TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP225A

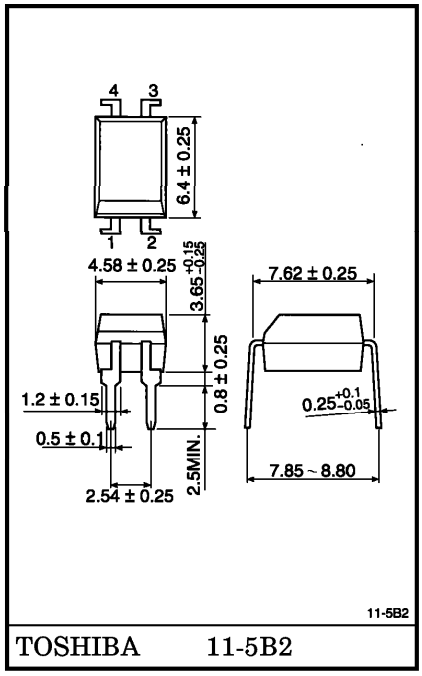
PROGRAMMABLE CONTROLLERS

I/O BOARD INTERFACE

DC-OUTPUT MODULE

REPLACEMENT FOR DC MECHANICAL RELAY

Unit in mm



TOSHIBA 11-5B2

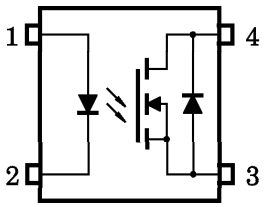
Weight : 0.27 g

The TOSHIBA TLP225A consist of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET 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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		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}	−55~125	°C
Operating Temperature Range		T_{opr}	−20~85	°C
Lead Soldering Temperature (10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 1min., R.H. ≦ 60%) (Note 1)		BV_S	2500	Vrms

(Note 1) : Pins 1 and 2 shorted together and pins 3 and 4 shorted together.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{DS}	—	—	48	V
Forward Current	I_F	12	20	30	mA
Collector Current	I_{ON}	—	—	300	mA
Operating Temperature	T_{opr}	−20	—	60	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
LED	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
LED	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Off-State Current	I_{OFF}	V_{OFF} = 60 V	—	—	1	μA
DETECTOR	Capacitance	C_{OFF}	V = 0, f = 1 MHz	—	—	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	I_{FT}	ION = 500 mA	—	3	5	mA
On-State Resistance	R_{ON}	I_{ON} = 500 mA, I_F = 10 mA	—	0.8	1.1	Ω

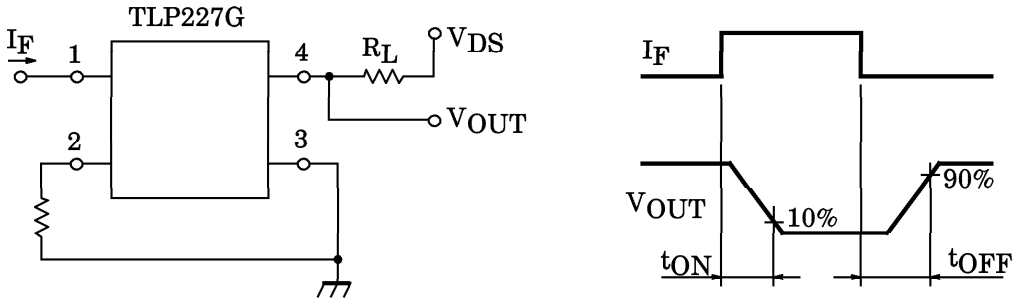
ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	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

