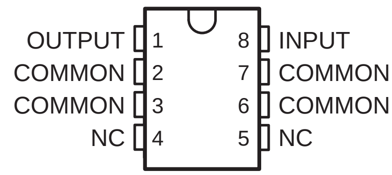
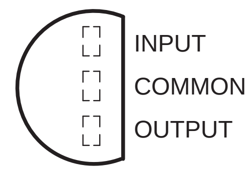
- **3-Terminal Regulators**
- **Output Current up to 100 mA**
- **No External Components**
- **Internal Thermal-Overload Protection**
- **Internal Short-Circuit Current Limiting**
- **Direct Replacements for Fairchild μA78L00 Series**

D PACKAGE
(TOP VIEW)



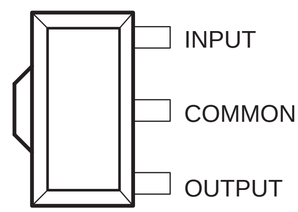
NC – No internal connection

LP PACKAGE
(TOP VIEW)



TO–226AA

PK PACKAGE
(TOP VIEW)



description

This series of fixed-voltage 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. One of these regulators can deliver up to 100 mA 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.

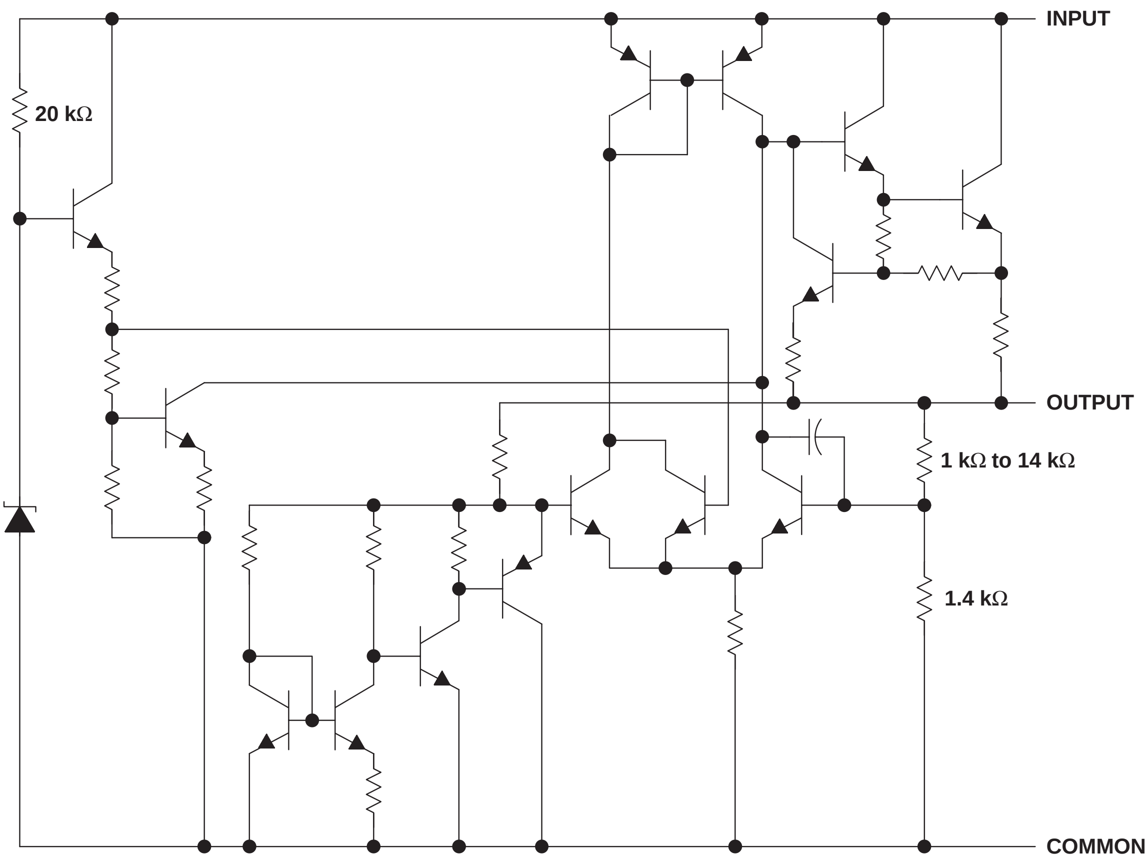
The μA78L00C and μA78L00AC series are characterized for operation over the virtual junction temperature range of 0°C to 125°C. The μA78L05AI is characterized for operation over the virtual junction temperature range of –40°C to 125°C.

