

Driver IC

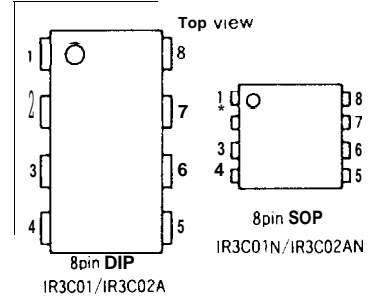
Laser Diodes Driver IC

Sharp manufactures a series of driver ICs (IR3C01/R3C01/R3C01N, IR3C02A/IR2C02AN) for use as laser diode APC circuits. Using these ICs, the power output of the laser is easily adjusted by means of an external resistance. Specifications are as follows:

IR3C01/IR3C01N, IR3C02A/IR3C02AN

Pin Assignment

Pin No.	IR3C01/IR3C01N		IR3C02A/IR3C02AN	
	symbol	Function	Symbol	Function
1	OUT	out	OUT	output
2	I_M	Monitor input	GN	Ground
3	V_{aj}	Output Setting	I	Monitor Input
4	V_E	(-) Power Supply	V	(-) Power Supply
5	V_i	Control Input (on/off)	V	Control Input (on/off)
6	GN	Ground	S	Operating signal output
7	C_f	Phase Compensation	C	Phase Compensation
8	V_C	(+) Power Supply	V	(+) Power Supply



Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Remarks	Ratings		Units
			IR3C01/IR3C01N	IR3C02A/IR3C02AN	
Supply Voltage	V_{CC}		13	10	v
Supply Voltage	V_{EE}		-20	-10	v
Output Current	I_o	Pin ①	170	-170	mA
Control Input Voltage	V_{IN}	Pin ⑤	-0.2 to 6	-0.2 to V_{CC}	v
Power Dissipation	P_c	$T_a \leq 25^\circ\text{C}$	450/330	550/500	mW
Derating ratio	—	$T_a > 25^\circ\text{C}$	4.6/333	4.4	mW/ $^\circ\text{C}$
Operating Temperature	T_{opr}		-20 to +85	-30 to +85	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	-55 to +150	$^\circ\text{C}$
Output Current	I_{os}	Pin ⑥ with laser on	—	5	mA
Output Applied Voltage	V_{os}	Pin ⑥ with laser off	—	-0.2 ~ V_{CC}	v

Electrical Characteristics

(a) IR3C01/IR3C01N

($V_{CC} = -5V, V_{EE} = -12V, T_a = 25^\circ\text{C}$)

(b) IR3C02A/IR3C02AN

($V_{CC} = 5V, V_{EE} = -5V, T_a = 25^\circ\text{C}$)

Parameter	Symbol	Condition	Rating			Units
			MIN	TYP	MAX	
Operating Supply Voltage	V_{CC}	—	4.5	5.0	5.5	v
	V_{EE}	—	-10.0	-12.0	-13.2	v
Circuit Current	I_{CC}	$V_{IN} = 0V$	—	2.8	4.5	mA
	$I_{EE OFF}$	$V_{IN} = 0V$	—	-1.3	-2.1	mA
	$I_{EE ON}$	$V_{IN} = 5V$	—	-2.8	-4.6	mA
Output Voltage	V_{OUT}	$I_o = 150mA$	3.6	4.1	—	v
		$I_o = 100mA$	3.7	4.2	—	v
		$I_o = 20mA$	3.8	4.3	—	v
Control Input Voltage (H)	V_{INH}	—	2.0	—	6	v
Control Input Voltage (L)	V_{INL}	—	0	—	0.8	v
Control Input Current	I_{IN}	$V_{IN} = 5V$	—	0.3	0.5	mA
Monitor Input pin Voltage	V_M	—	—	-6.9	—	v
Output Adjustment Pin Voltage	V_{aj}	$(V_{aj} - V_{EE}) \times \frac{35}{39}$	—	—	—	v
Power Supply Ripple Reduction	$\frac{\Delta I_o / \Delta V_{CC}}{\Delta I_o / \Delta V_{EE}}$	$f = 120Hz$	—	4×10^{-5}	—	A/v
	—	—	—	1×10^{-6}	—	A/v

Parameter	Symbol	Condition	Rating			Units	
			MIN	TYP	MAX		
Operating Supply Voltage	V_{CC}	—	4.5	5.0	5.5	v	
	V_{EE}	—	-4.5	-5.0	-5.5	v	
Circuit Current	$I_{CC ON}$	$V_{IN} = 5V$	—	2.8	-5.0	mA	
	$I_{EE ON}$		-2.0	-5.0			
	$I_{CC OFF}$	$V_{IN} = 0V$	—	4.1	7.5		
	$I_{EE OFF}$		-2.1	-3.8			
Output Voltage	V_{OUT}	$I_o = -150mA$	3.7	4.1	—	v	
		$I_o = -100mA$	3.8	4.2	—	v	
		$I_o = -20mA$	3.9	4.3	—	v	
Output Voltage	V_{OS1}	$I_{os} = 0mA, V_{IN} = 0V$	—	0.05	—	v	
	V_{OS2}	$I_{os} = 2mA, V_{IN} = 0V$	—	—	0.04	v	
Control	H	$V_{IN} H$	$V_o V_{os} L \rightarrow H$	1.43	1.53	1.63	v
'Input Voltage	L	$V_{IN} L$	$V_o V_{os} H \rightarrow L$	1.23	1.33	1.43	v
Voltage	Hysteresis	$V_{IN HY}$	$(V_{INH} - V_{INL})$	—	200	—	mV
Control Input Current	I_{IN}	—	—	-0.3	—	μA	
Monitor Input Pin Voltage	V	—	1.16	1.22	1.28	v	
Monitor Input Pin Current	I	—	—	-0.3	-5	μA	
Photo output power supply change	$\Delta I_P / \Delta V_{CC}$	$V_{EE} = -5V, V_{CC} = 5V \pm 10\%$	—	0.02	—	%/v	
	$\Delta I_P / \Delta V_{EE}$	$V_{CC} = -5V, V_{EE} = -5V \pm 10\%$	—	0.2	—	%/v	
Photo output changing width	$\Delta I_P / I_{PO}$	$T_a = -30$ to $+85^\circ\text{C}$	—	0.2	—	%	