TENTATIVE TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-MOS FET

TLP176A

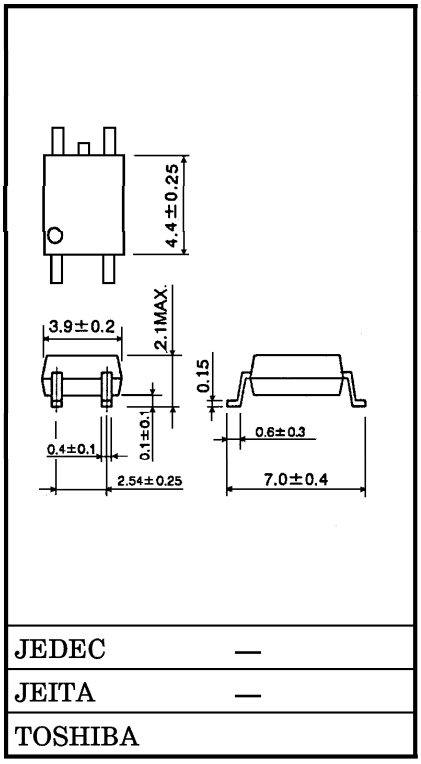
MEASUREMENT INSTRUMENT

DATA ACQUISITION

TELECOMMUNICATION

PROGRAMMABLE CONTROL

Unit in mm



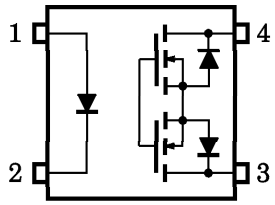
JEDEC	—
JEITA	—
TOSHIBA	

Weight : 0.1 g

The TOSHIBA TLP176A consists of gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a SOP, which is suitable for surface mount assembly.
The TLP176A is suitable for replacement of mechanical relays in many applications which require space savings.

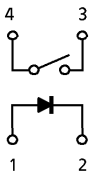
- SOP 4 pin (2.54SOP4) : 1-Form-A
- Peak Off-State Voltage : 60 V (MIN.)
- Trigger LED Current : 3 mA (MAX.)
- On-State Current : 400 mA (MAX.)
- On-State Resistance : 2 Ω (MAX.)
- Isolation Voltage : 1500 V_{rms} (MIN.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATION (TOP VIEW)

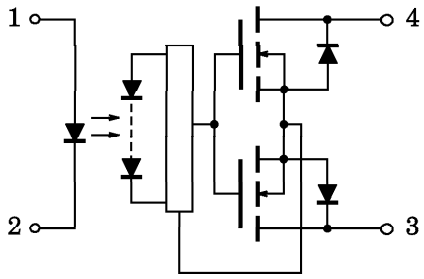


1 : ANODE
2 : CATHODE
3 : DRAIN
4 : DRAIN

1-Form-A



SCHEMATIC



MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	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 (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}	400	mA
	On-State RMS Current Derating (Ta ≧ 25°C)	ΔI_{ON} / °C	−4.0	mA / °C
	Junction Temperature	T_j	125	°C
Storage Temperature Range		T_{stg}	−55~125	°C
Operating Temperature Range		T_{opr}	−40~85	°C
Lead Soldering Temperature (10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 1 min., R.H. ≦ 60%) (Note 1)		BV_S	1500	V_{rms}

(Note 1) Device considered a two-terminal device : 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_{DD}	—	—	48	V
Forward Current	I_F	5	7.5	25	mA
On-State Current	I_{ON}	—	—	400	mA
Operating Temperature	T_{opr}	−20	—	65	°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	—	140	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	I_{FT}	I_{ON} = 400 mA	—	1	3	mA
On-State Resistance	R_{ON}	I_{ON} = 400 mA, I_F = 5 mA	—	1	2	Ω

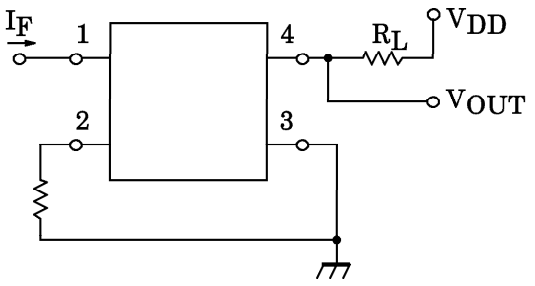
ISOLATION CHARACTERISTICS (Ta = 25°C)

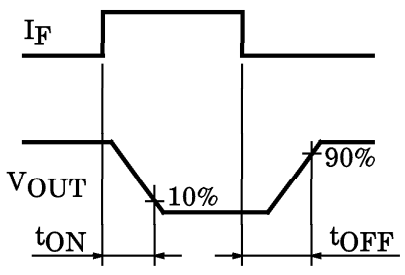
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H. ≦ 60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	1500	—	—	V_{rms}
		AC, 1 second (in oil)	—	3000	—	V_{rms}
		DC, 1 minute (in oil)	—	3000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

