



■ Electro-optical Characteristics

(Ta = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	$V_F$	$I_F = 8\text{mA}$	—	1.14	1.4	V	
	Reverse current	$I_R$	$V_R = 3\text{V}$	—	—	10.0	$\mu\text{A}$	
output	Operating supply voltage	$V_{CC}$	—	4.5	—	17.0	v	
	Low level output voltage	$V_{OL}$	$V_{CC} = 5\text{V}, I_F = 0\text{mA}, I_{OL} = 16\text{mA}$	—	0.15	0.4	V	
	High level output voltage	$V_{OH}$	$V_{CC} = 5\text{V}, I_F = 8\text{mA}$	4.9	—	—	V	
	Low level supply current	$I_{CCL}$	$V_{CC} = 5\text{V}, I_F = 0\text{mA}$	—	1.7	3.8	mA	
	High level supply current	$I_{CCH}$	$V_{CC} = 5\text{V}, I_F = 8\text{mA}$	—	0.7	2.2	mA	
	*1 "Low → High" threshold input current	$I_{FLH}$	$V_{CC} = 5\text{V}$	—	1.5	8.0	mA	
	*2 Hysteresis	$I_{FHL}/I_{FLH}$	$V_{CC} = 5\text{V}$	0.55	0.75	0.95	—	
Transfer characteristics	Response time	"Low → High" propagation delay time	$t_{PLH}$	—	3.0	9.0	$\mu\text{s}$	
		"High → Low" propagation delay time	$t_{PHL}$	—	5.0	15.0	$\mu\text{s}$	
		Rise time	$t_r$	$V_{CC} = 5\text{V}, I_F = 8\text{mA}$	—	0.1	0.5	$\mu\text{s}$
		Fall time	$t_f$	$R_L = 280\ \Omega$	—	0.05	0.5	$\mu\text{s}$

\*1  $I_{FLH}$  represents forward current when output changes from low to high.

\*2  $I_{FHL}$  represents forward current when output changes from high to low.

■ Recommended Operating Conditions

Parameter	Symbol	Operating temperature range	MIN.	MAX	Unit
Output current	$I_O$	Ta = 0 to +70°C	—	16.0	mA
Forward current	$I_F$		10.0	20.0	mA

Fig. 1 Forward Current vs. Ambient Temperature

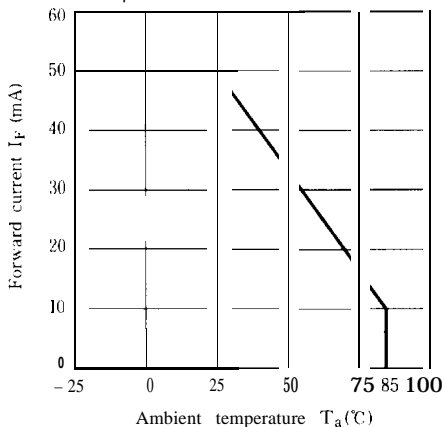
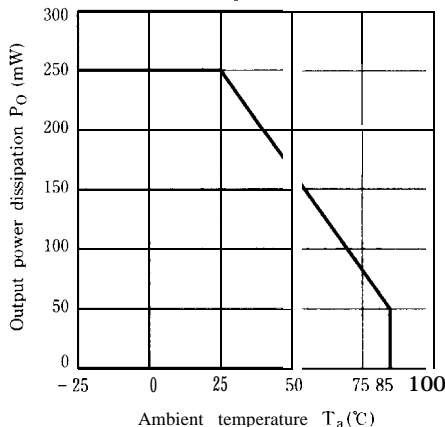
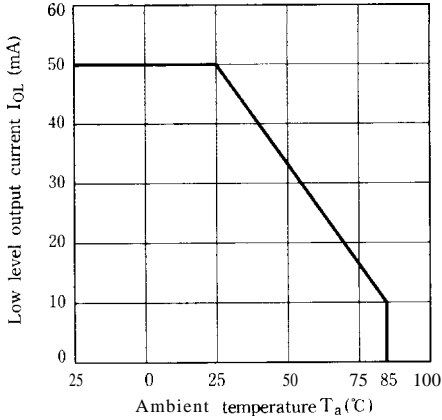


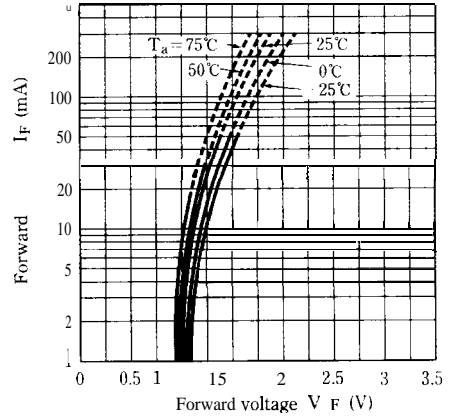
Fig. 2 Output Power Dissipation vs. Ambient Temperature



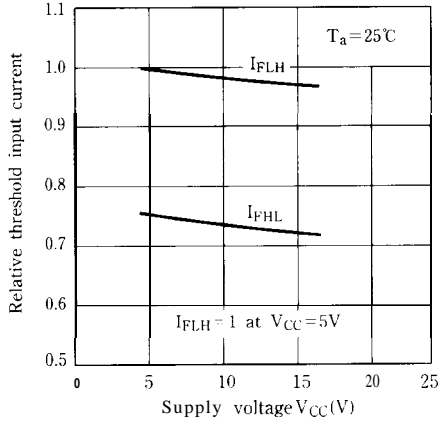
**Fig. 3 Low Level output Current Ve. Ambient Temperature**