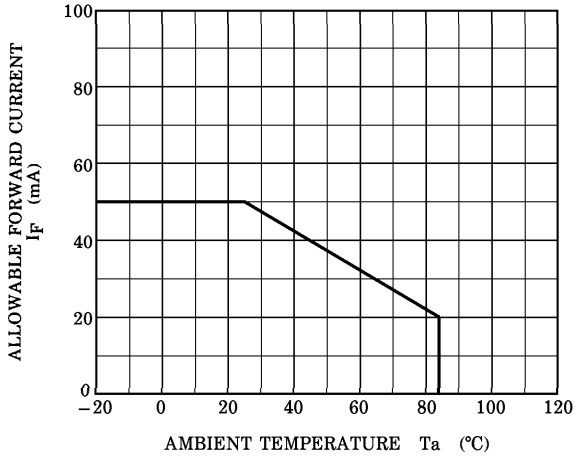
SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-on Time	t_{ON}	R_L = 200 Ω (Note 2)	—	—	2	ms
Turn-off Time	t_{OFF}	V_{DS} = 20 V, I_F = 10 mA	—	—	2	

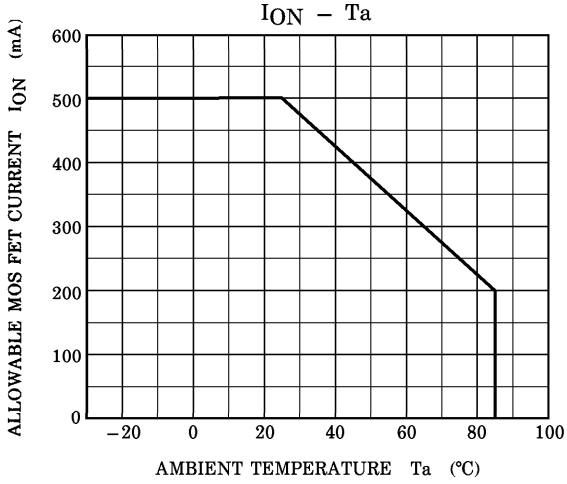
(Note 2) : SWITCHING TIME TEST CIRCUIT



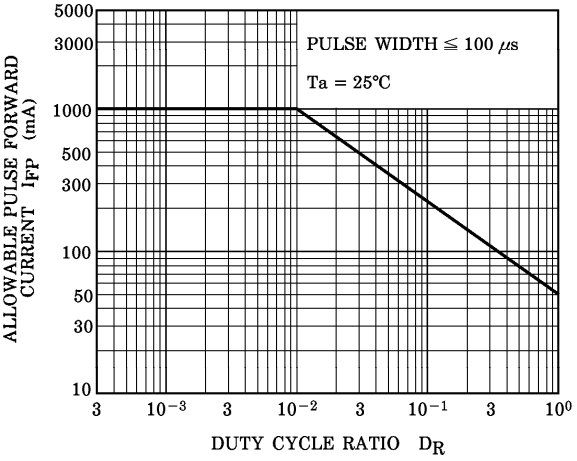
I_F – Ta



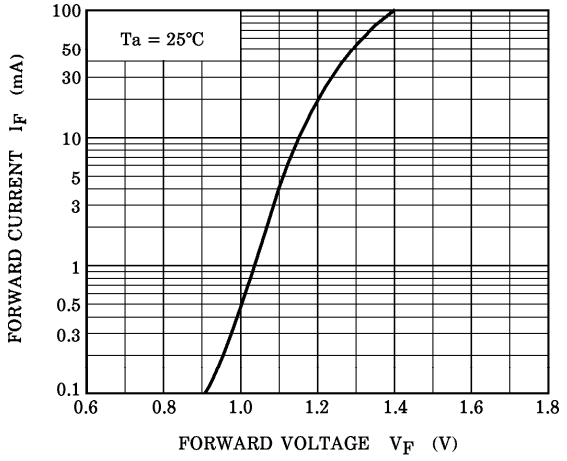
I_{ON} – Ta



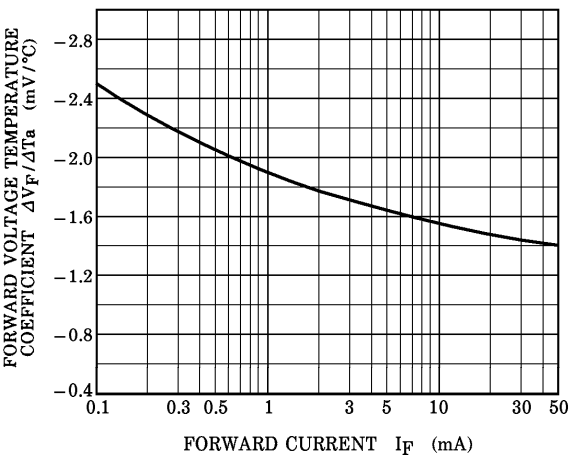
I_{FP} – D_R



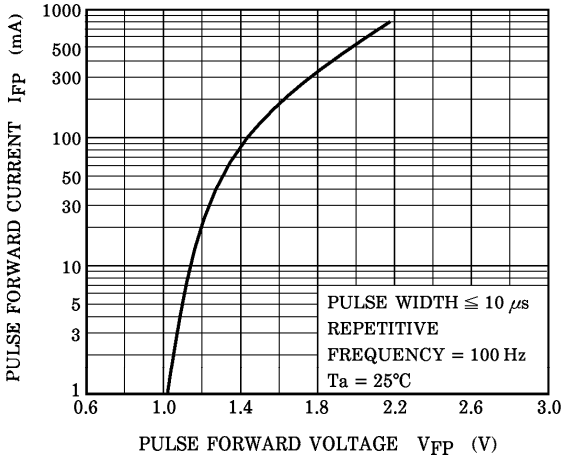
I_F – V_F

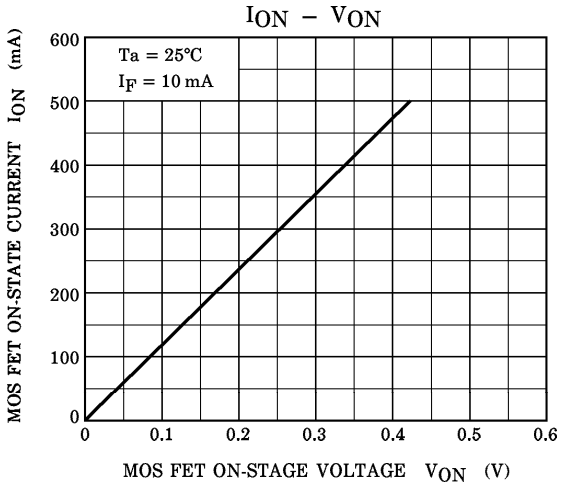


