Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

6N138

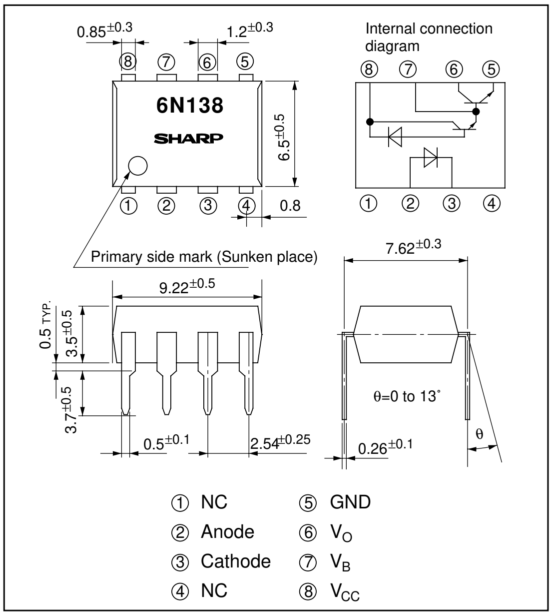
High Sensitivity, High Speed *OPIC Photocoupler

■ Features

1. High current transfer ratio
   (CTR : MIN. 300% at I_F=1.6mA)
2. High speed response
   ($t_{PHL}1$: TYP. 2µs at R_L=2.2kΩ)
3. Instantaneous common mode rejection voltage
   (CM_H : TYP. 500V/µs)
4. TTL compatible output
5. Recognized by UL, file No. E64380

■ Outline Dimensions

(Unit : mm)



* "OPIC" (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Applications

1. Interfaces for computer peripherals
2. Measuring instruments, Control equipment
3. Telephone sets
4. Signal transmission between circuits of different potentials and impedances

■ Absolute Maximum Ratings

(Ta=25˚C)

Parameter			Symbol	Rating	Unit
Input		Forward current	I_F	20	mA
	*1	Peak forward current	I_F	40	mA
	*2	Peak transient forward current	I_{FM}	1	A
		Reverse voltage	V_R	5	V
		Power dissipation	P	35	mW
Output		Supply voltage	V_{CC}	–0.5 to +7	V
		Output voltage	V_O	–0.5 to +7	V
		Emitter-base reverse withstand voltage (Pin 5 to 7)	V_{EBO}	0.5	V
	*3	Average output current	I_O	60	mA
		Power dissipation	P_O	100	mW
	*4	Isolation voltage	V_{iso}(rms)	2.5	kV
		Operating temperature	T_{opr}	0 to +70	˚C
		Storage temperature	T_{stg}	–55 to +125	˚C
	*5	Soldering temperature	T_{sol}	260	˚C

*1 50% duty cycle, Pulse width=1ms
*2 Pulse width≤1µs, 300pulse/s
*3 Decreases at the rate of 0.7mA/˚C if the external temperature is 25˚C or more.
*4 40 to 60% RH, AC for 1 minute
*5 For 10 seconds

■ Electro-optical Characteristics

(Ta=0 to 70˚C unless otherwise specified)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*6	Current transfer ratio	CTR	I_F=1.6mA, V_O=0.4V, V_{CC}=4.5V	300	1 600	–	%
	Logic (0) output voltage	V_{OL}	I_O=4.8mA, V_{CC}=4.5V, I_F=1.6mA	–	0.1	0.4	V
	Logic (1) output current	I_{OH}	I_F=0, V_{CC}=V_O=7V	–	0.1	250	µA
	Logic (0) supply current	I_{CCL}	I_F=1.6mA, V_{CC}=5V, V_O=open	–	0.5	–	mA
	Logic (1) supply current	I_{CCH}	I_F=0, V_{CC}=5V, V_O=open	–	10	–	nA
	Input forward voltage	V_F	I_F=1.6mA, Ta=25˚C	–	1.5	1.7	V
	Input forward voltage temperature coefficient	*7	I_F=1.6mA	–	–1.9	–	mV/˚C
	Input reverse voltage	BV_R	I_R=10µA, Ta=25˚C	5.0	–	–	V
	Input capacitance	C_{IN}	V_F=0, f=1MHz	–	60	–	pF
*8	Leak current (input-output)	I_{I-O}	Ta=25˚C, 45%RH, t=5s V_{I-O}=3kV DC	–	–	1.0	µA
*8	Isolation resistance (input-output)	R_{I-O}	V_{I-O}=500V DC	–	10^{12}	–	Ω
*8	Capacitance (input-output)	C_{I-O}	f=1MHz	–	0.6	–	pF

