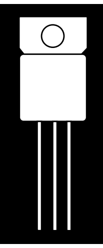
ISOLATED HERMETIC TO-257AA FIXED VOLTAGE NEGATIVE REGULATORS



Three Terminal, Fixed Voltage, 1.5 Amp Precision Negative Regulators In Hermetic JEDEC TO-257AA Package and D^2 Pac

FEATURES

- Isolated Hermetic Package, JEDEC TO-257AA Outline
- Output Voltages: -5V, -12V, -15V (Other Voltages Available)
- Output Voltages Set Internally To ±1% or ±2%
- Built-In Thermal Overload Protection
- Short Circuit Current Limiting
- Product Is Available Screened To MIL-STD-883

DESCRIPTION

These three terminal negative regulators are supplied in a hermetically sealed metal package whose outline is similar to the industry standard TO-220 plastic 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 1.5 amps of output current. These units feature internally trimmed output voltages to ±1% or 2% of nominal voltage. Standard voltages are -5V, -12V, and -15V. However, other voltages are available up to -24 volts. These units are ideally suited for Military applications where a hermetically sealed package is required.

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 17.5W
    T_A 3W
    Thermal Resistance
    θ_{JC} . . . . 4.2°C/W
    θ_{JA} . . . . 42°C/W

Notes: Product also available in Non-Isolated construction. To order this version, delete "**I**" from part number.

Example:	Isolated	Non-Isolated
	OM79XXIH	OM79XXH

Use letter "**A**" after part number to designate ±1% output voltage tolerance.
Example: OM7905AIH

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ELECTRICAL CHARACTERISTICS -5 Volt V_{IN} = -10V, I_o = 500mA, -55°C ≤ T_A ≤ 125°C (unless otherwise specified)

Parameter	Symbol	Test Conditions		Min.	Max.	Unit
Output Voltage	V_{OUT}	T_A = 25°C		-4.95	-5.05	V
		V_{IN} = -7.5V to -20V	•	-4.85	-5.15	V
Line Regulation	V_{RLINE}	V_{IN} = -7.5V to -20V			12	mV
(Note 1)			•		25	mV
		V_{IN} = -8.0V to -12V			5	mV
			•		12	mV
Load Regulation	V_{RLOAD}	I_O = 5mA to 1.5 Amp			20	mV
(Note 1)			•		25	mV
		I_O = 250mA to 750 mA			15	mV
			•		30	mV
Standby Current Drain	I_{SCD}				2.5	mA
			•		3.0	mA
Standby Current Drain Change With Line	ΔI_{SCD} (Line)	V_{IN} = -7.0V to -20V	•		0.4	mA
Standby Current Drain Change With Load	ΔI_{SCD} (Load)	I_O = 5mA to 1000mA	•		0.4	mA
Dropout Voltage	V_{DO}	ΔV_{OUT} = 100mV, I_O = 1.0A	•		2.5	V
Peak Output Current	$I_{O\ (pk)}$	T_A = 25°C		1.5	3.3	A
Short Circuit Current	I_{DS}	V_{IN} = -35V			1.2	A
(Note 2)			•		2.8	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	f =120 Hz, ΔV_{IN} = -10V		63		dB
		(Note 3)	•	60		dB
Output Noise Voltage (Note 3)	N_O	T_A = 25°C, f =10 Hz to 100KHz			40	µV/V RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	T_A = 25°C, t = 1000 hrs.			75	mV

ELECTRICAL CHARACTERISTICS -12 Volt V_{IN} = -19V, I_o = 500mA, -55°C ≤ T_A ≤ 125°C (unless otherwise specified)

Parameter	Symbol	Test Conditions		Min.	Max.	Unit
Output Voltage	V_{OUT}	T_A = 25°C		-11.88	-12.12	V
		V_{IN} = -14.5V to -27V	•	-11.64	-12.36	V
Line Regulation	V_{RLINE}	V_{IN} = -14.5V to -27V			20	mV
(Note 1)			•		50	mV
		V_{IN} = -16V to -22V			10	mV
			•		30	mV
Load Regulation	V_{RLOAD}	I_O = 5mA to 1.5 Amp			32	mV
(Note 1)			•		60	mV
		I_O = 250mA to 750 mA			16	mV
			•		30	mV
Standby Current Drain	I_{SCD}				3.5	mA
			•		4.0	mA
Standby Current Drain Change With Line	ΔI_{SCD} (Line)	V_{IN} = -14.5V to -27V	•		0.8	mA
Standby Current Drain Change With Load	ΔI_{SCD} (Load)	I_O = 5mA to 1000mA	•		0.5	mA
Dropout Voltage	V_{DO}	ΔV_{OUT} = 100mV, I_O = 1.0A	•		1.8	V
Peak Output Current	$I_{O\ (pk)}$	T_A = 25°C, I_O = 5mA to 1A		1.5	3.3	A
Short Circuit Current	I_{DS}	V_{IN} = -35V			1.2	A
(Note 2)			•		2.8	A
Ripple Rejection	$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	f =120 Hz, ΔV_{IN} = -10V		56		dB
		(Note 3)	•	53		dB
Output Noise Voltage (Note 3)	N_O	T_A = 25°C, f =10 Hz to 100KHz			40	µV/V RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	T_A = 25°C, t = 1000 hrs.			120	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.

