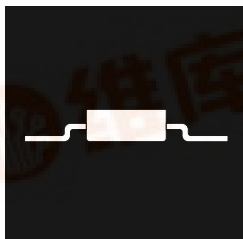


# SURFACE MOUNT POSITIVE 0.5 VOLT, LOW DROPOUT VOLTAGE REGULATOR



**Isolated Hermetic Surface Mount Package  
Three Terminal, Fixed Voltage, 1 Amp,  
Low Dropout Voltage Regulator**

## FEATURES

- Isolated Hermetic Surface Mount Package
- Similar To Industry Standard LM2940
- Dropout Voltage Typically 0.5 V @  $I_O = 1$  A
- Output Current In Excess Of 1 A
- Reverse Battery Protection
- Internal Short Circuit Protection
- Available Hi-Rel Screened

## DESCRIPTION

These three terminal fixed voltage regulators are designed to provide 1.0A with high efficiency. It has the ability to source 1A of output current with a typical dropout voltage of .5V and a maximum of 1V over the entire temperature range. It is supplied in a hermetic surface mount package and is ideally suited for Hi-Rel applications where small size and high reliability are required.

## ABSOLUTE MAXIMUM RATINGS @ 25°C

|                                                   |                   |
|---------------------------------------------------|-------------------|
| Input Voltage . . . . .                           | 26 Vdc            |
| Output Voltage . . . . .                          | +5V, +12V, +15Vdc |
| Operating Junction Temperature Range . . . . .    | - 55°C to + 125°C |
| Storage Temperature Range . . . . .               | - 65°C to + 150°C |
| Lead Temperature (Soldering 10 Seconds) . . . . . | 300°C             |
| Thermal Resistance:                               |                   |
| $\theta_{JC}$ (Isolated) . . . . .                | 4.2°C/W           |
| $\theta_{JA}$ . . . . .                           | 42°C/W            |
| Maximum Output Current. . . . .                   | 1.3 A             |

OM7648SM - OM7650SM

ELECTRICAL CHARACTERISTICS, P/N OM7648SM (5 Volts)

-55°C ≤ T<sub>A</sub> ≤ 125°C, V<sub>IN</sub> = 20 V, I<sub>O</sub> = 1 A, C<sub>OUT</sub> = 22 µF (unless otherwise specified).

| Parameter               | Symbol           | Test Conditions                                                                            | Notes | Min. | Max. | Unit   |
|-------------------------|------------------|--------------------------------------------------------------------------------------------|-------|------|------|--------|
| Output Voltage          | V <sub>OUT</sub> | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 4.85 | 5.15 | V      |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 6 V, I <sub>OUT</sub> = 5 mA                                             | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 7 V, I <sub>OUT</sub> = 5 mA                                             | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 26 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 1 A                                             | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 6 V, I <sub>OUT</sub> = 1 A                                              | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 6 V, I <sub>OUT</sub> = 50 mA                                            | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 50 mA                                           | 1     | 4.85 | 5.15 |        |
|                         |                  |                                                                                            | 2     | 4.75 | 5.25 |        |
|                         |                  |                                                                                            | 1, 2  | 40   |      |        |
| Maximum Line Transient  | V <sub>LT</sub>  | V <sub>O</sub> ≤ 6 V, R <sub>O</sub> = 100 Ω, t = 20 ms                                    | 1, 2  | 40   |      | V      |
| Reverse Polarity        | V <sub>RIN</sub> | R <sub>O</sub> = 100 Ω                                                                     | 1, 2  | -15  |      | V      |
| Input Voltage DC        | V <sub>RIT</sub> | R <sub>O</sub> = 100 Ω, t = 20 ms                                                          | 1, 2  | -45  |      | V      |
| Reverse Polarity        | V <sub>RIT</sub> |                                                                                            |       |      |      |        |
| Input Voltage Transient |                  |                                                                                            |       |      |      |        |
| Quiescent Current       | I <sub>Q</sub>   | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 15   | 15   | mA     |
|                         |                  |                                                                                            | 2     | 20   | 20   |        |
|                         |                  | V <sub>IN</sub> = 7 V, I <sub>OUT</sub> = 5 mA                                             | 1     | 15   | 15   |        |
|                         |                  |                                                                                            | 2     | 20   | 20   |        |
|                         |                  | V <sub>IN</sub> = 26 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 15   | 15   |        |
|                         |                  |                                                                                            | 2     | 20   | 20   |        |
|                         |                  | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 1 A                                             | 1     | 50   | 50   |        |
|                         |                  |                                                                                            | 2     | 100  | 100  |        |
|                         |                  | 7 V ≤ V <sub>IN</sub> ≤ 26 V, I <sub>OUT</sub> = 5 mA                                      | 1     | ±40  | ±40  |        |
|                         |                  |                                                                                            | 2     | ±50  | ±50  |        |
|                         |                  | V <sub>IN</sub> = 10 V, 50 mA ≤ I <sub>OUT</sub> ≤ 1 A                                     | 1     | ±50  | ±100 |        |
|                         |                  |                                                                                            | 2     | ±100 |      |        |
| Dropout Voltage         | V <sub>DO</sub>  | I <sub>OUT</sub> = 1 A                                                                     | 1     | .7   | .7   | V      |
|                         |                  |                                                                                            | 2     | 1    | 1    |        |
| Output Noise Voltage    | V <sub>ON</sub>  | I <sub>OUT</sub> = 100 mA                                                                  | 1     | 150  | 150  | mV     |
|                         |                  |                                                                                            | 2     | 200  | 200  |        |
| Output Noise Voltage    | V <sub>ON</sub>  | V <sub>IN</sub> = 10 V, I <sub>O</sub> = 5 mA, 10 Hz - 100 Hz                              | 1, 2  | 700  | 700  | µV rms |
| Output Impedance        | R <sub>O</sub>   | V <sub>IN</sub> = 10 V, I <sub>OUT</sub> = 100 mA dc and 20 mA ac, f <sub>o</sub> = 120 Hz | 1, 2  |      | 1    | Ω      |
| Short Circuit Current   | I <sub>OS</sub>  | V <sub>IN</sub> = 10 V                                                                     | 1     | 1.5  |      | A      |
|                         |                  |                                                                                            | 2     | 1.3  |      |        |
| Ripple Rejection        | R <sub>R</sub>   | V <sub>IN</sub> = 10 V + 1 V rms, I <sub>OUT</sub> = 5 mA, f = 1 kHz                       | 1     | 60   |      | dB     |
|                         |                  |                                                                                            | 2     | 50   |      |        |