Note) Type value : at Ta=25˚C

*6 Current transfer ratio is the ratio of input current and output current expressed in %.
*7 $\Delta V_F / \Delta T_a$
*8 Measured as 2-pin element (Short 1, 2, 3, 4 and 5, 6, 7, 8)

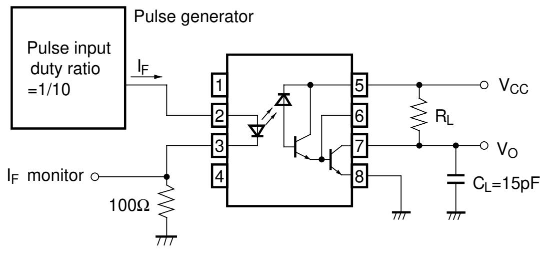
■ Switching Characteristics

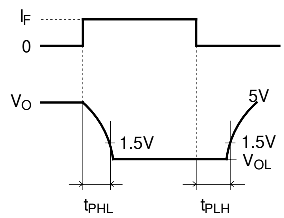
(Ta=25˚C, V_{CC} =5V)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*9	Propagation delay time Output (1) → (0)	t_{PHL}	I_F =1.6mA R_L =2.2kΩ	–	2	10	µs
*9	Propagation delay time Output (0) → (1)	t_{PLH}	I_F =1.6mA R_L =2.2kΩ	–	7	35	µs
*10 *11	Instantaneous common mode rejection voltage " output (1) "	CM_H	I_F =0, V_{CM} =10V P-P R_L =2.2kΩ	–	500	–	V/µs
*10 *11	Instantaneous common mode rejection voltage " output (0) "	CM_L	I_F =1.6mA, V_{CM} =10V P-P R_L =2.2kΩ	–	–500	–	V/µs

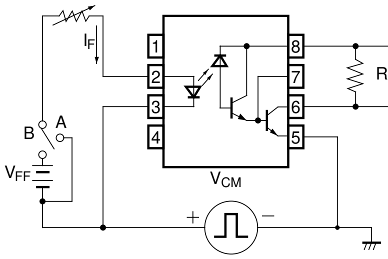
*10 Instantaneous common mode rejection voltage " output (1) " represents a common mode voltage variation that can hold the output above (1) level (V_O>2.0V)
Instantaneous common mode rejection voltage " output (0) " represents a common mode voltage variation that can hold the output above (0) level (V_O<0.8V)

