

# MC34063A/MC33063A

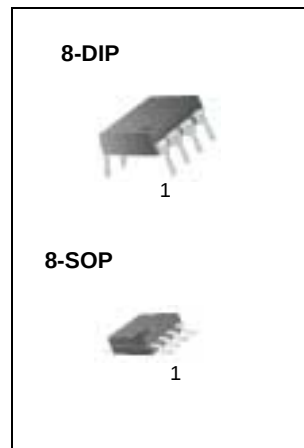
## SMPS Controller

### Features

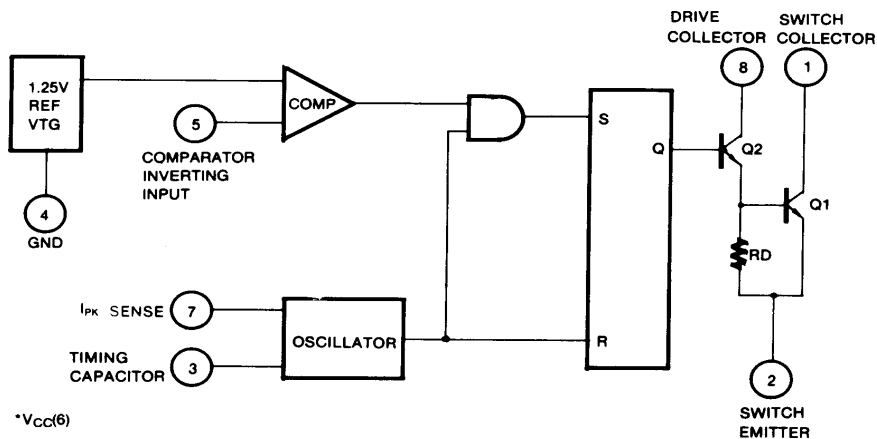
- Operation from 3.0 to 40V input
- Short circuit current limiting
- Low standby current
- Output switch current of 1.5A without external transistors
- Output voltage adjustable
- Frequency of operation from 100Hz to 100KHz
- Step up, Step down or inverting switching regulators

### Description

The MC34063A/MC33063A is a monolithic regulator sub system intended for use as DC to DC converter. This device contains a temperature compensated bandgap reference, a duty cycle control oscillator, driver and high current output switch. It can be used for step down, step up or inverting switching regulators as well as for series pass regulators.



### Internal Block Diagram



## Absolute Maximum Ratings

| Parameter                           | Symbol                | Value        | Unit |
|-------------------------------------|-----------------------|--------------|------|
| Supply Voltage                      | V <sub>CC</sub>       | 40           | V    |
| Comparator Input Voltage Range      | V <sub>I</sub> (COMP) | - 0.3 ~ + 40 | V    |
| Switch Collector Voltage            | V <sub>C</sub> (SW)   | 40           | V    |
| Switch Emitter Voltage              | V <sub>E</sub> (SW)   | 40           | V    |
| Switch Collector To Emitter Voltage | V <sub>CE</sub> (SW)  | 40           | V    |
| Driver Collector Voltage            | V <sub>C</sub> (DR)   | 40           | V    |
| Switch Current                      | I <sub>SW</sub>       | 1.5          | A    |
| Storage Temperature Range           | T <sub>STG</sub>      | - 65 ~ + 150 | °C   |

## Electrical Characteristics

(V<sub>CC</sub> = 5.0V, T<sub>A</sub> = 0°C to +70°C for the MC34063, T<sub>A</sub> = -40°C to the +85°C for the MC33063, unless otherwise specified)