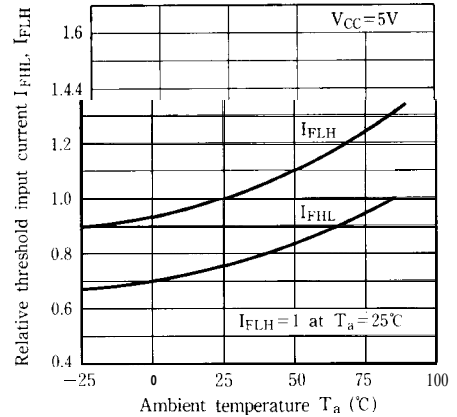
**Fig. 4 Forward Current vs. Forward Voltage**



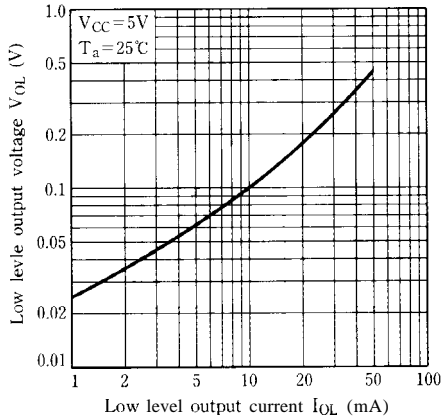
**Fig. 5 Relative Threshold Input Current vs. Supply Voltage**



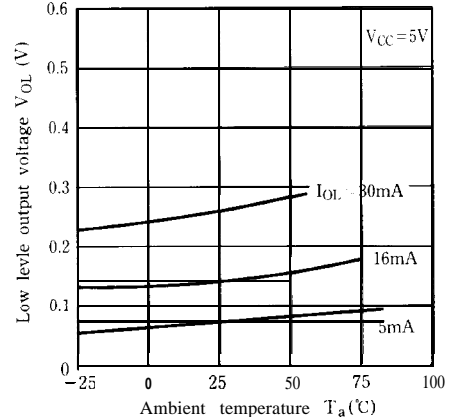
**Fig. 6 Relative Threshold Input Current vs. Ambient Temperature**



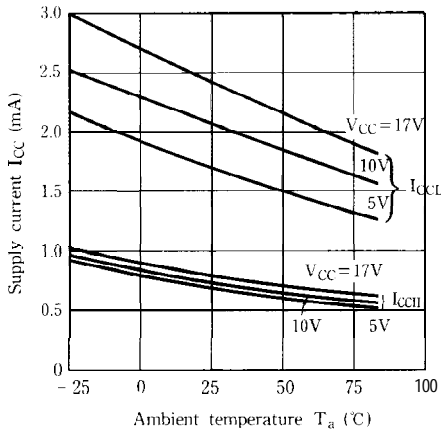
**Fig. 7 Low Level Output Voltage vs. Low Level Output Current**



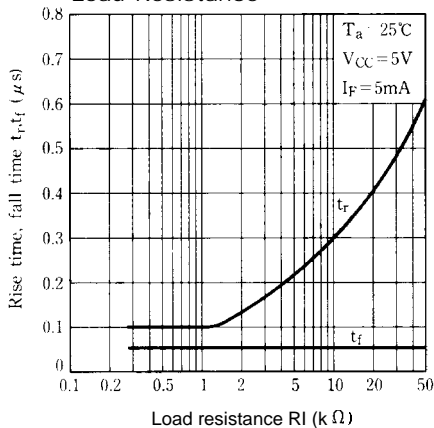
**Fig. 8 Low Level Output Voltage vs. Ambient Temperature**



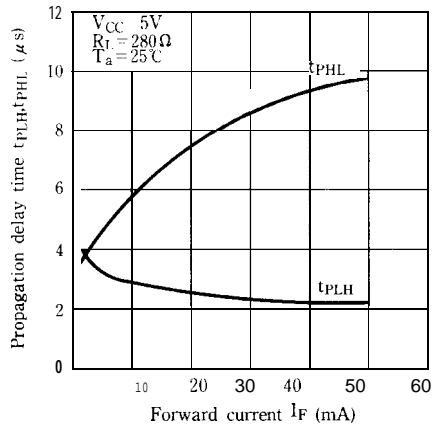
**Fig. 9 Supply Current vs. Ambient Temperature**



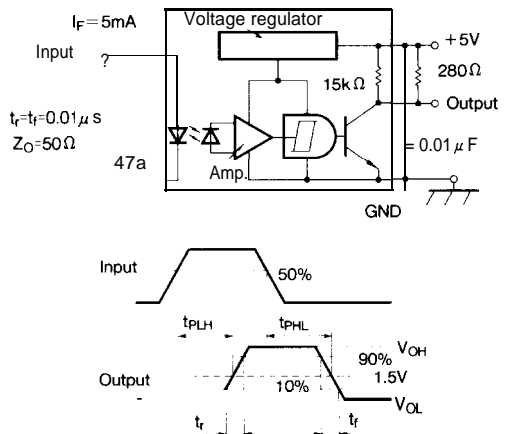
**Fig.11 Rise Time, Fall Time vs. Load Resistance**



**Fig.10 Propagation Delay Time vs. Forward Current**



**Test Circuit for Response Time**



**■ Precautions for Use**

- (1) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01 μF between Vcc and GND near the device.
- (2) In case of cleaning, use only the following type of cleaning solvent.  
Ethyl alcohol, Methyl alcohol, Isopropyl alcohol
- (3) As for other general cautions, refer to the chapter “Precautions for Use” (Page 78 to 93).