

TOSHIBA Photocoupler Photorelay

TLP174GA

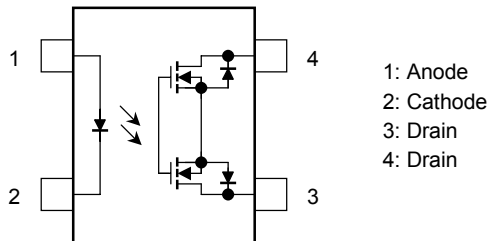
Modem-Fax Cards, Modems in PC
Telecommunications
PBX
Measurement Equipment

The Toshiba TLP174GA consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

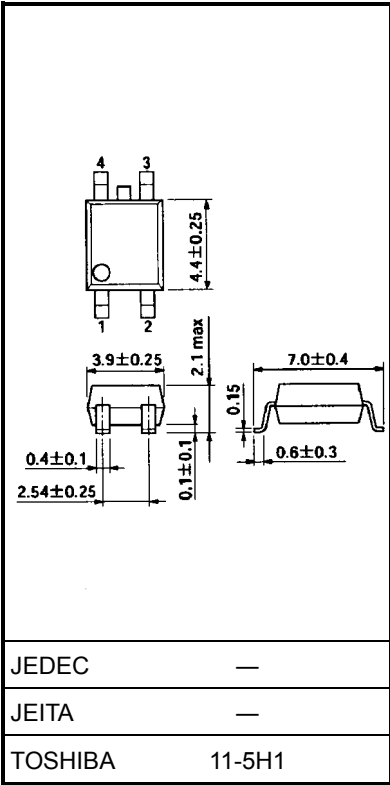
The TLP174GA is suitable for the modem applications which require space savings.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm
- 1-Form-A
- Peak Off-state voltage: 400 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- Limit current: 150 mA~300 mA (t = 5 ms)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 Vrms (min)

Pin Configuration (top view)



Unit: mm



Weight: 0.1 g (typ.)

Maximum Rating (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating (Ta $\geq$ 25°C)	$\Delta I_F/^{\circ}\text{C}$	-0.5	mA/ $^{\circ}\text{C}$
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	$^{\circ}\text{C}$
Detector	Off-state output terminal voltage	V_{OFF}	400	V
	On-state current	I_{ON}	120	mA
	On-state current derating (Ta $\geq$ 25°C)	$\Delta I_{ON}/^{\circ}\text{C}$	-1.2	mA/ $^{\circ}\text{C}$
	Junction temperature	T_j	125	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-55~125	$^{\circ}\text{C}$
Operating temperature range		T_{opr}	-40~85	$^{\circ}\text{C}$
Lead soldering temperature (10 s)		T_{sol}	260	$^{\circ}\text{C}$
Isolation voltage (AC, 1 min, R.H. $\leq$ 60%) (Note 1)		BV_S	1500	Vrms

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}	—	—	320	V
Forward current	I_F	5	7.5	25	mA
On-state current	I_{ON}	—	—	120	mA
Operating temperature	T_{opr}	-20	—	65	$^{\circ}\text{C}$

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	$V = 0, f = 1\text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 400\text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1\text{ MHz}$	—	70	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$I_{ON} = 120\text{ mA}$	—	1	3	mA
Close LED current	I_{FC}	$I_{OFF} = 100\text{ }\mu\text{A}$	0.1	—	—	mA
Load current limiting	I_{LIM}	$I_{ON} = 5\text{ mA}$, $V_{DD} = 5\text{ V}$, $t < 5\text{ ms}$	150	—	300	Ω
On-state resistance	R_{ON}	$I_{ON} = 120\text{ mA}$, $I_F = 5\text{ mA}$	—	17	35	

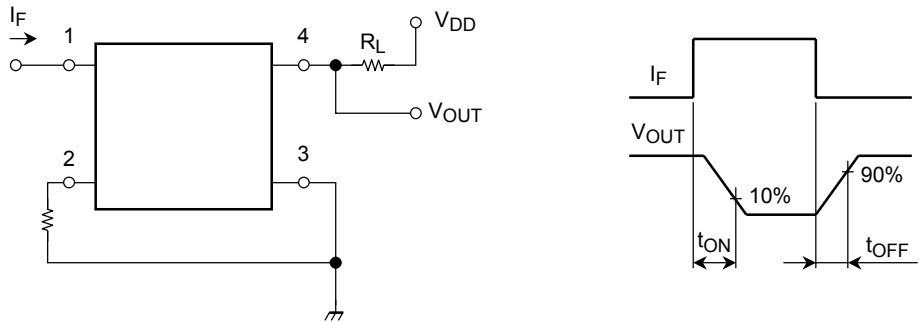
Isolation Characteristics (Ta = 25°C)