| Parameter                          | Symbol                   | Conditions                                                                                                                                  | Min. | Typ. | Max. | Unit |
|------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| <b>OSCILLATOR</b>                  |                          |                                                                                                                                             |      |      |      |      |
| Charging Current                   | I <sub>CHG</sub>         | V <sub>CC</sub> = 5 to 40V<br>T <sub>A</sub> = 25°C                                                                                         | 22   | 31   | 42   | μA   |
| Discharging Current                | I <sub>DISCHG</sub>      | V <sub>CC</sub> = 5 to 40V<br>T <sub>A</sub> = 25°C                                                                                         | 140  | 190  | 260  | μA   |
| Oscillator Amplitude               | V(OSC)                   | T <sub>A</sub> = 25°C                                                                                                                       | -    | 0.5  | -    | V    |
| Discharge To Charge Current Ratio  | K                        | V <sub>7</sub> = V <sub>CC</sub> , T <sub>A</sub> = 25°C                                                                                    | 5.2  | 6.1  | 7.5  | -    |
| Current Limit Sense Voltage        | V <sub>SENSE</sub> (C.L) | I <sub>CHG</sub> = I <sub>DISCHG</sub><br>T <sub>A</sub> = 25°C                                                                             | 250  | 300  | 350  | mV   |
| <b>OUTPUT SWITCH</b>               |                          |                                                                                                                                             |      |      |      |      |
| Saturation Voltage 1 (Note)        | V <sub>CE</sub> (SAT)1   | I <sub>SW</sub> = 1.0A<br>V <sub>C</sub> (driver) = V <sub>C</sub> (SW)                                                                     | -    | 0.95 | 1.3  | V    |
| Saturation Voltage 2 (Note)        | V <sub>CE</sub> (SAT)2   | I <sub>SW</sub> = 1.0A,<br>V <sub>C</sub> (driver) = 50mA                                                                                   | -    | 0.45 | 0.7  | V    |
| DC Current Gain (Note)             | G <sub>I</sub> (DC)      | I <sub>SW</sub> = 1.0A,<br>V <sub>CE</sub> = 5.0V, T <sub>A</sub> = 25°C                                                                    | 50   | 180  | -    | -    |
| Collector off State Current (Note) | I <sub>C</sub> (OFF)     | V <sub>CE</sub> = 40V, T <sub>A</sub> = 25°C                                                                                                | -    | 0.01 | 100  | μA   |
| <b>COMPARATOR</b>                  |                          |                                                                                                                                             |      |      |      |      |
| Threshold Voltage                  | V <sub>TH</sub>          | -                                                                                                                                           | 1.21 | 1.24 | 1.29 | V    |
| Threshold Voltage Line Regulation  | ΔV <sub>TH</sub>         | V <sub>CC</sub> = 3 to 40V                                                                                                                  | -    | 2.0  | 5.0  | mV   |
| Input Bias Current                 | I <sub>BIAS</sub>        | V <sub>I</sub> = 0V                                                                                                                         | -    | 50   | 400  | nA   |
| <b>TOTAL DEVICE</b>                |                          |                                                                                                                                             |      |      |      |      |
| Supply Current<br>MC34063          | I <sub>CC</sub>          | V <sub>CC</sub> = 5 to 40V<br>C <sub>T</sub> = 0.001μF<br>V <sub>7</sub> = V <sub>CC</sub> , V <sub>5</sub> > V <sub>TH</sub><br>pin2 = GND | -    | -    | 4.0  | mA   |
| MC33063                            |                          |                                                                                                                                             | -    | -    | 5.0  |      |

**Note :**

Output switch tests are performed under pulsed conditions to minimize power dissipation

## Typical Performance Characteristics

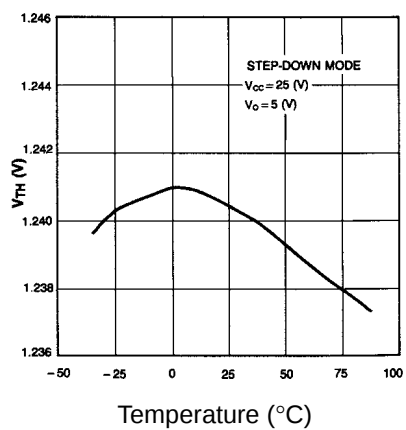


Figure 1. Temperature Drift ( $V_{TH}$ )