AVAILABLE OPTIONS

T_J	$V_{O(NOM)}$ (V)	PACKAGED DEVICES						CHIP FORM (Y)
		SMALL OUTLINE (D)		PLASTIC CYLINDRICAL (LP)		SOT-89 (PK)		
		OUTPUT VOLTAGE TOLERANCE						
		5%	10%	5%	10%	5%	10%	
0°C to 125°C	2.6	µA78L02ACD	–	µA78L02ACLP	µA78L02CLP	µA78L02ACPK	µA78L02CPK	µA78L02Y
	5	µA78L05ACD	µA78L05CD	µA78L05ACLP	µA78L05CLP	µA78L05ACPK	µA78L05CPK	µA78L05Y
	6.2	µA78L06ACD	µA78L06CD	µA78L06ACLP	µA78L06CLP	µA78L06ACPK	µA78L06CPK	µA78L06Y
	8	µA78L08ACD	µA78L08CD	µA78L08ACLP	µA78L08CLP	µA78L08ACPK	µA78L08CPK	µA78L08Y
	9	µA78L09ACD	µA78L09CD	µA78L09ACLP	µA78L09CLP	µA78L09ACPK	µA78L09CPK	µA78L09Y
	10	µA78L10ACD	–	µA78L10ACLP	µA78L10CLP	µA78L10ACPK	µA78L10CPK	µA78L10Y
	12	µA78L12ACD	µA78L12CD	µA78L12ACLP	µA78L12CLP	µA78L12ACPK	µA78L12CPK	µA78L12Y
	15	µA78L15ACD	µA78L15CD	µA78L15ACLP	µA78L15CLP	µA78L15ACPK	µA78L15CPK	µA78L15Y
–40°C to 125°C	5	–	–	µA78L05AILP	–	–	–	–

D and LP packages are available taped and reeled. Add the suffix R to the device type (e.g., µA78L05ACDR). The PK package is only available taped and reeled (e.g., µA78L02ACPKR). Chip forms are tested at T_A = 25°C.

schematic



NOTE A: Resistor values shown are nominal.

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

		μA78Lxx	UNIT
Input voltage, V_I	μA78L02AC, μA78L05C–μA78L09C, μA78L10AC	30	V
	μA78L12C, μA78L12AC, μA78L15C, μA78L15AC	35	
Package thermal impedance, θ_{JA} (see Notes 1 and 2)	D package	97	°C
	LP package	156	
	PK package	52	
Virtual junction temperature range, T_J		150	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		260	°C
Storage temperature range, T_{stg}		–65 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. Due to variations in individual device electrical characteristics and thermal resistance, the built-in thermal-overload protection may be activated at power levels slightly above or below the rated dissipation.
2. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions

		MIN	MAX	UNIT
Input voltage, V_I	μA78L02AC	4.75	20	V
	μA78L05C, μA78L05AC	7	20	
	μA78L06C, μA78L06AC	8.5	20	
	μA78L08C, μA78L08AC	10.5	23	
	μA78L09C, μA78L09AC	11.5	24	
	μA78L10AC	12.5	25	
	μA78L12C, μA78L12AC	14.5	27	
	μA78L15C, μA78L15AC	17.5	30	
Output current, I_O			100	mA
Operating virtual junction temperature, T_J	μA78LXXC and μA78LXXAC series	0	125	°C
	μA78L05AI	–40	125	

