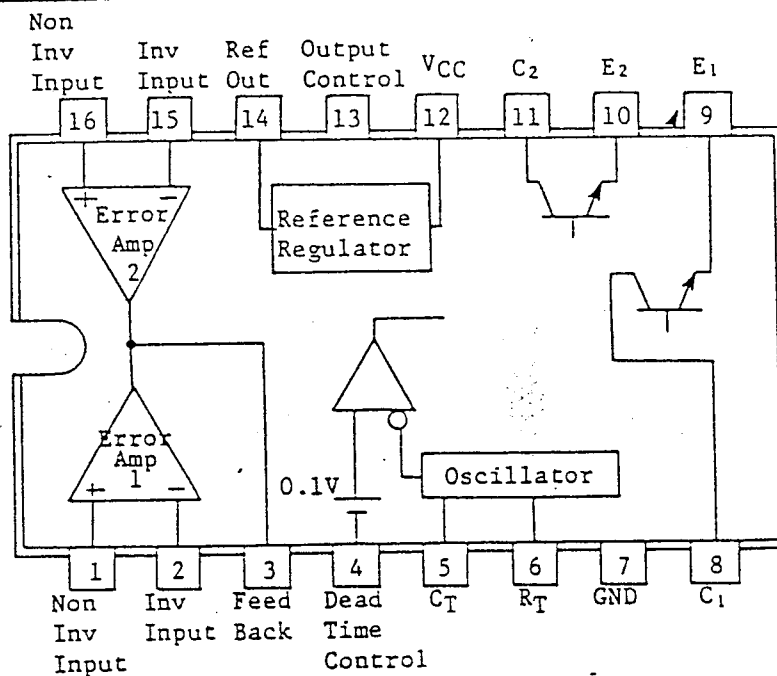


SHARP

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 _{CC} | 41 | V | |
| Input Voltage | V _I | V _{CC} + 0.3 | V | Pin 1, 2, 15, 16 |
| Output Voltage | V _C | 41 | V | Pin 3, 11 |
| Output Current | I _C | 250 | mA | " |
| Power Dissipation (25°C) | P _C | 1000 | mW | Derating ratio 10 mW/°C (T _a >25°C) |
| Operating Temperature Range | T _{opr} | -25 ~ +85 | °C | |
| Storage Temperature Range | T _{stg} | -65 ~ +150 | °C | |

SHARP4. Recommended Operating Conditions

| Parameter | Symbol | Rating | | | Unit | Remarks |
|-------------------------------------|------------------|--------|------|--------------------|------------|---------------------|
| | | Min. | Typ. | Max. | | |
| Supply Voltage | V _{CC} | 7 | 15 | 40 | V | |
| Input Voltage | V _I | -0.3 | | V _{CC} -2 | V | |
| Output Voltage | V _C | | | 40 | V | |
| Output Current | I _C | 5 | 100 | 200 | mA | |
| Output Current on Reference Voltage | I _{REF} | | 5 | 10 | mA | |
| Outgoing Current | I _{OSO} | | | 2 | mA | Outgoing into Pin 3 |
| Incoming Current | I _{OSI} | | | 0.3 | mA | Incoming into Pin 3 |
| Timing Capacitance | C _T | 470 | | 68000 | pF | |
| Timing Resistance | R _T | 1.8 | | 500 | K Ω | |
| Oscillator Frequency | f | 1 | | 300 | KHz | |