*9 Test Circuit for Propagation Delay Time





***11 Test Circuit for Instantaneous Common Mode Rejection Voltage**



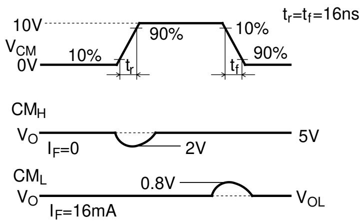


Fig. 1 Forward Current vs. Ambient Temperature

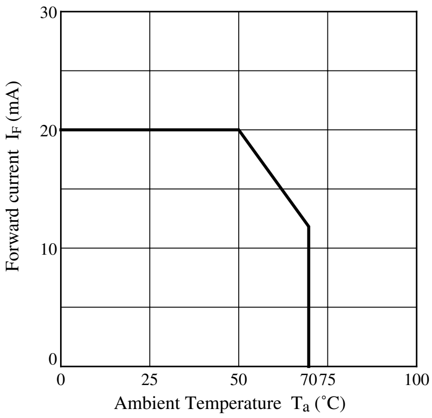


Fig. 2 Power Dissipation vs. Ambient Temperature

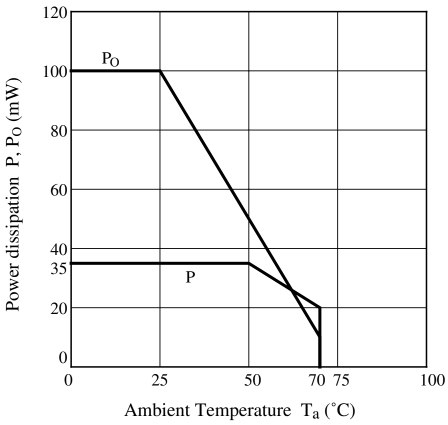


Fig. 3 Forward Current vs. Forward Voltage

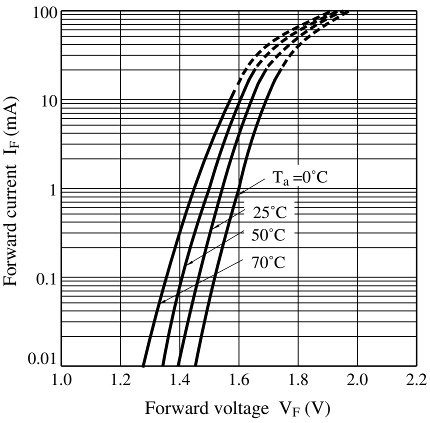


Fig. 4 Output Current vs. Output Voltage

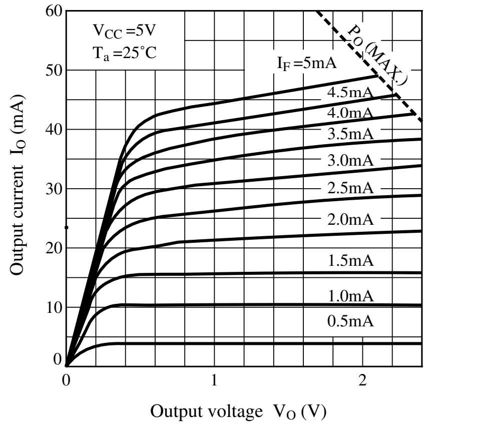


Fig. 5 Current Transfer Ratio vs. Forward Current

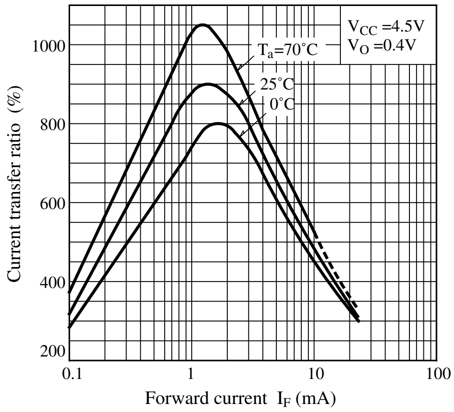


Fig. 6 Output Current vs. Forward Current

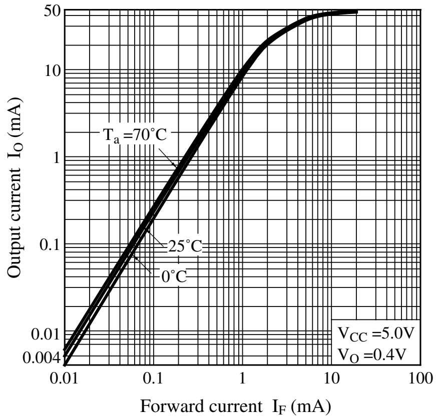


Fig. 7-a Propagation Delay Time vs. Ambient Temperature

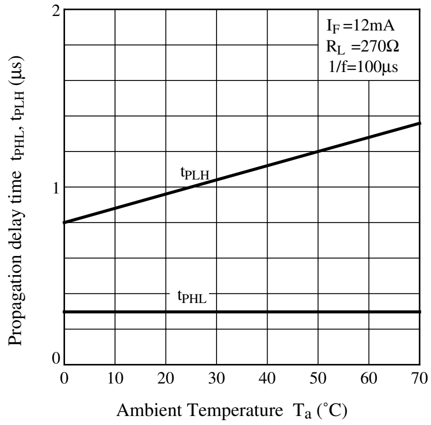


Fig. 7-b Propagation Delay Time vs. Ambient Temperature