ELECTRICAL CHARACTERISTICS -15 Volt V_{IN} = -23V, I_o = 500mA, -55°C ≤ T_A ≤ 125°C (unless otherwise specified)

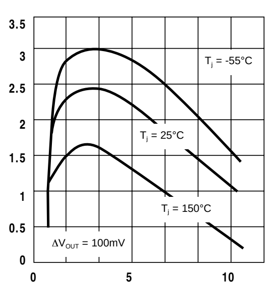
Parameter	Symbol	Test Conditions		Min.	Max.	Unit
Output Voltage	V_{OUT}	T_A = 25°C		-14.85	-15.15	V
		V_{IN} = -17.5V to -30V	•	-14.55	-15.45	V
Line Regulation (Note 1)	V_{RLINE}	V_{IN} = -17.5V to -30V			25	mV
			•		50	mV
		V_{IN} = -20V to -26V			15	mV
			•		25	mV
Load Regulation (Note 1)	V_{RLOAD}	I_O = 5mA to 1.5 Amp			35	mV
			•		75	mV
		I_O = 250mA to 750 mA			21	mV
			•		45	mV
Standby Current Drain	I_{SCD}				6.0	mA
			•		6.5	mA
Standby Current Drain Change With Line	ΔI_{SCD} (Line)	V_{IN} = -17.5V to -30V	•		0.8	mA
Standby Current Drain Change With Load	ΔI_{SCD} (Load)	I_O = 5mA to 1000mA	•		0.5	mA
Dropout Voltage	V_{DO}	ΔV_{OUT} = 100mV, I_O = 1.0A	•		2.5	V
Peak Output Current	$I_{O\ (pk)}$	T_A = 25°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, ΔV_{IN} = -10V		53		dB
		(Note 3)	•	50		dB
Output Noise Voltage (Note 3)	N_O	T_A = 25°C, f =10 Hz to 100KHz			40	µV/V RMS
Long Term Stability (Note 3)	$\frac{\Delta V_{OUT}}{\Delta t}$	T_A = 25°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.

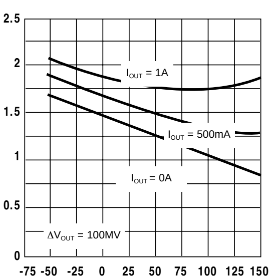
TYPICAL PERFORMANCE CHARACTERISTICS

PEAK OUTPUT CURRENT



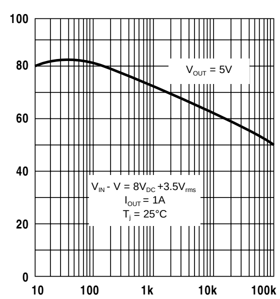
Input To Output Differential (V)

DROPOUT VOLTAGE



Junction Temperature (°C)

RIPPLE REJECTION



Frequency (Hz)

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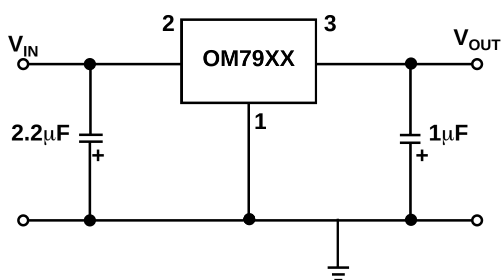
TYPICAL APPLICATIONS

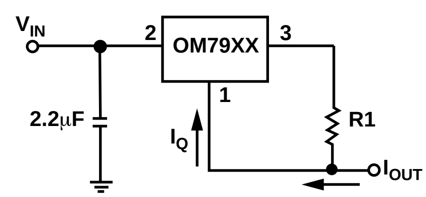
Input bypass capacitors are recommended for stable operation of the OM7900 series of regulators over the input voltage and output current ranges. Output bypass capacitors will improve the transient response of the regulator.

