

TENTATIVE

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-MOS FET

TLP176A

MEASUREMENT INSTRUMENT

DATA ACQUISITION

TELECOMMUNICATION

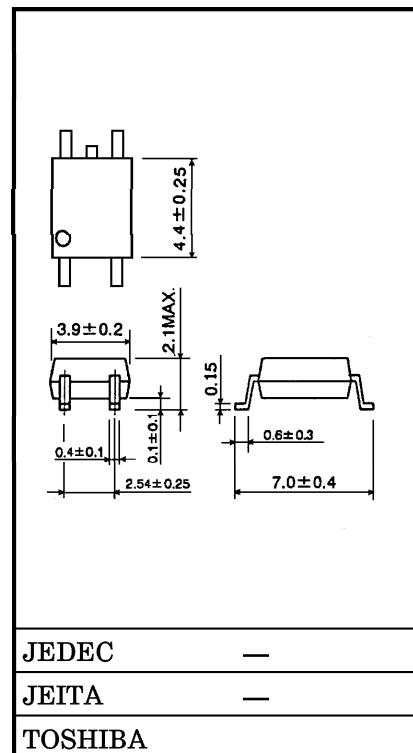
PROGRAMMABLE CONTROL

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.

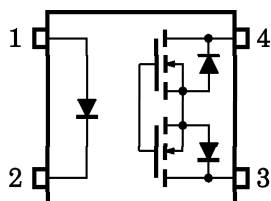
- SOP 4 pin (2.54SOP4) : 1-Form-A
- Peak Off-State Voltage : 60 V (MIN.)
- Trigger LED Current : 3 mA (MAX.)
- On-State Current : 400 mA (MAX.)
- On-State Resistance : $2\ \Omega$ (MAX.)
- Isolation Voltage : 1500 V_{rms} (MIN.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



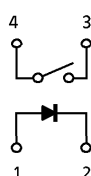
Weight : 0.1 g

PIN CONFIGURATION (TOP VIEW)

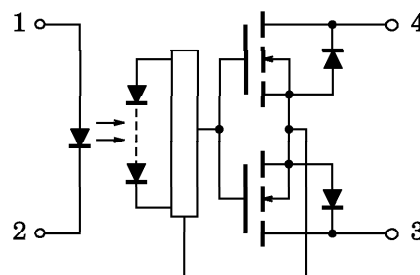


1 : ANODE
2 : CATHODE
3 : DRAIN
4 : DRAIN

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	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
DETECTOR	Off-State Current	I_{OFF}	$V_{\text{OFF}} = 60 \text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1 \text{ MHz}$	—	140	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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

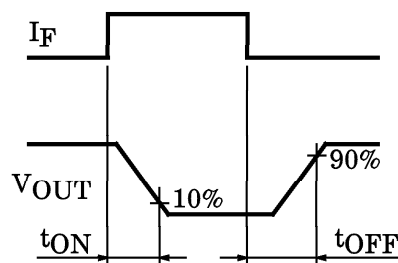
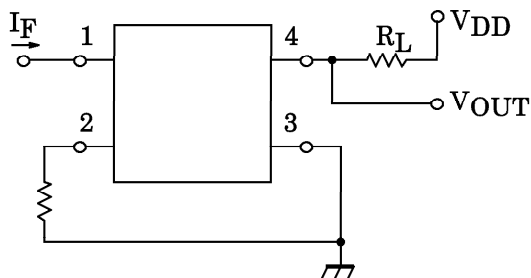
ISOLATION CHARACTERISTICS (Ta = 25°C)

