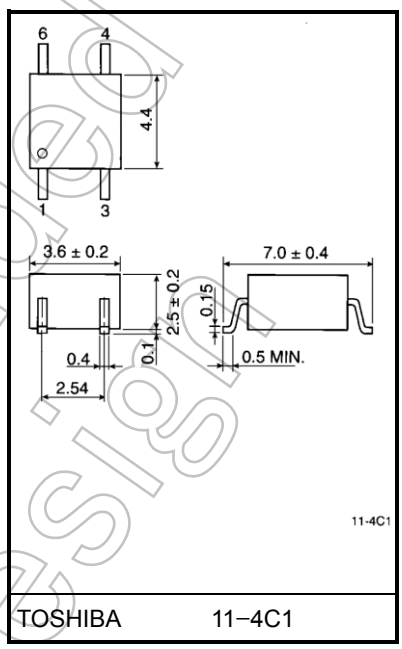
TOSHIBA Photocoupler IRED & Photo−Diode Arry

TLP190B

Telecommunications
Programmable Controllers
MOS Gate Drivers
MOSFET Gate Drivers

Unit: mm



TOSHIBA 11−4C1

Weight: 0.09 g (typ.)

The TOSHIBA TLP190B mini-flat photocoupler is suitable for surface-mount assembly.
The TLP190B consists of an infrared emitting diode optically coupled to a series connected photodiode array which is suitable for MOSFET gate drivers.
TLP190 : Mini Flat Package, 4Pin, one circuit.

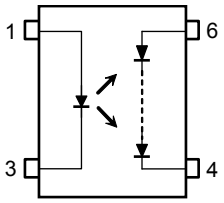
- Open voltage: 7.0V (min)
- Short current: 12.0 μA (min)
- Isolation voltage: 2500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
  File No.E67349

Short Current

Type Name	Classification	Short Current (min)	Short Current I_F	Marking of Classification
TLP190B	C20	20 μA	10 mA	20
	Standard	12 μA		20, blank

Note: Application type name for certification test, please use standard product type name, i.e.
TLP190B(C20) : TLP190B

Pin Configuration (top view)



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

Start of commercial production
1990-11

Absolute Maximum Ratings (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
	Pulse forward current (100μs pulse 100pps)	I_{FP}	1	A
	Reverse voltage	V_R	3	V
	Diode power dissipation	P_D	100	mW
	Diode power dissipation derating (Ta >25°C)	ΔP_D /°C	-1.0	mW/°C
	Junction temperature	T_j	125	°C
Detector	Forward current	I_{FD}	50	μA
	Reverse voltage	V_{RD}	10	V
	Output power dissipation	P_O	0.5	mW
	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	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

Characteristics	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 between terminals	C_T	V_F = 0 V, f = 1 MHz	—	30	60	pF
Detector	Forward voltage	V_{FD}	I_{FD} = 10 μA	—	7	—	V
	Reverse current	I_{RD}	V_{RD} = 10 V	—	1	—	nA
	Capacitance (anode to cathode)	C_{TD}	V = 0 V, f = 1 MHz	—	—	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	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

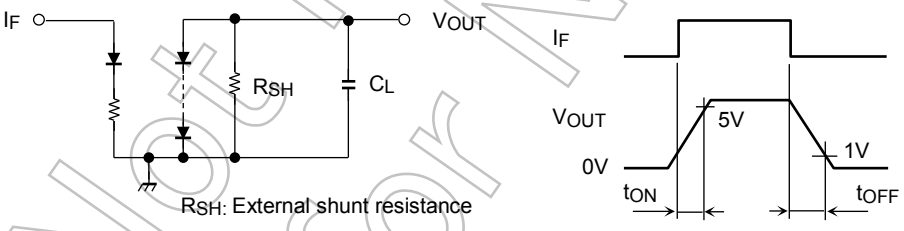
Isolation Characteristics (Ta = 25°C)

Characteristics	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	2500	—	—	Vrms

