

MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

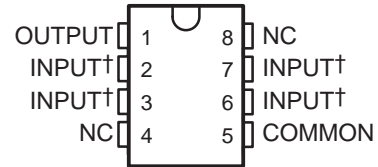
SLVS011A – OCTOBER 1982 – REVISED NOVEMBER 1991

- 3-Terminal Regulators
- Output Current Up to 100 mA
- No External Components Required
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Direct Replacement for Motorola MC79L00 Series
- Available in 5% or 10% Selections

description

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

D PACKAGE
(TOP VIEW)



† Internally connected

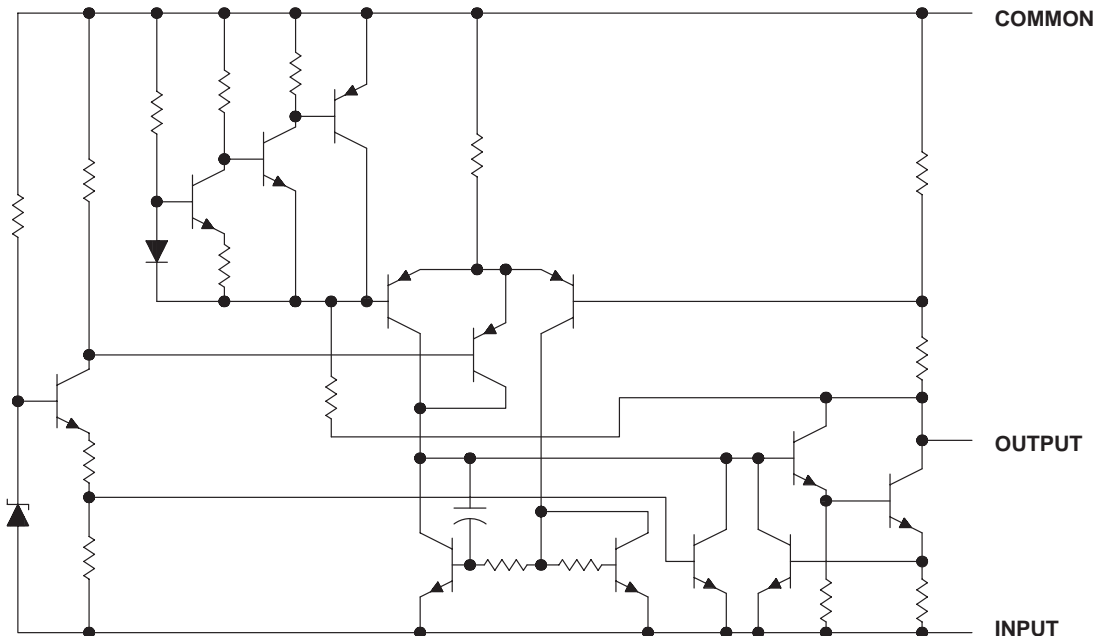
LP SILECT PACKAGE
(TOP VIEW)



NC—No internal connection

NOMINAL OUTPUT VOLTAGE	5% OUTPUT VOLTAGE TOLERANCE	10% OUTPUT VOLTAGE TOLERANCE
-5 V	MC79L05AC	MC79L05C
-12 V	MC79L12AC	MC79L12C
-15 V	MC79L15AC	MC79L15C

equivalent schematic



PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

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absolute maximum ratings over operating temperature ranges (unless otherwise noted)

	MC79L05	MC79L12 MC79L15	UNIT
Input voltage	-30	-35	V
Continuous total dissipation	See Dissipation Rating Tables 1 and 2		
Operating free-air, case, or virtual junction temperature range	0 to 150	0 to 150	°C
Storage temperature range	-65 to 150	-65 to 150	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260	260	°C

DISSIPATION RATING TABLE 1 – FREE-AIR TEMPERATURE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR	DERATE ABOVE T_A	$T_A = 70^\circ\text{C}$ POWER RATING
D	825 mW	6.6 mW/°C	25°C	528 mW
LP†	775 mW	6.2 mW/°C	25°C	496 mW

† The LP package dissipation rating is based on thermal resistance measured in still air with the device mounted in an Augat socket. The bottom of the package was 10 mm (0.375 in.) above the socket.

DISSIPATION RATING TABLE 2 – CASE TEMPERATURE

PACKAGE	$T_C \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR	DERATE ABOVE T_C	$T_C = 125^\circ\text{C}$ POWER RATING
D	1600 mW	29.0 mW/°C	95°C	725 mW
LP	1600 mW	28.6 mW/°C	94°C	715 mW

recommended operating conditions

		MIN	MAX	UNIT
Input voltage, V_I	MC79L05	-7	-20	V
	MC79L12	-14.5	-27	
	MC79L15	-17.5	-30	
Output current, I_O			100	mA
Operating virtual junction temperature, T_J		0	125	°C

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electrical characteristics at specified virtual junction temperature, $V_I = -10\text{ V}$, $I_O = 40\text{ mA}$ (unless otherwise noted)

