TOSHIBA Photocoupler IRED & Photo-MOS FET

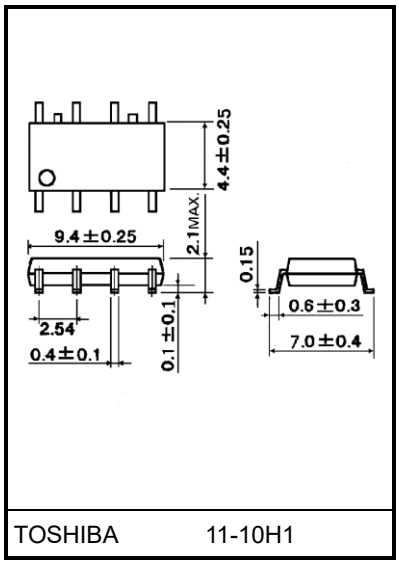
TLP206G

PBX
Modem・FAX Card
Measurement Instrument

The TOSHIBA TLP206G consists of an infrared emitting diode optically coupled to a photo-MOS FET in a 8 pin SOP.
The TLP206G is a 2-Form-A switch which is suitable for replacement of mechanical relays in many applications.

- SOP 8 pin (2.54SOP8): 2-Form-A
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 V_{rms} (min)
- UL-recognized: UL 1577, File No.E67349

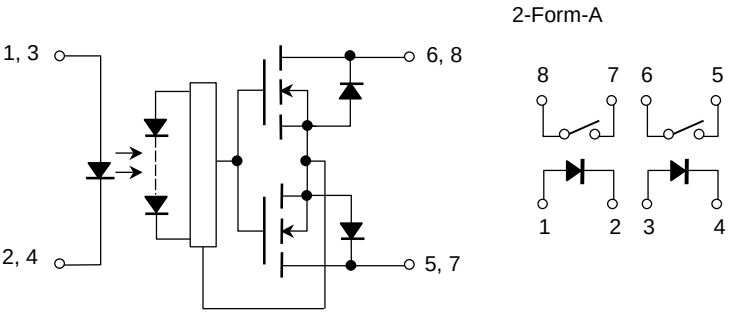
Unit: mm



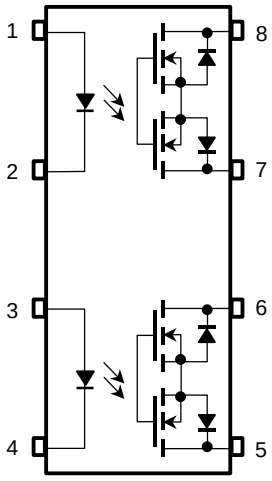
TOSHIBA 11-10H1

Weight: 0.2 g (typ.)

Schematic



Pin Configuration (top view)



1, 3: Anode
2, 4: Cathpde
5: Drain D1
6: Drain D2
7: Drain D3
8: Drain D4

Start of commercial production
1997-08

Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
LED	Forward current		I_F	50	mA
	Forward current derating (Ta ≥ 25°C)		ΔI_F / °C	-0.5	mA / °C
	Pulse forward current (100μs pulse, 100pps)		I_{FP}	1	A
	Reverse voltage		V_R	5	V
	Diode power dissipation		P_D	50	mW
	Diode power dissipation derating (Ta ≥ 25°C)		ΔP_D /°C	-0.5	mW/°C
	Junction temperature		T_j	125	°C
Detector	Off-state output terminal voltage		V_{OFF}	350	V
	On-state current	Both channel	I_{ON}	100	mA
		One channel		120	
	On-state RMS current derating(Ta ≥ 25°C)	Both channel	ΔI_{ON} / °C	-1.0	mA / °C
		One channel		-1.2	
	Output power dissipation		P_O	454	mW
	Output power dissipation derating (Ta ≥ 25°C)		ΔP_O / °C	-4.54	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 %) (Note 1)			BV_S	1500	V_{rms}

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: Pins1, 2, 3 and 4 shorted together and pins 5, 6, 7 and 8 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	280	V
Forward current	I_F	5	7.5	25	mA
On-state current	I_{ON}	—	—	100	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.