electrical characteristics at specified virtual junction temperature, V_I = 9 V, I_O = 40 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA78L02C MIN	μA78L02C TYP	μA78L02C MAX	UNIT
Output voltage	V_I = 4.75 V to 20 V, I_O = 1 mA to 40 mA	25°C	2.5	2.6	2.7	V
		0°C to 125°C	2.45		2.75	
	I_O = 1 mA to 70 mA	0°C to 125°C	2.45		2.75	
Input voltage regulation	V_I = 4.75 V to 20 V	25°C		20	100	mV
	V_I = 5 V to 20 V			16	75	
Ripple rejection	V_I = 6 V to 20 V, f = 120 Hz	25°C	43	51		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		12	50	mV
	I_O = 1 mA to 40 mA			6	25	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		30		μV
Dropout voltage		25°C		1.7		V
Bias current		25°C		3.6	6	mA
		125°C			5.5	
Bias current change	V_I = 5 V to 20 V	0°C to 125°C			2.5	mA
	I_O = 1 mA to 40 mA				0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J‡	μA78L05C MIN	μA78L05C TYP	μA78L05C MAX	μA78L05AC μA78L05AI MIN	μA78L05AC μA78L05AI TYP	μA78L05AC μA78L05AI MAX	UNIT
Output voltage	V_I = 7 V to 20 V, I_O = 1 mA to 40 mA	25°C	4.6	5	5.4	4.8	5	5.2	V
		Full range	4.5		5.5	4.75		5.25	
	I_O = 1 mA to 70 mA	Full range	4.5		5.5	4.75		5.25	
Input voltage regulation	V_I = 7 V to 20 V	25°C		32	200		32	150	mV
	V_I = 8 V to 20 V			26	150		26	100	
Ripple rejection	V_I = 8 V to 18 V, f = 120 Hz	25°C	40	49		41	49		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		15	60		15	60	mV
	I_O = 1 mA to 40 mA			8	30		8	30	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		42			42		μV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		3.8	6		3.8	6	mA
		125°C			5.5			5.5	
Bias current change	V_I = 8 V to 20 V	Full range			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

‡ Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Full range for the μA78L05AC is T_J = 0°C to 125°C and full range for the μA78L05AI is T_J = –40°C to 125°C.

electrical characteristics at specified virtual junction temperature, V_I = 12 V, I_O = 40 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA78L06C MIN	μA78L06C TYP	μA78L06C MAX	μA78L06AC MIN	μA78L06AC TYP	μA78L06AC MAX	UNIT
Output voltage	V_I = 8.5 V to 20 V, I_O = 1 mA to 40 mA	25°C	5.7	6.2	6.7	5.95	6.2	6.45	V
		0°C to 125°C	5.6		6.8	5.9		6.5	
	I_O = 1 mA to 70 mA	0°C to 125°C	5.6		6.8	5.9		6.5	
Input voltage regulation	V_I = 8.5 V to 20 V	25°C		35	200		35	175	mV
	V_I = 9 V to 20 V			29	150		29	125	
Ripple rejection	V_I = 10 V to 20 V, f = 120 Hz	25°C	39	48		40	48		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		16	80		16	80	mV
	I_O = 1 mA to 40 mA			9	40		9	40	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		46			46		μV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		3.9	6		3.9	6	mA
		125°C			5.5			5.5	
Bias current change	V_I = 9 V to 20 V	0°C to 125°C			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J†	μA78L08C MIN	μA78L08C TYP	μA78L08C MAX	μA78L08AC MIN	μA78L08AC TYP	μA78L08AC MAX	UNIT
Output voltage	V_I = 10.5 V to 23 V, I_O = 1 mA to 40 mA	25°C	7.36	8	8.64	7.7	8	8.3	V
		0°C to 125°C	7.2		8.8	7.6		8.4	
	I_O = 1 mA to 70 mA	0°C to 125°C	7.2		8.8	7.6		8.4	
Input voltage regulation	V_I = 10.5 V to 23 V	25°C		42	200		42	175	mV
	V_I = 11 V to 23 V			36	150		36	125	
Ripple rejection	V_I = 13 V to 23 V, f = 120 Hz	25°C	36	46		37	46		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		18	80		18	80	mV
	I_O = 1 mA to 40 mA			10	40		10	40	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		54			54		μV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		4	6		4	6	mA
		125°C			5.5			5.5	
Bias current change	V_I = 5 V to 20 V	0°C to 125°C			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J†	μA78L09C			μA78L09AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage	V_I = 12 V to 24 V, I_O = 1 mA to 40 mA	25°C	8.3	9	9.7	8.6	9	9.4	V
		0°C to 125°C	8.1		9.9	8.55		9.45	
	I_O = 1 mA to 70 mA	0°C to 125°C	8.1		9.9	8.55		9.45	
Input voltage regulation	V_I = 12 V to 24 V	25°C		45	225		45	175	mV
	V_I = 13 V to 24 V			40	175		40	125	
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz	25°C	36	45		38	45		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		19	90		19	90	mV
	I_O = 1 mA to 40 mA			11	40		11	40	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		58			58		μV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		4.1	6		4.1	6	mA
		125°C			5.5			5.5	
Bias current change	V_I = 13 V to 24 V	0°C to 125°C			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J†	μA78L10AC			UNIT
			MIN	TYP	MAX	
Output voltage	V_I = 13 V to 25 V, I_O = 1 mA to 40 mA	25°C	9.6	10	10.4	V
		0°C to 125°C	9.5		10.5	
	I_O = 1 mA to 70 mA	0°C to 125°C	9.5		10.5	
Input voltage regulation	V_I = 13 V to 25 V	25°C		51	175	mV
	V_I = 14 V to 25 V			42	125	
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz	25°C	37	44		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		20	90	mV
	I_O = 1 mA to 40 mA			11	40	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		62		μV
Dropout voltage		25°C		1.7		V
Bias current		25°C		4.2	6	mA
		125°C			5.5	
Bias current change	V_I = 14 V to 25 V	0°C to 125°C			1.5	mA
	I_O = 1 mA to 40 mA				0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J†	µA78L12C MIN	µA78L12C TYP	µA78L12C MAX	µA78L12AC MIN	µA78L12AC TYP	µA78L12AC MAX	UNIT
Output voltage	V_I = 14 V to 27 V, I_O = 1 mA to 40 mA	25°C	11.1	12	12.9	11.5	12	12.5	V
		0°C to 125°C	10.8		13.2	11.4		12.6	
	I_O = 1 mA to 70 mA	0°C to 125°C	10.8		13.2	11.4		12.6	
Input voltage regulation	V_I = 14.5 V to 27 V	25°C		55	250		55	250	mV
	V_I = 16 V to 27 V			49	200		49	200	
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz	25°C	36	42		37	42		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		22	100		22	100	mV
	I_O = 1 mA to 40 mA			13	50		13	50	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		70			70		µV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		4.3	6.5		4.3	6.5	mA
		125°C			6			6	
Bias current change	V_I = 16 V to 27 V	0°C to 125°C			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.

