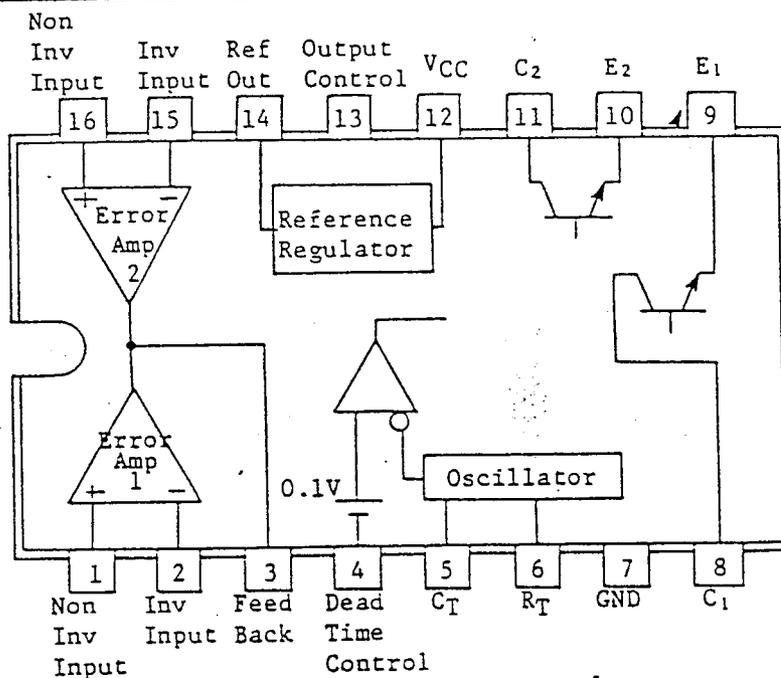


**SHARP**

### 1. General Description

The IR3M02 is an upgraded version of the IR9494 Pulse Width Modulation Type Switching Regulator Control IC with the added feature of low-voltage error preventive circuit. The IR9494 TL-494 and MB-3759 are all pin compatible.

### 2. Pin Configuration



### 3. Maximum Ratings

Parameter	Symbol	Rating	Unit	Remarks
Supply Voltage	V <sub>CC</sub>	41	V	
Input Voltage	V <sub>I</sub>	V <sub>CC</sub> + 0.3	V	Pin 1, 2, 15, 16
Output Voltage	V <sub>C</sub>	41	V	Pin 3, 11
Output Current	I <sub>C</sub>	250	mA	"
Power Dissipation (25°C)	P <sub>C</sub>	1000	mW	Derating ratio 10 mW/°C (T <sub>a</sub> > 25°C)
Operating Temperature Range	T <sub>opr</sub>	-25 ~ +85	°C	
Storage Temperature Range	T <sub>stg</sub>	-65 ~ +150	°C	

**SHARP**4. Recommended Operating Conditions

Parameter	Symbol	Rating			Unit	Remarks
		Min.	Typ.	Max.		
Supply Voltage	V <sub>CC</sub>	7	15	40	V	
Input Voltage	V <sub>I</sub>	-0.3		V <sub>CC</sub> -2	V	
Output Voltage	V <sub>C</sub>			40	V	
Output Current	I <sub>C</sub>	5	100	200	mA	
Output Current on Reference Voltage	I <sub>REF</sub>		5	10	mA	
Outgoing Current	I <sub>OSO</sub>			2	mA	Outgoing into Pin 3
Incoming Current	I <sub>OSI</sub>			0.3	mA	Incoming into Pin 3
Timing Capacitance	C <sub>T</sub>	470		68000	pF	
Timing Resistance	R <sub>T</sub>	1.8		500	K $\Omega$	
Oscillator Frequency	f	1		300	KHz	

5. Electrical Characteristics(V<sub>CC</sub>=15V, T<sub>a</sub>=25°C)

Parameter	Symbol	Rating			Unit	Conditions
		Min.	Typ.	Max.		
Reference Voltage Source						
Output Voltage	V <sub>REF</sub>	4.75	5.0	5.25	V	I <sub>O</sub> =1mA
Input Stability			2	25	mV	7V $\leq$ V <sub>CC</sub> $\leq$ 40V
Output Stability			-1	-15	mV	1mA $\leq$ I <sub>O</sub> $\leq$ 10mA
Thermal Stability			0.3	1.5	%	-25°C $\leq$ T <sub>a</sub> $\leq$ 85°C
Short-circuit Output Current	I <sub>REF</sub>	15	40		mA	
Output Inhibit Voltage on Low-Voltage Supply			4.3		V	
Above Hysteresis Width			0.3		V	

