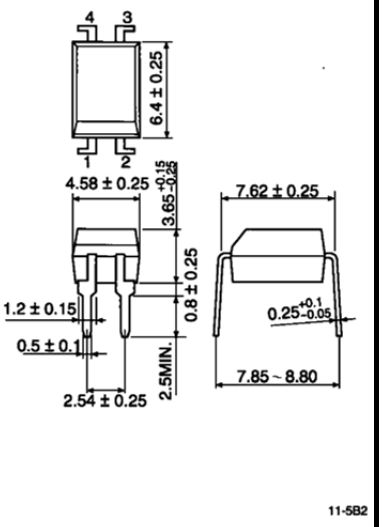
TOSHIBA Photocoupler Photorelay

TLP225A

Programmable Controllers
I/O Board Interface
DC-Output Module
Replacement for DC Mechanical Relay

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11-5B2

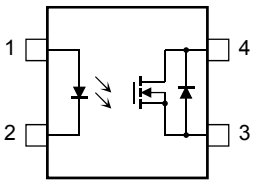
Weight: 0.27 g (typ.)

The TOSHIBA TLP225A consists of gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a four lead plastic DIP package (DIP4).

The TLP225A is MOSFET output and can control a current of 0.5 A which is suitable for DC output module.

- Peak off-state voltage: 60 V (min)
- Trigger LED current: 5 mA (max)
- On-state current: 500 mA (max)
- On-state resistance: 1.1 Ω (max)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1577, file No. E67349

Pin Configuration (top view)



1: Anode
2: Cathode
3: Source
4: Drain

Start of commercial production
1993/06

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating (Ta ≥ 53°C)	ΔI_F/°C	−0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	°C
Detector	Off-state output terminal voltage	V_{OFF}	60	V
	On-state current	I_{ON}	500	mA
	On-state current derating (Ta ≥ 25°C)	ΔI_{ON}/°C	−5.0	mA/°C
	Junction temperature	T_j	125	°C
Storage temperature range		T_{stg}	−55 to 125	°C
Operating temperature range		T_{opr}	−20 to 85	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note)		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: Pins1 and 2 shorted together and pins 3 and 4 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DS}	—	—	48	V
Forward current	I_F	12	20	30	mA
On-state current	I_{ON}	—	—	300	mA
Operating temperature	T_{opr}	−20	—	60	°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)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I_{OFF}	V_{OFF} = 60 V	—	—	1	μA
	Capacitance	C_{OFF}	V = 0, f = 1 MHz	—	—	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	I_{ON} = 500 mA	—	3	5	mA
On-state resistance	R_{ON}	I_{ON} = 500 mA, I_F = 10 mA	—	0.8	1.1	Ω

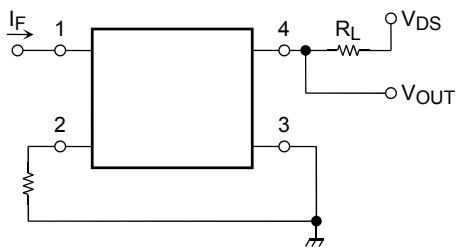
Isolation Characteristics (Ta = 25°C)

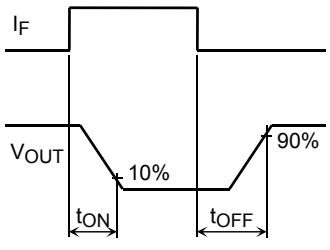
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≤ 60%	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000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

Switching Characteristics (Ta = 25°C)

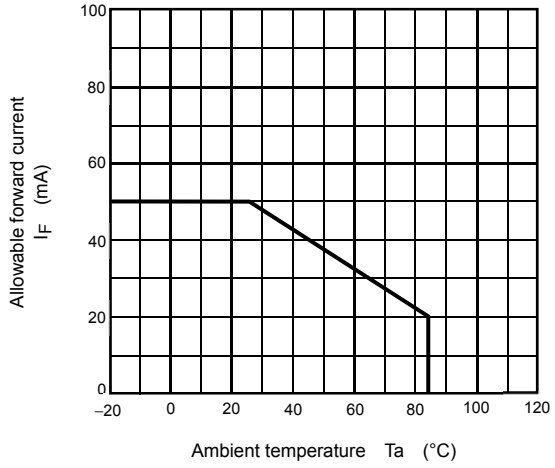
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	R_L = 200 Ω (Note) V_{DS} = 20 V, I_F = 10 mA	—	—	2	ms
Turn-off time	t_{OFF}	R_L = 200 Ω (Note) V_{DS} = 20 V, I_F = 10 mA	—	—	2	ms