Notes: 1. T<sub>A</sub> = 25°C.  
2. Over full operating temperature range.

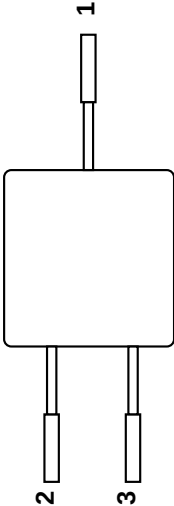
ELECTRICAL CHARACTERISTICS, P/N OM7649SM (12 Volts)

-55°C ≤ T<sub>A</sub> ≤ 125°C, V<sub>IN</sub> = 20 V, I<sub>O</sub> = 1 A, C<sub>OUT</sub> = 22 µF (unless otherwise specified).

| Parameter               | Symbol           | Test Conditions                                                                            | Notes | Min.  | Max.  | Unit   |
|-------------------------|------------------|--------------------------------------------------------------------------------------------|-------|-------|-------|--------|
| Output Voltage          | V <sub>OUT</sub> | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 11.64 | 12.36 | V      |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 13.6 V, I <sub>OUT</sub> = 5 mA                                          | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 14 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 26 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 1 A                                             | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 13.6 V, I <sub>OUT</sub> = 1 A                                           | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 13.6 V, I <sub>OUT</sub> = 50 mA                                         | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 50 mA                                           | 1     | 11.64 | 12.36 |        |
|                         |                  |                                                                                            | 2     | 11.40 | 12.60 |        |
|                         |                  | V <sub>O</sub> ≤ 13 V, R <sub>O</sub> = 100 Ω, t = 20 ms                                   | 1, 2  | 40    |       |        |
| Maximum Line Transient  | V <sub>LT</sub>  |                                                                                            | 1, 2  | 40    |       | V      |
| Reverse Polarity        | V <sub>RIN</sub> | R <sub>O</sub> = 100 Ω                                                                     | 1, 2  | -15   |       | V      |
| Input Voltage DC        | V <sub>RIT</sub> | R <sub>O</sub> = 100 Ω, t = 20 ms                                                          | 1, 2  | -45   |       | V      |
| Reverse Polarity        | V <sub>RIT</sub> |                                                                                            |       |       |       |        |
| Input Voltage Transient |                  |                                                                                            |       |       |       |        |
| Quiescent Current       | I <sub>Q</sub>   | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 15    | 15    | mA     |
|                         |                  |                                                                                            | 2     | 20    | 20    |        |
|                         |                  | V <sub>IN</sub> = 14 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 15    | 15    |        |
|                         |                  |                                                                                            | 2     | 20    | 20    |        |
|                         |                  | V <sub>IN</sub> = 26 V, I <sub>OUT</sub> = 5 mA                                            | 1     | 15    | 15    |        |
