# CM8561

## 1.5A SINK & SOURCE ADJUSTABLE LINEAR BUS TERMINATOR

## GENERAL DESCRIPTION

The CM8561 is a low cost linear regulator designed to provide a desired output voltage or termination voltage for various applications by converting voltage supplies ranging from 1.6V to 6.0V. The desired output voltage could be programmable by two external voltage divider resistors.

The CM8561 is capable of sourcing or sinking up to 1.5A of current while regulating an output VOUT voltage to within 2% (DDR-I), 3% (DDR-II) or less.

The CM8561 provides low profile 8-pin SOIC package to save system space.

## FEATURES

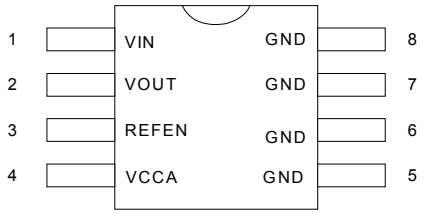
- Ideal for DDR-I and DDR-II
- 8-pin SOIC package
- Source and sink up to 1.5A, no heat sink required
- Integrated power MOSFETs
- Programmable output voltage by external resistors
- Output voltage could go down to 0.6V
- Iccq at VCCA ~ 230uA
- Current limit protection and Short Circuit protection
- Thermal shutdown protection
- Shutdown for standby or suspend mode operation
- Minimum external components

## APPLICATIONS

- Mother Board
- PCI/AGP Graphics
- Game/ Play Station
- Set Top Box
- IPC
- SCSI-III Bus terminator

## PIN CONFIGURATION

SOP-8 (S08)
Top View



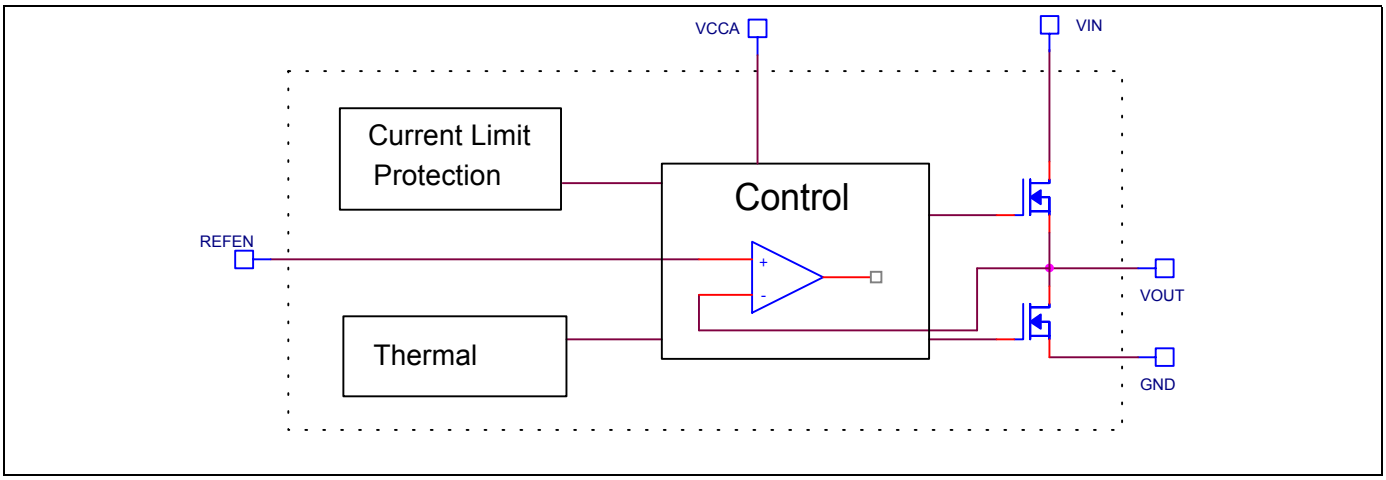
## PIN DESCRIPTION

| Pin No. | Symbol | Description | Operating Rating | | | |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Unit |
| 1 | VIN | Input Power | | 2.5/1.8 | 6 | V |
| 2 | VOUT | Output Voltage | | | 6 | V |
| 5,6,7,8 | GND | Ground | | | | |
| 3 | REFEN | Reference Voltage Input and Chip Enable | | | VCCA-1.9 | V |
| 4 | VCCA | Voltage supply for internal circuits | | | 6 | V |

