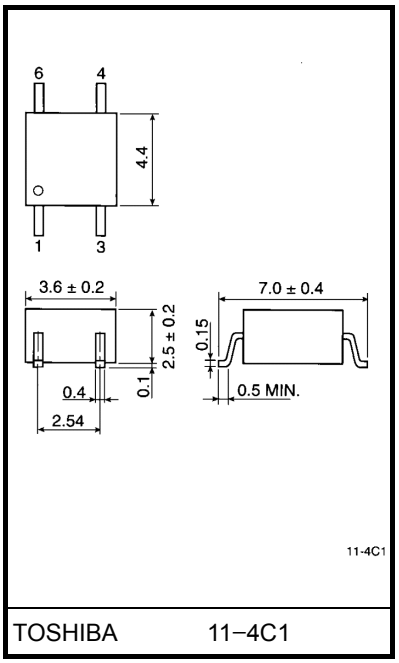
TOSHIBA Photocoupler GaAℓAs Ired & Photo−Diode Array

TLP190B

Telecommunication
Programmable Controllers
MOS Gate Driver
MOS FET Gate Driver

Unit in mm



TOSHIBA 11−4C1

Weight: 0.09 g

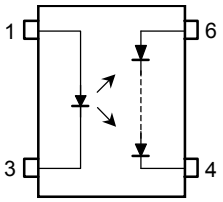
The TOSHIBA mini flat coupler TLP190B is a small outline coupler, suitable for surface mount assembly.
The TLP190B consists of a GaAℓAs light emitting diode, optically coupled to a series connected photo diode array which is suitable for MOS FET gate drive.

- Open voltage: 7.0V (min.)
- Short current: 12.0μA (min.)
- Isolation voltage: 2500Vrms (min.)
- UL recognized: UL1577, file no. E67349

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	3	V
	Junction temperature	T_j	125	°C
Detector	Forward current	I_{FD}	50	μA
	Reverse voltage	V_{RD}	10	V
	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)		BV_S	2500	Vrms

Pin Configuration (top view)



1. Anode
3. Cathode
4. Cathode
6. Anode

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: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Forward current	I_F	—	20	25	mA
Operating temperature	T_{opr}	−25	—	85	°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)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.2	1.4	1.7	V
	Reverse current	I_R	V_R = 3 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	60	pF
Detector	Forward voltage	V_{FD}	I_C = 10 μA	—	7	—	V
	Reverse current	I_{RD}	V_R = 10 V	—	1	—	nA
	Capacitance (anode to cathode)	C_{TD}	V = 0, f = 1 MHz	—	—	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	MIn.	Typ.	Max.	Unit
Open voltage	V_{OC}	I_F = 10 mA	7	8	—	V
Short current	I_{SC}	I_F = 10 mA	12	20	—	μA

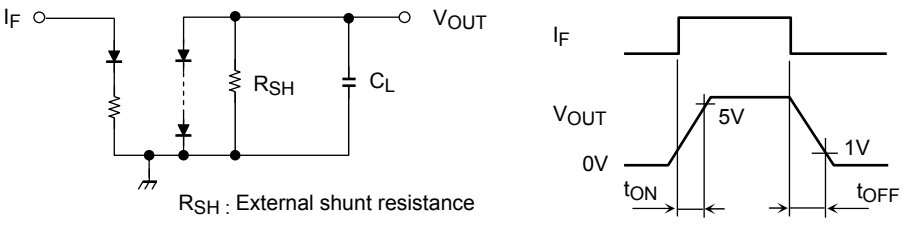
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	V_S = 0, 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, 1 minute	2500	—	—	Vrms
		AC, 1 second in oil	—	5000	—	
		DC, 1 minute in oil	—	5000	—	Vdc

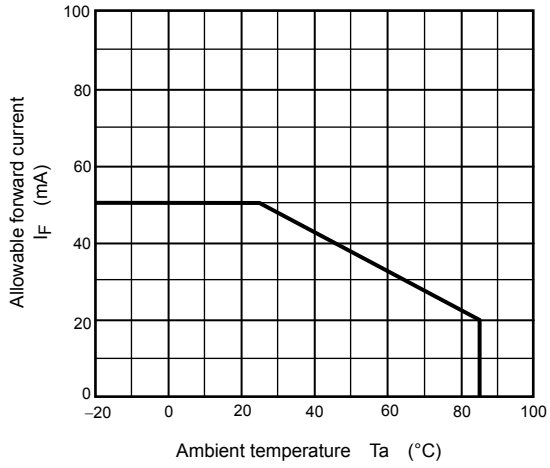
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Turn−on time	t_{ON}	I_F = 20 mA, R_{SH} = 510 kΩ, C_L = 1000pF (Fig. 1)	—	0.2	—	ms
Turn−off time	t_{OFF}		—	1	—	ms

