

TOSHIBA Photocoupler Photorelay

TLP174GA

Modem-Fax Cards, Modems in PC

Telecommunications

PBX

Measurement Equipment

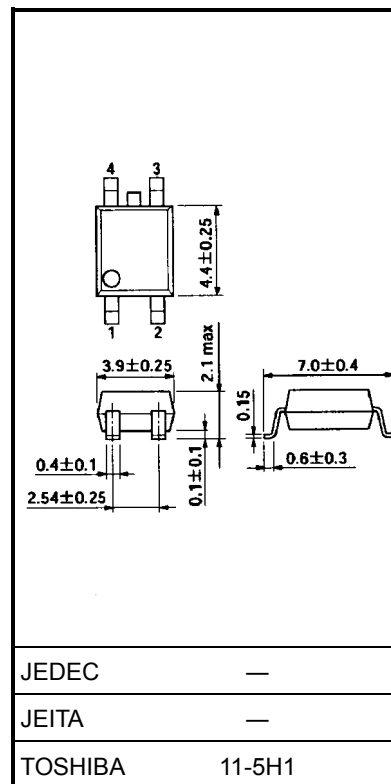
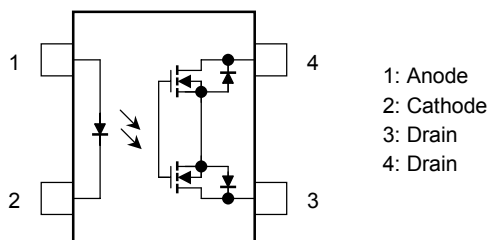
Unit: mm

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: 35Ω (max)
- Isolation voltage: 1500 Vrms (min)

Pin Configuration (top view)



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 ≥ 25°C)	ΔI _F /°C	−0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I _{FP}	1	A
	Reverse voltage	V _R	5	V
	Junction temperature	T _j	125	°C
Detector	Off-state output terminal voltage	V _{OFF}	400	V
	On-state current	I _{ON}	120	mA
	On-state current derating (Ta ≥ 25°C)	ΔI _{ON} /°C	−1.2	mA/°C
	Junction temperature	T _j	125	°C
Storage temperature range		T _{stg}	−55~125	°C
Operating temperature range		T _{opr}	−40~85	°C
Lead soldering temperature (10 s)		T _{sol}	260	°C
Isolation voltage (AC, 1 min, R.H. ≤ 60%) (Note 1)		BV _S	1500	V _{rms}

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	°C

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I _{OFF}	V _{OFF} = 400 V	—	—	1	μA
	Capacitance	C _{OFF}	V = 0, f = 1 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	

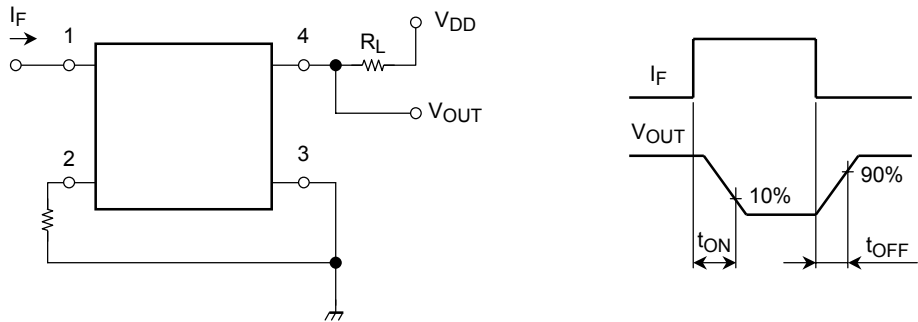
Isolation Characteristics (Ta = 25°C)

