

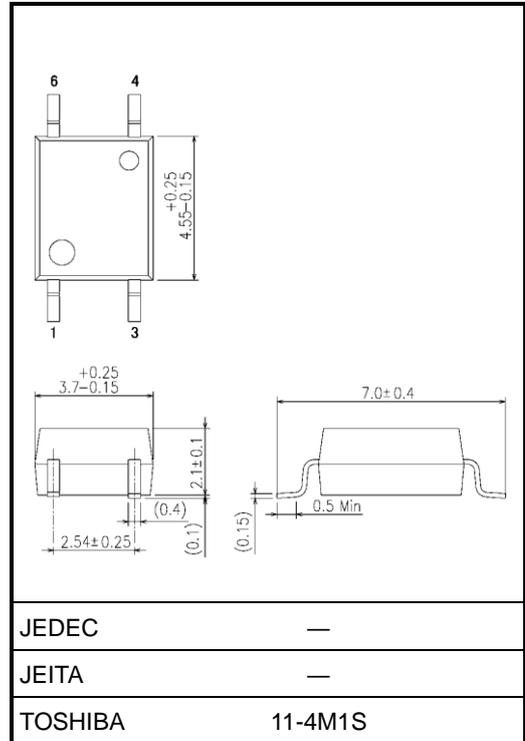
# TLX9910

## Automotive MOSFET Gate Drivers

Unit: mm

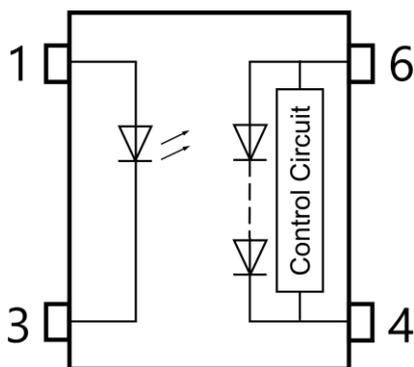
The TLX9910 is a photocoupler in the SO6 package that consists of an infrared light emitting diode optically coupled to a photodiode array. The photodiodes are connected in series, making the TLX9910 suitable for MOS gate drive applications.

- Open voltage: 13.5 V (min)
- Short current: 8  $\mu$ A (min)
- Isolation voltage: 3750 Vrms (min)
- AEC-Q101 qualified



Weight: 0.08 g (typ.)

### Pin Configuration (top view)



- 1: Anode (Input)
- 3: Cathode (Input)
- 4: Cathode (Output)
- 6: Anode (Output)

Start of commercial production  
2023-10

## Absolute Maximum Rating (Unless otherwise specified, Ta = 25°C) (Note)

Characteristics		Symbol	Rating	Unit
LED	Input forward current	I <sub>F</sub>	30	mA
	Input forward current (Ta = 125 °C)	I <sub>F</sub>	10	
	Input forward current derating (Ta ≥ 100 °C)	ΔI <sub>F</sub> /ΔTa	-0.8	mA/°C
	Input power dissipation	P <sub>D</sub>	50	mW
	Input power dissipation derating (Ta ≥ 100 °C)	Δ P <sub>D</sub> /ΔTa	-1.3	mW/°C
	Input reverse voltage	V <sub>R</sub>	3	V
Detector	Output forward current	I <sub>FD</sub>	50	μA
	Output reverse voltage	V <sub>RD</sub>	20	V
	Output power dissipation (-40 °C ≤ Ta ≤ 125 °C)	P <sub>O</sub>	0.5	mW
Common	Operating temperature	T <sub>opr</sub>	-40 to 125	°C
	Storage temperature	T <sub>stg</sub>	-55 to 135	°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>	3750	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: This device is considered as a two-terminal device: Pins 1 and 3 are shorted together, and pins 4 and 6 are shorted together.

## Recommended Operating Conditions (Note)

Characteristics	Symbol	Min	Typ.	Max	Unit
Input forward current	I <sub>F</sub>	—	12	15	mA
Operating temperature	T <sub>opr</sub>	-40	—	105	°C

Note: The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this data sheet should also be considered.

