

#### DESCRIPTION

The LX8941 is an adjustable, low dropout regulator rated for more than 1A of output current. It can regulate with as low as 0.8V headroom between the input and output voltages, at 1A output current, thus minimizing power dissipation. In addition, it can be used in applications where worst case supplies require a low input output differential to maintain regulation.

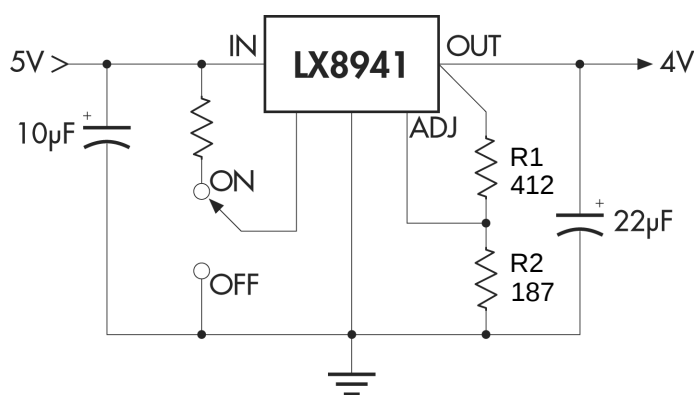
This feature makes it ideal for some processor applications that require 4V operation from a 5V supply. In addition, the LX8941 provides an on/off switch that reduces the IC quiescent current when activated, making it ideal for battery operated applications.

#### KEY FEATURES

- 2% Internally Trimmed Output
- Output Current In Excess of 1A
- Input-Output Differential Less Than 0.8V @ 1A
- Reverse Battery Protection
- Short Circuit Protection
- Internal Thermal Overload Protection
- Available in 5-Lead Plastic TO-220 & Surface-Mount TO-263

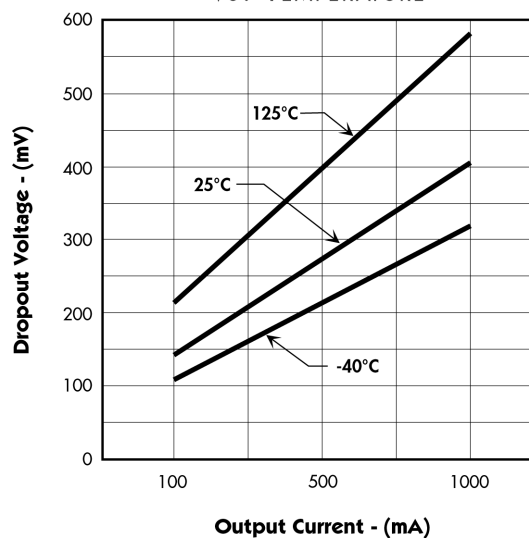
**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

#### PRODUCT HIGHLIGHT



$$V_O = V_{ADJ} \times \left(1 + \frac{R1}{R2}\right) + I_{ADJ} \times R1$$

DROPOUT VOLTAGE VS. OUTPUT CURRENT  
VS. TEMPERATURE



#### PACKAGE ORDER INFO

| T <sub>A</sub> (°C) | P | Plastic TO-220<br>5-Pin | DD | Plastic TO-263<br>5-Pin |
|---------------------|---|-------------------------|----|-------------------------|
| 0 to 70             |   | LX8941CP                |    | LX8941CDD               |

Note: Available in Tape & Reel.  
Append the letter "T" to the part number. (i.e. LX8941CDDT)

#### ABSOLUTE MAXIMUM RATINGS (Note 1)

|                                          |                |
|------------------------------------------|----------------|
| Input Voltage ( $V_{IN}$ )               | 26V            |
| Operating Junction Temperature           |                |
| Plastic (P, DD Package)                  | 150°C          |
| Storage Temperature Range                | -65°C to 150°C |
| Lead Temperature (Soldering, 10 seconds) | 300°C          |

Note 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

#### THERMAL DATA

##### P PACKAGE:

|                                                       |         |
|-------------------------------------------------------|---------|
| THERMAL RESISTANCE-JUNCTION TO TAB, $\theta_{JT}$     | 4.5°C/W |
| THERMAL RESISTANCE-JUNCTION TO AMBIENT, $\theta_{JA}$ | 60°C/W  |

