

# Negative-Voltage Regulators



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**VSP MIKRON**

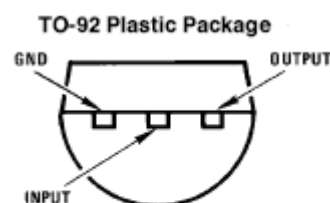
**79LXXnd**

- 3-Terminal Regulators
- Output Current Up to 100mA
- No External Components
- Internal Thermal Overload Protection
- Internal Short-Circuit Limiting
- Direct Replacement for Motorola MC79L00 Series

## DESCRIPTION

This series of fixed-voltage monolithic integrated circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power-pass elements to make high-current voltage regulators. Each of these regulators can deliver up to 100mA of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload. When used as a replacement for a Zener diode-resistor combination, an effective improvement in output impedance can be obtained together with lower-bias current.

Nominal output voltage	Regulator
-5V	79L05nd
-6V	79L06nd
-8V	79L08nd
-9V	79L09nd
-10V	79L10nd
-12V	79L12nd
-15V	79L15nd
-18V	79L18nd
-24V	79L24nd



## Absolute maximum ratings over operating temperature range (unless otherwise noted)

	79L05nd thru 79L10nd	79L12nd thru 79L18nd	79L24nd	UNIT
Input voltage	-30	-35	-40	V
Operating free-air, case, or virtual junction temperature range	0 to 150	0 to 150	0 to 150	°C
Storage temperature range	-65 to 150	-65 to 150	-65 to 150	
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds	260	260	260	

## Recommended operating conditions

Parameter		MIN	MAX	UNIT
Input voltage, $V_I$	79L05 nd	-7	-20	V
	79L06 nd	-8	-20	
	79L08 nd	-10.5	-23	
	79L09 nd	-12	-24	
	79L10 nd	-12.8	-25	
	79L12 nd	-14.5	-27	
	79L15 nd	-17.5	-30	
	79L18 nd	-20.5	-33	
	79L24 nd	-27	-38	
Output current, $I_o$			100	mA
Operating virtual junction temperature, $T_J$		0	125	°C

## Negative-Voltage Regulators


**VSP MIKRON**
**79LXXnd**

### 79L05nd electrical characteristics at specified virtual junction temperature, $V_I = -10V$ , $I_O = 40mA$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		79L05nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-4.8	-5	-5.2	V
	$I_O = 1mA$ to 40mA $V_I = -7V$ to -20V	0 to 125 °C	-4.75	-5	-5.25	
	$I_O = 1mA$ to 70mA		-4.75	-5	-5.25	
Input regulation	$V_I = -7V$ to -20V	25°C		15	150	mV
	$V_I = -8V$ to -20V			12	100	
Ripple rejection	$V_I = -8V$ to -18V, $f = 120Hz$	25°C	41	49		dB
Output regulation	$I_O = 1mA$ to 100mA	25°C		20	60	mV
	$I_O = 1mA$ to 40mA			10	30	
Output noise voltage	$f = 10Hz - 100Hz$	25°C		40		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C		3.8	6	mA
		125°C			5.5	
Bias current change	$V_I = -8V$ to -20V	0 to 125 °C			1.5	
	$I_O = 1mA$ to 40mA				0.1	

### 79L06nd electrical characteristics at specified virtual junction temperature, $V_I = -11V$ , $I_O = 40mA$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		79L06nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-5.75	-6	-6.25	V
	$I_O = 1mA$ to 40mA $V_I = -8V$ to -20V	0 to 125 °C	-5.7	-6	-6.3	
	$I_O = 1mA$ to 70mA		-5.7	-6	-6.3	
Input regulation	$V_I = -8V$ to -20V	25°C		20	175	mV
	$V_I = -9V$ to -20V			15	125	
Ripple rejection	$V_I = -9V$ to -19V, $f = 120Hz$	25°C	40	48		dB
Output regulation	$I_O = 1mA$ to 100mA	25°C		21	80	mV
	$I_O = 1mA$ to 40mA			11	40	
Output noise voltage	$f = 10Hz - 100Hz$	25°C		44		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6	mA
		125°C			5.5	
Bias current change	$V_I = -9V$ to -20V	0 to 125 °C			1.5	
	$I_O = 1mA$ to 40mA				0.1	

\*Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately. All characteristics are measured with a 0.33µF capacitor across the input and a 0.1µF capacitor across the output.