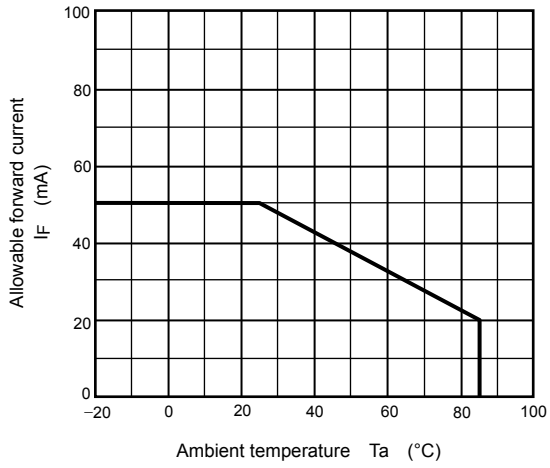
Switching Characteristics (Ta = 25°C)

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

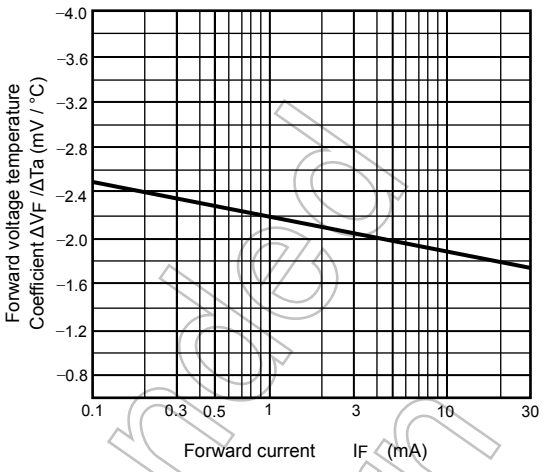
Note 1: Switching time test circuit



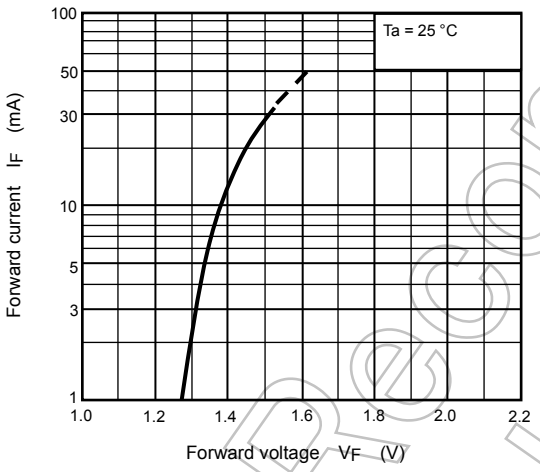
I_F – Ta



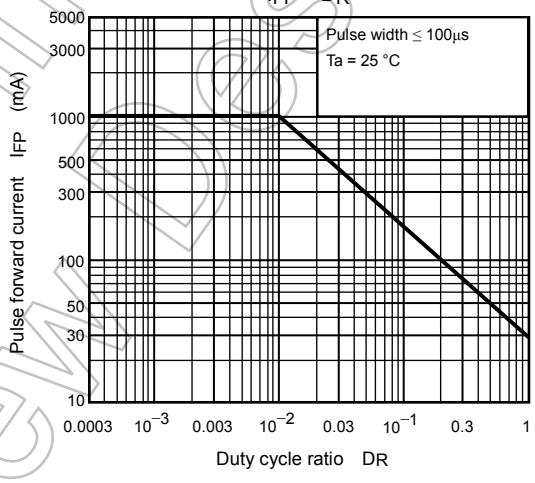
$\Delta V_F / \Delta Ta$ – I_F



I_F – V_F

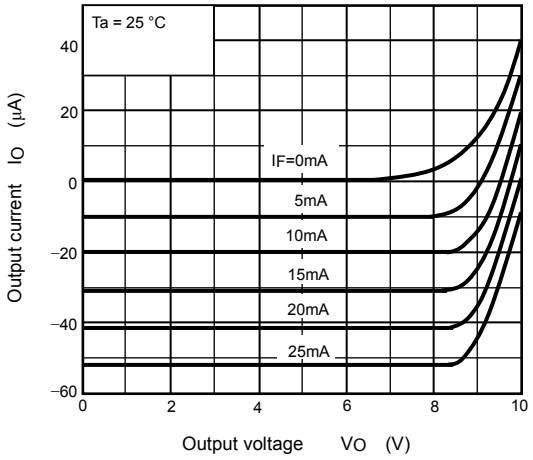


I_{FP} – D_R

