



## MIC94001

### P-Channel MOSFET

Not Recommended for New Designs

### General Description

The MIC94001 is a silicon gate P-channel MOSFET designed for low on-resistance, high-side switch applications. The MIC94001 has a maximum on-resistance of  $0.4\Omega$  at 4.5V gate-to-source voltage.

Improved ESD protection is provided by the gate protection network shown in the schematic diagram.

The MIC94001 is supplied in a low-profile version of the 8-lead SOIC package.

The MIC94001 die can be assembled in a 4-terminal configuration with the body not shorted to the source for use in analog switch applications. Contact the factory for more information.

### Features

- 15V minimum drain-to-source breakdown
- $0.4\Omega$  maximum on-resistance at 4.5V gate-to-source
- Functional at 2.7V gate-to-source
- 0.063" maximum height

### Applications

- High-side switch
- Power management
- Stepper motor control
- 1.8" PCMCIA disk-drive  $V_{CC}$  switch

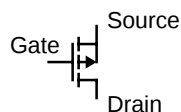
### Ordering Information

| Part Number | Temperature Range*                              | Package      |
|-------------|-------------------------------------------------|--------------|
| MIC94001BLM | $-55^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ | 8-lead SOIC† |

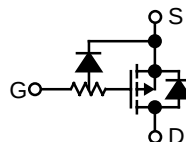
\* Operating Junction Temperature

† Low Profile Leads, see Package Information

### Schematic Information

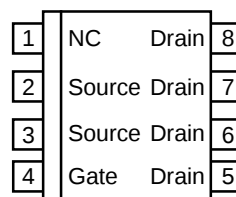


#### Schematic Symbol



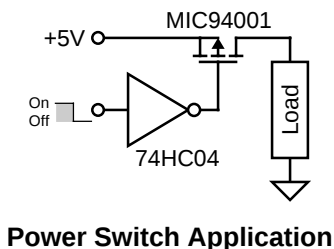
#### Schematic Diagram

### Pin Configuration



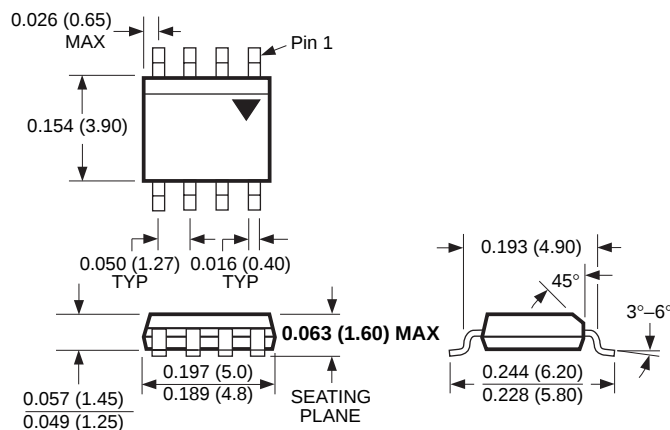
#### 8-lead Low-Profile SOIC Package (LM)

### Typical Application



#### Power Switch Application

### Package Information



## Absolute Maximum Ratings

Voltage and current values are negative. Signs not shown for clarity.

|                                      |                                             |
|--------------------------------------|---------------------------------------------|
| Drain-to-Source Voltage .....        | 15V                                         |
| Gate-to-Source Voltage .....         | 15V                                         |
| Continuous Drain Current             |                                             |
| $T_A = 25^\circ\text{C}$ .....       | 1.6A                                        |
| $T_A = 100^\circ\text{C}$ .....      | 1A                                          |
| Operating Junction Temperature ..... | $-55^\circ\text{C}$ to $+150^\circ$         |
| Storage Temperature .....            | $-55^\circ\text{C}$ to $+150^\circ\text{C}$ |

### Total Power Dissipation

|                                 |      |
|---------------------------------|------|
| $T_A = 25^\circ\text{C}$ .....  | 1W   |
| $T_A = 100^\circ\text{C}$ ..... | 0.4W |

### Thermal Resistance

|                     |                       |
|---------------------|-----------------------|
| $\theta_{JA}$ ..... | $125^\circ\text{C/W}$ |
| $\theta_{JC}$ ..... | $76^\circ\text{C/W}$  |

### Lead Temperature

|                            |                      |
|----------------------------|----------------------|
| 1/16" from case, 10s ..... | $+300^\circ\text{C}$ |
|----------------------------|----------------------|

## Electrical Characteristics $T_A = 25^\circ\text{C}$ unless noted. All values are negative. Signs not shown for clarity.

| Symbol       | Parameter                       | Condition                                                                | Min | Typ  | Max  | Units         |
|--------------|---------------------------------|--------------------------------------------------------------------------|-----|------|------|---------------|
| $V_{BDSS}$   | Drain-Source Breakdown Voltage  | $V_{GS} = 0\text{V}$ , $I_D = 250\mu\text{A}$                            | 15  |      |      | V             |
| $V_{GS}$     | Gate Threshold Voltage          | $V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$                               | 1   |      | 3    | V             |
| $I_{GSS}$    | Gate-Body Leakage               | $V_{DS} = 0\text{V}$ , $V_{GS} = 15\text{V}$ , <b>Note 2</b>             |     |      | 100  | nA            |
| $I_{DSS}$    | Zero Gate Voltage Drain Current | $V_{DS} = 15\text{V}$ , $V_{GS} = 0\text{V}$                             |     |      | 25   | $\mu\text{A}$ |
|              |                                 | $V_{DS} = 15\text{V}$ , $V_{GS} = 0\text{V}$ , $T_J = 125^\circ\text{C}$ |     |      | 250  | $\mu\text{A}$ |
| $I_{D(ON)}$  | On-State Drain Current          | $V_{DS} \geq 10\text{V}$ , $V_{GS} = 10\text{V}$ , <b>Note 1</b>         |     | 5.5  |      | A             |
| $R_{DS(ON)}$ | Drain-Source On-State Resist.   | $V_{GS} = 4.5\text{V}$ , $I_D = 50\text{mA}$                             |     | 0.35 | 0.40 | $\Omega$      |
| $g_{FS}$     | Forward Transconductance        | $V_{DS} = 15\text{V}$ , $I_D = 1\text{A}$ , <b>Note 1</b>                |     | 0.7  |      | S             |

**Note 1:** Pulse Test: Pulse Width  $\leq 300\mu\text{sec}$ , Duty Cycle  $\leq 2\%$

**Note 2:** ESD gate protection diode conducts during positive gate-to-source voltage excursions.

