

TOSHIBA Photocoupler GaAlAs Ired & Photo-Diode Array

# TLP590B

Telecommunications  
 Programmable Controllers  
 MOS Gate Drivers  
 MOSFET Gate Drivers

The TOSHIBA TLP590B consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a series-connected photo-diode array in a six-lead plastic DIP package.  
 The TLP590B is suitable for MOSFET gate drivers.

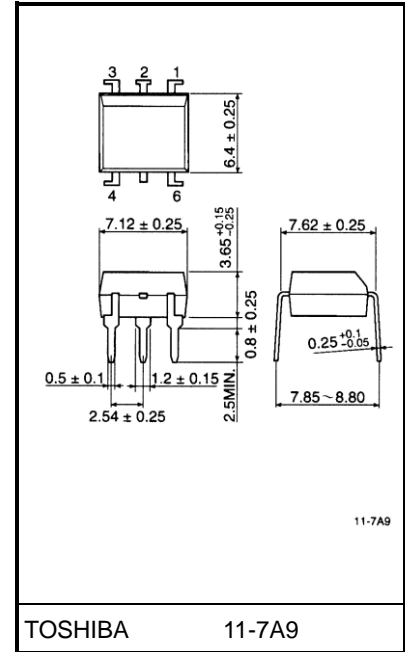
- UL recognized: UL1577, file No. E67349

### Short Current

Type Name	Classification	Short Current		Classification Marking
		(min)	I <sub>F</sub>	
TLP590B	C20	20 μA	10 mA	20
	Standard	12 μA		20, blank

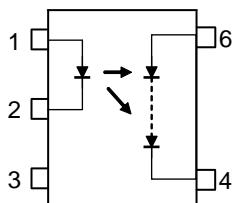
Note: When applying for a safety standard approval, use the type name of the standard device.  
 TLP590B(C20): TLP590B

Unit: mm



Weight: 0.39 g (typ.)

### Pin Configuration (Top View)



- 1: Anode(LED)
- 2: Cathode(LED)
- 3: N.C.
- 4: Cathode
- 6: Anode

Start of commercial production  
 1989-02

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I <sub>F</sub>	50	mA
	Forward current derating (Ta ≥ 25°C)	ΔI <sub>F</sub> / °C	-0.5	mA / °C
	Pulse forward current (100 μs pulse, 100 pps)	I <sub>FP</sub>	1	A
	Reverse voltage	V <sub>R</sub>	3	V
	Diode power dissipation	P <sub>D</sub>	100	mW
	Diode power dissipation derating (Ta ≥ 25°C)	ΔP <sub>D</sub> / °C	-1.0	mW/°C
	Junction temperature	T <sub>j</sub>	125	°C
Detector	Forward current	I <sub>FD</sub>	50	μA
	Reverse voltage	V <sub>RD</sub>	10	V
	Output power dissipation	P <sub>O</sub>	0.5	mW
	Junction temperature	T <sub>j</sub>	125	°C
Storage temperature range		T <sub>stg</sub>	-55 to 125	°C
Operating temperature range		T <sub>opr</sub>	-40 to 85	°C
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	°C
Isolation voltage (AC, 60 s, R.H. ≤ 60%) (Note 1)		BV <sub>S</sub>	2500	V <sub>rms</sub>

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, 2 and 3 shorted together, and pins 4 and 6 shorted together.

## Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Forward current	I <sub>F</sub>	—	20	25	mA
Operating temperature	T <sub>opr</sub>	-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.

## 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	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0\text{V}, f = 1 \text{ MHz}$	—	30	60	pF
Detector	Forward voltage	$V_{FD}$	$I_{FD} = 10 \mu\text{A}$	—	7	—	V
	Reverse current	$I_{RD}$	$V_{RD} = 10 \text{ V}$	—	1	—	nA

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Open voltage	$V_{OC}$	$I_F = 10 \text{ mA}$	7.0	8.0	—	V
Short current	$I_{SC}$	$I_F = 10 \text{ mA}$	12	20	—	$\mu\text{A}$

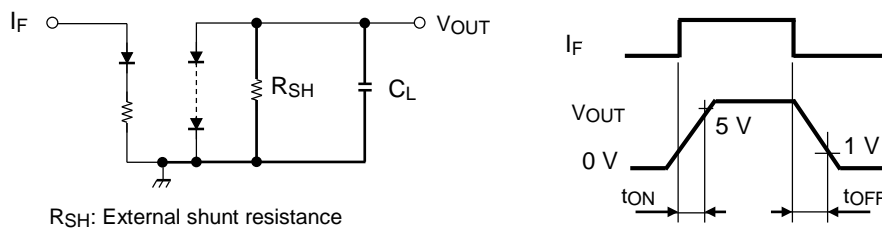
## Isolation Characteristics (Ta = 25°C)