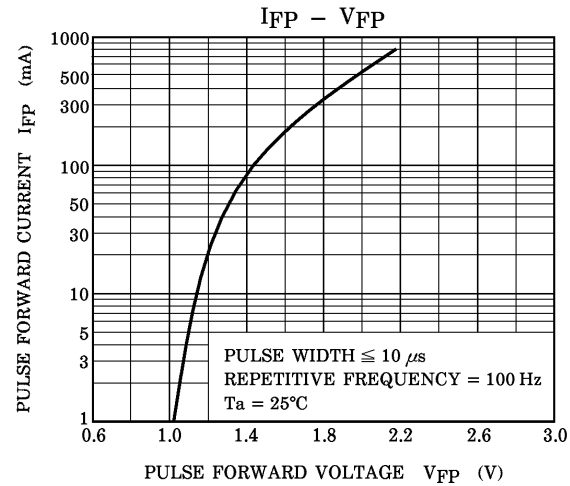
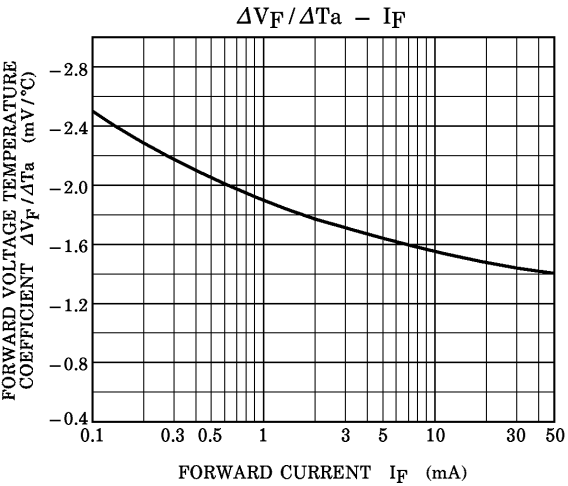
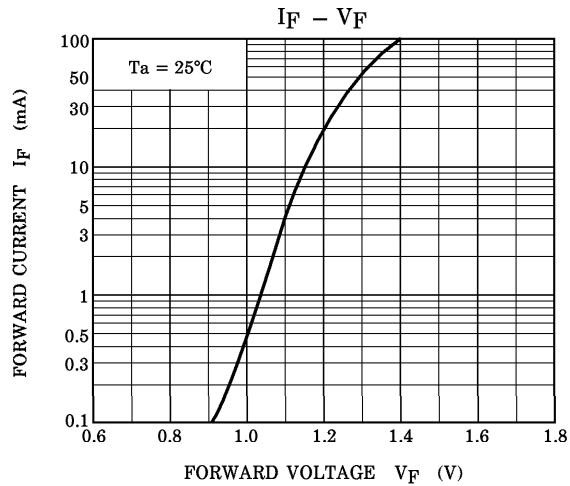
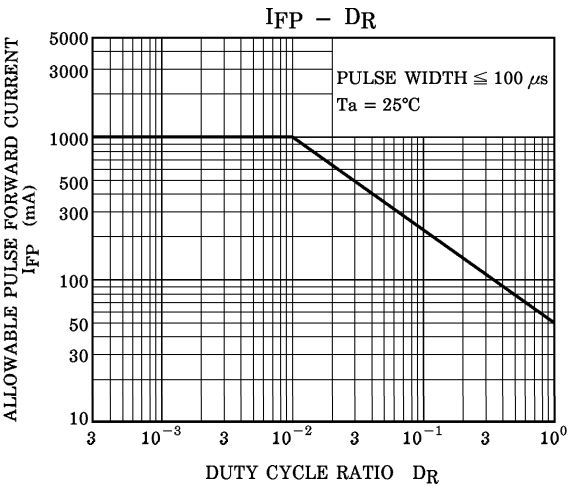
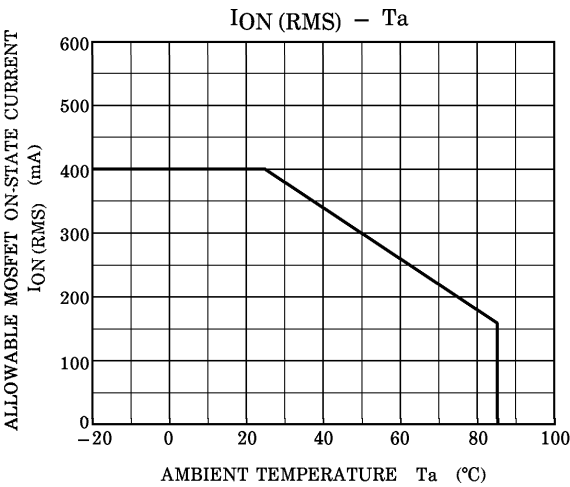
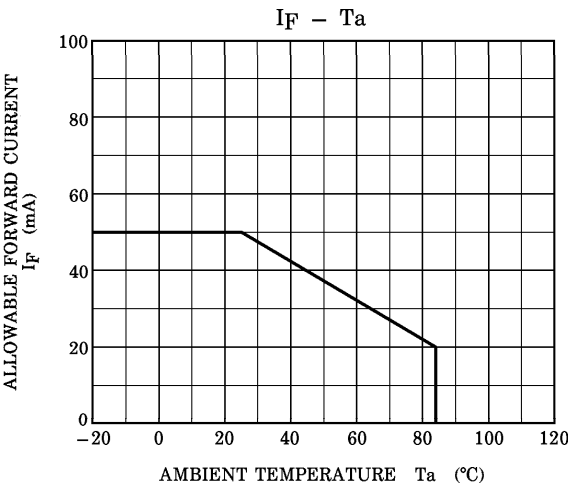
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	1500	—	—	V_{rms}
		AC, 1 second (in oil)	—	3000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