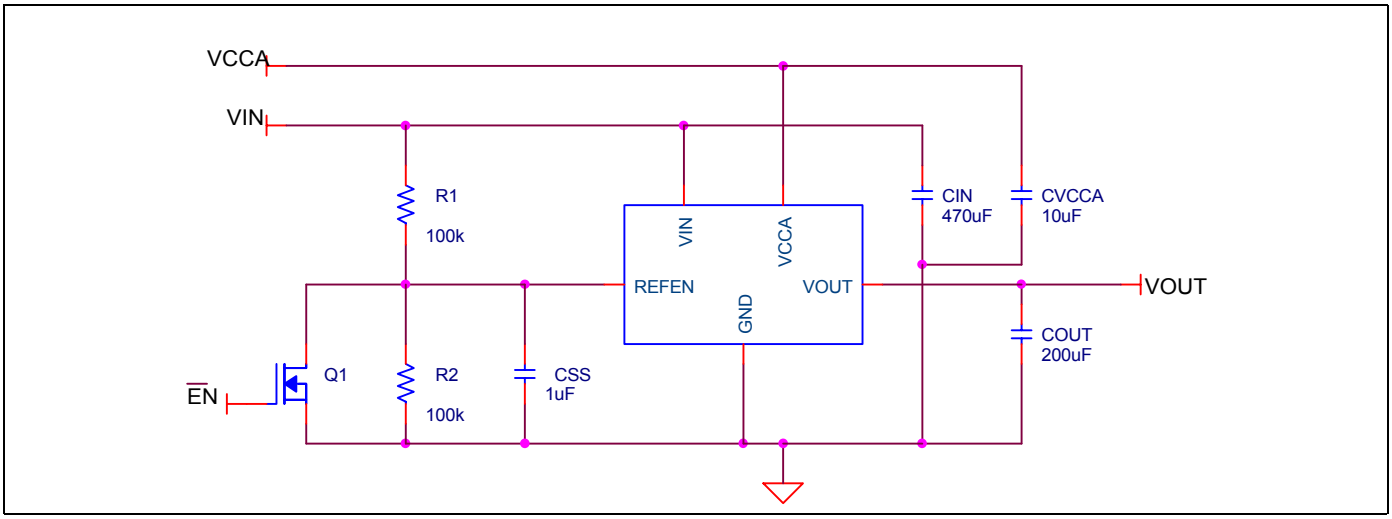
## ORDERING INFORMATION

| Part Number | Temperature Range | Package |
|---|---|---|
| CM8561IS | -40℃ to 85℃ | 8-Pin SOP (S08) |

## BLOCK DIAGRAM




## APPLICATION CIRCUITS



## ABSOLUTE MAXIMUM RATINGS

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

VIN, VCCA …….....……..……7V

Output RMS Current, Source or Sink .....……..…….....…..1.5A

Storage Temperature …….....……. -65°C to 125°C

Lead Temperature (Soldering, 5 sec)…….. 260°C

Thermal Resistance ( $\theta_{JC}$ )….. ……..…….. .15.7°C/W

## ELECTRICAL CHARACTERISTICS **(Unless otherwise stated, these specifications apply $T_A$=25°C; VIN=+2.5V and VCCA=+3.3V, VREFEN=1.25V)** maximum ratings are stress ratings only and functional device operation is not implied. (Note 1)

| Symbol | Parameter | Test Conditions | CM8561 | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{OS}$ | Output Offset Voltage | $I_{OUT}$=0A (Note 2) | -20 | | 20 | mV |
| $I_{OP}$ | Operating Current at VIN | No load, Cout=200uF | | | 1 | mA |
| $\lvert \Delta V_{LOAD} \rvert$ | Load Regulation (DDR I/II) | $I_L$: 0A -> 1.5A | | 0.8/1.2 | 2/3 | % |
| | | $I_L$: 0A -> -1.5A | | 0.8/1.2 | 2/3 | % |
| $I_{CCQ}$ | Quiescent Current at $V_{CCA}$ | At Room Temp. | | 190 | 230 | µA |
| $I_{SHDN}$ | Current in Shutdown Mode | REFEN<0.2V, $R_L$ = 10 Ohm | | 90 | 110 | µA |
| $V_{IN}$ | Input Voltage Range (Note 3) | No Load | | 2.5/1.8 | 6 | V |
| $V_{CCA}$ | Input Voltage Range (Note 3) | $R_L$ = 10 Ohm | 3.15 | 3.3 | 6 | V |
| **SHORT CIRCUIT PROTECTION** | | | | | | |
| $I_{LIMIT}$ | Current Limit | | | 5 | | A |
| $I_{SC,VIN}$ | Short Current | Sinking | 1.5 | | | A |
| $I_{SC,GND}$ | Short Current | Sourcing | 1.5 | | | A |
| **OVER THERMAL PROTECTION** | | | | | | |
| THSD | Thermal Shutdown Temperature | 3.15V<=VCCA<=6V | 125 | 150 | 155 | ℃ |
| | Thermal Shutdown Hysteresis | | 25 | 30 | 35 | ℃ |
| **REFEN FUNCTION** | | | | | | |
| | REFEN Threshold | VREFEN < VIN<br>VREFEN < VCCA – 1.9V | 0.4 | 0.5 | 0.6 | V |