|                         |                  |                                                                                            | 2     | 20    | 20    |        |
|                         |                  | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 1 A                                             | 1     | 5     | 5     |        |
|                         |                  |                                                                                            | 2     | 60    | 60    |        |
|                         |                  | 14 V ≤ V <sub>IN</sub> ≤ 26 V, I <sub>OUT</sub> = 5 mA                                     | 1     | ±75   | ±75   |        |
|                         |                  |                                                                                            | 2     | ±120  | ±120  |        |
|                         |                  | V <sub>IN</sub> = 17 V, 50 mA ≤ I <sub>OUT</sub> ≤ 1 A                                     | 1     |       | ±120  |        |
|                         |                  |                                                                                            | 2     |       | ±190  |        |
| Dropout Voltage         | V <sub>DO</sub>  | I <sub>OUT</sub> = 1 A                                                                     | 1     | .7    | .7    | V      |
|                         |                  |                                                                                            | 2     | 1     | 1     |        |
| Output Noise Voltage    | V <sub>ON</sub>  | I <sub>OUT</sub> = 100 mA                                                                  | 1     | 150   | 150   | mV     |
|                         |                  |                                                                                            | 2     | 200   | 200   |        |
| Output Noise Voltage    | V <sub>ON</sub>  | V <sub>IN</sub> = 17 V, I <sub>O</sub> = 5 mA, 10 Hz - 100 Hz                              | 1     | 1000  | 1000  | µV rms |
| Output Impedance        | R <sub>O</sub>   | V <sub>IN</sub> = 17 V, I <sub>OUT</sub> = 100 mA dc and 20 mA ac, f <sub>o</sub> = 120 Hz | 1, 2  |       | 1     | Ω      |
| Short Circuit Current   | I <sub>OS</sub>  | V <sub>IN</sub> = 17 V                                                                     | 1     | 1.6   |       | A      |
|                         |                  |                                                                                            | 2     | 1.3   |       |        |
| Ripple Rejection        | R <sub>R</sub>   | V <sub>IN</sub> = 17 V + 1 V rms, I <sub>OUT</sub> = 5 mA, f = 1 kHz                       | 1     | 45    |       | dB     |
|                         |                  |                                                                                            | 2     | 42    |       |        |

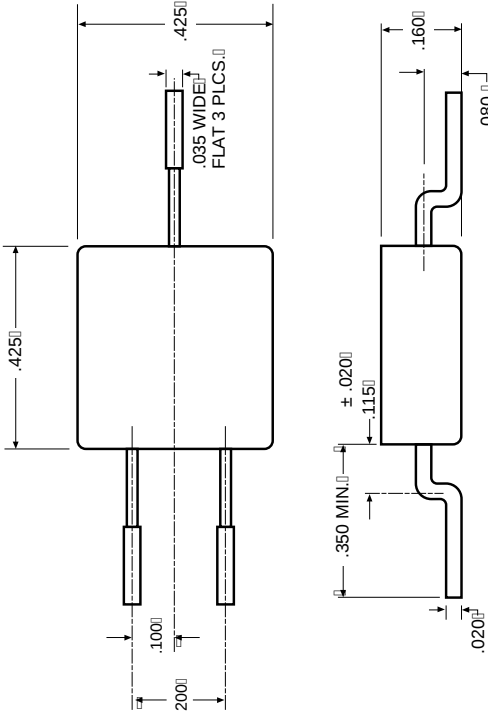
Notes: 1. T<sub>A</sub> = 25°C.  
2. Over full operating temperature range.

PIN CONNECTION



Pin 1:  $V_{OUT}$   
Pin 2: Adjust  
Pin 3:  $V_{IN}$   
Case: Isolated

MECHANICAL OUTLINE



ELECTRICAL CHARACTERISTICS, P/N OM7650SM (15 Volts)

-55°C ≤ T<sub>A</sub> ≤ 125°C; V<sub>IN</sub> = 20 V, I<sub>O</sub> = 1 A, C<sub>OUT</sub> = 22 μF (unless otherwise specified).

