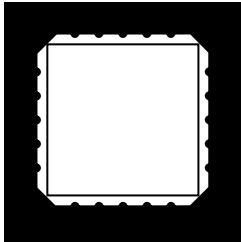


# HERMETIC SURFACE MOUNT FIXED VOLTAGE NEGATIVE REGULATORS APPROVED TO DESC DRAWING



## LCC 20, Fixed Voltage, Precision Negative Regulators In Hermetic Surface Mount Package

### FEATURES

- Hermetic Surface Mount Package
- Output Voltages: -5V, -12V, -15V
- Output Voltages Set Internally To  $\pm 1\%$
- Built-In Thermal Overload Protection
- Short Circuit Current Limiting
- Product Is Available Hi-Rel Screened

### DESCRIPTION

These negative regulators are supplied in a hermetically sealed surface mount package. All protective features are designed into the circuit including thermal shutdown, current limiting and safe-area control. With heat sinking, they can deliver over .5 amps of output current. These units feature internally trimmed output voltages to  $\pm 1\%$  of nominal voltage. Standard voltages are -5V, -12V, and -15V. These units are ideally suited for Military applications where a hermetic surface mount package is required.

### PART NUMBER DESIGNATOR

Standard Military Drawing Number

5962-8874601 2X

5962-8874701 2X

5962-8874801 2X

Omnirel Part Number

OM1905N2M

OM1912N2M

OM1915N2M

3.5

## ABSOLUTE MAXIMUM RATINGS @ 25°C

Input Voltage	.....	-35 V
Operating Junction Temperature Range	.....	- 55°C to + 150°C
Storage Temperature Range	.....	- 65°C to + 150°C
Typical Power/Thermal Characteristics:		
Rated Power @ 25° C	$T_C$ .....	2W
	$T_A$ .....	1040 mW
Thermal Resistance	$\theta_{JC}$ .....	25°C/W
	$\theta_{JA}$ .....	120°C/W

## ELECTRICAL CHARACTERISTICS -5 Volt $V_{IN} = -10V, I_o = 100mA, -55^\circ C \ T_A \ 125^\circ C$ (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^\circ C$	-4.95	-5.05	V
		$V_{IN} = -7.5V$ to $-20V$ $I_O = 5\text{ mA}$ to $500\text{ mA}$ , $P \leq 2W$	• -4.85	-5.15	V
Line Regulation (Note 1) (Note 4)	$V_{RLINE}$	$V_{IN} = -7.5V$ to $-20V$	•	12 25	mV mV
		$V_{IN} = -8.0V$ to $-12V$	•	5 12	mV mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5\text{ mA}$ to $500\text{ mA}$	•	25 50	mV mV
Standby Current Drain	$I_{SCD}$		•	2.5 3.0	mA mA
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = -7.0V$ to $-20V$	•	0.4	mA
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5\text{ mA}$ to $500\text{ mA}$	•	0.4	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100\text{mV}$ , $I_O = 500\text{ mA}$	•	2.5	V
Peak Output Current	$I_{O(pk)}$	$T_A = 25^\circ C$	0.5	1.7	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$	•	.7 2.0	A A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120\text{ Hz}$ , $\Delta V_{IN} = -10V$ (Note 3)	•	63 60	dB dB
Output Noise Voltage (Note 3)	$N_O$	$T_A = 25^\circ C$ , $f = 10\text{ Hz}$ to $100\text{ KHz}$		40	$\mu V/V$ RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	$T_A = 25^\circ C$ , $t = 1000\text{ hrs.}$		75	mV

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**Notes:**

1. Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
2. Short Circuit protection is only assured up to  $V_{IN} = -35V$ .
3. If not tested, shall be guaranteed to the specified limits.  
The • denotes the specifications which apply over the full operating temperature range.
4. Minimum load current for full line regulation = 5.0 mA.