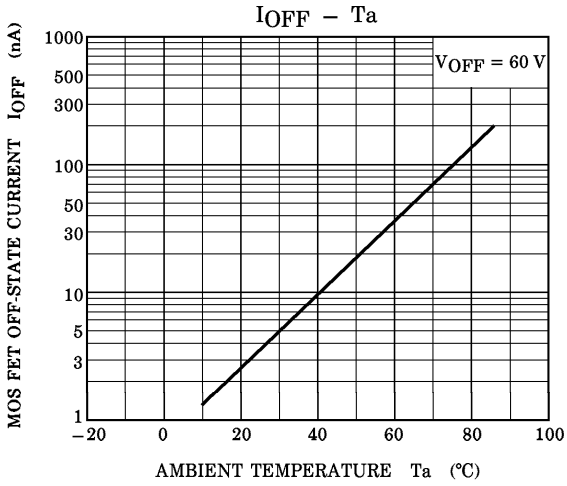
$\Delta V_F / \Delta Ta$ – I_F



I_{FP} – V_{FP}




I_{ON} – V_{ON}
Ta = 25°C
I_F = 10 mA
MOS FET ON-STATE CURRENT I_{ON} (mA)
600
500
400
300
200
100
0
0
0.1
0.2
0.3
0.4
0.5
0.6
MOS FET ON-STAGE VOLTAGE V_{ON} (V)


I_{OFF} – Ta
V_{OFF} = 60 V
MOS FET OFF-STATE CURRENT I_{OFF} (nA)
1000
500
300
100
50
30
10
5
3
1
–20
0
20
40
60
80
100
AMBIENT TEMPERATURE Ta (°C)

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000707EBC

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