

TOSHIBA Photocoupler GaAlAs Ired & Photo-Diode Array

TLP190B

Telecommunications
 Programmable Controllers
 MOS Gate Drivers
 MOSFET Gate Drivers

The TOSHIBA TLP190B mini-flat photocoupler is suitable for surface-mount assembly.
 The TLP190B consists of a GaAlAs light emitting diode optically coupled to a series connected photodiode array which is suitable for MOSFET gate drivers.

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

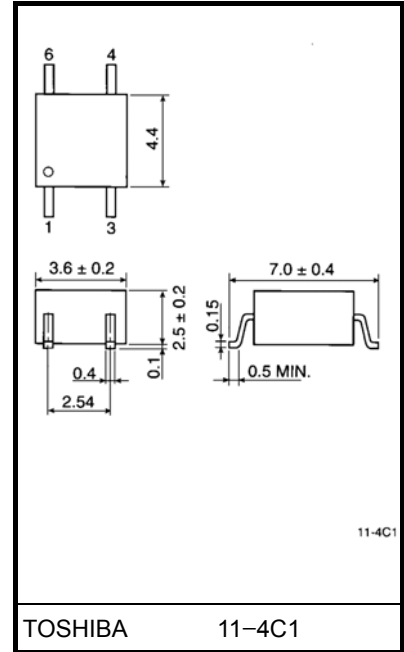
Short Current

Type Name	Classification	Short Current		Marking Of Classification
		(min)	I _F	
TLP190B	C20	20 μ A	10 mA	20
	Standard	12 μ A		20, blank

Note: Application type name for certification test, please use standard product type name, i.e.

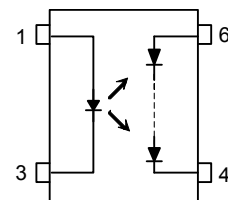
TLP190B(C20) : TLP190B

Unit: mm



Weight: 0.09 g (typ.)

Pin Configuration (top view)



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

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-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 to 125	°C
Operating temperature range		T_{opr}	-40 to 85	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 min., R.H. ≤ 60%) Note 1		BV_S	2500	Vrms

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: 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	$I_F = 10 \text{ mA}$	1.2	1.4	1.7	V
	Reverse current	I_R	$V_R = 3 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	60	pF
Detector	Forward voltage	V_{FD}	$I_C = 10 \mu\text{A}$	—	7	—	V
	Reverse current	I_{RD}	$V_R = 10 \text{ V}$	—	1	—	nA
	Capacitance (anode to cathode)	C_{TD}	$V = 0, f = 1 \text{ MHz}$	—	—	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

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

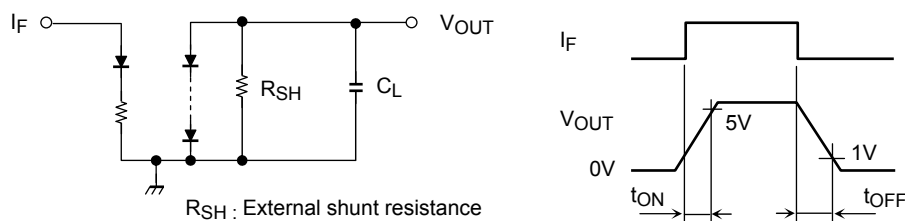
Isolation Characteristics (Ta = 25°C)