##### DD PACKAGE:

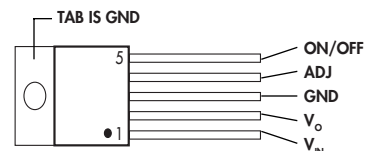
|                                                       |         |
|-------------------------------------------------------|---------|
| THERMAL RESISTANCE-JUNCTION TO TAB, $\theta_{JT}$     | 4.5°C/W |
| THERMAL RESISTANCE-JUNCTION TO AMBIENT, $\theta_{JA}$ | 60°C/W  |

Junction Temperature Calculation:  $T_J = T_A + (P_D \times \theta_{JA})$ .

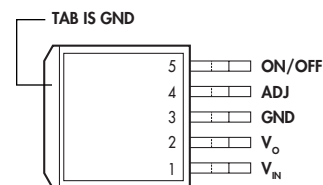
The  $\theta_{JA}$  numbers are guidelines for the thermal performance of the device/pc-board system.

All of the above assume no ambient airflow.

#### PACKAGE PIN OUTS

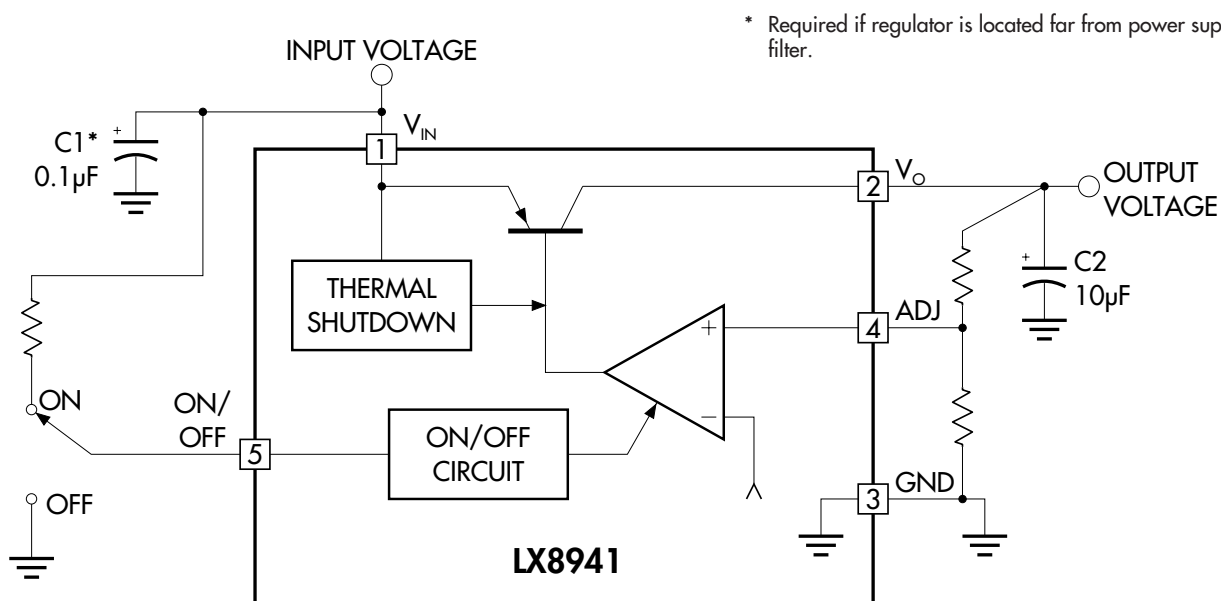


**P PACKAGE**  
(Top View)



**DD PACKAGE**  
(Top View)

#### BLOCK DIAGRAM



## ADJUSTABLE LOW DROPOUT REGULATOR

## PRELIMINARY DATA SHEET

## RECOMMENDED OPERATING CONDITIONS

| Parameter                                                         | Symbol   | Recommended Operating Conditions |      |      | Units   |
|-------------------------------------------------------------------|----------|----------------------------------|------|------|---------|
|                                                                   |          | Min.                             | Typ. | Max. |         |
| Input Voltage (Note 2)                                            | $V_{IN}$ | 3.8                              |      | 26   | V       |
| Load Current (with adequate heatsinking)                          |          | 5                                |      | 1000 | mA      |
| Input Capacitor ( $V_{IN}$ to GND)                                |          | 0.1                              |      |      | $\mu$ F |
| Output Capacitor with ESR of $10\Omega$ max., ( $V_{OUT}$ to GND) |          | 10                               |      |      | $\mu$ F |

Note 2.  $V_{IN(MIN)} = V_{OUT} + 1.2\Delta V_{(MAX)}$ . See Dropout Voltage maximum limit.

