

# DUAL POSITIVE AND NEGATIVE FIXED VOLTAGE REGULATORS



Dual 5V, 12V and 15V, 1.5 Amp Fixed Voltage Regulators In Single Hermetic MO-078AA Package

## FEATURES

- Positive And Negative Regulators In One Package
- Hermetic 5-Pin Metal Package, JEDEC MO-078AA
- Isolated Case
- Output Voltages 5V, 12V and 15V; Other Voltages Available
- Output Voltages Set Internally To  $\pm 2.0\%$
- Built-In Thermal Overload Protection
- Short Circuit Current Limiting
- Product Is Available Screened To MIL-S-19500, TX, TXV And S Levels

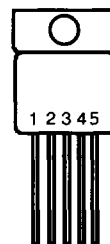
## DESCRIPTION

This series of products offers a positive and a negative fixed voltage regulator in one hermetically sealed, 5 PIN package whose outline is similar to the industry standard TO-247 package. With heat sinking, they can regulate over 1.5 Amp of output current per device. Standard voltages are + or - 5V, 12V and 15V. Other voltages are available upon request. Output voltages are internally trimmed to  $\pm 2.0\%$  of nominal voltage. These devices are ideally suited for Military applications where small size and high reliability are required.

To order, use the following Omnirel part numbers to determine the required output voltage of each regulator within one package.

Omnirel Part Number	Output Voltages	
	Positive	Negative
OM7501SC	+5V	-5V
OM7502SC	+5V	-12V
OM7503SC	+5V	-15V
OM7504SC	+12V	-5V
OM7505SC	+12V	-12V
OM7506SC	+12V	-15V
OM7507SC	+15V	-5V
OM7508SC	+15V	-12V
OM7509SC	+15V	-15V

## PIN CONNECTION



Pin 1: + Input  
 Pin 2: + Output  
 Pin 3: Common  
 Pin 4: - Input  
 Pin 5: - Output

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## INDIVIDUAL POSITIVE REGULATORS

### ELECTRICAL CHARACTERISTICS +5 Volt $V_{IN} = 10V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$ (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	4.92	5.08	V
		$V_{IN} = 7.5V$ to 20V	• 4.85	5.15	V
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = 7.5V$ to 20V	•	5	mV
		$V_{IN} = 8.0V$ to 12V	•	12	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp	•	4	mV
		$I_O = 250mA$ to 750 mA	•	10	mV
Standby Current Drain	$I_{SCD}$		•	12	mV
			•	25	mV
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = 7.5V$ to 20V	•	6	mV
			•	15	mV
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5mA$ to 1000mA	•	6	mV
			•	15	mV
Dropout Voltage	$V_{DO}$	$T_A = 25^{\circ}C, \Delta V_{OUT} = 100mV, I_O = 1.0A$		2.5	V
Peak Output Current	$I_{O(PK)}$	$T_A = 25^{\circ}C$	1.5	3.3	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = 35V$		1.2	A
			•	2.8	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120$ Hz, $\Delta V_{IN} = 10V$		66	dB
		(Note 3)	•	60	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.		75	mV

### ELECTRICAL CHARACTERISTICS +12 Volt $V_{IN} = 19V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$ (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	11.88	12.12	V
		$V_{IN} = 14.5V$ to 27V	• 11.64	12.36	V
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = 14.5V$ to 27V	•	18	mV
		$V_{IN} = 16V$ to 22V	•	50	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp	•	9	mV
		$I_O = 250mA$ to 750 mA	•	30	mV
Standby Current Drain	$I_{SCD}$		•	32	mV
			•	60	mV
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = 15V$ to 30V	•	40	mV
			•	6.0	mV
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5mA$ to 1000mA	•	6.5	mV
			•	0.8	mV
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100mV, I_O = 1.0A$	•	2.5	V
Peak Output Current	$I_{O(PK)}$	$T_A = 25^{\circ}C$	1.5	3.3	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = 35V$		1.2	A
			•	2.8	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120$ Hz, $\Delta V_{IN} = 10V$		61	dB
		(Note 3)	•	54	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.		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.