5. Electrical Characteristics(V_{CC}=15V, T_a=25°C)

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

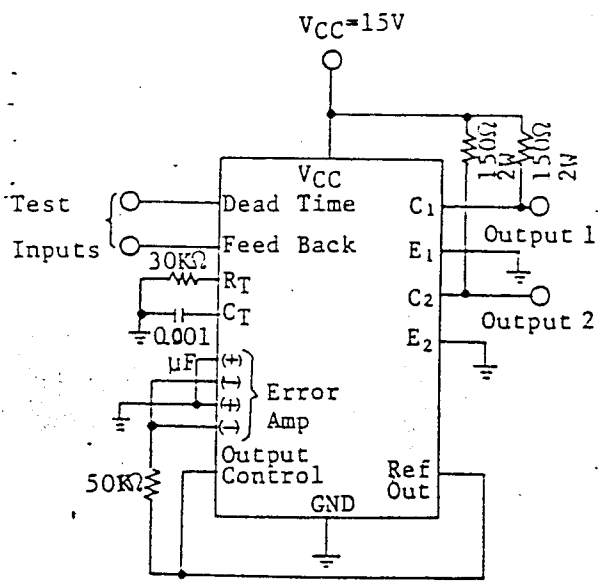
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| Parameter | Symbol | Rating | | | Unit | Conditions |
|-------------------------------|-----------|--------|-----------|------------|---------|--|
| | | Min. | Typ. | Max. | | |
| Oscillator Circuit | | | | | | |
| Frequency | f | 36 | 40 | 44 | KHz | $R_T=30K\Omega$, $C_T=1000pF$ |
| Frequency Setting Accuracy | | | ± 3 | | % | V_{CC} , C_T , R_T , T_a fixed |
| Frequency Input Stability | | | ± 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 | μA | $0 \leq V_I \leq 5.25V$ |
| 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 | μA | $V_O(\text{pin } 3)=2.5V$ |
| 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 | $15mV \leq V_{ID} \leq 5V$, $V_O=3.5V$ |

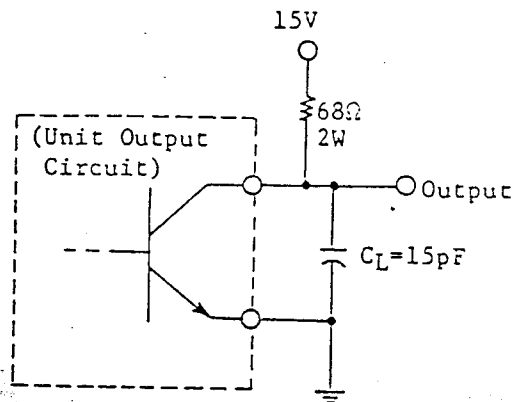
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| Parameter | Symbol | Rating | | | Unit | Conditions |
|---------------------------------------|------------------|---------------------|------|------|---------------|---|
| | | Min. | Typ. | Max. | | |
| Output Circuit | | | | | | |
| Off-state Corrector Current | | | | 100 | μA | $V_{CC}=40\text{V}, V_C=40\text{V}$ |
| Off-state Emitter Current | | | | -100 | μA | $V_{CC}=V_C=40\text{V}, V_E=0$ |
| 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 | |

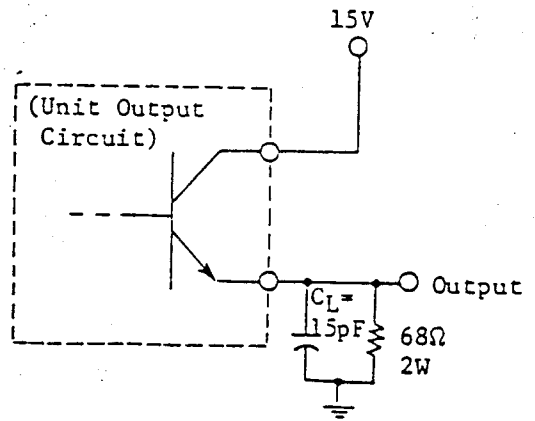
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(Fig. 1)



(Fig. 2)



(Fig. 3)

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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 |

