TOSHIBA

TOSHIBA Photocoupler GaAs IRED & Photo-MOSFET

TLP176D

Modem in PC Modem · Fax Card Telecommunication

The TOSHIBA TLP176D consists of gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

The TLP176D is suitable for modem and PBX applications which require space savings.

- SOP 4 pin (2.54SOP4): 1-form-A
- Peak off-state voltage: 200 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 200 mA (max)
- On-state resistance: 8Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1577, file No. E67349

Pin Configuration (top view)



Internal Circuit





Weight: 0.1 g (typ.)

Unit: mm

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
	Forward current	١ _F	50	mA
LED	Forward current derating $(Ta \ge 25^{\circ}C)$	∆I _F /°C	-0.5	mA/°C
	Pulse forward current (100 μ s pulse, 100 pps)	I _{FP}	1	А
	Reverse voltage	V _R	5	V
	Junction temperature	Tj	125	°C
	Off-state output terminal voltage	V _{OFF}	200	V
	On-state current	I _{ON}	200	mA
Detector	On-state RMS current derating $(Ta \ge 25^{\circ}C)$	∆l _{ON} /°C	-2.0	mA/°C
	Junction temperature	Tj	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, 1 min., R.H. \leq 60%) (Note)		BVS	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: Device considered a two-terminal device: pins1 and 2 shorted together and pins 3 and 4 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	V _{DD}		150	200	V
Forward current	١ _F	5	7.5	25	mA
On-state current	I _{ON}			130	mA
Operating temperature	T _{opr}	-20		65	°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	Тур.	Max	Unit
	Forward voltage	VF	I _F = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I _R	V _R = 5 V	_	_	10	μA
	Capacitance	CT	V = 0, f = 1 MHz	_	30	_	pF
Detector	Off-state current	IOFF	V _{OFF} = 200 V	_	_	1	μA
	Capacitance	C _{OFF}	V = 0, f = 1 MHz		100	_	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I _{FT}	I _{ON} = 200 mA	_	1	3	mA
On-state resistance	R _{ON}	$I_{ON} = 200 \text{ mA}, I_F = 5 \text{ mA}$		5	8	Ω

Isolation Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	$V_S = 0, f = 1 MHz$		0.8		pF
Isolation resistance	R _S	$V_S=500~V,~R.H.\leq 60\%$	5 × 10 ¹⁰	10 ¹⁴		Ω
	BVS	AC, 1 minute	1500	_	_	Vrms
Isolation voltage		AC, 1 second, in oil	_	3000	_	VIIIS
		DC, 1 minute, in oil		3000		Vdc

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition		Min	Тур.	Max	Unit
Turn-on time	ton	$\begin{array}{l} R_L = 200 \ \Omega \\ V_{DD} = 20 \ V, \ I_F = 5 \ m A \end{array}$	(Note)		0.6	1.5	ms
Turn-off time	^t OFF	$\begin{array}{l} R_L = 200 \ \Omega \\ V_{DD} = 20 \ V, \ I_F = 5 \ m A \end{array}$	(Note)	_	0.1	1.0	ms

Note: Switching time test circuit





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