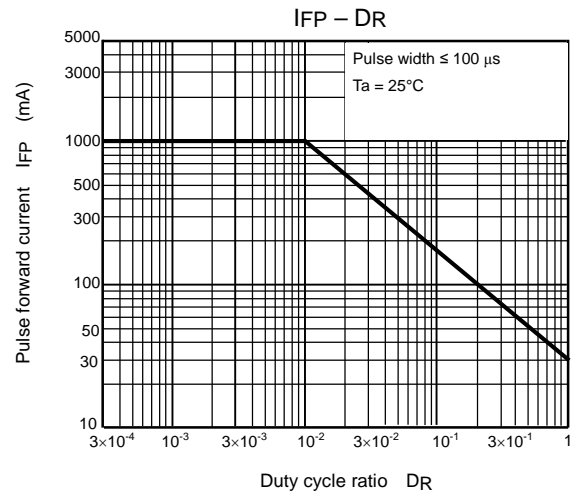
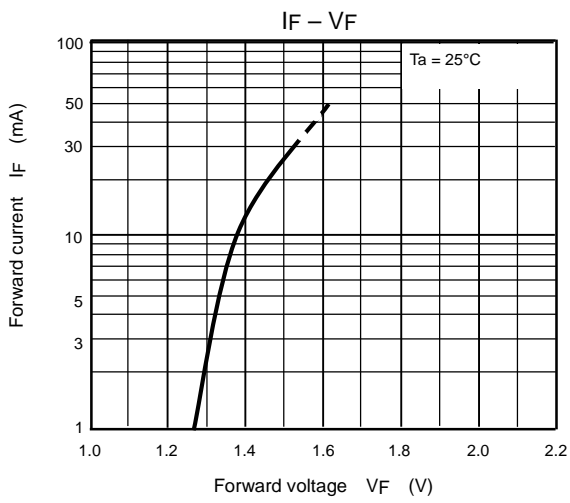
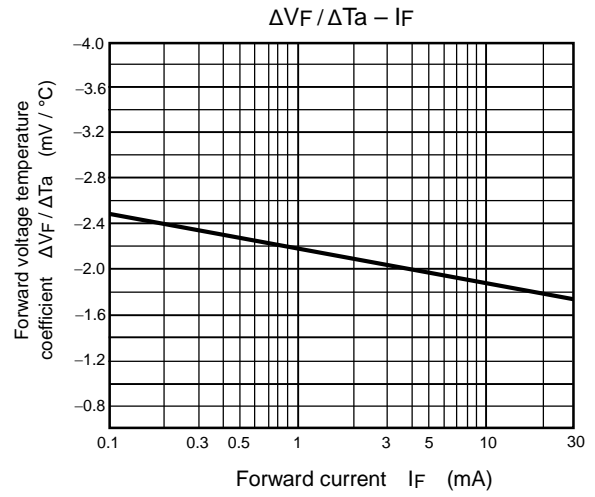
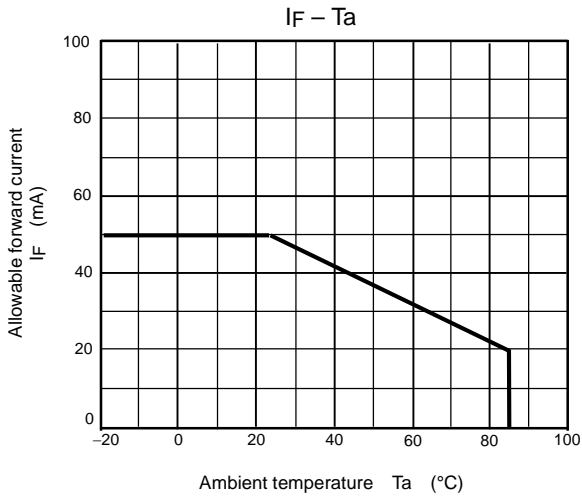
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0\text{V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 60 s	2500	—	—	Vrms
		AC,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