**Note 1:** Limits are guaranteed by 100% testing, sampling, or correlation with worst case test conditions

**Note 2:** VOS = VREFEN – VOUT

**Note 3:** Keep VCCA >= VIN and VCCA >= VREFEN + 1.9V on operation power on and power off sequences

**Note 4:** Guaranteed by design, not 100% test

## FUNCTIONAL DESCRIPTION

The CM8561 is a linear regulator that is capable of sinking and sourcing 1.5A of current without an external heat sink.

The CM8561 integrates power MOSFETs that are capable of source and sink 1.5A of current while maintaining excellent voltage regulation. The output voltage can be regulated within 3% or less by using the external feedback. Separate voltage supply inputs have been added to fit applications with various power supplies for the databus and power buses.

**OUTPUTS**

The output voltage pins (VOUT) are tied to the databus, address, or clock lines via an external inductor. Output voltage is determined by the VIN.

**INPUTS**

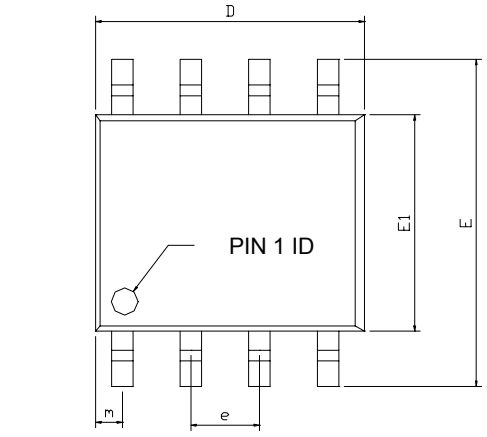
The input voltage pins (VIN) determine the output voltages (VOUT). At CM8561, the desired output voltage could be programmable by two external voltage divider resistors. VIN is suggested to connect to VDDQ of memory module for better tracking with memory VDDQ.

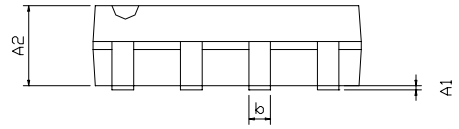
**OTHER SUPPLY VOLTAGES**

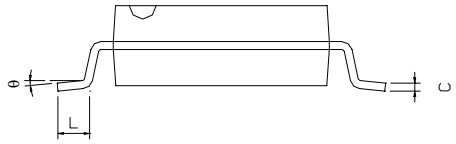
VCCA provide the voltage supply to the logic section and internal error amplifiers of CM8561.

## PACKAGE DIMENSION

**8-Pin SOP (S08)**




| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHS | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A1 | 0.10 | --- | 0.25 | 0.004 | --- | 0.010 |
| A2 | 1.40 | --- | 1.55 | 0.055 | --- | 0.061 |
| b | 0.30 | --- | 0.51 | 0.012 | --- | 0.020 |
| C | 0.15 | --- | 0.26 | 0.006 | --- | 0.010 |
| D | 4.60 | --- | 5.06 | 0.169 | --- | 0.199 |
| E | 5.79 | --- | 6.20 | 0.228 | --- | 0.244 |
| E1 | 3.76 | --- | 4.01 | 0.148 | --- | 0.158 |
| e | --- | 1.27 | --- | --- | 0.050 | --- |
| L | 0.38 | --- | 0.69 | 0.015 | --- | 0.035 |
| m | 0.43 | --- | 0.69 | 0.017 | --- | 0.027 |
| θ | 0° | --- | 8° | 0° | --- | 8° |

## IMPORTANT NOTICE

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