## ELECTRICAL CHARACTERISTICS

Unless otherwise specified, these specifications apply over the operating ambient temperature of  $0^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  for LX8941CP;  $V_{IN} = 10\text{V}$ ,  $I_O = 1\text{A}$ ,  $C_{OUT} = 22\mu\text{F}$ , and are for DC characteristics only. (Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.) Note 3: The output voltage range is 4 to 25V and is determined by the two external resistors, R1 and R2. See Product Highlight.

| Parameter                     | Symbol          | Test Conditions                                                    | LX8941 |      |       | Units                  |
|-------------------------------|-----------------|--------------------------------------------------------------------|--------|------|-------|------------------------|
|                               |                 |                                                                    | Min.   | Typ. | Max.  |                        |
| ADJ Pin Voltage (Note 3)      | $V_{ADJ}$       | $I_O = 0\text{A}$ , $T_A = 25^{\circ}\text{C}$                     | 1.225  | 1.25 | 1.275 | V                      |
| Line Regulation               | $\Delta V_{OL}$ | $V_O + 2\text{V} \leq V_{IN} \leq 26\text{V}$ , $I_O = 5\text{mA}$ |        | 1    | 50    | mV                     |
| Load Regulation               | $\Delta V_{OL}$ | $50\text{mA} \leq I_O \leq 1\text{A}$ , $V_O = V_{ADJ}$            |        | 10   | 50    | mV                     |
| Dropout Voltage               | $\Delta V$      | $I_O = 100\text{mA}$                                               |        | 150  | 300   | mV                     |
|                               |                 | $I_O = 500\text{mA}$                                               |        | 275  | 500   | mV                     |
|                               |                 | $I_O = 1\text{A}$                                                  |        | 400  | 800   | mV                     |
| Quiescent Current             | $I_Q$           | $I_O \leq 5\text{mA}$ , $7 \leq V_{IN} \leq 26\text{V}$            |        | 3    | 15    | mA                     |
|                               |                 | $I_O = 500\text{mA}$                                               |        | 30   | 50    | mA                     |
|                               |                 | $I_O = 1000\text{mA}$                                              |        | 115  | 180   | mA                     |
| Adjust Pin Current            | $I_{ADJ}$       | $V_{IN} = 10\text{V}$ , $I_O = 1\text{A}$                          |        | 2    | 20    | $\mu$ A                |
| Current Limit                 | $I_{CL}$        | $V_{IN} = 26\text{V}$                                              | 1      | 1.2  |       | A                      |
| Output Noise Voltage (Note 4) | $V_{O(RMS)}$    | 10Hz - 100kHz, $I_O = 5\text{mA}$                                  |        | 150  |       | $\mu$ V <sub>RMS</sub> |
| Long Term Stability (Note 4)  |                 |                                                                    |        | 20   |       | mV/1000hr              |
| Ripple Rejection (Note 4)     | $R_R$           | $f_O = 120\text{Hz}$ , $1V_{RMS}$ , $I_O = 100\text{mA}$           |        | 66   |       | dB                     |

## Enable Logic Section

|                       |  |  |     |      |     |         |
|-----------------------|--|--|-----|------|-----|---------|
| On Threshold Voltage  |  |  | 2   |      |     | V       |
| On Threshold Current  |  |  |     | 0.1  | 50  | $\mu$ A |
| Off Threshold Voltage |  |  |     |      | 0.8 | V       |
| Off Threshold Current |  |  | -10 | -0.3 |     | $\mu$ A |

Note 4: These parameters although guaranteed, are not tested in production.

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