The bypass capacitors, (2.2µF on the input, 1µF on the output) should be ceramic or solid tantalum which have good high frequency characteristics. If aluminum electrolytics are used, their values should be 10µF or larger. The bypass capacitors should be mounted with the shortest leads, and if possible, directly across the regulator terminals.

Fixed Output Regulator

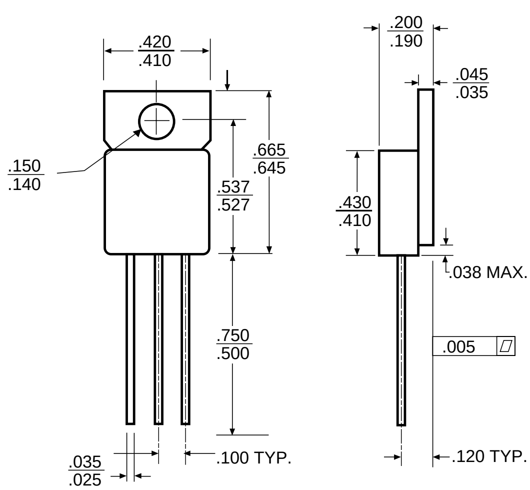


Basic Current Regulator



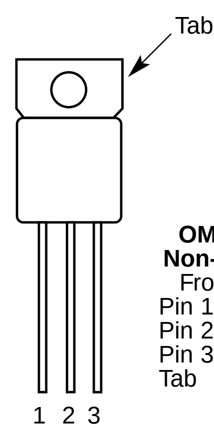
$$I_{OUT} = \frac{V_{OUT}}{R1} + I_Q$$

MECHANICAL OUTLINE



Note:
- Case is metal/hermetically sealed
- Isolated Tab
- Outline similar to JEDEC TO-220 outline

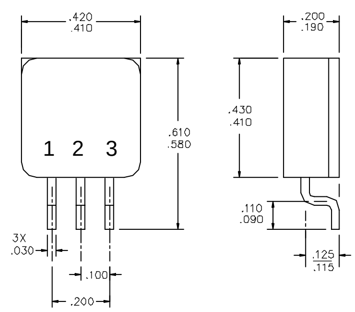
PIN CONNECTION



OM79XXIH
Isolated
Front View
Pin 1: Ground
Pin 2: Input
Pin 3: Output
Tab: Isolated

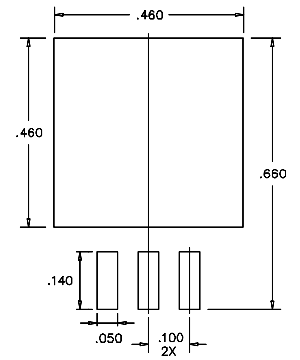
OM79XXH
Non-Isolated
Front View
Pin 1: Ground
Pin 2: Input
Pin 3: Output
Tab Input

MECHANICAL OUTLINE



Pin 1: Ground
Pin 2: Input
Pin 3: Output
Case N/C

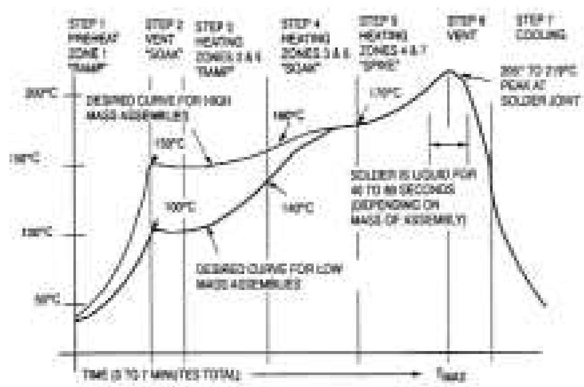
SOLDERING FOOTPRINT



TYPICAL SOLDERING PROFILE

Figure 1 shows a typical soldering profile for the D^2 and D^3 Packages when soldering a to a printed circuit board. The profile will vary from system to system and solders to solders. Factors that can affect the profile include the type of soldering system used, density and type of components on the board or substrate material being used. This profile shows temperature versus time. The two profiles described are based on a high density and a low density board. The type solder used was 62/36/2 Tin Lead Silver with a melting point between 177-189ºC. An convection/infrared soldering reflow system was used. The circuit and solder joints heat up first due to their mass followed by the components which typically run 30 degrees cooler than the solder joints.

TYPICAL HEATING PROFILE



Typical Soldering Heating Profile
Fig 1.

PART NUMBER DESIGNATOR

OM	7900	S	R	M
↑	↑	↑	↑	↑
Omnirel	**Device Type**	**Isolated Package**	**Package Style**	**Hi-Rel Screening Level**

Omnirel 205 Crawford Street, Leominster, MA 01453 USA (508) 534-5776 FAX (508) 537-4246