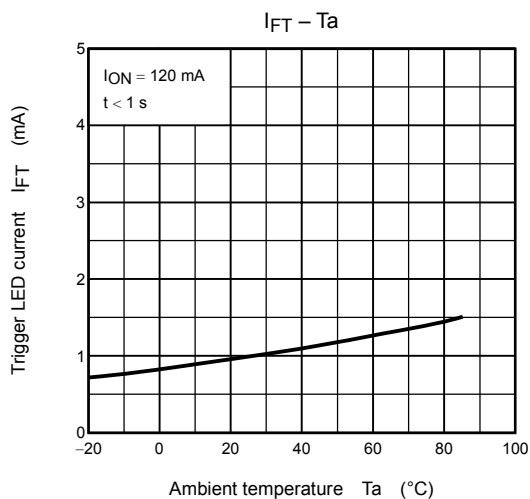
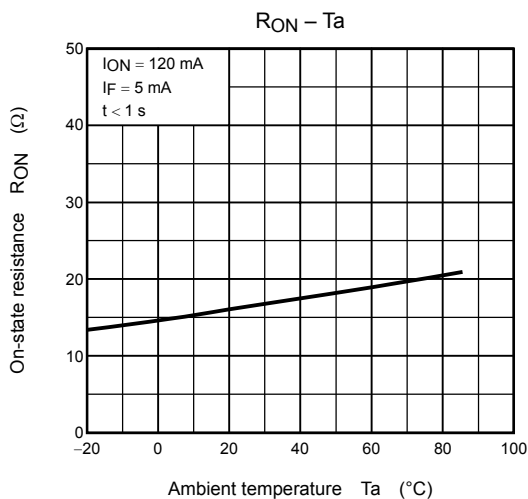
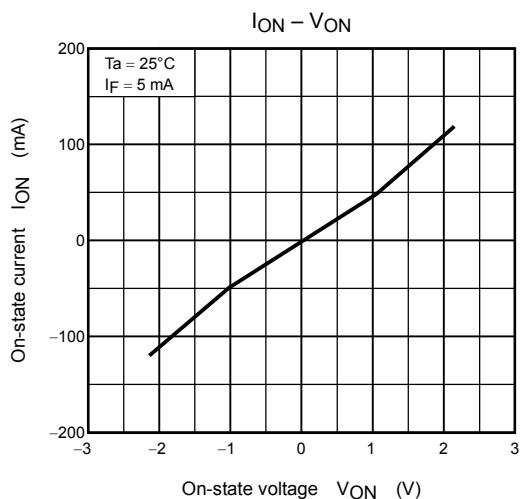
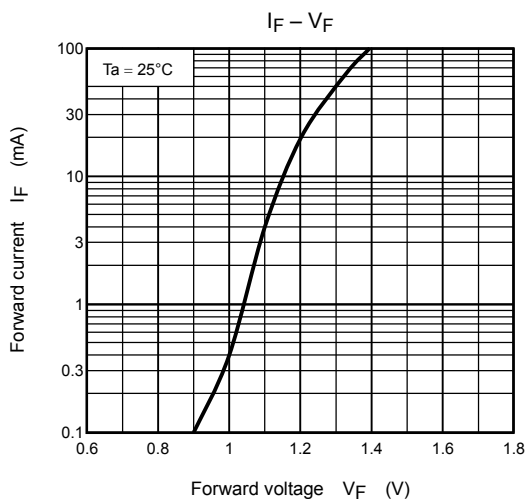
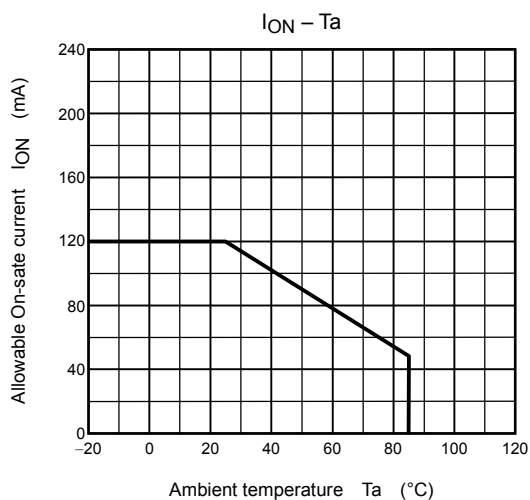
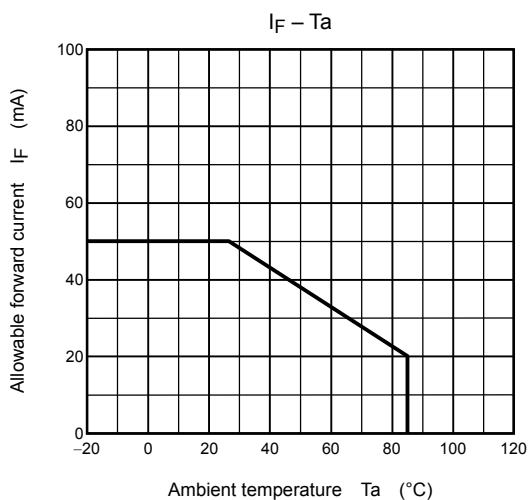
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500\text{ V}$, R.H. $\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	1500	—	—	Vrms
		AC, 1 s, in oil	—	3000	—	
		DC, 1 min, in oil	—	3000	—	Vdc