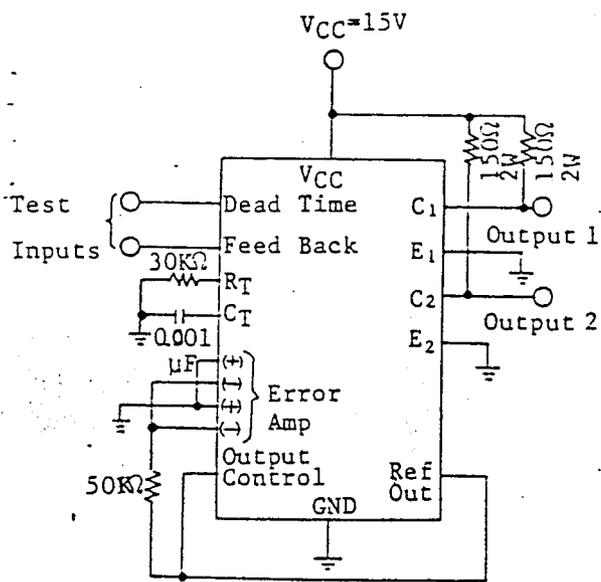
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Parameter	Symbol	Rating			Unit	Conditions
		Min.	Typ.	Max.		
Oscillator Circuit						
Frequency	f	36	40	44	KHz	$R_T=30K\Omega$ , $C_T=1000pF$
Frequency Setting Accuracy			$\pm 3$		%	$V_{CC}$ , $C_T$ , $R_T$ , $T_a$ fixed
Frequency Input Stability			$\pm 0.1$		%	$7V \leq V_{CC} \leq 40V$
Frequency Thermal Stability				3	%	$-25^\circ C \leq T_a \leq 85^\circ C$
Halt Time Setting Circuit						
Input Bias Current	$I_B$		-2	-10	$\mu A$	$0 \leq V_I \leq 5.25V$
Output Maximum Duty		40	45		%	$V_I=0$
Input Voltage (Pin 4)	$V_I$		3.0	3.3	V	0% Duty
		0			V	Max. Duty
Error Amp						
Input Offset Voltage	$V_{IO}$		2	10	mV	$V_O(\text{pin } 3)=2.5V$
Input Offset Current	$I_{IO}$		25	250	nA	$V_O(\text{pin } 3)=2.5V$
Input Bias Current	$I_B$		-0.2	-1.0	$\mu A$	$V_O(\text{pin } 3)=2.5V$
Common Input Voltage Range	$V_{CM}$	-0.3		$V_{CC}-2$	V	$7V \leq V_{CC} \leq 40V$
Open Voltage Gain	$A_v$	70	95		dB	$0.5V \leq V_O \leq 3.5V$
GB Product	G·B		800		KHz	
Common Signal Rejection Ratio	CMR	65	80		dB	$V_{CC}=40V$
Output Sink Current	$I_{OSi}$	0.3	0.7		mA	$-5V \leq V_{ID} \leq -15mV$ , $V_O=0.7V$
Output Source Current	$I_{OSO}$	-2	-10		mA	$15mV \leq V_{ID} \leq 5V$ , $V_O=3.5V$

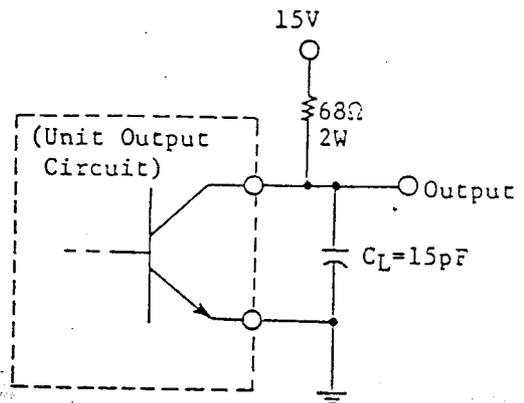
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Parameter	Symbol	Rating			Unit	Conditions
		Min.	Typ.	Max.		
Output Circuit						
Off-state Corrector Current				100	$\mu\text{A}$	$V_{CC}=40\text{V}, V_C=40\text{V}$
Off-state Emitter Current				-100	$\mu\text{A}$	$V_{CC}=V_C=40\text{V}, V_E=0$
Output Saturation Voltage	Common Emitter	$V_{CE\text{ sat}}$	1.1	1.3	V	$V_E=0, I_C=200\text{mA}$
	Common Collector	$V_{CE\text{ sat}}$	1.5	2.5	V	$V_C=15\text{V}, I_E=-200\text{mA}$
Output Control Input Current (Pin 13)			1.3	3.5	mA	$V_I=V_{REF}$
PWM Comparator						
Input Voltage (Pin 3)	$V_I$		4	4.5	V	0% Duty
Input Current (Pin 3)		0.3	0.7		mA	$V_O(\text{pin } 3)=0.7\text{V}$
Whole Circuitry				15	mA	
Static Supply Current	$I_{CC1}$		7	12	mA	$V(\text{pin } 6)=V_{REF},$ I/O Pin Open
Supply Current (Standard Connection)	$I_{CC2}$		8		mA	$V_{4-7}=2\text{V}$ Fig.1
Output Switching Characteristics						
Rise Time	$t_{rc}$		100	200	ns	Common Emitter, $R_L=68\Omega$ Fig.2
Fall Time	$t_{fc}$		25	100	ns	
Rise Time	$t_{re}$		100	200	ns	Common Collector $R_L=68\Omega$ Fig.3
Fall Time	$t_{fe}$		40	100	ns	

