

TLP209D

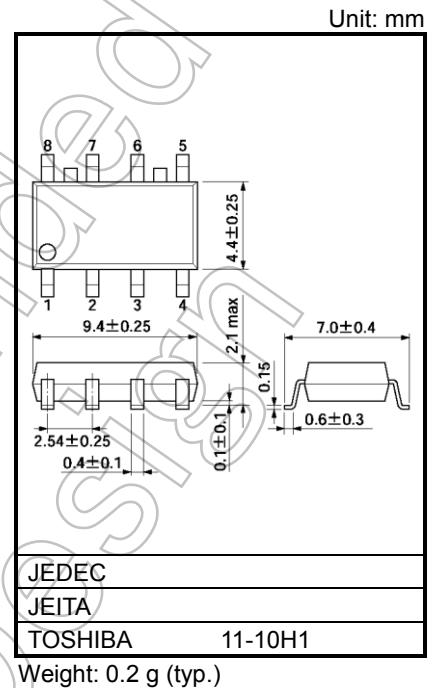
MEASUREMENT INSTRUMENTS
 LOGIC IC TESTERS / MEMORY TESTERS
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The TOSHIBA TLP209D consists of an infrared emitting diode optically coupled to a photo-MOSFET in a plastic SOP package.

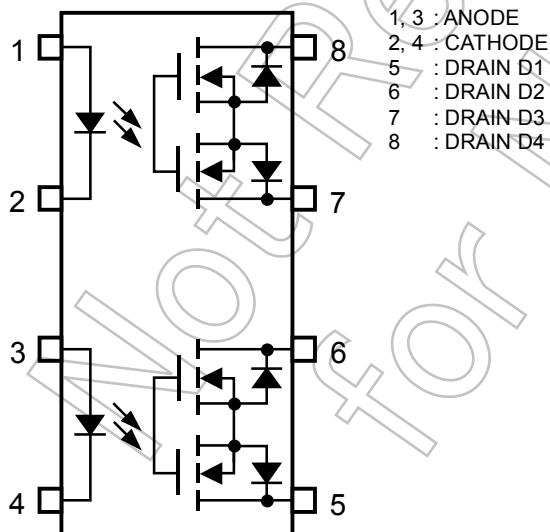
Its characteristics include low OFF-state current and low output pin capacitance, enabling it to be used in high-frequency measurement instruments.

Features

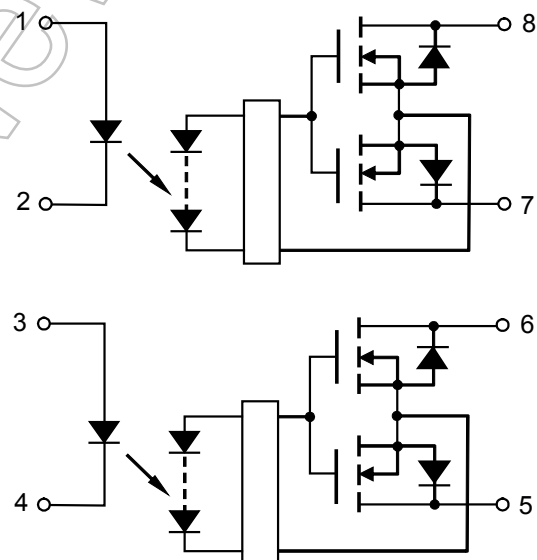
- 8 pin SOP (2.54SOP8) : 2.1 mm high, 2.54 mm pitch
- 2-Form-A
- Peak Off-State Voltage : 200 V (min)
- Trigger LED Current : 3 mA (max)
- On-State Current : 50 mA (max)
- On-State Resistance : 50 Ω (max)
- Output Capacitance : 20 pF (max)
- Isolation Voltage : 1500 Vrms (min)
- UL-recognized : UL 1577, File No.E67349



Pin Configuration (top view)



Schematic



Start of commercial production
 2008-10

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward Current	I_F	50	mA
	Forward Current Derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA/°C
	Reverse Voltage	V_R	5	V
	Diode Power Dissipation	P_D	50	mW
	Diode Power Dissipation Derating (Ta > 25°C)	$\Delta P_D / ^\circ\text{C}$	-0.5	mW/°C
	Junction Temperature	T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V_{OFF}	200	V
	On-State Current	I_{ON}	50	mA
	On-State Current Derating (Ta ≥ 25°C)	$\Delta I_{ON} / ^\circ\text{C}$	-0.5	mA/°C
	Output Power Dissipation	P_O	125	mW
	Output Power Dissipation Derating (Ta ≥ 25°C)	$\Delta P_O / ^\circ\text{C}$	-1.25	mW / °C
	Junction Temperature	T_j	125	°C
Storage Temperature Range		T_{stg}	-55 to 125	°C
Operating Temperature Range		T_{opr}	-40 to 85	°C
Lead Soldering Temperature (10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 60 s, R.H. ≤ 60 %) (NOTE1)		BV_S	1500	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.

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 : Device considered a two-terminal device : LED side pins shorted together, and DETECTOR side pins shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply Voltage	V_{DD}	—	—	160	V
Forward Current	I_F	5	7.5	15	mA
On-State Current	I_{ON}	—	—	50	mA
Operating Temperature	T_{opr}	-20	—	60	°C

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.

Individual Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward Voltage	V_F	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	pF
DETECTOR	Off-State Current	I_{OFF}	$V_{OFF} = 160 \text{ V}$	—	—	1	nA
	Capacitance	C_{OFF}	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	15	20	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED Current	I _{FT}	I _{ON} = 50 mA	—	1	3	mA
Return LED Current	I _{FC}	I _{OFF} = 100 μA	0.1	—	—	mA
On-State Resistance	R _{ON}	I _{ON} = 50 mA, I _F = 5 mA	—	40	50	Ω

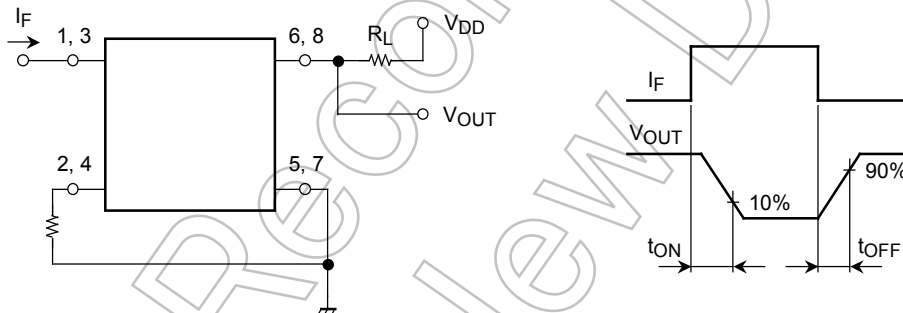
Isolation Characteristics (Ta = 25°C)

Characteristics	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	V _S = 500 V, R.H. ≤ 60 %	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 60 s	1500	—	—	V _{rms}

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on Time	t _{ON}	R _L = 200 Ω (Note 2)	—	0.03	0.5	ms
Turn-off Time	t _{OFF}	V _{DD} = 10 V, I _F = 5 mA	—	0.07	0.2	

Note 2: SWITCHING TIME TEST CIRCUIT



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