Electrical Characteristics (Ta = 25°C)

	Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I_R	V_R = 5 V	—	—	10	μA
LED	Capacitance	C_T	V_F = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I_{OFF}	V_{OFF} = 350 V	—	—	1	μA
Detector	Capacitance	C_{OFF}	V = 0 V, f = 1MHz	—	40	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	I_{ON} = 120 mA	—	1	3	mA
On-state resistance	R_{ON}	I_{ON} = 120 mA, I_F = 5 mA	—	22	35	Ω

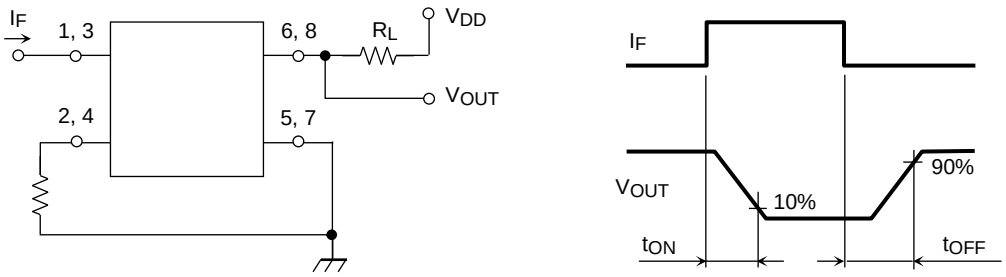
Isolation Characteristics (Ta = 25°C)

Characteristic	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}

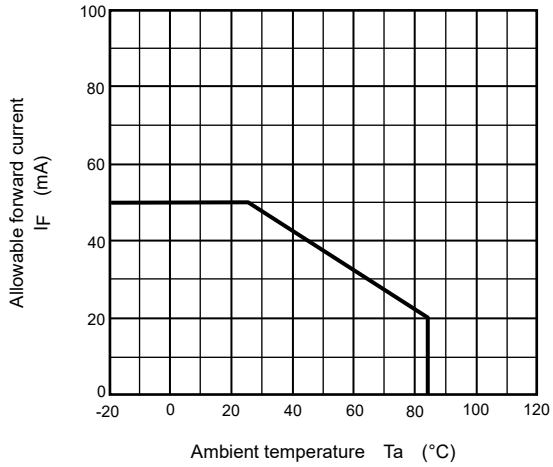
Switching Characteristics (Ta = 25°C)