## Electrical Characteristics (Unless otherwise specified, Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Input forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.5	1.65	1.8	V
	Input reverse current	I <sub>R</sub>	V <sub>R</sub> = 3 V	—	—	10	μA
	Input capacitance	C <sub>T</sub>	V = 0 V, f = 1 MHz	—	45	—	pF

## Coupled Electrical Characteristics (Unless otherwise specified, Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I <sub>FT</sub>	V <sub>oc</sub> ≥ 10 V	—	—	3	mA
Open voltage	V <sub>OC</sub>	I <sub>F</sub> = 10 mA	13.5	17.5	—	V
		I <sub>F</sub> = 10 mA, Ta = 125°C	8	11	—	
Short-circuit current	I <sub>SC</sub>	I <sub>F</sub> = 10 mA	8	18	—	μA
		I <sub>F</sub> = 10 mA, Ta = 125°C	6	13	—	

## Isolation Characteristics (Ta = 25°C)

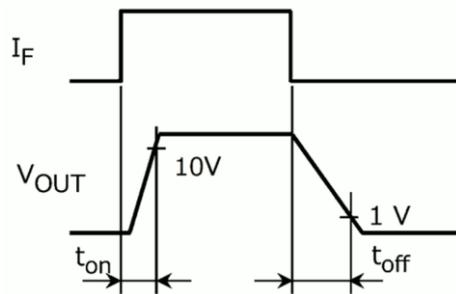
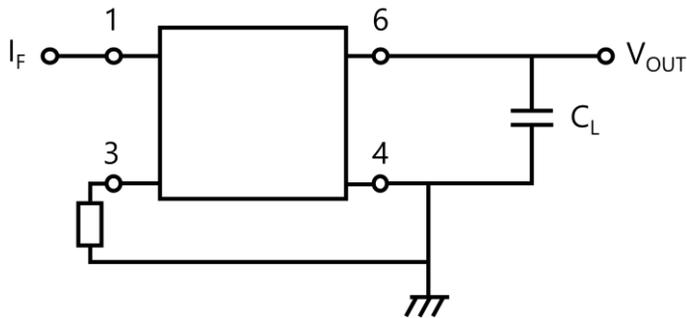
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Total capacitance (input to output)	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz (Note 1)	—	0.8	—	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60 % (Note 1)	10 <sup>12</sup>	10 <sup>14</sup>	—	Ω
Isolation voltage	BV <sub>S</sub>	AC, 60 s (Note 1)	3750	—	—	V <sub>rms</sub>

Note 1: This device is considered as a two-terminal device: Pins 1 and 3 are shorted together, and pins 4 and 6 are shorted together.

## Switching Characteristics (Unless otherwise specified, Ta = 25°C)

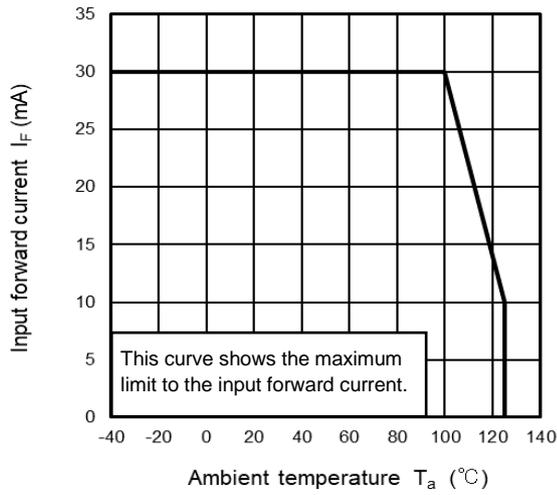
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t <sub>on</sub>	I <sub>F</sub> = 10 mA, C <sub>L</sub> = 1000 pF (Note 2)	—	0.5	1	ms
Turn-off time	t <sub>off</sub>		—	0.1	1	