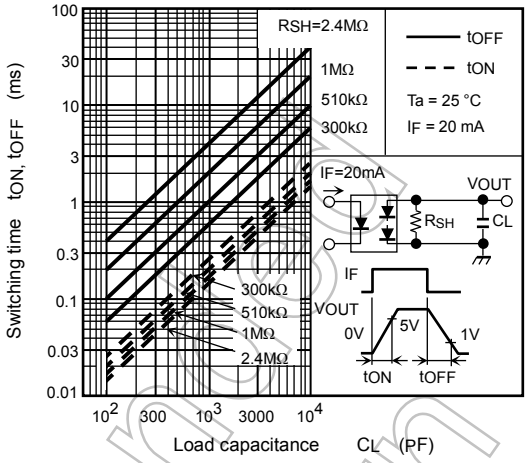


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

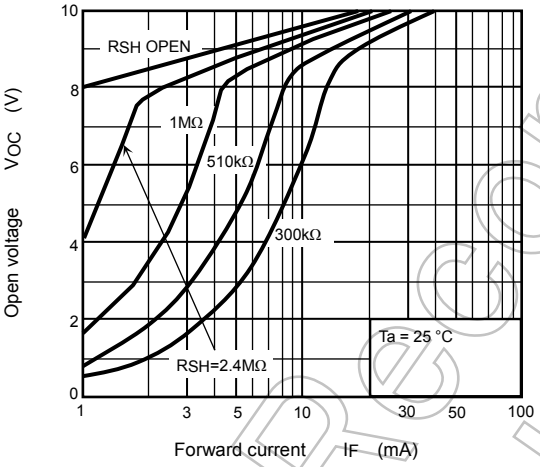
$I_O - V_O$



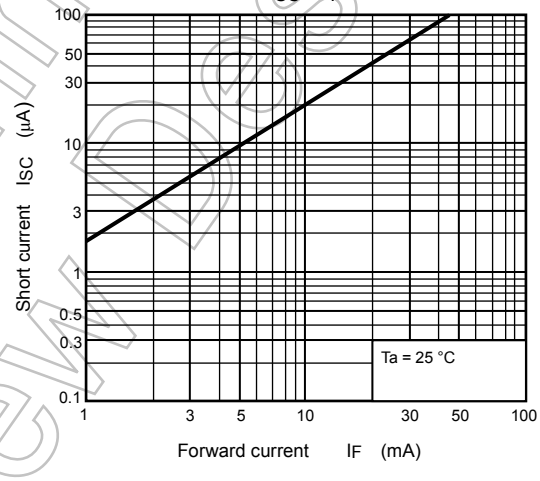
t_{ON}, t_{OFF} – C_L



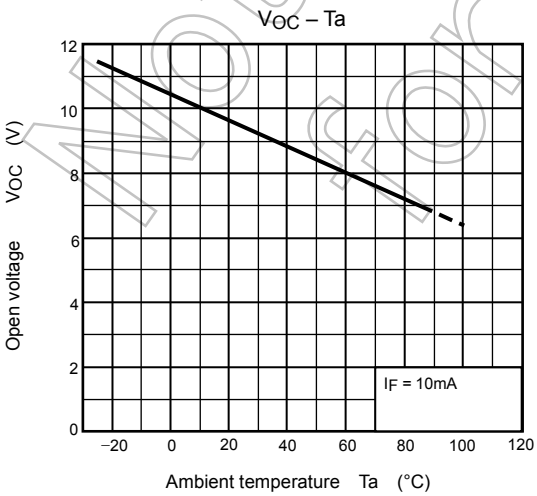
V_{OC} – I_F



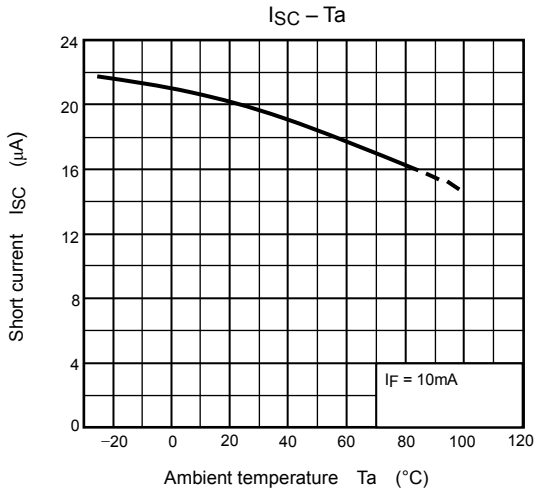
I_{SC} – I_F



V_{OC} – Ta



I_{SC} – Ta



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