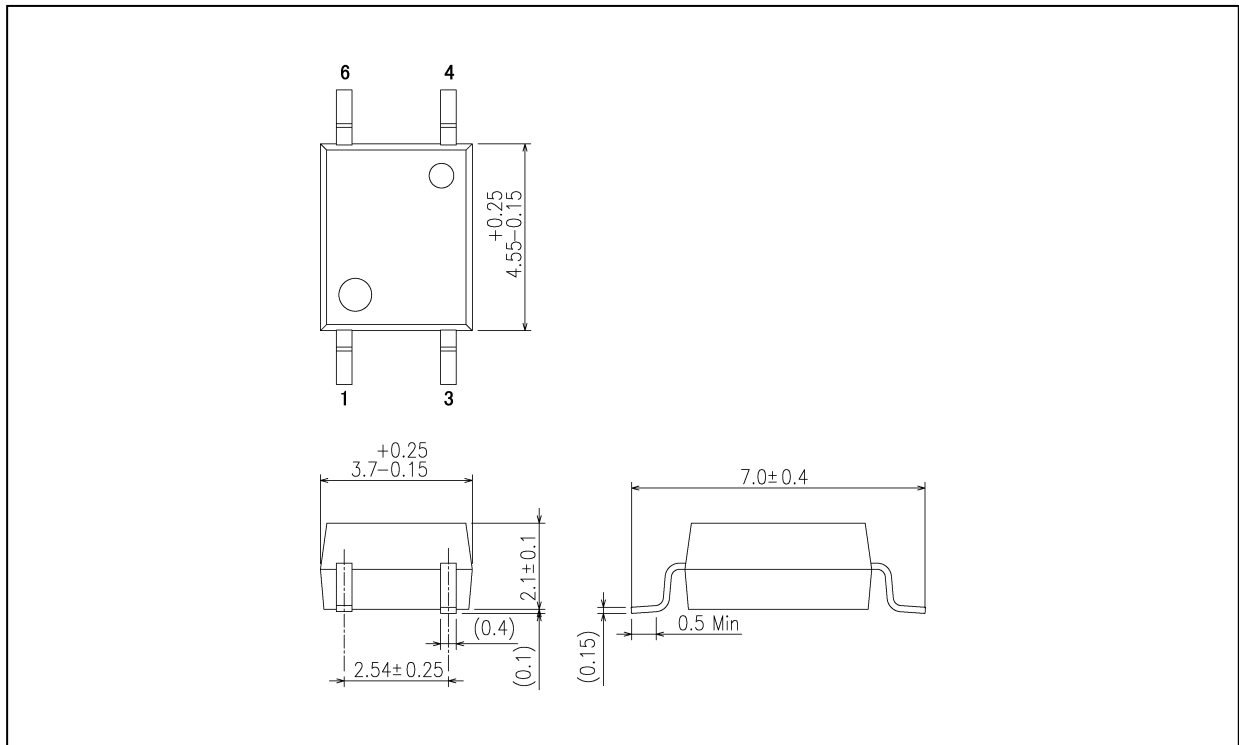
12. Ordering Information (Example of Item Name)

Item Name	Packaging (Note 1)	Packing (MOQ)
TLP172AM(E(O	SMD	Magazine (125 pcs)
TLP172AM(TPL,E(O	SMD	Tape and reel (3000 pcs)
TLP172AM(TPR,E(O	SMD	Tape and reel (3000 pcs)

Note 1: SMD: Surface Mount Device

Package Dimensions

Unit: mm



Weight: 0.1 g (typ.)

Package Name(s)
TOSHIBA: 11-4M1S

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