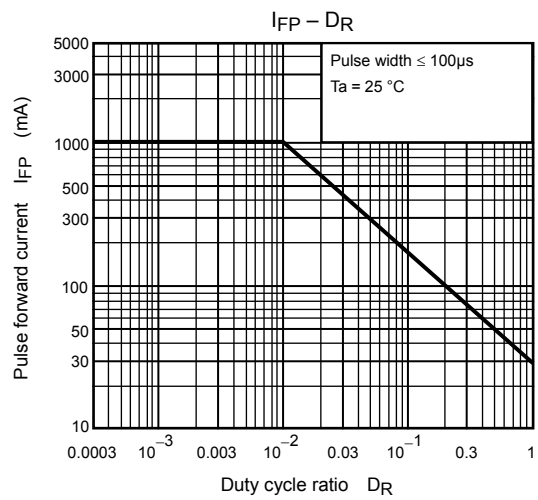
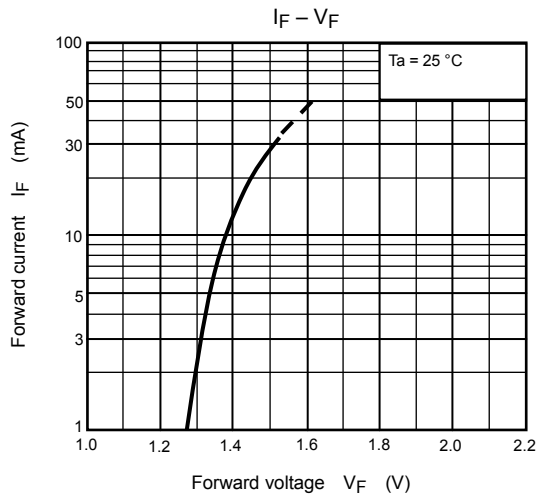
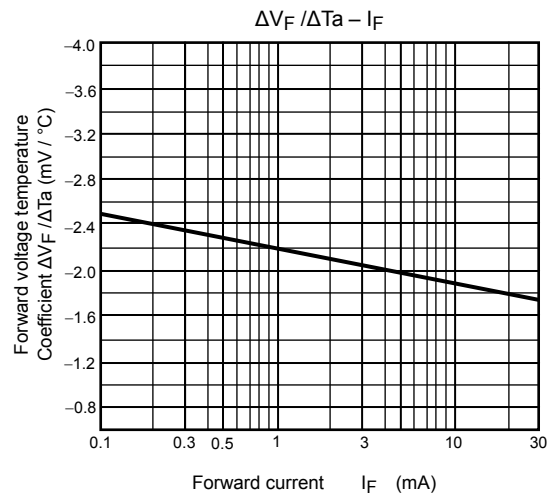
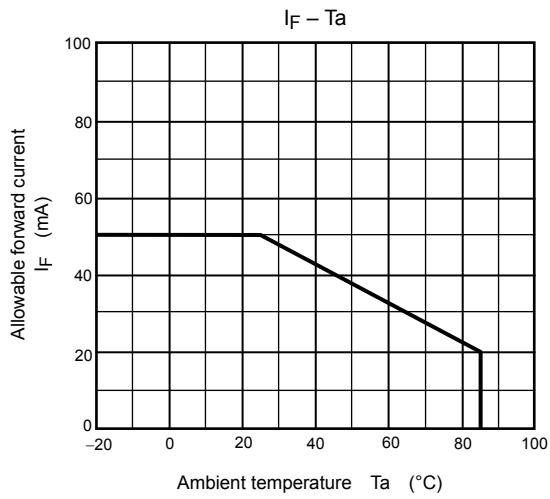
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second in oil	—	5000	—	
		DC, 1 minute in oil	—	5000	—	Vdc