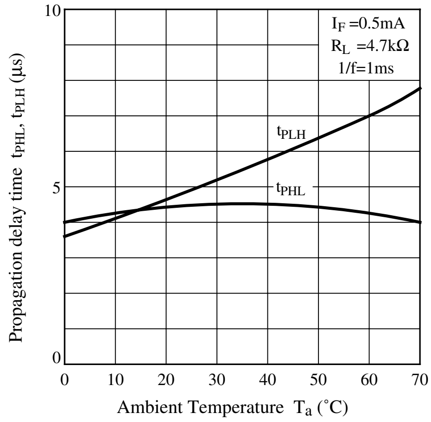


Fig. 8 Rise Time, Fall Time vs. Load Resistance

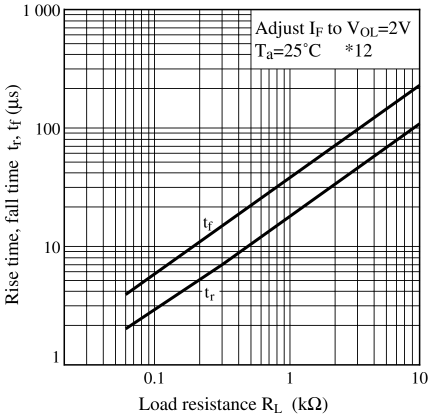
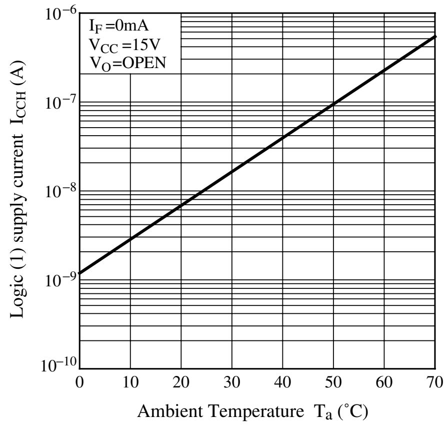
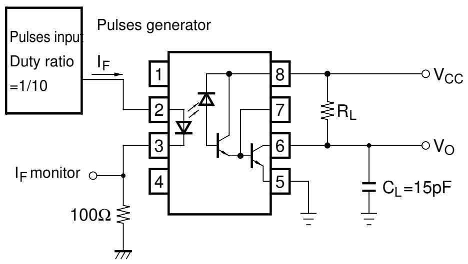
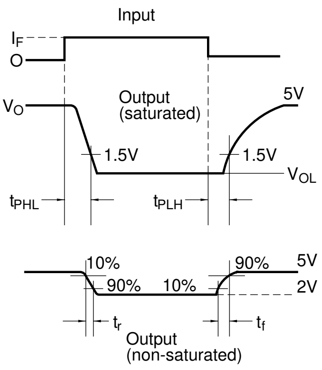


Fig. 9 Logic (1) Supply Current vs. Ambient Temperature



*12 Test Circuit for Rise Time, Fall Time vs. Load Resistance





■ Precaution for use

(1) It is recommended that a by-pass capacitor of more than 0.01µF be added between V_{CC} and GND near the device in order to stabilize power supply line.
(2) Transistor of detector side in bipolar configuration is apt to be affected by static electricity for its minute design. When handling them, general counterplan against static electricity should be taken to avoid breakdown of devices or degradation of characteristics.

NOTICE