

### General Description

The MP1251 and MP1252 are voltage sources with SMBus interfaces. These ICs have a D/A converter that outputs a voltage based on an internal reference. The MP1251 output voltage has 32 voltage steps from 0.0V to 2.0V. The MP1252 output voltage has 32 voltage steps from 0.0V to 1.9V.

The MP1251 and MP1252 have three additional outputs based on the unused three lower bits on the SMBus interface. These outputs can be used for additional controls.

### Features

- D/A converter.
- Series/Synchronous SMBus interface
- 32 step output voltage control
- Three outputs from unused SMBus data bits.
- 2% Internal Reference

### Applications

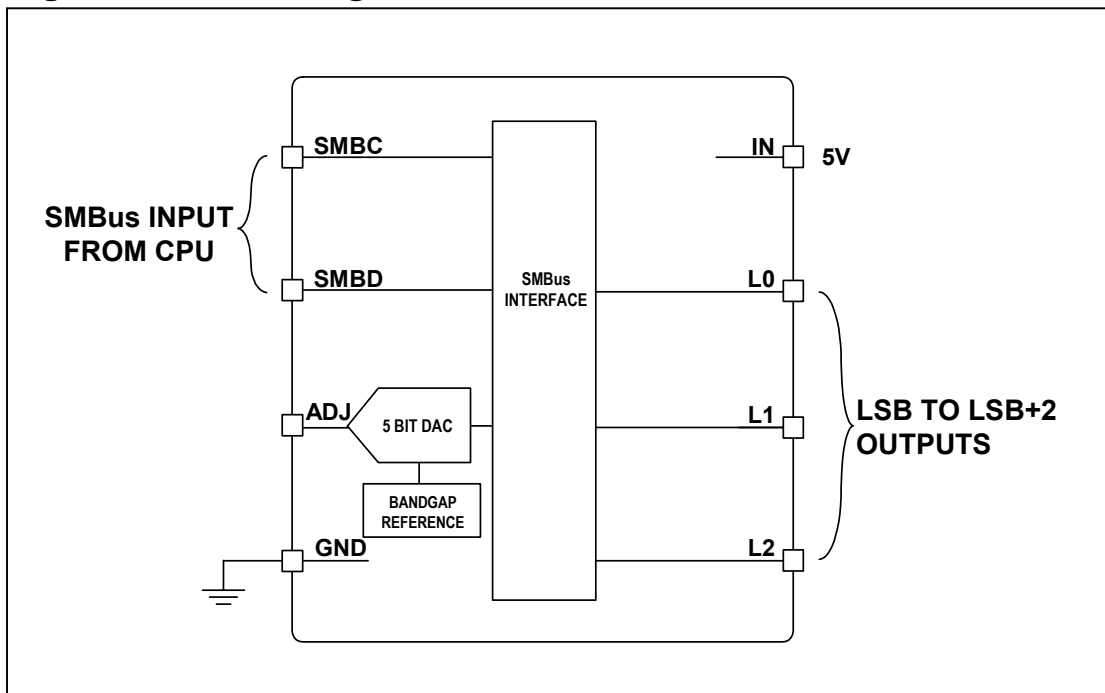
- Ideal for brightness control of CCFL in notebook applications

### Ordering Information

Part Number *	Package	Temperature
MP1251DS	SOIC8	-40°C to +85°C
MP1252DS	SOIC8	-40°C to +85°C

\* For Tape & Reel use suffix - Z (i.e., MP1251DS-Z)

Figure 1: Block Diagram



### Absolute Maximum Ratings

$V_{IN}$	7.0V
Logic Inputs	-0.3V to $V_{IN} + 0.3V$
Junction Temperature	150Deg°C
Storage Temp	-55Deg°C to 150Deg°C

### Recommended Operation Conditions

$V_{IN}$	4.5V to 5.5V
Operating Temperature	-40 to +85°C

### Thermal Characteristics

Thermal Resistance SOIC8	105°C/W
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### Electrical Characteristics (Unless otherwise specified $T_A = 25^\circ\text{C}$ )

