

# TLP174G

Modem·Fax Cards, Modems in PC  
Telecommunications  
PBX  
Measurement Equipment

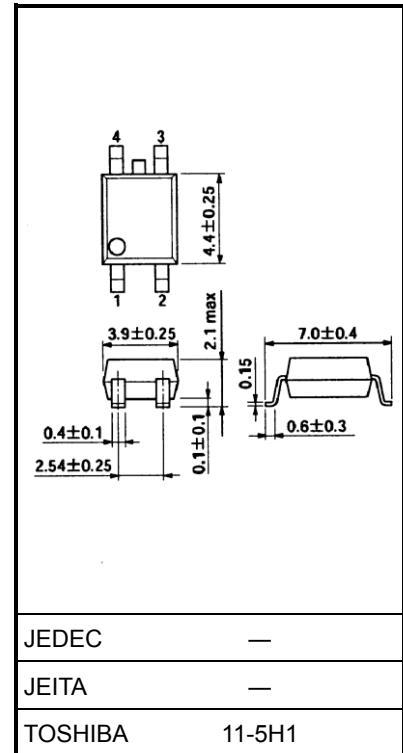
Unit: mm

The Toshiba TLP174G consists of an infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

Because of the high-voltage MOS FET used for the output stage, the TLP174G is suitable for replacement of dial pulse relay and hook relay of modem and facsimile, and also suitable for PBX and the line interface section of exchange.

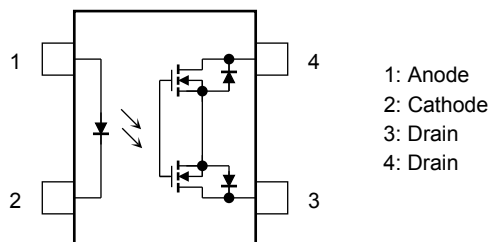
In addition, the MOS FET control circuit is provided the current limiting function, and it conforms to the FCC Part 68 new standard.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm
- 1-Form-A
- Peak Off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- Limit current: 150 mA to 300 mA (t = 5 ms)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A  
File No.E67349



Weight: 0.1 g (typ.)

## Pin Configuration (top view)



Start of commercial production  
2002-02

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I <sub>F</sub>	50	mA
	Forward current derating (Ta≥25°C)	ΔI <sub>F</sub> /°C	-0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I <sub>FP</sub>	1	A
	Reverse voltage	V <sub>R</sub>	5	V
	Diode power dissipation	P <sub>D</sub>	50	mW
	Diode power dissipation derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-0.5	mW/°C
	Junction temperature	T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage	V <sub>OFF</sub>	350	V
	On-state current	I <sub>ON</sub>	120	mA
	On-state current derating (Ta≥25°C)	ΔI <sub>ON</sub> /°C	-1.2	mA/°C
	Output power dissipation	P <sub>O</sub>	300	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔP <sub>O</sub> /°C	-3.0	mW/°C
	Junction temperature	T <sub>j</sub>	125	°C
Storage temperature range		T <sub>stg</sub>	-55 to 125	°C
Operating temperature range		T <sub>opr</sub>	-40 to 85	°C
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	°C
Isolation voltage (AC, 60 s, R.H.≤ 60 %) (Note 1)		BV <sub>S</sub>	1500	V <sub>rms</sub>

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 <sub>DD</sub>	—	—	280	V
Forward current	I <sub>F</sub>	5	7.5	25	mA
On-state current	I <sub>ON</sub>	—	—	120	mA
Operating temperature	T <sub>opr</sub>	-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	Typ.	Max	Unit
LED	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA
	Capacitance between terminals	C <sub>T</sub>	V <sub>F</sub> = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I <sub>OFF</sub>	V <sub>OFF</sub> = 350 V	—	—	1	μA
	Capacitance between terminals	C <sub>OFF</sub>	V = 0 V, f = 1 MHz	—	70	—	pF

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I <sub>FT</sub>	I <sub>ON</sub> = 120 mA	—	1	3	mA
Return LED current	I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1	—	—	mA
Load current limiting	I <sub>LIM</sub>	I <sub>F</sub> = 5 mA, V <sub>DD</sub> = 5 V, t = 5 ms	150	—	300	mA
On-state resistance	R <sub>ON</sub>	I <sub>ON</sub> = 120 mA, I <sub>F</sub> = 5 mA	—	17	35	Ω