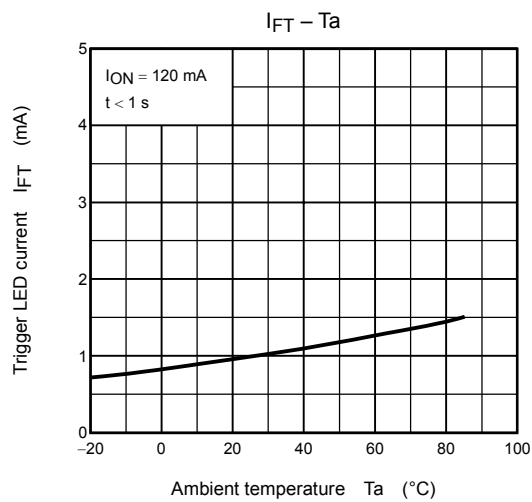
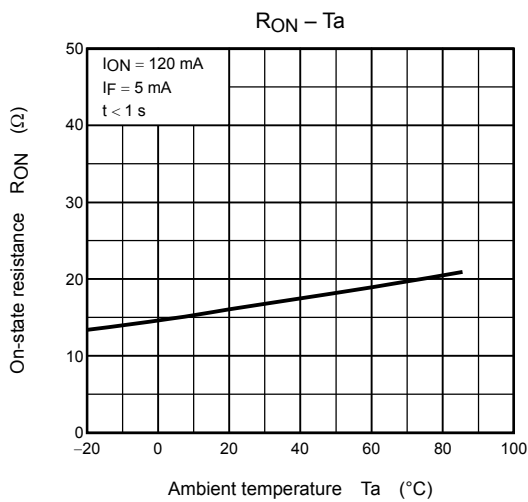
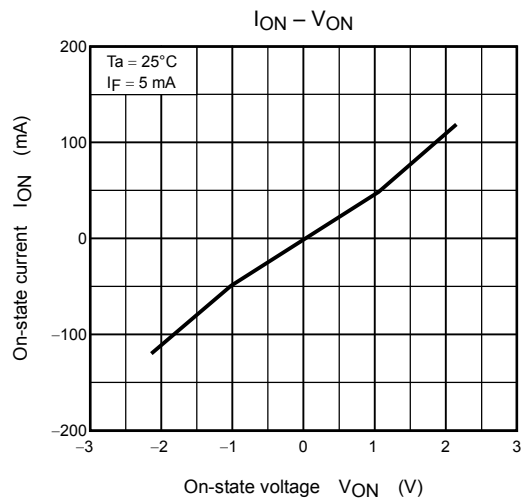
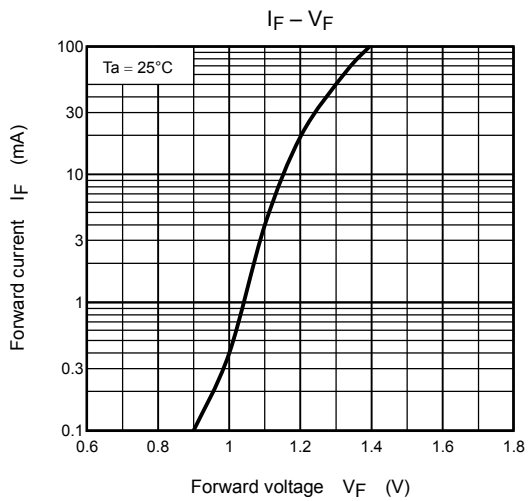
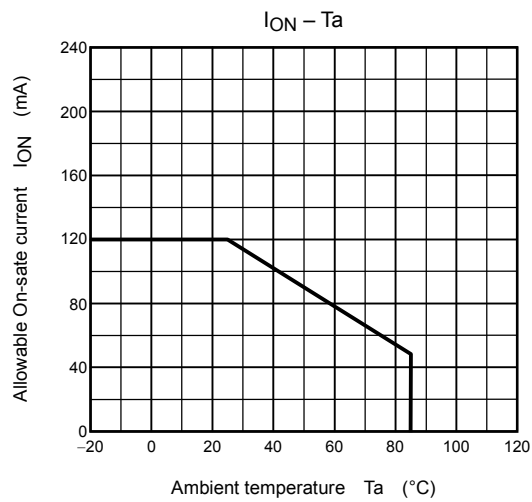
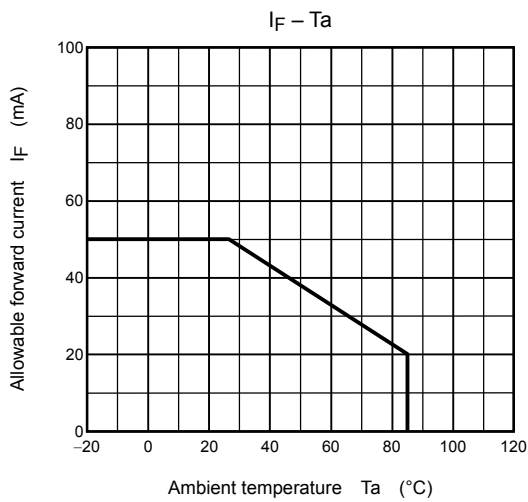
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500\text{ V}$, R.H. $\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	1500	—	—	Vrms
		AC, 1 s, in oil	—	3000	—	
	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