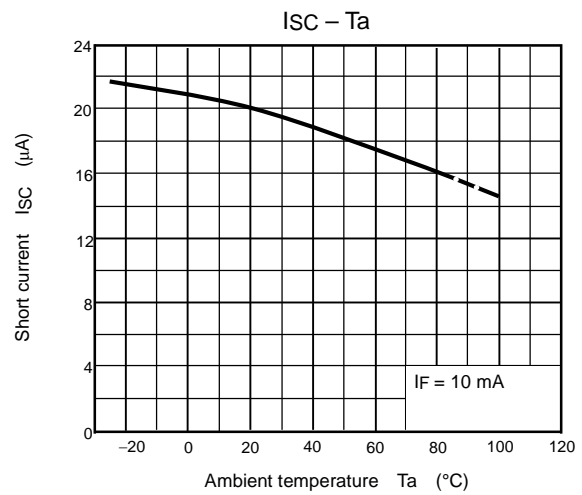
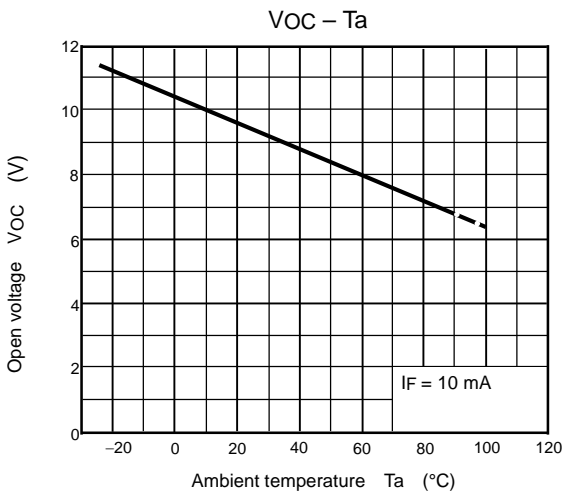
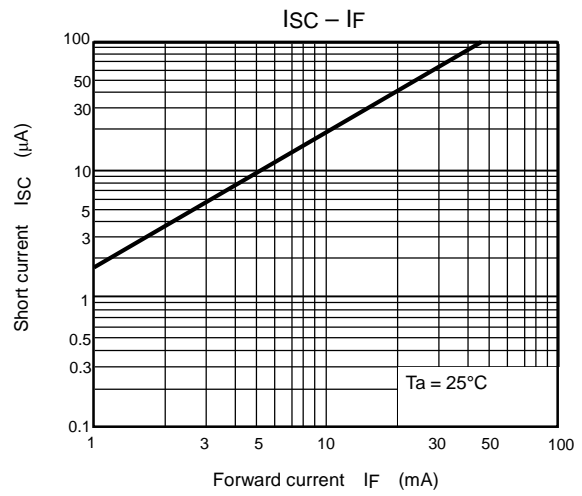
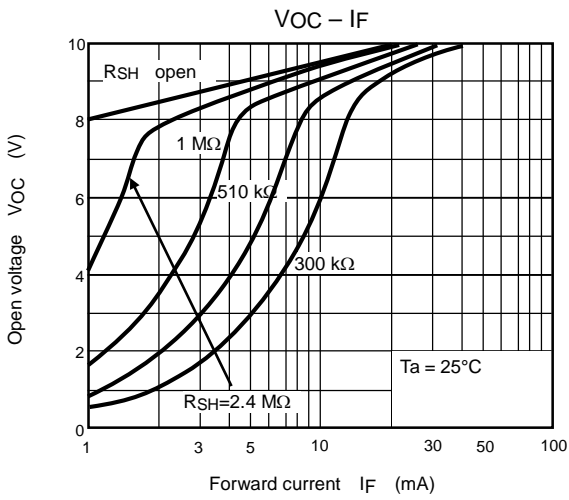
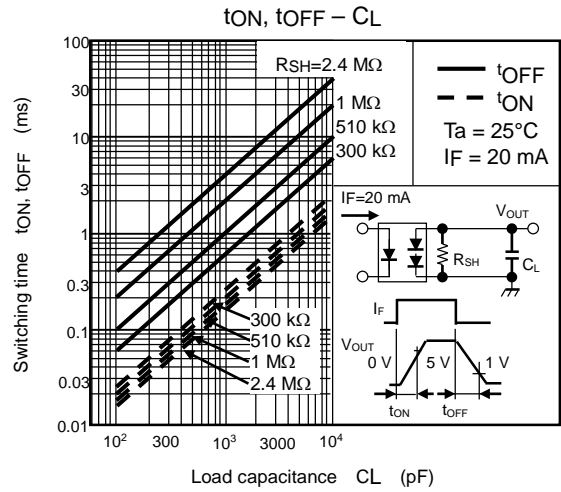
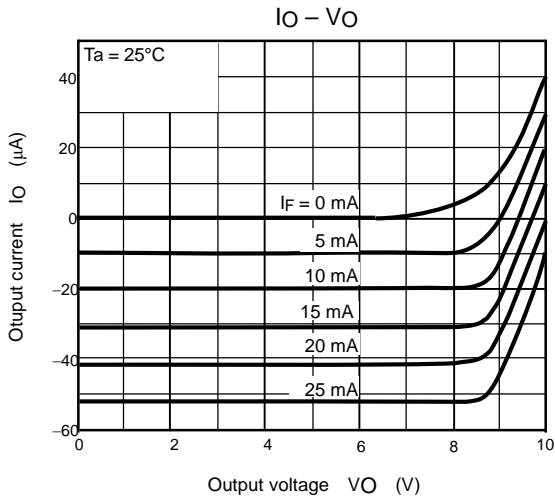
## Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$I_F = 20 \text{ mA}, R_{SH} = 510 \text{ k}\Omega$	—	0.2	—	ms
Turn-off time	$t_{OFF}$	$C_L = 1000 \text{ pF}$ (Note 2)	—	1	—	ms

Note 2: Switching time test circuit







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