Parameters	Symbol	Conditions	Min	Typ	Max	Units
<b>Dimming D/A Output (ADJ- Floating)</b>						
Maximum Level (MP1251)		$V_{IN} = 5V$ , Data=00000xxx	1.925	2.0	2.075	V
Minimum Level (MP1251)		$V_{IN} = 5V$ , Data=11111xxx	0.0	0.05	0.1	V
Maximum Level (MP1252)		$V_{IN} = 5V$ , Data=00000xxx	1.825	1.9	1.975	V
Minimum Level (MP1252)		$V_{IN} = 5V$ , Data=11111xxx	0.0	0.05	0.1	V
Power-on Reset Default				3.5		V
Setting Time				10		$\mu\text{S}$
D/A output levels				32		
<b>Supply Voltage</b>						
$V_{IN}$ current – Active			150	200	300	$\mu\text{A}$

Note:  $V_{ADJ}(\text{DATA}[7:3]) = (1 - (\text{DATA}[7:3] / 31)) * \text{Maximum Level}$

### Pin Description

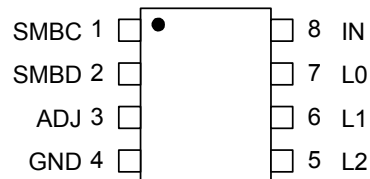


Table 1: Pin Designators

Pin #	Pin Name	Pin Function
1	SMBC	SMBus Clock Input/Output
2	SMBD	SMBus Data Input/Output
3	ADJ	The output of the brightness D/A converter.
4	GND	Ground
5	L2	Output of data bus bit D2
6	L1	Output of data bus bit D1
7	L0	Output of data bus bit D0
8	IN	Supply Voltage

## Two-Wire Bus Register Description

The register map between the SMBus interface and the SMBus Host:

### Register Map

#### Address

SMBus Protocol: Read or Write Byte

Input/Output: Byte-bit flags mapped as follows:

# Bits	Name	R / W	Value	Description
8	A7 - A0	W	01011000 (58h)	<ol style="list-style-type: none"> <li>Bits A7 – A1 are the base address.</li> <li>A0 is the read selection bit. A0 is zero for write.</li> <li>The host outputs both write and read addresses.</li> </ol>
		R	01011001 (59h)	

#### Index

# Bits	Name	R / W	Value	Description
8	B7 - B0	W	10101010 (AAh)	<ol style="list-style-type: none"> <li>The host outputs the write index.</li> <li>The MP1251 or MP1252 outputs the read index.</li> </ol>
		R	00000000 (00h)	

#### Brightness

# Bits	Name	R / W	Default	Description
8	D7 - D0	R / W	00000000	<ol style="list-style-type: none"> <li>Bits D7 – D3 contain the brightness level settings.</li> <li>Only D7 – D3 are used to step the 32 levels.</li> <li>When D7 – D0 = 1111 1xxx, the MP1251 or MP1252 outputs the minimum voltage. When D7 – D0 = 0000 0xxx, the outputs are at a maximum level.</li> <li>D2 – D0 are outputted as L2 – L0 for the customer use.</li> <li>The host outputs the write brightness.</li> <li>The MP1251 or MP1252 outputs the read brightness.</li> </ol>

Note:  $V_{ADJ}(\text{DATA}[7:3]) = (1 - (\text{DATA}[7:3] / 31)) * \text{Maximum Level}$

**Communication Protocol**

The MP1251 or MP1252 uses “Write Byte Protocol” and “Read Byte Protocol” to communicate with the host. The “Write Byte Protocol” can be used by the host to write to the Data Register, while the “Read Byte Protocol” is used to read data from the Data Register. The base address for the SMBus is 58hex.