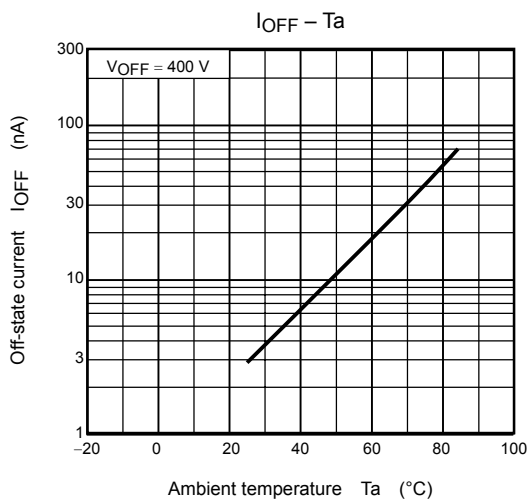
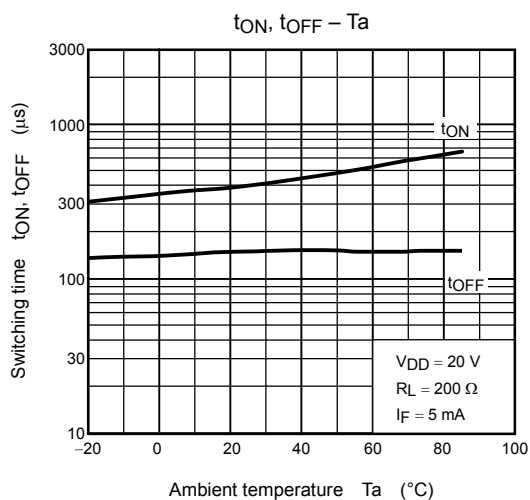
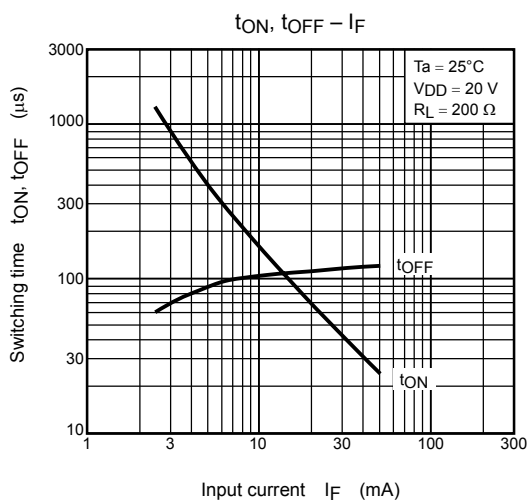
Switching Characteristics (Ta = 25°C)

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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