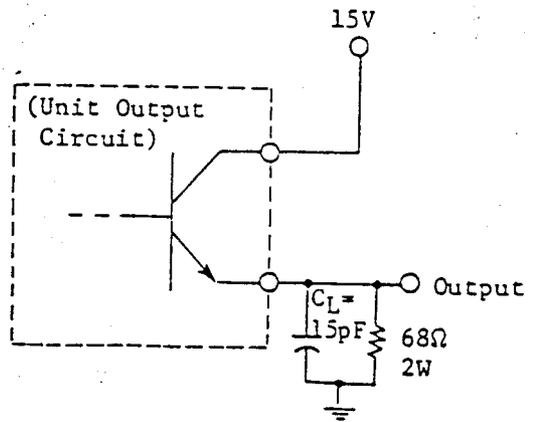
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(Fig. 1)



(Fig. 2)



(Fig. 3)

**SHARP**

## 1. Package Specification

Refer to Drawing No. AA640-025.

## 2. Markings

## 2-1. Marking contents

(1) Product name: IR3M02

(2) Company name: **SHARP**

(3) Date code:

(Example) 2 2 6 A --- Indicates the product was manufactured in the 1st week of June, 1982.

Denotes the production week. (A, B, C, D, E)

Denotes the production month. (1, 2, 3, .... 9, X, Y, Z)

Denotes the last digit of the year.

Denotes the I.D. No.

## 2-2. Marking positions

Refer to Drawing No. AA640-025.

## 2-3. Marking color

Silver

## 3. Crating Specification

## 3-1. Crating materials

Crating parts	Parts materials	Purposes
Tube	Conductive plastic ( 25 devices per tube)	Device crating
Stopper	Plastic	Device fixing
Label	Paper	Indication of product name, quantity and production date.
Inside crating case	Cardboard	Inside crating of tubes
Outside crating case	Cardboard	Outside crating of tubes

**SHARP**

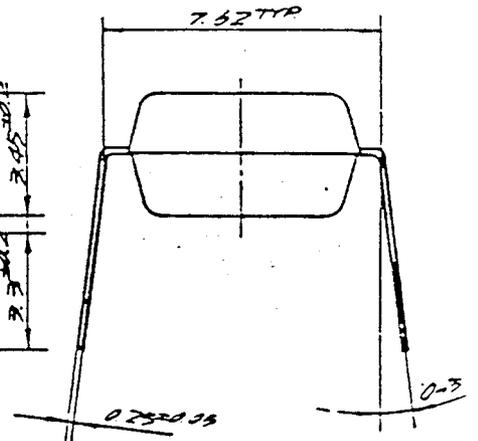
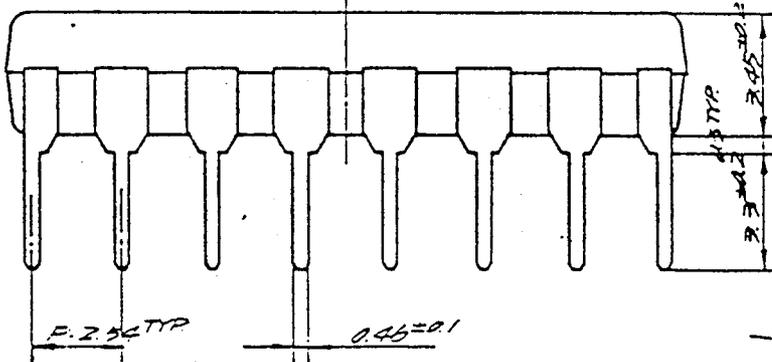
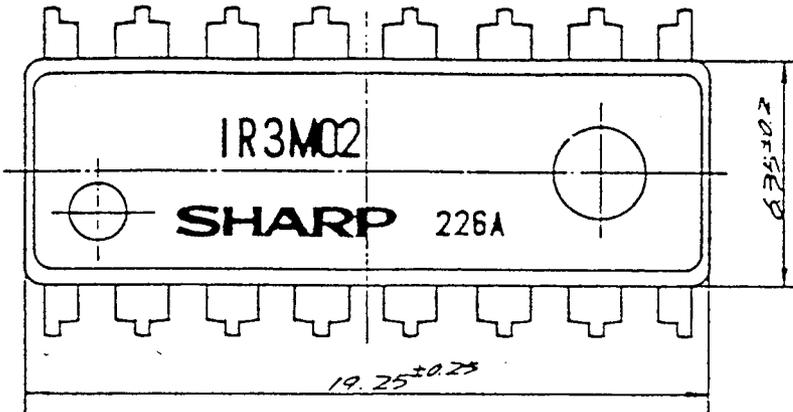
### 3-2. External view of crated products