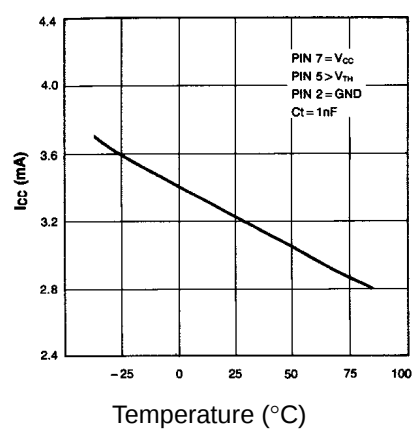
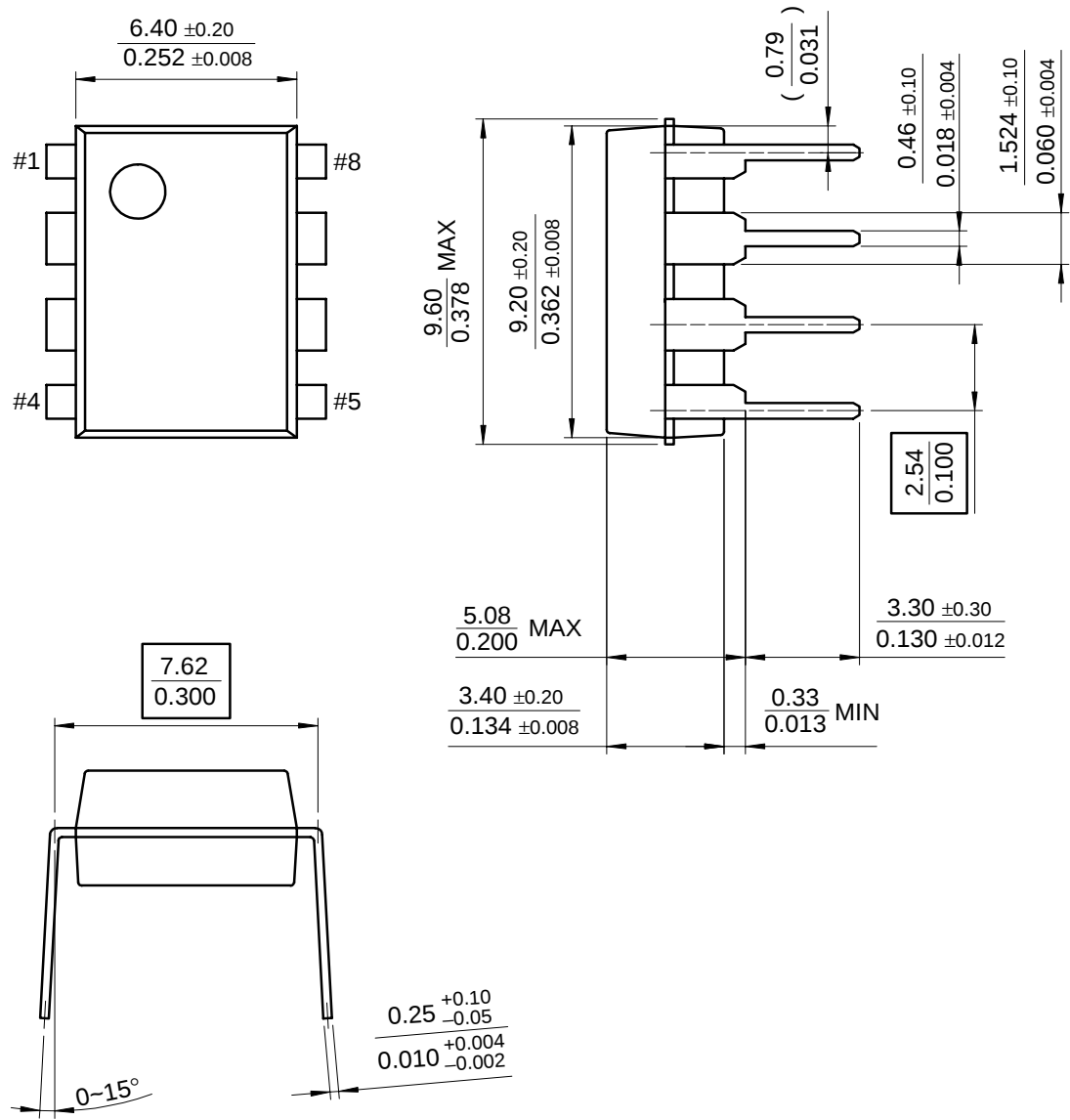


Figure 2. Temperature Drift ( $I_{OC}$ )

Mechanical Dimensions

Package

8-DIP





## Ordering Informatio

| Product Number | Package | Operating Temperature |
|----------------|---------|-----------------------|
| MC34063AP      | 8-DIP   | 0 ~ + 70°C            |
| MC34063AD      | 8-SOP   |                       |
| MC33063AP      | 8-DIP   | -40 ~ + 85°C          |
| MC33063AD      | 8-SOP   |                       |



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