\*\*This specification applies only for dc power dissipation permitted by absolute maximum ratings.

## Negative-Voltage Regulators



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79LXXnd

**79L08nd electrical characteristics at specified virtual junction temperature,  $V_I=-14V$ ,  $I_O=40mA$   
(unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		79L08nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-7.7	-8	-8.3	V
	$I_O=1mA$ to 40mA $V_I=-10.5V$ to -23V	0 to 125 °C	-7.6	-8	-8.4	
	$I_O=1mA$ to 70mA		-7.6	-8	-8.4	
Input regulation	$V_I=-10.5V$ to -23V	25°C		42	200	mV
	$V_I=-11V$ to -23V			36	150	
Ripple rejection	$V_I=-13V$ to -23V, $f=120Hz$	25°C	37	46		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		30	100	mV
	$I_O=1mA$ to 40mA			15	50	
Output noise voltage	$f=10Hz-100Hz$	25°C		54		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6	mA
		125°C			5.5	
Bias current change	$V_I=-11V$ to -23V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

**79L09nd electrical characteristics at specified virtual junction temperature,  $V_I=-16V$ ,  $I_O=40mA$   
(unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		79L09nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-8.6	-9	-9.4	V
	$I_O=1mA$ to 40mA $V_I=-12V$ to -24V	0 to 125 °C	-8.55	-9	-9.45	
	$I_O=1mA$ to 70mA		-8.55	-9	-9.45	
Input regulation	$V_I=-12V$ to -24V	25°C		45	175	mV
	$V_I=-13V$ to -24V			40	125	
Ripple rejection	$V_I=-15V$ to -24V, $f=120Hz$	25°C	40	45		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		30	100	mV
	$I_O=1mA$ to 40mA			15	50	
Output noise voltage	$f=10Hz-100Hz$	25°C		62		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.2	mA
		125°C			5.7	
Bias current change	$V_I=-13V$ to -24V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

\*Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

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## Negative-Voltage Regulators



**VSP MIKRON**

**79LXXnd**

**79L10nd electrical characteristics at specified virtual junction temperature,  $V_I=-17V$ ,  $I_O=40mA$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		79L10nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-9.6	-10	-10.4	V
	$I_O=1mA$ to 40mA $V_I=-13V$ to -25V	0 to 125 °C	-9.5	-10	-10.5	
	$I_O=1mA$ to 70mA		-9.5	-10	-10.5	
Input regulation	$V_I=-13V$ to -24V	25°C		46	175	mV
	$V_I=-14V$ to -24V			40	125	
Ripple rejection	$V_I=-15V$ to -24V, $f=120Hz$	25°C	40	44		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		28	100	mV
	$I_O=1mA$ to 40mA			15	50	
Output noise voltage	$f=10Hz-100Hz$	25°C		68		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.2	mA
		125°C			5.7	
Bias current change	$V_I=-14V$ to -24V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

**79L12nd electrical characteristics at specified virtual junction temperature,  $V_I=-19V$ ,  $I_O=40mA$  (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		79L12nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-11.5	-12	-12.5	V
	$I_O=1mA$ to 40mA $V_I=-14V$ to -27V	0 to 125 °C	-11.4	-12	-12.6	
	$I_O=1mA$ to 70mA		-11.4	-12	-12.6	
Input regulation	$V_I=-14V$ to -27V	25°C		50	250	mV
	$V_I=-16V$ to -27V			40	200	
Ripple rejection	$V_I=-15V$ to -25V, $f=120Hz$	25°C	37	42		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		24	100	mV
	$I_O=1mA$ to 40mA			15	50	
Output noise voltage	$f=10Hz-100Hz$	25°C		80		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.5	mA
		125°C			6	
Bias current change	$V_I=-16V$ to -27V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