Refer to Drawing No. BJ023-00.

#### Precaution for unpacking

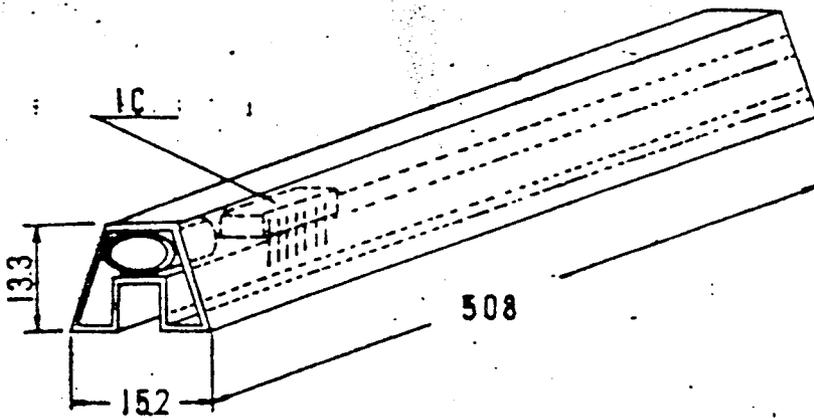
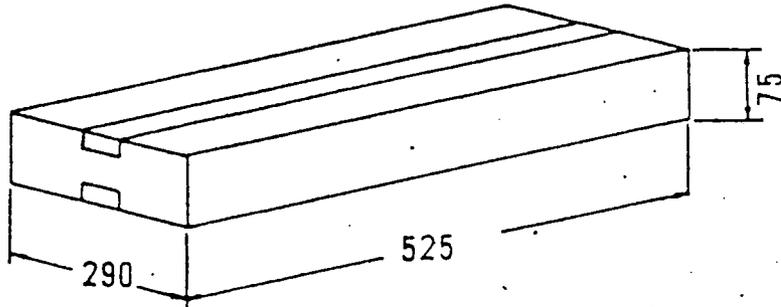
- 1) Unpacking should be done on the stand as well as a human body treated with anti-ESD.
- 2) Conductive treatment or anti-ESD treatment is given to a tube. Use the equivalent tube, if it is changed to another one.
- 3) Be sure to fix two stoppers to both ends of a tube when storage to prevent the devices from slipping.

**SHARP**



適用機种		尺寸 SCALE	單位 UNIT	△	
APPLICABLE MODEL		5/1	1 = 1/11 mm	△	
MODEL IR3M02				改訂 DATE: 改訂記号 REVERSE 用者 CHANG	
厚度 THICKNESS	数量 PIECES	材質 MATERIAL	仕上 FINISH	名称 NAME	
			Sn plating	DPT16DP	
日付 DATE		コ一卜 CODE			
設計 DRAW	製図 TRACE	検査 CHECK	承認 APPROVE	SHARP CORPORATION	
				図番 DRAWING No	AA 640-025

SHARP



△				適用機種		名 稱		IC	
△				MODEL		NAME		PACKING CASE	
年-月-日		訂正記号		IR3M02		数量		單位	
DATE		REVISE		板厚		PECES		UNIT	
材 質		仕 上		尺 寸		3角図法		M	
MATERIAL		FINISH		THICKNESS		SCALE		CODE	
設計		描 写		SHARP CORPORATION		日付 DATE		57.9.7	
DRAW		TRACE		SHARP CORPORATION		圖 番		DRAWING NO. 81023-00	
CHECK		APPROVE		SHARP CORPORATION		DRAWING NO.		81023-00	