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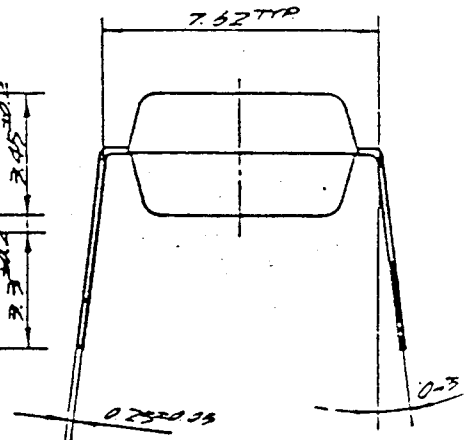
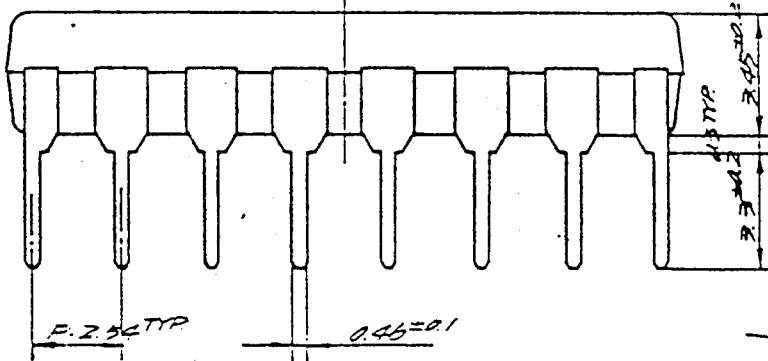
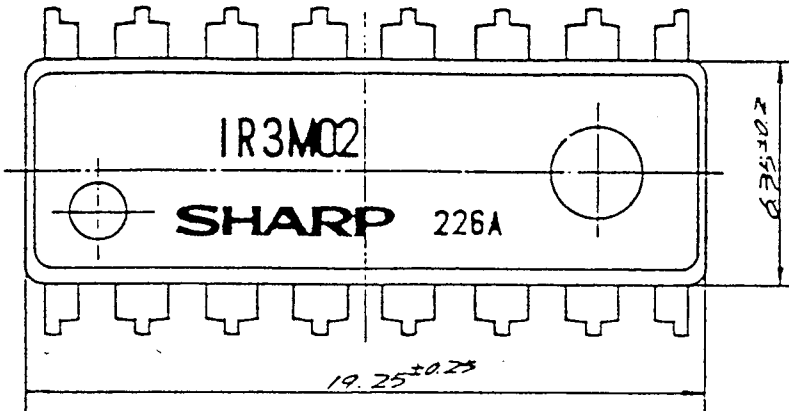
3-2. External view of crated products

Refer to Drawing No. BJ023-00.

Precaution for unpacking

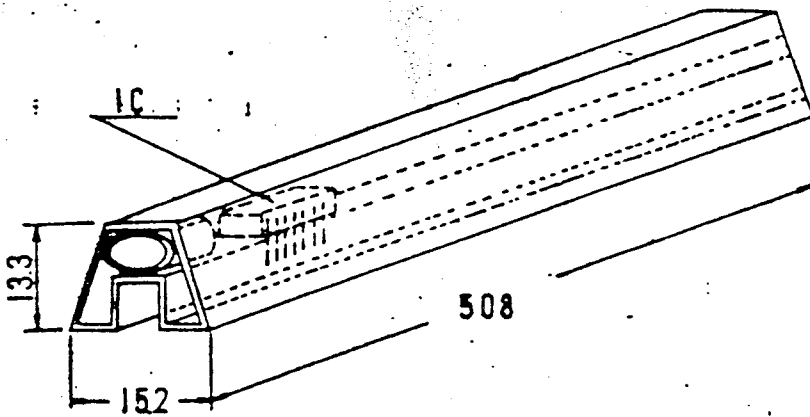
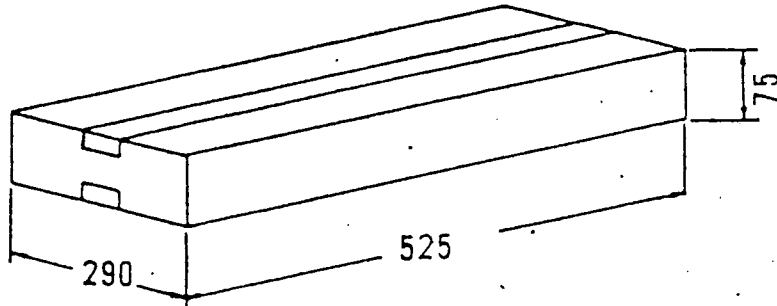
- 1) Unpacking should be done on the stand as well as a human body treated with anti-ESD.
- 2) Conductive treatment or anti-ESD treatment is given to a tube. Use the equivalent tube, if it is changed to another one.
- 3) Be sure to fix two stoppers to both ends of a tube when storage to prevent the devices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

SHARP



| | | | | | |
|-------------------|-----------|-------------|-------------|--------------------------------|--|
| 適用機種 | | 尺度 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 | |
| | | | Sn plating | NAME | |
| 日付 DATE | | | | DPT16DP | |
| 設計 DRAW | 製図 TRACE | 検査 CHECK | 承認 APPROVE | コ ー ド | |
| SHARP CORPORATION | | | | CODE | |
| | | | | 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 | |
| DRAW | | TRACE | | | | | | 57.9.7. | |
| CHECK | | APPROVE | | SHARP CORPORATION | | 圖 番 | | DRAWING NO. | |
| | | | | | | 81023-00 | | | |