PARAMETER	TEST CONDITION [†]	T _J [‡]	MC79L05C			MC79L05AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage [§]		25°C	-4.6	-5	-5.4	-4.8	-5	-5.2	V
	$V_I = -7\text{ V to } -20\text{ V}$, $I_O = 1\text{ mA to } 40\text{ mA}$	Full range	-4.5		-5.5	-4.75		-5.25	
	$V_I = -10\text{ V}$, $I_O = 1\text{ mA to } 70\text{ mA}$	Full range	-4.5		-5.5	-4.75		-5.25	
Input regulation	$V_I = -7\text{ V to } -20\text{ V}$	25°C			200			150	mV
	$V_I = -8\text{ V to } -20\text{ V}$				150			100	
Ripple rejection	$V_I = -8\text{ V to } -18\text{ V}$, $f = 120\text{ Hz}$	25°C	40	49		41	49		dB
Output regulation	$I_O = 1\text{ mA to } 100\text{ mA}$	25°C			60			60	mV
	$I_O = 1\text{ mA to } 40\text{ mA}$				30			30	
Output noise voltage	$f = 10\text{ Hz to } 100\text{ kHz}$	25°C		40		40			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C		1.7		1.7			V
Bias current		25°C			6			6	mV
		125°C			5.5			5.5	
Bias current change	$V_I = -8\text{ V to } -20\text{ V}$	Full range			1.5			1.5	mV
	$I_O = 1\text{ mA to } 40\text{ mA}$				0.2			0.1	

electrical characteristics at specified virtual junction temperature, $V_I = -19\text{ V}$, $I_O = 40\text{ mA}$ (unless otherwise noted)

PARAMETER	TEST CONDITION [†]	T _J [‡]	MC79L12C			MC79L12AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage [§]		25°C	-11.1	-12	-12.9	-11.5	-12	-12.5	V
	$V_I = -14.5\text{ V to } -27\text{ V}$, $I_O = 1\text{ mA to } 40\text{ mA}$	Full range	-10.8		-13.2	-11.4		-12.6	
	$V_I = -19\text{ V}$, $I_O = 1\text{ mA to } 70\text{ mA}$	Full range	-10.8		-13.2	-11.4		-12.6	
Input regulation	$V_I = -14.5\text{ V to } -27\text{ V}$	25°C			250			250	mV
	$V_I = -16\text{ V to } -27\text{ V}$				200			200	
Ripple rejection	$V_I = -15\text{ V to } -25\text{ V}$, $f = 120\text{ Hz}$	25°C	36	42		37	42		dB
Output regulation	$I_O = 1\text{ mA to } 100\text{ mA}$	25°C			100			100	mV
	$I_O = 1\text{ mA to } 40\text{ mA}$				50			50	
Output noise voltage	$f = 10\text{ Hz to } 100\text{ kHz}$	25°C		80		80			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C		1.7		1.7			V
Bias current		25°C			6.5			6.5	mV
		125°C			6			6	
Bias current change	$V_I = -16\text{ V to } -27\text{ V}$	Full range			1.5			1.5	mV
	$I_O = 1\text{ mA to } 40\text{ mA}$				0.2			0.1	

[†] All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. 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.

[‡] Full range virtual junction temperature is 0°C to 125°C.

[§] This specification applies only for dc power dissipation permitted by absolute maximum ratings.



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electrical characteristics at specified virtual junction temperature, $V_I = -23\text{ V}$, $I_O = 40\text{ mA}$ (unless otherwise noted)

PARAMETER	TEST CONDITION [†]	T_J [‡]	MC79L15C			MC79L15AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage [§]		25°C	-13.8	-15	-16.2	-14.4	-15	-15.6	V
	$V_I = -17.5\text{ V to }-30\text{ V}$, $I_O = 1\text{ mA to }40\text{ mA}$	Full range	-13.5		-16.5	-14.25		-15.75	
	$V_I = -23\text{ V}$, $I_O = 1\text{ mA to }70\text{ mA}$	Full range	-13.5		-16.5	-14.25		-15.75	
Input regulation	$V_I = -17.5\text{ V to }-30\text{ V}$	25°C				300			mV
	$V_I = -17.5\text{ V to }-30\text{ V}$					250			
Ripple rejection	$V_I = -18.5\text{ V to }-28.5\text{ V}$, $f = 120\text{ Hz}$	25°C	33	39		34	39		dB
Output regulation	$I_O = 1\text{ mA to }100\text{ mA}$	25°C				150			mV
	$I_O = 1\text{ mA to }40\text{ mA}$					75			
Output noise voltage	$f = 10\text{ Hz to }100\text{ kHz}$	25°C	90			90			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C	1.7			1.7			V
Bias current		25°C	6.5			6.5			mV
		125°C	6			6			
Bias current change	$V_I = -20\text{ V to }-30\text{ V}$	Full range	1.5			1.5			mV
	$I_O = 1\text{ mA to }40\text{ mA}$		0.2			0.1			

[†] All characteristics are measured with a 0.33- μF capacitor across the input and a 0.1- μF capacitor across the output. 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.

[‡] Full range virtual junction temperature is 0°C to 125°C.

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