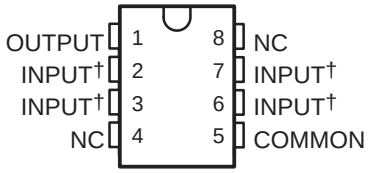
SLVS011B – OCTOBER 1982 – REVISED FEBRUARY 2000

- **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**

D PACKAGE
(TOP VIEW)



† Internally connected
NC–No internal connection

LP PACKAGE
(TOP VIEW)

description

This series of fixed negative-voltage 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, with lower bias current.

The MC79L00C series is characterized for operation over the virtual junction temperature range of 0°C to 125°C.

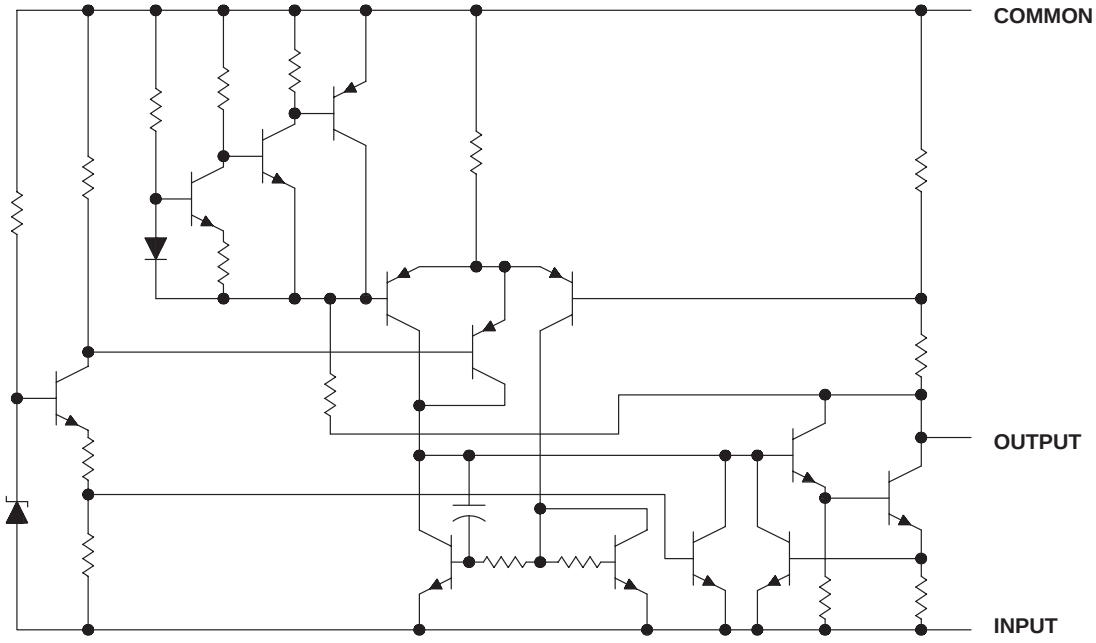
AVAILABLE OPTIONS

T_J	NOMINAL OUTPUT VOLTAGE (V)	PACKAGED DEVICES			
		OUTPUT VOLTAGE TOLERANCE			
		SMALL OUTLINE (D)		PLASTIC CYLINDRICAL (LP)	
		5%	10%	5%	10%
0°C to 125°C	–5	MC79L05ACD‡	–	MC79L05ACLP‡	–
	–12	MC79L12ACD‡	MC79L12CD	MC79L12ACLP‡	MC79L12CLP
	–15	MC79L15ACD	MC79L15CD	MC79L15ACLP§	–

‡ This device is available taped and reeled. Add the suffix R to the device type (e.g., MC79L05ACDR).
§ This device is available taped and reeled or in ammo pack. Add the suffix M to the device type for ammo pack (e.g., MC79L15ACLPM).

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251–1443

equivalent schematic



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Input voltage: MC79L05 . . . . . –30 V
MC79L12, MC79L15 . . . . . –35 V
Operating free-air, case, or virtual junction temperature . . . . . 150°C
Package thermal impedance, θ_{JA} (see Notes 1 and 2): D package . . . . . 97°C/W
LP package . . . . . 196°C/W
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C
Storage temperature range, T_{stg} . . . . . –65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. Maximum power dissipation is a function of $T_J(max)$, θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) – T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can impact reliability.
2. The package thermal impedance is calculated in accordance with JESD 51.

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

electrical characteristics at specified virtual junction temperature, V_I = –10 V, I_O = 40 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	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 V to –20 V, I_O = 1 mA to 40 mA	0°C to 125°C	–4.5		–5.5	–4.75		–5.25	
	V_I = –10 V, I_O = 1 mA to 70 mA	0°C to 125°C	–4.5		–5.5	–4.75		–5.25	
Input regulation	V_I = –7 V to –20 V	25°C			200			150	mV
	V_I = –8 V to –20 V				150			100	
Ripple rejection	V_I = –8 V to –18 V, f = 120 Hz	25°C	40	49		41	49		dB
Output regulation	I_O = 1 mA to 100 mA	25°C			60			60	mV
	I_O = 1 mA to 40 mA				30			30	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		40			40		μV
Dropout voltage	I_O = 40 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 V to –20 V	0°C to 125°C			1.5			1.5	mV
	I_O = 1 mA to 40 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.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = –19 V, I_O = 40 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	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 V to –27 V, I_O = 1 mA to 40 mA	0°C to 125°C	–10.8		–13.2	–11.4		–12.6	
	V_I = –19 V, I_O = 1 mA to 70 mA	0°C to 125°C	–10.8		–13.2	–11.4		–12.6	
Input regulation	V_I = –14.5 V to –27 V	25°C			250			250	mV
	V_I = –16 V to –27 V				200			200	
Ripple rejection	V_I = –15 V to –25 V, f = 120 Hz	25°C	36	42		37	42		dB
Output regulation	I_O = 1 mA to 100 mA	25°C			100			100	mV
	I_O = 1 mA to 40 mA				50			50	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		80			80		μV
Dropout voltage	I_O = 40 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 V to –27 V	0°C to 125°C			1.5			1.5	mV
	I_O = 1 mA to 40 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.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = –23 V, I_O = 40 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	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 V to –30 V, I_O = 1 mA to 40 mA	0°C to 125°C	–13.5		–16.5	–14.25		–15.75	
	V_I = –23 V, I_O = 1 mA to 70 mA	0°C to 125°C	–13.5		–16.5	–14.25		–15.75	
Input regulation	V_I = –17.5 V to –30 V	25°C			300			300	mV
	V_I = –17.5 V to –30 V				250			250	
Ripple rejection	V_I = –18.5 V to –28.5 V, f = 120 Hz	25°C	33	39		34	39		dB
Output regulation	I_O = 1 mA to 100 mA	25°C			150			150	mV
	I_O = 1 mA to 40 mA				75			75	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		90			90		μV
Dropout voltage	I_O = 40 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 V to –30 V	0°C to 125°C			1.5			1.5	mV
	I_O = 1 mA to 40 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.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

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