**ELECTRICAL CHARACTERISTICS -12 Volt**  $V_{IN} = -19V, I_O = 100 \text{ mA}, -55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^\circ\text{C}$	-11.88	-12.12	V
		$V_{IN} = -14.5V \text{ to } -27V$ $I_O = 5\text{mA to } 500 \text{ mA}, P_D \leq 2 \text{ W}$	-11.64	-12.36	V
Line Regulation (Note 1) (Note 4)	$V_{RLINE}$	$V_{IN} = -14.5V \text{ to } -27V$		20	mV
		$V_{IN} = -16V \text{ to } -22V$		50	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5 \text{ mA to } 500 \text{ mA}$		10	mV
				30	mV
Standby Current Drain	$I_{SCD}$			3.5	mA
Standby Current Drain Change With Line (Line)	$\Delta I_{SCD}$	$V_{IN} = -14.5V \text{ to } -27V$		4.0	mA
				0.8	mA
Standby Current Drain Change With Load (Load)	$\Delta I_{SCD}$	$I_O = 5\text{mA to } 500 \text{ mA}$		0.5	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100\text{mV}, I_O = 500 \text{ mA}$		1.8	V
Peak Output Current	$I_{O(pk)}$	$T_A = 25^\circ\text{C}, I_O = 5 \text{ mA to } 1A$	0.5	1.7	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$		.7	A
				2.0	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120 \text{ Hz}, \Delta V_{IN} = -10V$ (Note 3)		56	dB
				53	dB
Output Noise Voltage (Note 3)	$N_O$	$T_A = 25^\circ\text{C}, f = 10 \text{ Hz to } 100 \text{ KHz}$		40	$\mu\text{V/V}$ RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	$T_A = 25^\circ\text{C}, t = 1000 \text{ hrs.}$		120	mV

**Notes:**

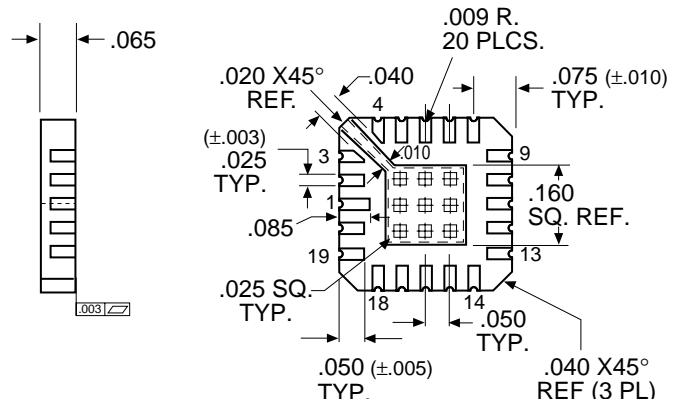
- Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
- Short Circuit protection is only assured up to  $V_{IN} = -35V$ .
- If not tested, shall be guaranteed to the specified limits.  
The • denotes the specifications which apply over the full operating temperature range.
- Minimum load current for full line regulation = 5.0 mA.

**PIN CONNECTION**

Terminal Number	
1	NC
2	$V_{INinput}$
3	NC
4	$V_{OUTput}$
5	$V_{OUTput}$
6	NC
7	$V_{OUTput}$
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	Ground
16	NC
17	Ground
18	NC
19	NC
20	$V_{INinput}$

Note: The input pins (2 and 20) are to be connected together, the output pins (4,5, and 7) are to be connected together and the ground pins (15 and 17) are to be connected together for operation.

**MECHANICAL OUTLINE**



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**ELECTRICAL CHARACTERISTICS -15 Volt**  $V_{IN} = -23V, I_O = 100mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	-14.85	-15.15	V
		$V_{IN} = -17.5V$ to $-30V$ $I_O = 5 mA$ to $500 mA, P_D \leq 2 W$	• -14.55	-15.45	V
Line Regulation (Note 1) (Note 4)	$V_{RLINE}$	$V_{IN} = -17.5V$ to $-30V$	•	25 50	mV mV
		$V_{IN} = -20V$ to $-26V$	•	15 25	mV mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to $500 mA$	•	50 90	mV mV
			•		
Standby Current Drain	$I_{SCD}$		•	6.0 6.5	mA mA
			•		
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = -17.5V$ to $-30V$	•	0.8	mA
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5mA$ to $500 mA$	•	0.5	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100mV, I_O = 500 mA$	•	2.5	V
Peak Output Current	$I_{O(pk)}$	$T_A = 25^{\circ}C$	0.5	1.7	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$	•	0.7 2.0	A A
			•		
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120 Hz, \Delta V_{IN} = -10V$ (Note 3)	•	53 50	dB dB
			•		
Output Noise Voltage (Note 3)	$N_O$	$T_A = 25^{\circ}C, f = 10 Hz$ to $100KHz$		40	$\mu V/V$ RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	$T_A = 25^{\circ}C, t = 1000 hrs.$		150	mV

**Notes:**

- Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
- Short Circuit protection is only assured up to  $V_{IN} = -35V$ .
- If not tested, shall be guaranteed to the specified limits.  
The • denotes the specifications which apply over the full operating temperature range.
- Minimum load current for full line regulation = 5.0 mA.