Note 2: Switching time test circuit, Waveform

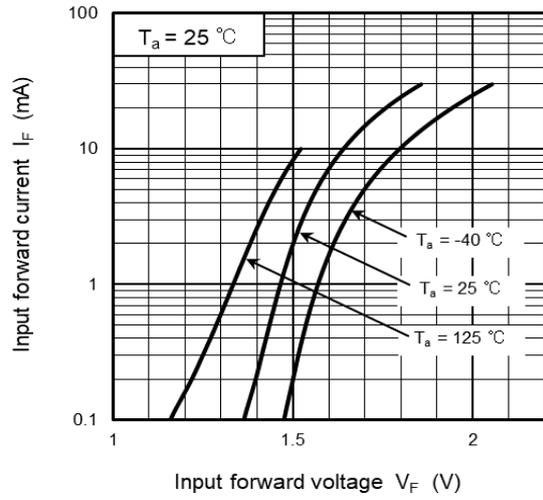


## Characteristics curve (Note)

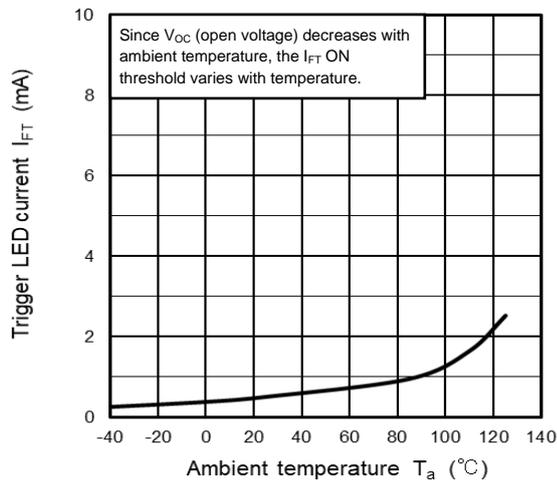
$I_F - T_a$



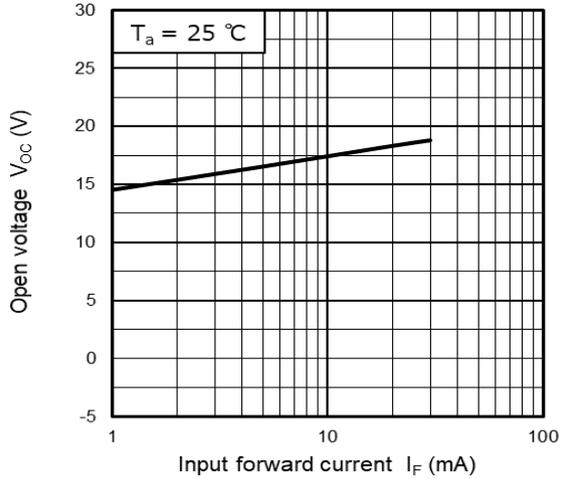
$I_F - V_F$



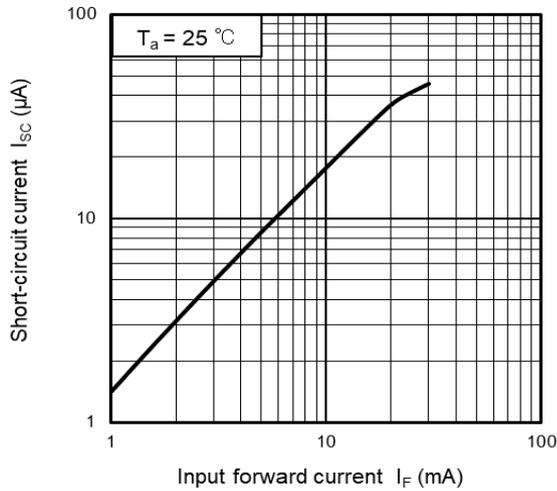
$I_{FT} - T_a$