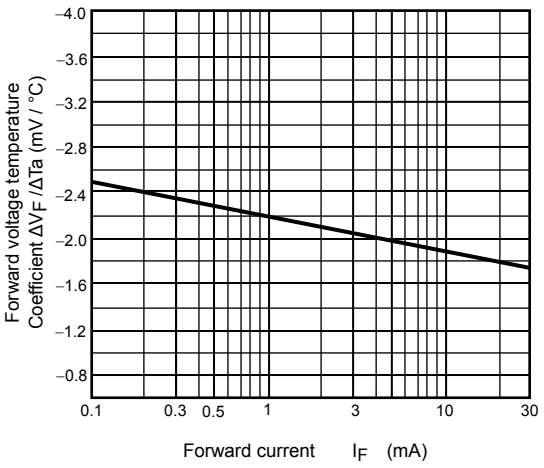
Fig. 1 Switching time test circuit



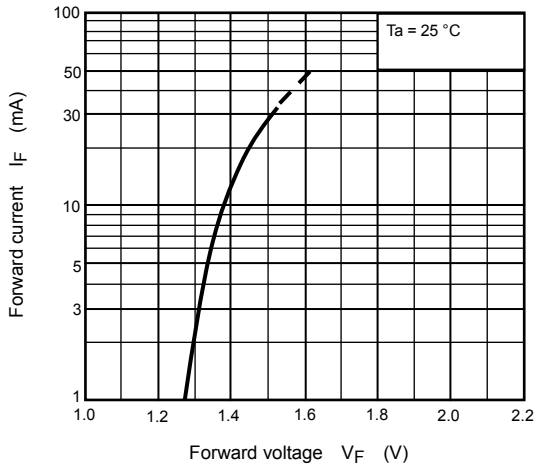
I_F – Ta



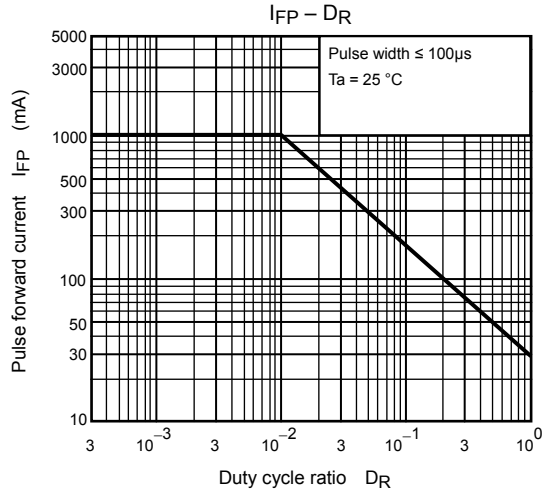
$\Delta V_F / \Delta Ta$ – I_F



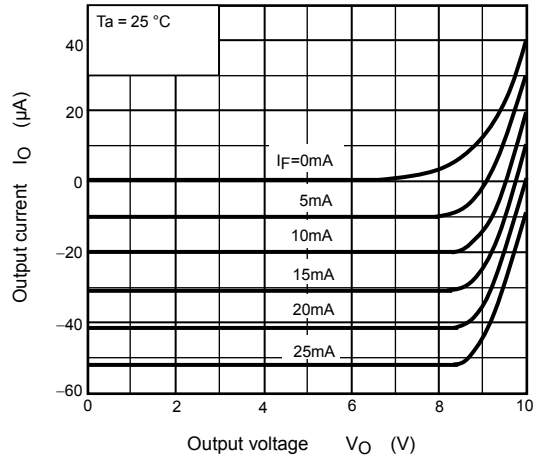
I_F – V_F



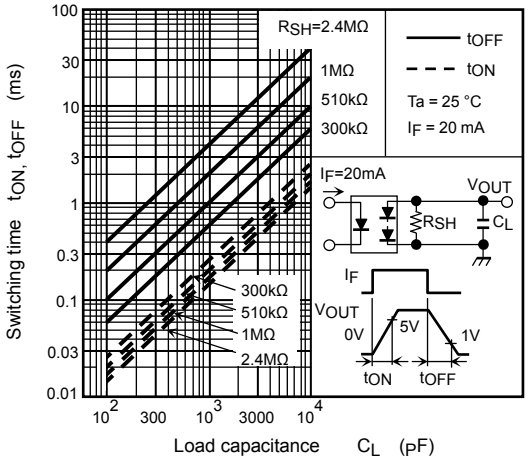
I_{FP} – D_R