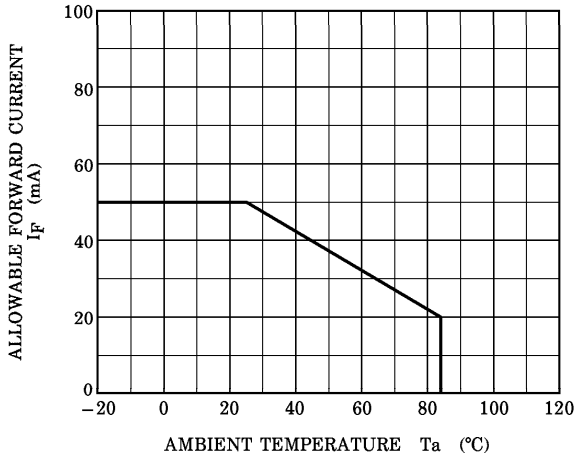
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-on Time	t_{ON}	R_L = 200 Ω (Note 2)	—	0.9	2.0	ms
Turn-off Time	t_{OFF}	V_{DD} = 20 V, I_F = 5 mA	—	0.1	1.0	ms

(Note 2) Switching Time Test Circuit

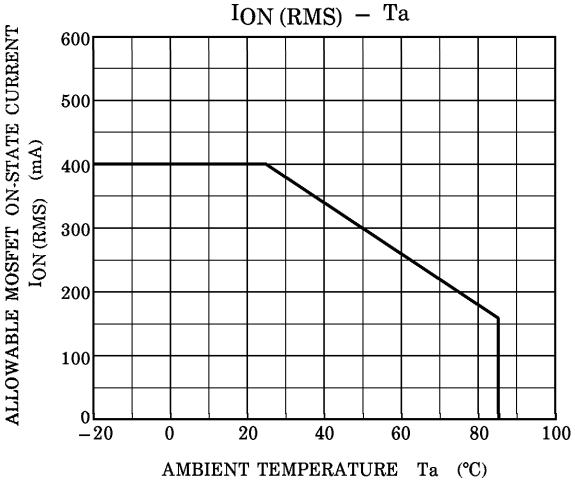




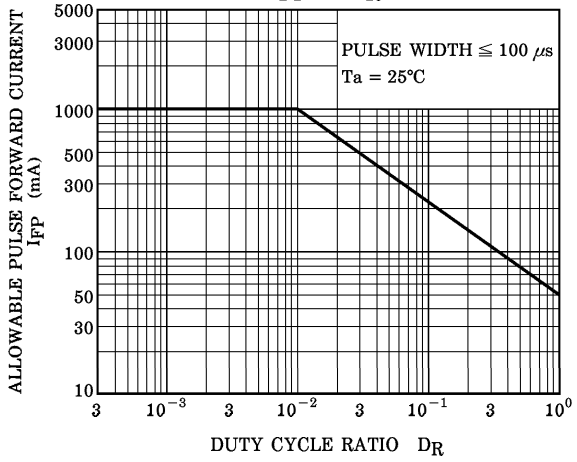
I_F – Ta



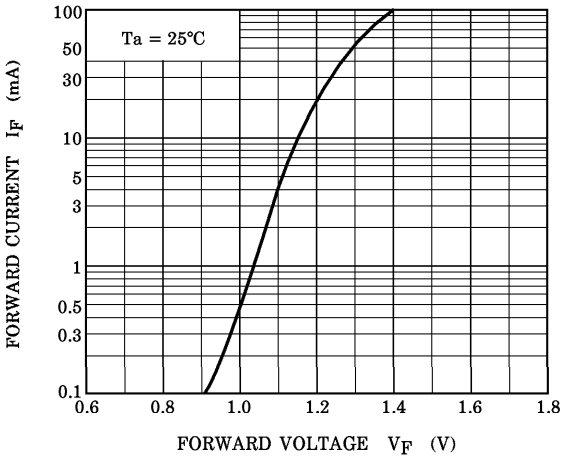
$I_{ON\ (RMS)}$ – Ta