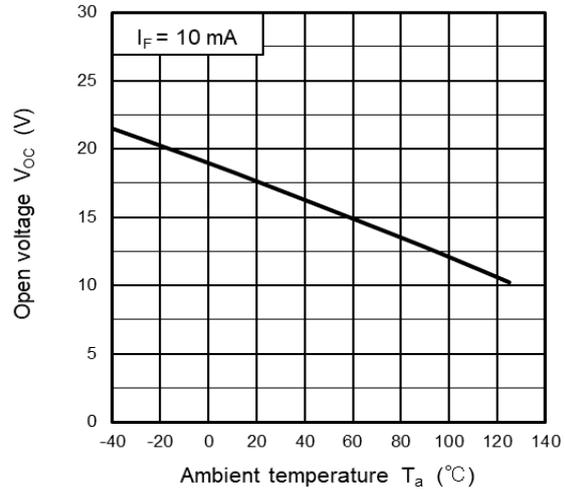
$V_{OC} - I_F$

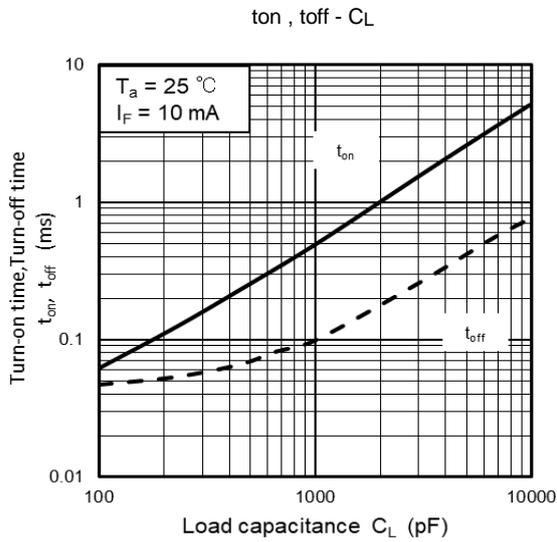
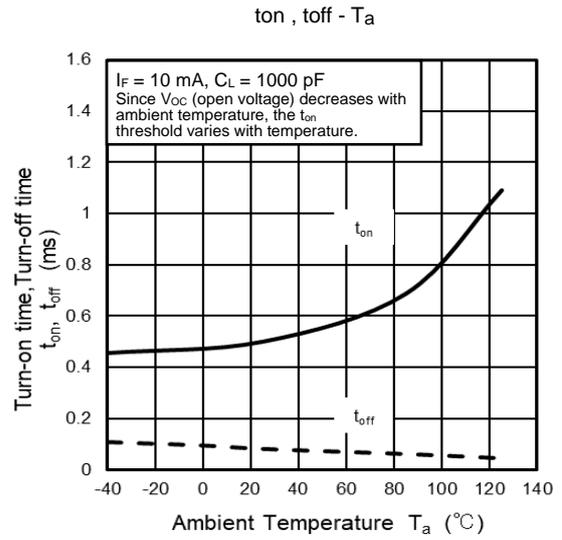
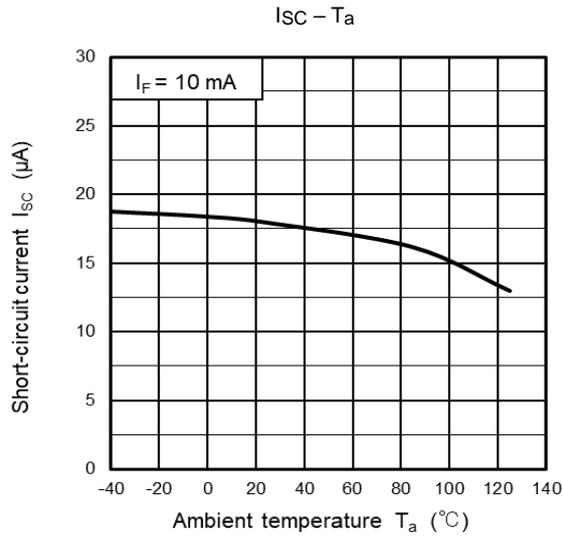


$I_{SC} - I_F$



$V_{OC} - T_a$





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

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