Note: Switching time test circuit

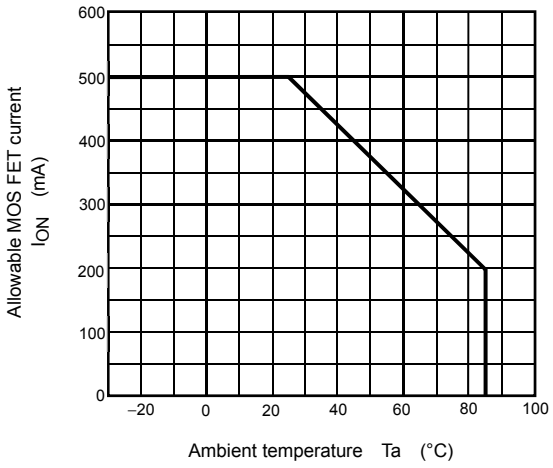




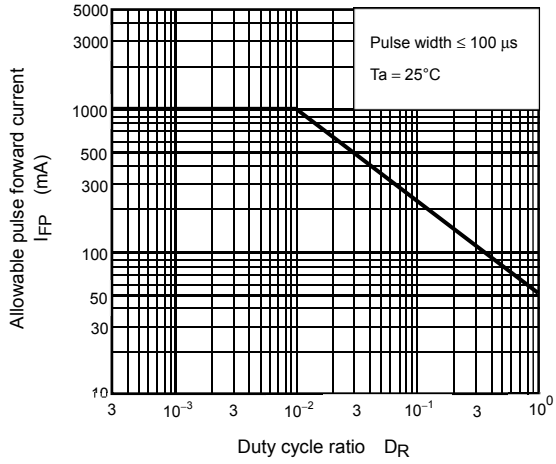
I_F – Ta



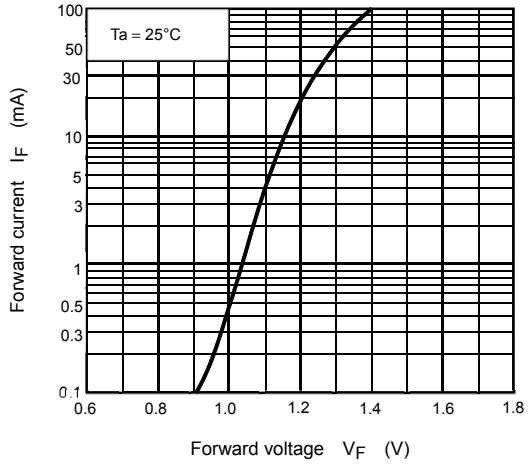
I_{ON} – Ta



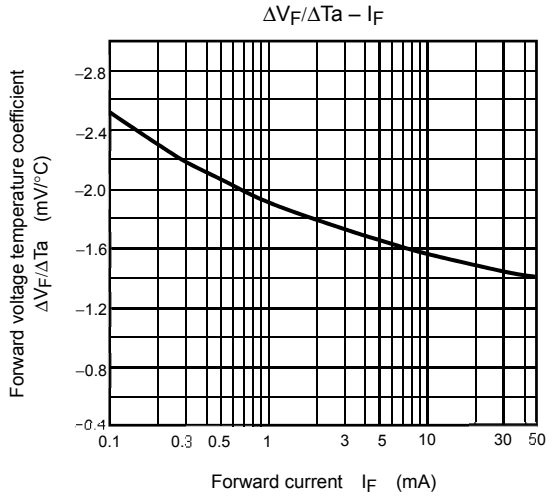
I_{FP} – D_R



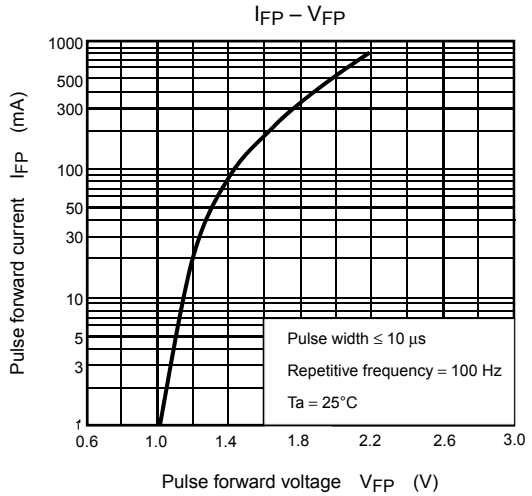
I_F – V_F



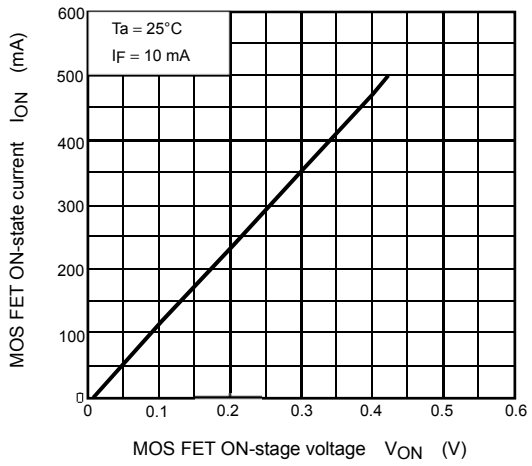
$\Delta V_F/\Delta Ta$ – I_F



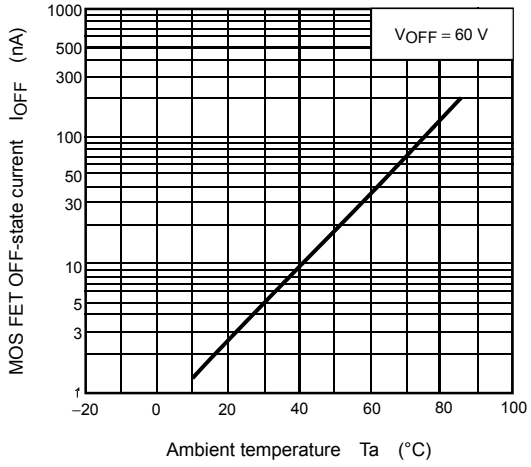
I_{FP} – V_{FP}



I_{ON} – V_{ON}



I_{OFF} – Ta



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