**ELECTRICAL CHARACTERISTICS +15 Volt**  $V_{IN} = 23V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	14.8	15.2	V
		$V_{IN} = 18.5V$ to 30V	• 14.6	15.4	V
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = 17.5V$ to 30V		20	mV
				50	mV
		$V_{IN} = 20V$ to 26V		15	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp		35	mV
		$I_O = 5mA$ to 1.0 Amp		75	mV
		$I_O = 250mA$ to 750 mA		21	mV
Standby Current Drain	$I_{SCD}$			6.0	mA
				6.5	mA
Standby Current Drain Change With Line (Line)	$\Delta I_{SCD}$	$V_{IN} = 18.5V$ to 30V		0.8	mA
Standby Current Drain Change With Load (Load)	$\Delta I_{SCD}$	$I_O = 5mA$ to 1000mA		0.5	mA
Dropout Voltage	$V_{DO}$	$T_A = 25^{\circ}C, \Delta V_{OUT} = 100mV, I_O = 1.0A$		2.5	V
Peak Output Current	$I_{O(PEAK)}$	$T_A = 25^{\circ}C$	1.5	3.3	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = 35V$		1.2	A
				2.8	A
Ripple Rejection	$\Delta V_{IN}$	$f = 120 Hz, \Delta V_{IN} = 10V$	54		dB
	$\Delta V_{OUT}$	(Note 3)	• 52		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)	$\Delta V_{OUT}$ $\Delta I$	$T_A = 25^{\circ}C, t = 1000 hrs.$		150	mV

**ELECTRICAL CHARACTERISTICS -5 Volt**  $V_{IN} = -10V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	-4.95	-5.05	V
		$V_{IN} = -7.5V$ to -20V	• -4.85	-5.15	V
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = -7.5V$ to -20V		12	mV
				25	mV
		$V_{IN} = -8.0V$ to -12V		5	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp		20	mV
				25	mV
		$I_O = 250mA$ to 750 mA		15	mV
Standby Current Drain	$I_{SCD}$			2.5	mA
				3.0	mA
Standby Current Drain Change With Line (Line)	$\Delta I_{SCD}$	$V_{IN} = -7.0V$ to -20V		0.4	mA
Standby Current Drain Change With Load (Load)	$\Delta I_{SCD}$	$I_O = 5mA$ to 1000mA		0.4	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100mV, I_O = 1.0A$		2.5	V
Peak Output Current	$I_{O(PEAK)}$	$T_A = 25^{\circ}C$	1.5	3.3	A
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$		1.2	A
				2.8	A
Ripple Rejection	$\Delta V_{IN}$	$f = 120 Hz, \Delta V_{IN} = -10V$	63		dB
	$\Delta V_{OUT}$	(Note 3)	• 60		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)	$\Delta V_{OUT}$ $\Delta I$	$T_A = 25^{\circ}C, t = 1000 hrs.$		75	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  $V_{IN} = +35V$ , positive regulator;  $V_{IN} = -35V$ , negative regulator.
  - If not tested, shall be guaranteed to the specified limits.
- The • denotes the specifications which apply over the full operating temperature range.

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**ELECTRICAL CHARACTERISTICS -12 Volt**  $V_{IN} = -19V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Output Voltage	$V_{OUT}$	$T_A = 25^{\circ}C$	-11.88	-12.12	V
		$V_{IN} = -14.5V$ to $-27V$	*	-11.64	-12.36
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = -14.5V$ to $-27V$	*	20	mV
		$V_{IN} = -16V$ to $-22V$	*	50	mV
			*	10	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp	*	32	mV
		$I_O = 250mA$ to 750 mA	*	60	mV
Standby Current Drain	$I_{SCD}$		*	16	mV
			*	30	mV
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = -14.5V$ to $-27V$	*	3.5	mA
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5mA$ to 1000mA	*	4.0	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100mV, I_O = 1.0A$	*	0.8	mA
Peak Output Current	$I_{O(pk)}$	$T_A = 25^{\circ}C, I_O = 5mA$ to 1A	*	0.5	mA
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$	*	1.2	A
			*	2.8	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120$ Hz, $\Delta V_{IN} = -10V$	*	56	dB
		(Note 3)	*	53	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.		120	mV