| Parameter                         | Symbol    | Test Conditions                                                                  | Notes | Min.  | Max.  | Unit   |
|-----------------------------------|-----------|----------------------------------------------------------------------------------|-------|-------|-------|--------|
| Output Voltage                    | $V_{OUT}$ | $V_{IN} = 20\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 14.55 | 15.45 | V      |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 16.75\text{ V}, I_{OUT} = 5\text{ mA}$                                 | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 17\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 26\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 1\text{ A}$                                     | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
| Maximum Line Transient            | $V_{LT}$  | $V_{IN} = 16.75\text{ V}, I_{OUT} = 1\text{ A}$                                  | 1     | 14.55 | 15.45 | V      |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 16.75\text{ V}, I_{OUT} = 50\text{ mA}$                                | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 50\text{ mA}$                                   | 1     | 14.55 | 15.45 |        |
|                                   |           |                                                                                  | 2     | 14.25 | 15.75 |        |
|                                   |           | $V_O \leq 16\text{ V}, R_O = 100\ \Omega, t = 20\text{ ms}$                      | 1, 2  | 40    |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $R_O = 100\ \Omega$                                                              | 1, 2  | -15   |       |        |
|                                   |           |                                                                                  |       |       |       |        |
| Reverse Polarity Input Voltage DC | $V_{RIN}$ | $R_O = 100\ \Omega$                                                              | 1, 2  | -45   |       | V      |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $R_O = 100\ \Omega, t = 20\text{ ms}$                                            | 1, 2  | -45   |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       |        |
|                                   |           |                                                                                  | 2     | 20    |       |        |
|                                   |           | $V_{IN} = 17\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       |        |
|                                   |           |                                                                                  | 2     | 20    |       |        |
|                                   |           | $V_{IN} = 26\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       |        |
|                                   |           |                                                                                  | 2     | 20    |       |        |
| Quiescent Current                 | $I_Q$     | $V_{IN} = 20\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       | mA     |
|                                   |           |                                                                                  | 2     | 20    |       |        |
|                                   |           | $V_{IN} = 17\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       |        |
|                                   |           |                                                                                  | 2     | 20    |       |        |
|                                   |           | $V_{IN} = 26\text{ V}, I_{OUT} = 5\text{ mA}$                                    | 1     | 15    |       |        |
|                                   |           |                                                                                  | 2     | 20    |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 1\text{ A}$                                     | 1     | 50    |       |        |
|                                   |           |                                                                                  | 2     | 60    |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 1\text{ A}$                                     | 1     | ±95   |       |        |
|                                   |           |                                                                                  | 2     | ±150  |       |        |
| Line Regulation                   | $V_{RLN}$ | $17\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 5\text{ mA}$                | 1     |       |       | mV     |
|                                   |           |                                                                                  | 2     |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, 50\text{ mA} \leq I_{OUT} \leq 1\text{ A}$                | 1     |       |       |        |
|                                   |           |                                                                                  | 2     |       |       |        |
|                                   |           | $I_{OUT} = 1\text{ A}$                                                           | 1     | .7    |       |        |
|                                   |           |                                                                                  | 2     | 1     |       |        |
|                                   |           | $I_{OUT} = 100\text{ mA}$                                                        | 1     | 150   |       |        |
|                                   |           |                                                                                  | 2     | 200   |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_O = 5\text{ mA}, 10\text{ Hz} - 100\text{ Hz}$          | 1     |       | 1000  |        |
|                                   |           |                                                                                  |       |       |       |        |
| Output Noise Voltage              | $V_{ON}$  | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1, 2  |       |       | μV rms |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
| Output Impedance                  | $R_O$     | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1, 2  |       |       | Ω      |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           | $V_{IN} = 20\text{ V}, I_{OUT} = 100\text{ mA ac}$                               | 1     |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
| Short Circuit Current             | $I_{OS}$  | $V_{IN} = 20\text{ V}$                                                           | 1     | 1.6   |       | A      |
|                                   |           |                                                                                  | 2     | 1.3   |       |        |
|                                   |           | $V_{IN} = 20\text{ V} + 1\text{ V rms}, I_{OUT} = 5\text{ mA}, t = 1\text{ kHz}$ | 1     | 48    |       |        |
|                                   |           |                                                                                  | 2     | 42    |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
| Ripple Rejection                  | $R_R$     | $V_{IN} = 20\text{ V} + 1\text{ V rms}, I_{OUT} = 5\text{ mA}, t = 1\text{ kHz}$ | 1     | 48    |       | dB     |
|                                   |           |                                                                                  | 2     | 42    |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |
|                                   |           |                                                                                  |       |       |       |        |

Notes: 1. T<sub>A</sub> = 25°C.  
2. Over full operating temperature range.

TYPICAL APPLICATIONS