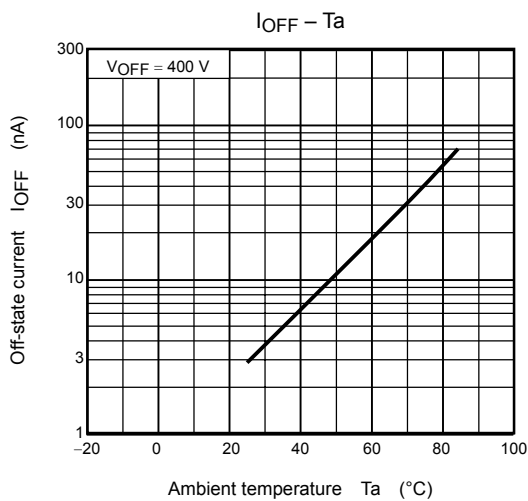
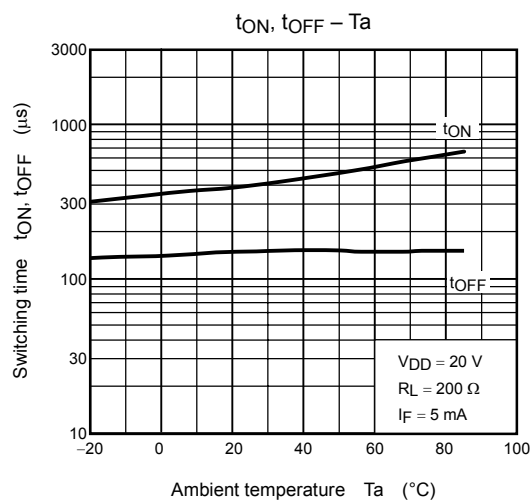
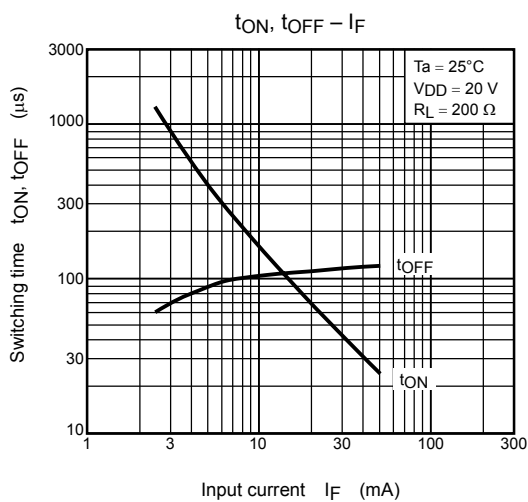
Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200\text{ }\Omega$ $V_{DD} = 20\text{ V}$, $I_F = 5\text{ mA}$ (Note 2)	—	0.3	1	ms
Turn-off time	t_{OFF}		—	0.1	1	

Note 2: Switching time test circuit







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