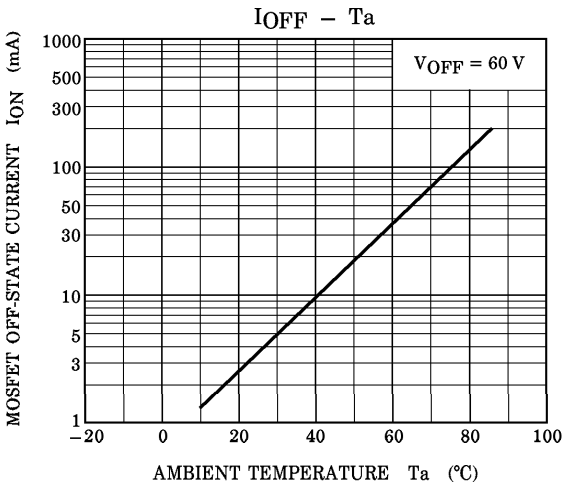
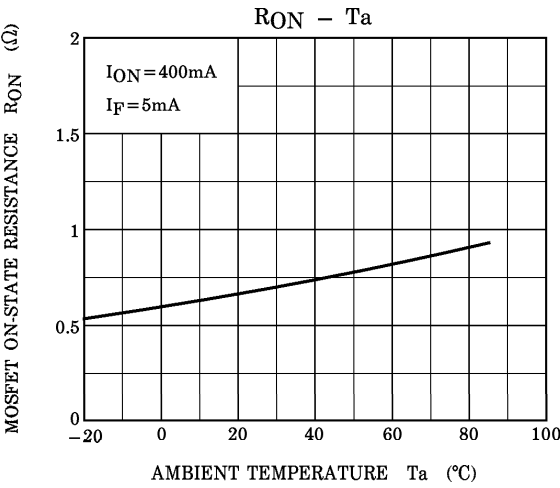
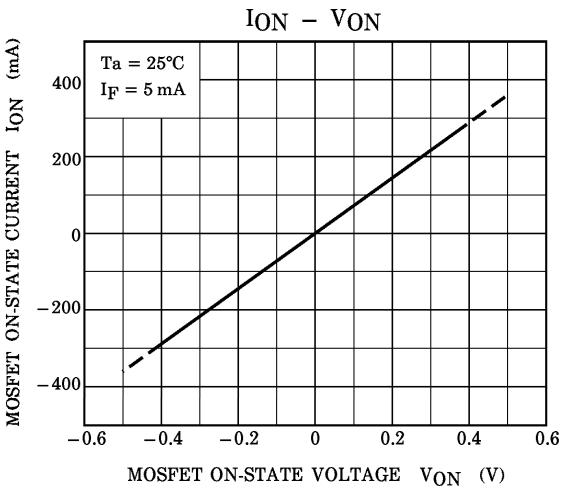
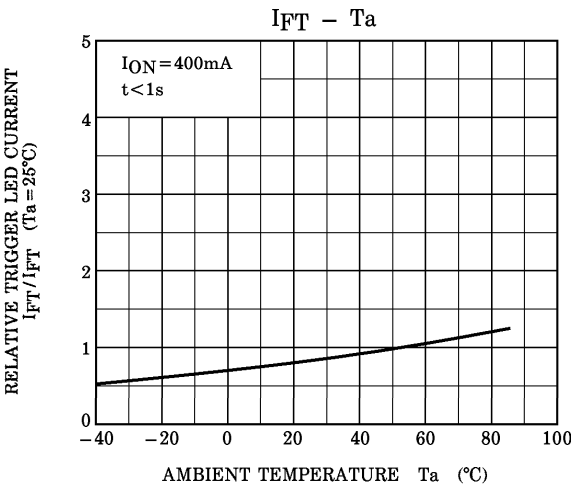
SWITCHING CHARACTERISTICS (Ta = 25°C)

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

(Note 2) Switching Time Test Circuit







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020704EBC

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