## Negative-Voltage Regulators



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**79LXXnd**

### 79L15nd electrical characteristics at specified virtual junction temperature, $V_I=-23V$ , $I_O=40mA$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		79L15nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-14.4	-15	-15.6	V
	$I_O=1mA$ to 40mA $V_I=-17.5V$ to -30V	0 to 125 °C	-14.25	-15	-15.75	
	$I_O=1mA$ to 70mA		-14.25	-15	-15.75	
Input regulation	$V_I=-17.5V$ to -30V	25°C		65	300	mV
	$V_I=-19V$ to -30V			50	250	
Ripple rejection	$V_I=-18.5V$ to -28.5V, $f=120Hz$	25°C	34	39		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		25	150	mV
	$I_O=1mA$ to 40mA			15	75	
Output noise voltage	$f=10Hz-100Hz$	25°C		90		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.5	mA
		125°C			6	
Bias current change	$V_I=-19V$ to -30V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

### 79L18nd electrical characteristics at specified virtual junction temperature, $V_I=-26V$ , $I_O=40mA$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		79L18nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-17.3	-18	-18.7	V
	$I_O=1mA$ to 40mA $V_I=-20.5V$ to -33V	0 to 125 °C	-17.1	-18	-18.9	
	$I_O=1mA$ to 70mA		-17.1	-18	-18.9	
Input regulation	$V_I=-20.5V$ to -33V	25°C		70	325	mV
	$V_I=-22V$ to -33V			60	275	
Ripple rejection	$V_I=-21.5V$ to -31.5V, $f=120Hz$	25°C	33	48		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		27	170	mV
	$I_O=1mA$ to 40mA			19	85	
Output noise voltage	$f=10Hz-100Hz$	25°C		150		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.5	mA
		125°C			6	
Bias current change	$V_I=-22V$ to -33V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

\*Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33µF capacitor across the input and a 0.1µF capacitor across the output.

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## Negative-Voltage Regulators



**VSP MIKRON**

**79LXXnd**

**79L24nd electrical characteristics at specified virtual junction temperature,  $V_I=-33V$ ,  $I_O=40mA$   
(unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		79L24nd			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	-23	-24	-25	V
	$I_O=1mA$ to 40mA $V_I=-27V$ to -38V	0 to 125 °C	-22.8	-24	-25.2	
	$I_O=1mA$ to 70mA		-22.8	-24	-25.2	
Input regulation	$V_I=-27V$ to -38V	25°C		90	350	mV
	$V_I=-28V$ to -38V			75	300	
Ripple rejection	$V_I=-29V$ to -35V, $f=120Hz$	25°C	31	47		dB
Output regulation	$I_O=1mA$ to 100mA	25°C		40	200	mV
	$I_O=1mA$ to 40mA			25	100	
Output noise voltage	$f=10Hz-100Hz$	25°C		200		µV
Dropout voltage		25°C		1.7		V
Bias current		25°C			6.5	mA
		125°C			6	
Bias current change	$V_I=-28V$ to -38V	0 to 125 °C			1.5	
	$I_O=1mA$ to 40mA				0.1	

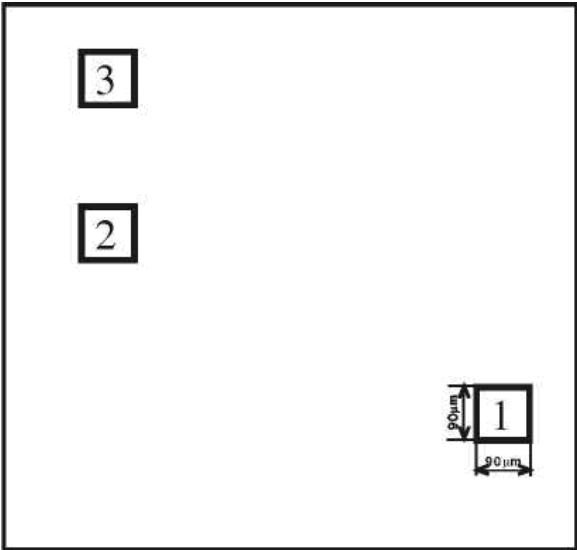
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# Negative-Voltage Regulators

 <b>VSP MIKRON</b>	<b>79LXXnd</b>
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## Pad Location 79LXXnd



Chip size 0.85 x 0.85mm

Wafer Thickness: 460±30µm (or 350±30µm,  
 280±30µm)  
 Top metal: AlSi  
 Backside metal: - (or Ti-Ni (V)-Ag)  
 Wafer size: 100 mm

### Pad Location Coordinates

	Pad Name	X(um)	Y(um)
1	Ground	740	110
2	Input	110	310
3	Output	110	740