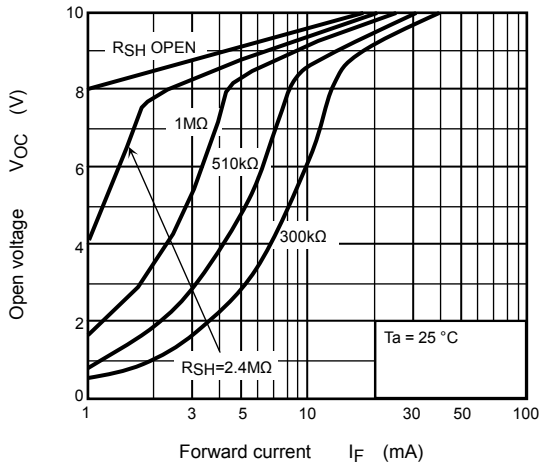
$I_O - V_O$



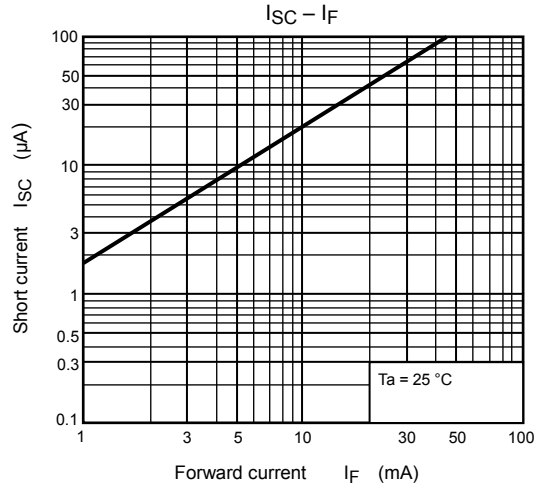
t_{ON}, $t_{OFF} - C_L$



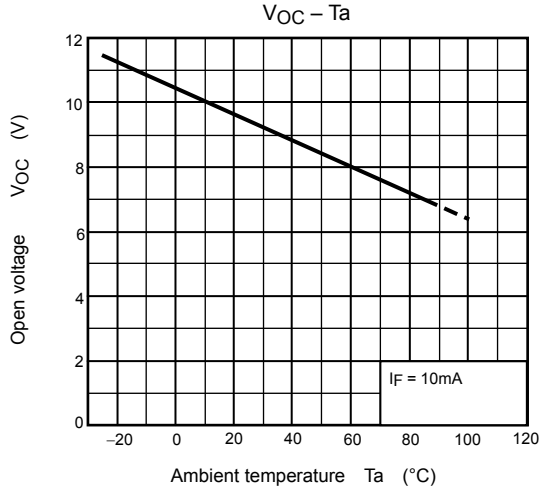
$V_{OC} - I_F$



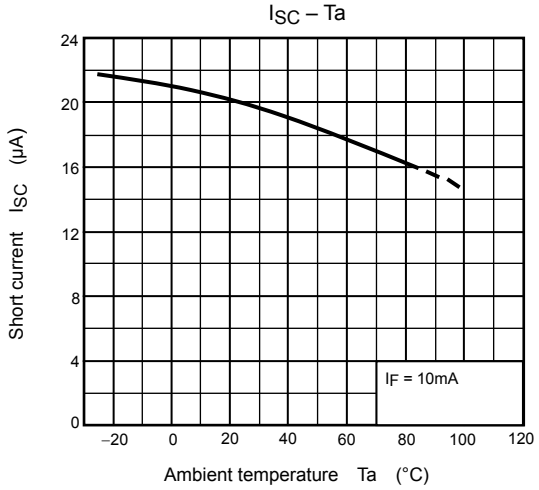
$I_{SC} - I_F$



$V_{OC} - Ta$



$I_{SC} - Ta$



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