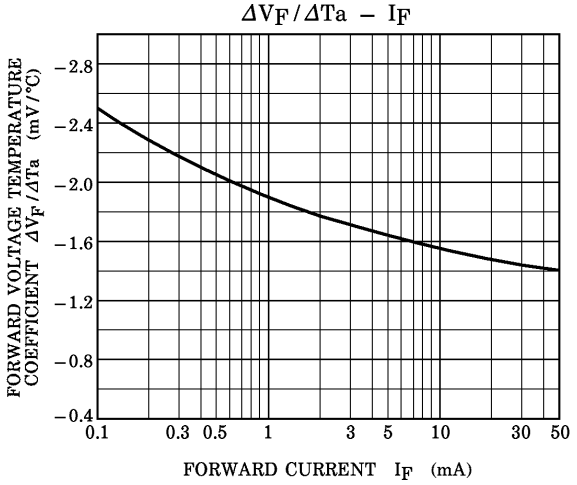
I_{FP} – D_R



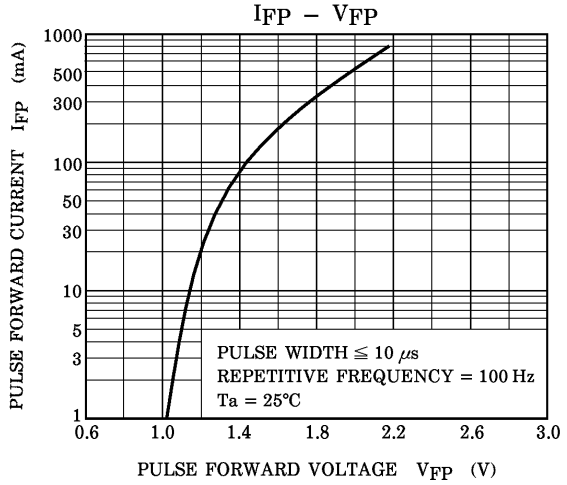
I_F – V_F



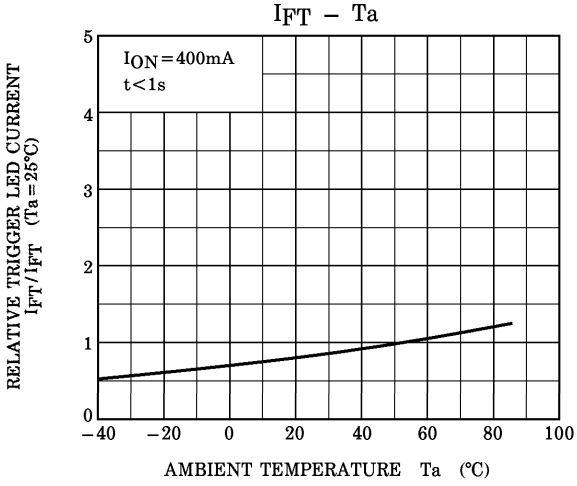
$\Delta V_F / \Delta Ta$ – I_F



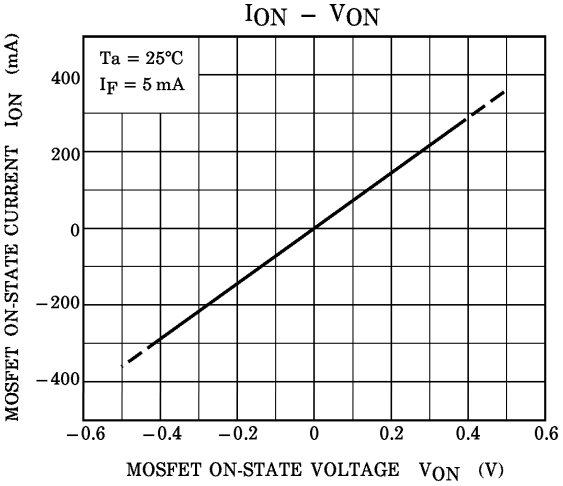
I_{FP} – V_{FP}



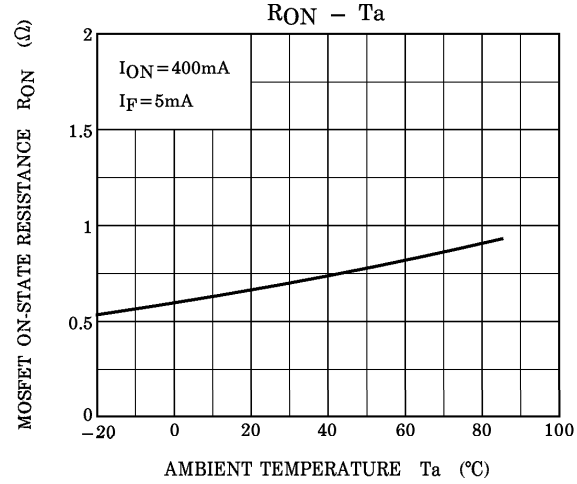
I_{FT} – Ta



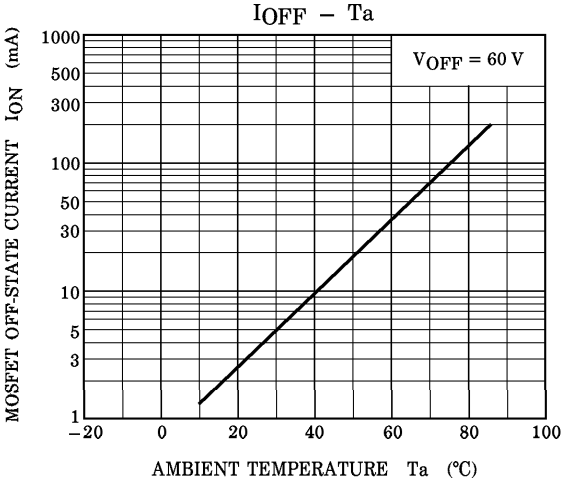
I_{ON} – V_{ON}



R_{ON} – Ta



I_{OFF} – Ta



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