MP1251 or MP1252 to Master

Master to MP1251 or MP1252

**Two Wire Read Protocols**

	ADDRESS			INDEX			DATA BYTE		
	7	0							
<b>S</b>	<b>0101100</b>	<b>1</b>	<b>A</b>	<b>000000</b>	<b>0</b>	<b>A</b>	<b>Brightness</b>	<b>A</b>	<b>P</b>
Start Condition		Read							Stop Condition

A = Acknowledge

**Two Wire Write Protocols**

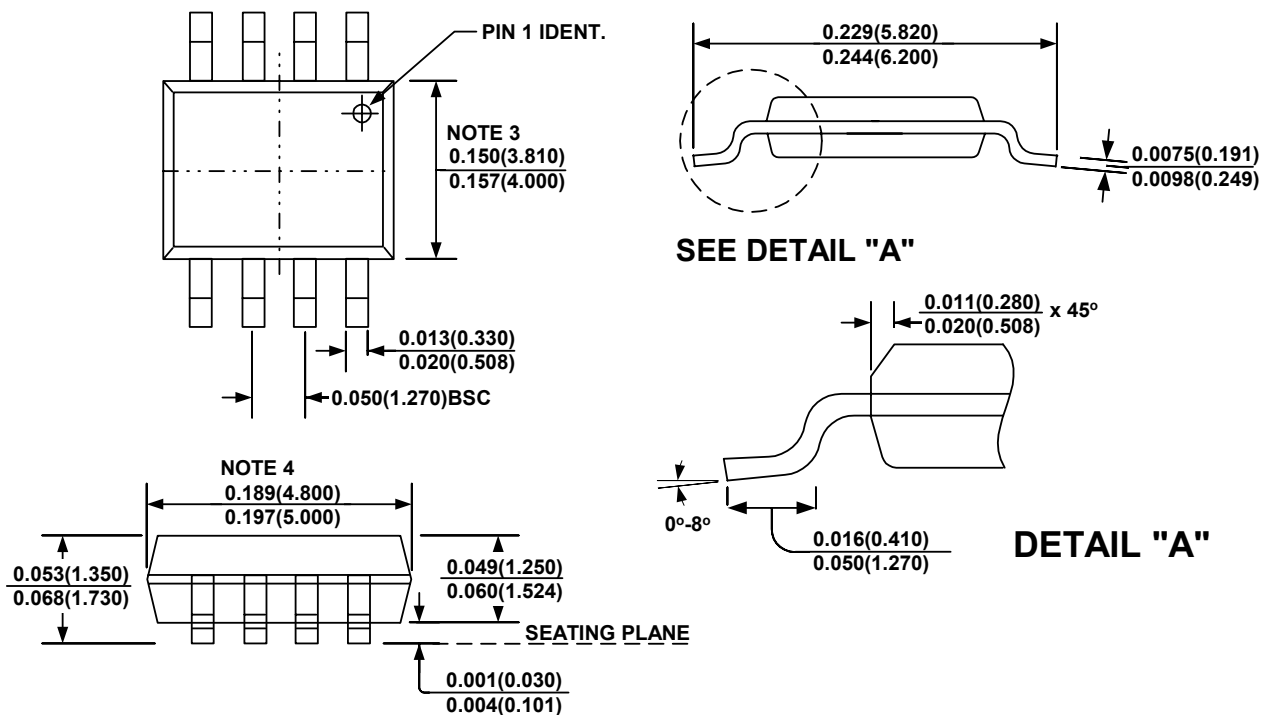
**Write D/A Output**

	ADDRESS			INDEX			DATA BYTE		
	7	0							
<b>S</b>	<b>0101100</b>	<b>0</b>	<b>A</b>	<b>1010101</b>	<b>0</b>	<b>A</b>	<b>Brightness</b>	<b>A</b>	<b>P</b>
Start Condition		Read							Stop Condition

A = Acknowledge

### Packaging

#### SOIC8



**NOTE:**

- 1) Control dimension is in inches. Dimension in bracket is millimeters.
- 2) The length of the package does not include mold flash. Mold flash shall not exceed 0.006in. (0.15mm) per side. With the mold flash included, over-all length of the package is 0.2087in. (5.3mm) max.
- 3) The width of the package does not include mold flash. Mold flash shall not exceed 0.10in. (0.25mm) per side. With the mold flash included, over-all width of the package is 0.177in. (4.5mm) max.

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