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

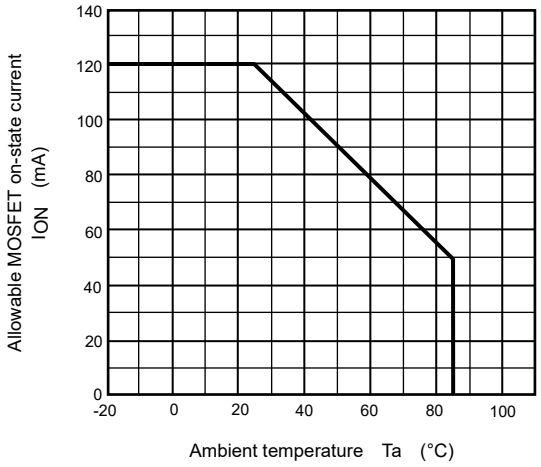
Note 2: Switching time test circuit



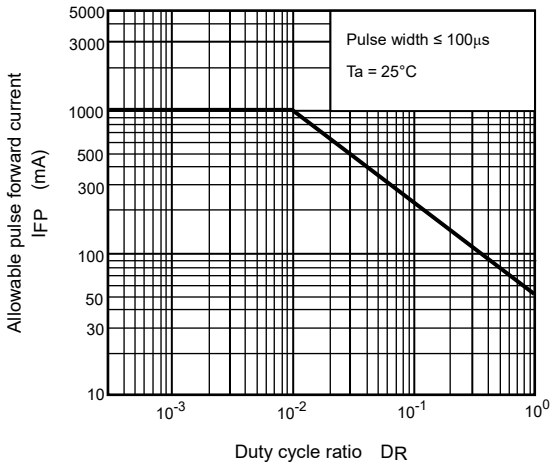
I_F – Ta



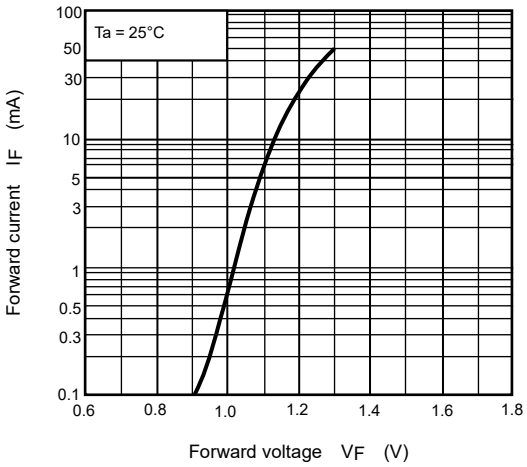
I_{ON} – Ta



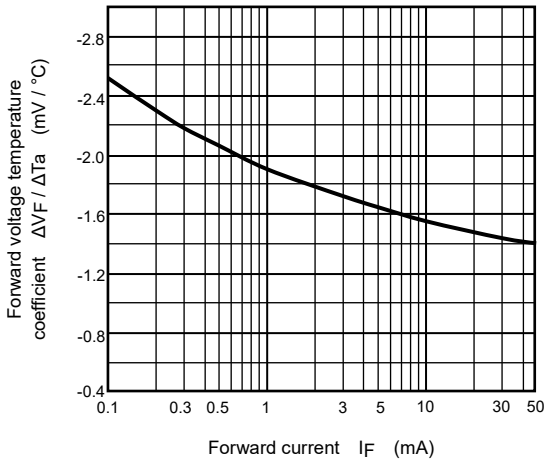
I_{FP} – D_R



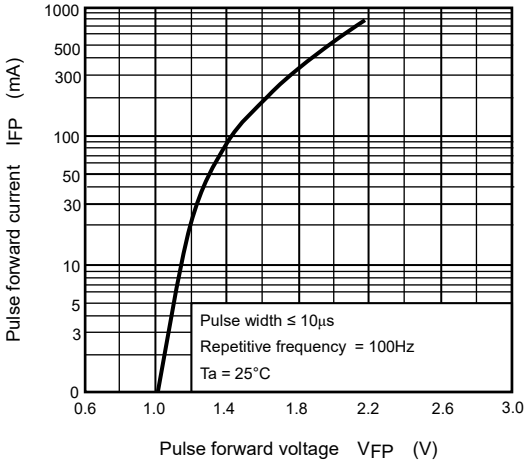
I_F –V_F



$\Delta V_F / \Delta Ta$ – I_F

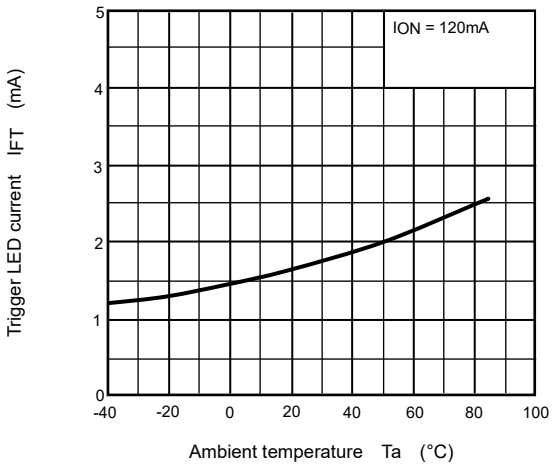