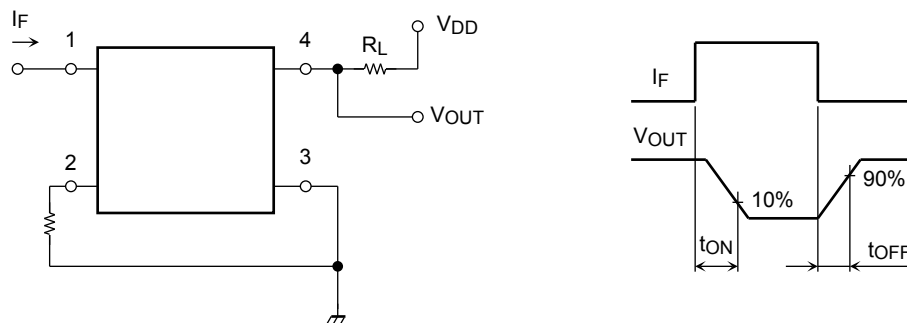
## Isolation Characteristics (Ta = 25°C)

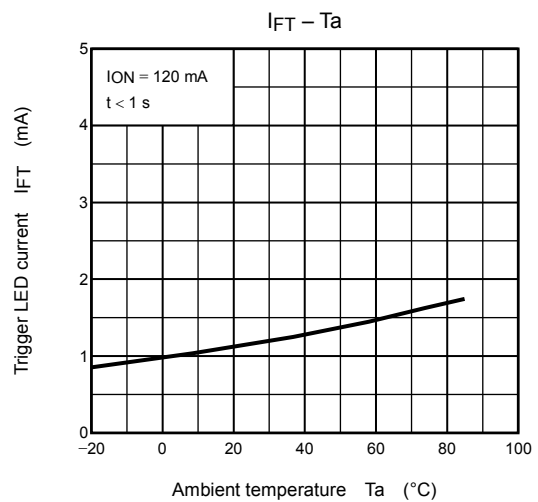
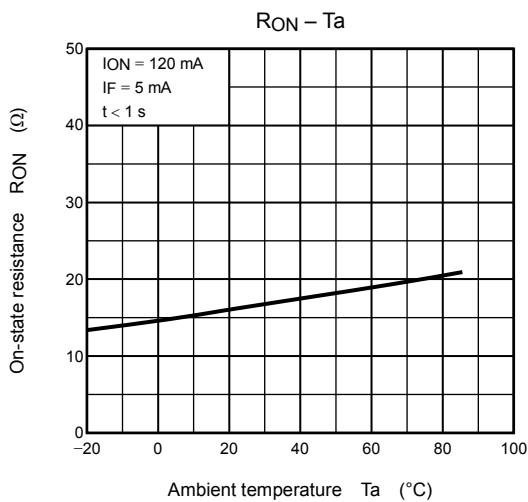
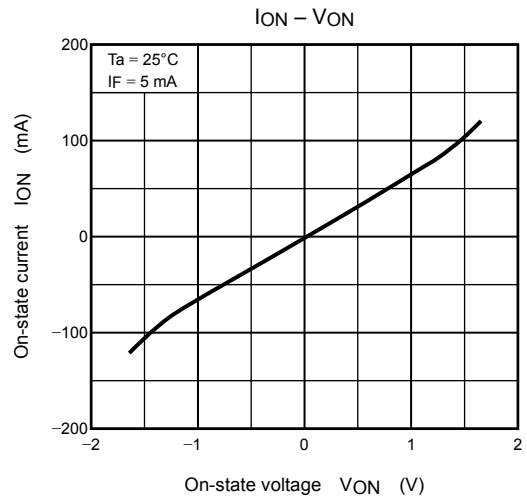
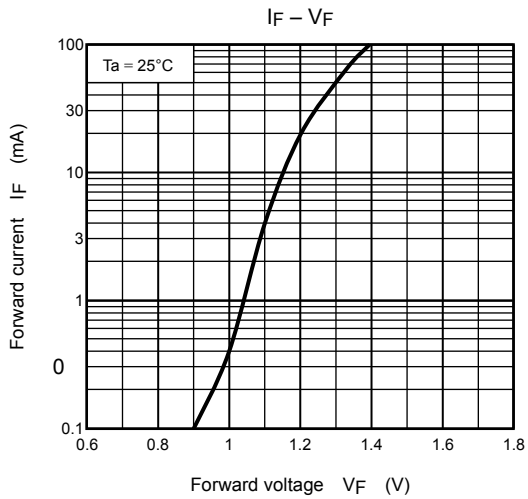
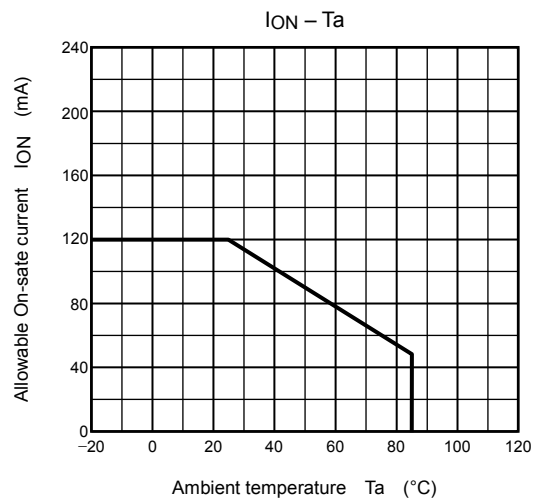
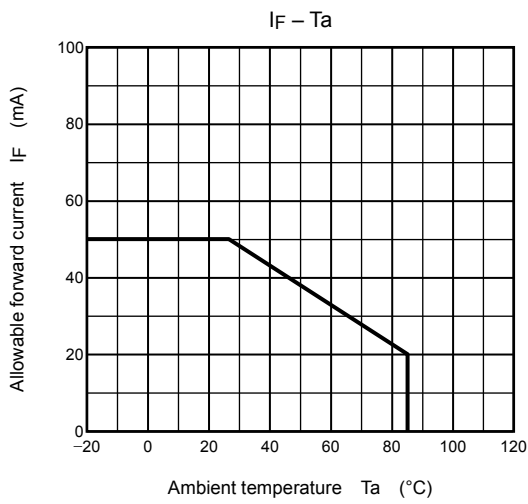
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60 %	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation voltage	BV <sub>S</sub>	AC, 60 s	1500	—	—	V <sub>rms</sub>