**ELECTRICAL CHARACTERISTICS -15 Volt**  $V_{IN} = -23V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (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 $-30V$	*	-14.55	-15.45
Line Regulation (Note 1)	$V_{RLINE}$	$V_{IN} = -17.5V$ to $-30V$	*	25	mV
		$V_{IN} = -20V$ to $-26V$	*	50	mV
			*	15	mV
Load Regulation (Note 1)	$V_{RLOAD}$	$I_O = 5mA$ to 1.5 Amp	*	25	mV
		$I_O = 250mA$ to 750 mA	*	35	mV
Standby Current Drain	$I_{SCD}$		*	75	mV
			*	21	mV
Standby Current Drain Change With Line	$\Delta I_{SCD}$ (Line)	$V_{IN} = -17.5V$ to $-30V$	*	45	mV
Standby Current Drain Change With Load	$\Delta I_{SCD}$ (Load)	$I_O = 5mA$ to 1000mA	*	6.0	mA
Dropout Voltage	$V_{DO}$	$\Delta V_{OUT} = 100mV, I_O = 1.0A$	*	6.5	mA
Peak Output Current	$I_{O(pk)}$	$T_A = 25^{\circ}C$	1.5	0.8	mA
Short Circuit Current (Note 2)	$I_{DS}$	$V_{IN} = -35V$	*	0.5	mA
			*	1.2	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	$f = 120$ Hz, $\Delta V_{IN} = -10V$	*	2.8	A
		(Note 3)	*	53	dB
Output Noise Voltage (Note 3)	$N_O$	$T_A = 25^{\circ}C, f = 10$ Hz to 100KHz		50	dB
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	$T_A = 25^{\circ}C, t = 1000$ hrs.		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

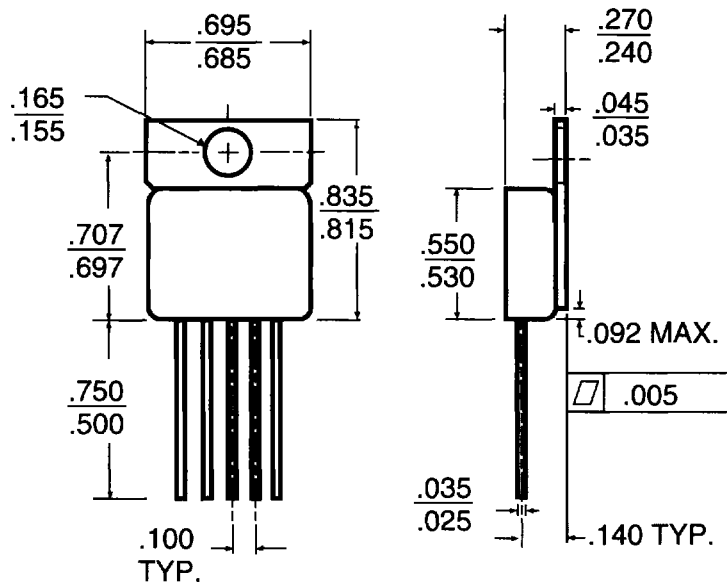
**Notes:**

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.

**ABSOLUTE MAXIMUM RATINGS** (Per Regulator)

Input Voltage .....	Positive Regulator = 35V, Negative Regulator = - 35V
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	
$T_C$ .....	17.5W
$T_A$ .....	3W
Thermal Resistance	
$\theta_{JC}$ .....	4.2°C/W
$\theta_{JA}$ .....	42°C/W
Thermal Shutdown, $I_O = 5mA, V_{IN}$ @ Voltage .....	175°C

**MECHANICAL OUTLINE**



**NOTES:**

- Case is metal/hermetically sealed
- Isolated Tab