I_{FP} – V_{FP}

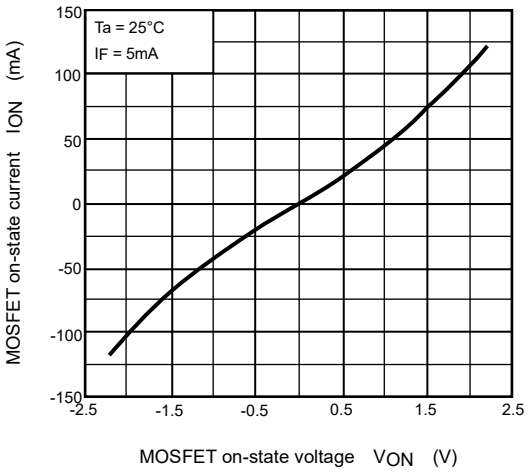


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

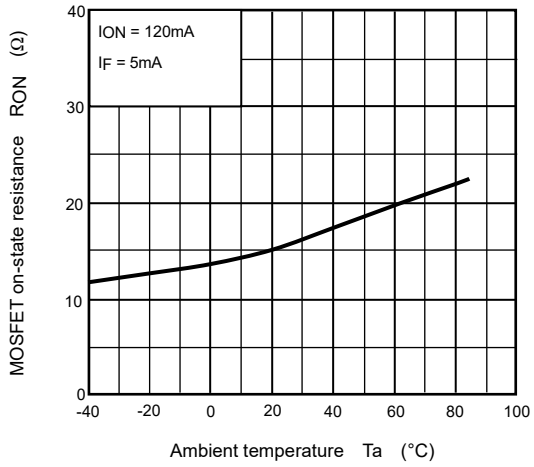
I_{FT} – Ta



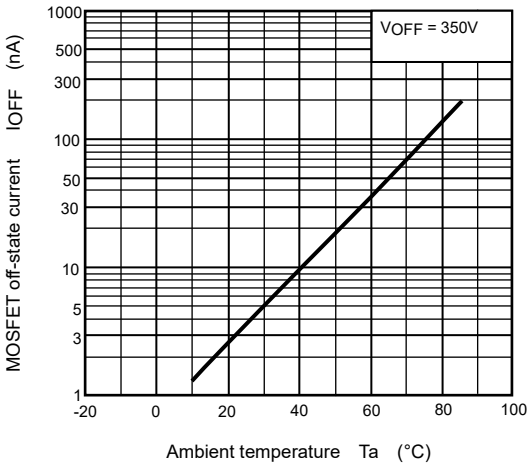
I_{ON} – V_{ON}



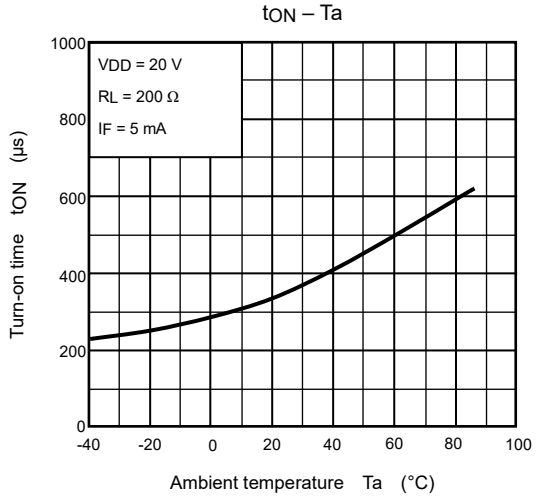
R_{ON} – Ta



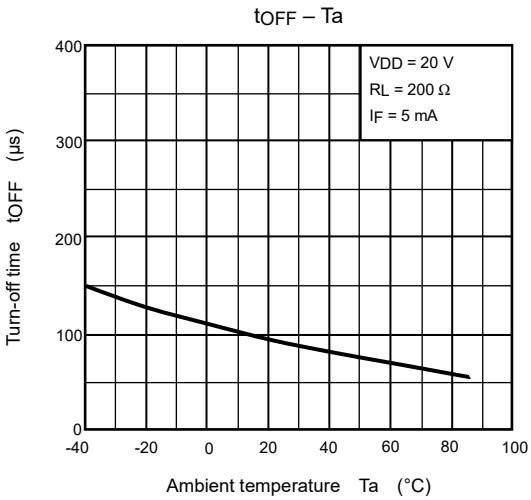
I_{OFF} – Ta



t_{ON} – Ta



t_{OFF} – Ta



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