## Switching Characteristics (Ta = 25°C)

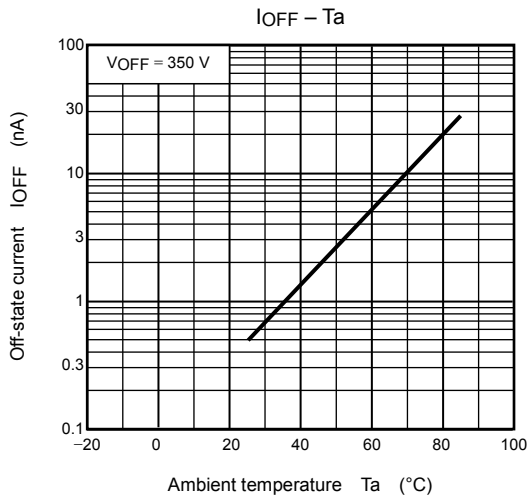
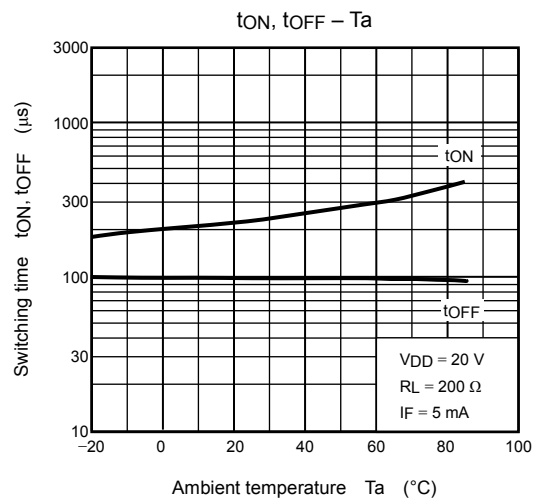
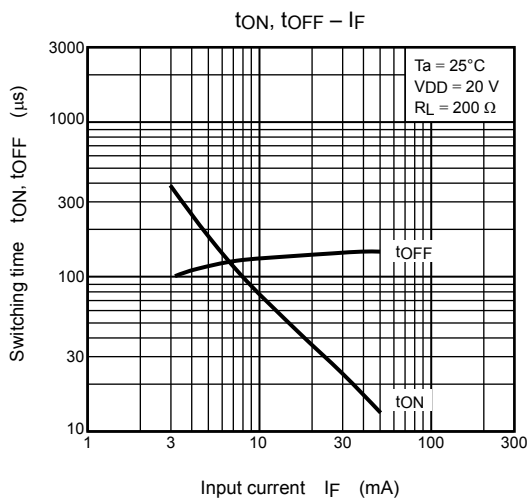
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω V <sub>DD</sub> = 20 V, I <sub>F</sub> = 5 mA (Note 2)	—	0.3	1	ms
Turn-off time	t <sub>OFF</sub>		—	0.1	1	

Note 2: Switching time test circuit





NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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