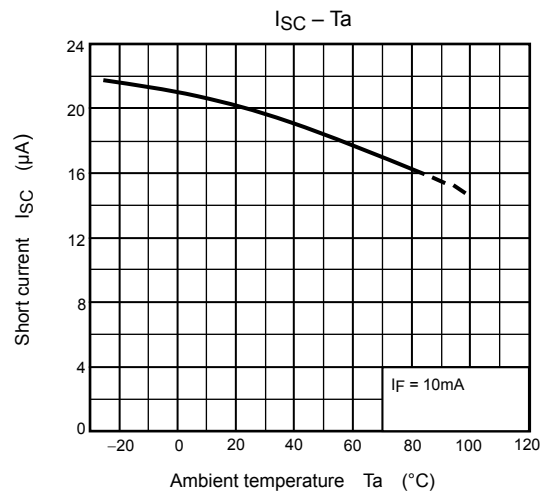
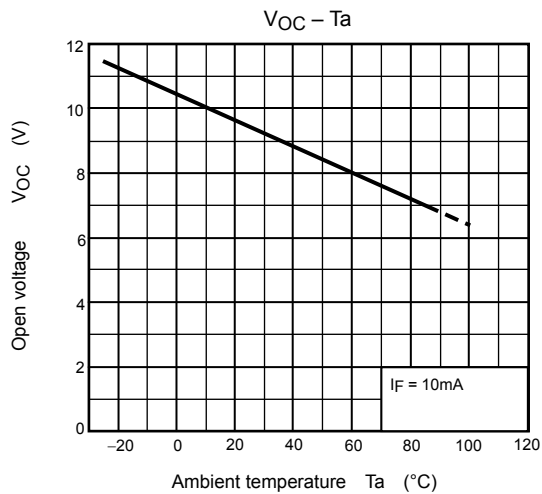
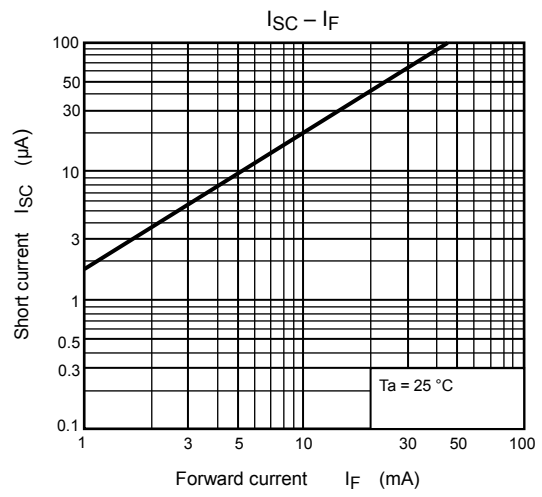
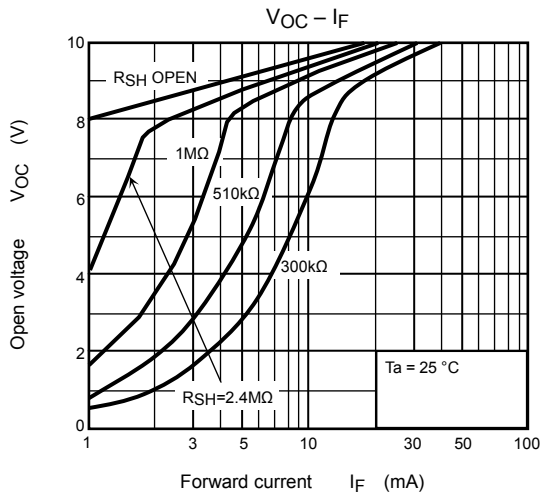
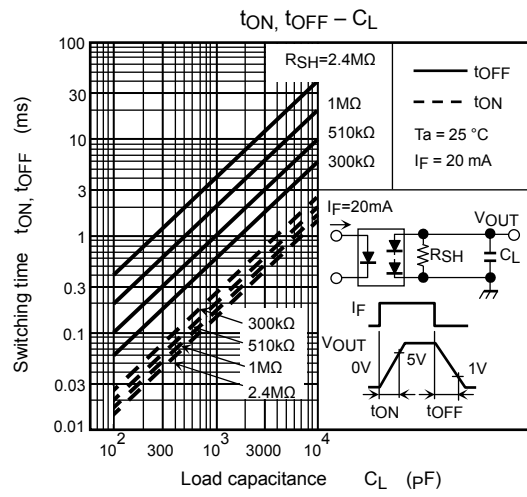
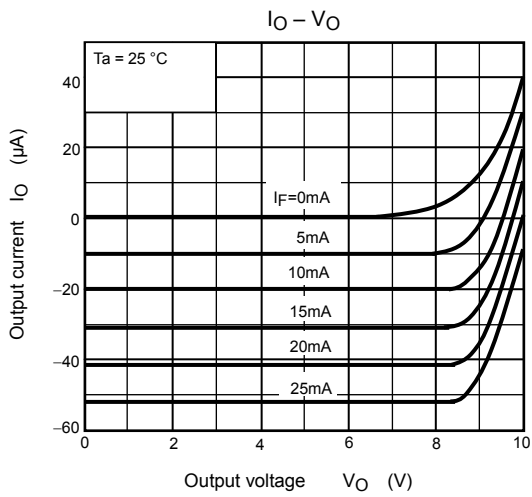
Switching Characteristics (Ta = 25°C)

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

Fig. 1 Switching time test circuit







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