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

PARAMETER	TEST CONDITIONS	T_J†	µA78L15C MIN	µA78L15C TYP	µA78L15C MAX	µA78L15AC MIN	µA78L15AC TYP	µA78L15AC MAX	UNIT
Output voltage	V_I = 17.5 V to 30 V, I_O = 1 mA to 40 mA	25°C	13.8	15	16.2	14.4	15	15.6	V
		0°C to 125°C	13.5		16.5	14.25		15.75	
	I_O = 1 mA to 70 mA	0°C to 125°C	13.5		16.5	14.25		15.75	
Input voltage regulation	V_I = 17.5 V to 30 V	25°C		65	300		65	300	mV
	V_I = 20 V to 30 V			58	250		58	250	
Ripple rejection	V_I = 18.5 V to 28.5 V, f = 120 Hz	25°C	33	39		34	39		dB
Output voltage regulation	I_O = 1 mA to 100 mA	25°C		25	150		25	150	mV
	I_O = 1 mA to 40 mA			15	75		15	75	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		82			82		µV
Dropout voltage		25°C		1.7			1.7		V
Bias current		25°C		4.6	6.5		4.6	6.5	mA
		125°C			6			6	
Bias current change	V_I = 10 V to 30 V	0°C to 125°C			1.5			1.5	mA
	I_O = 1 mA to 40 mA				0.2			0.1	

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 9 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA78L02Y MIN	μA78L02Y TYP	μA78L02Y MAX	UNIT
Output voltage			2.6		V
Input voltage regulation	V_I = 4.75 V to 20 V		20		mV
	V_I = 5 V to 20 V		16		
Ripple rejection	V_I = 6 V to 20 V, f = 120 Hz		51		dB
Output voltage regulation	I_O = 1 mA to 100 mA		12		mV
	I_O = 1 mA to 40 mA		6		
Output noise voltage	f = 10 Hz to 100 kHz		30		μV
Dropout voltage			1.7		V
Bias current			3.6		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 10 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA78L05Y MIN	μA78L05Y TYP	μA78L05Y MAX	UNIT
Output voltage			5		V
Input voltage regulation	V_I = 7 V to 20 V		32		mV
	V_I = 8 V to 20 V		26		
Ripple rejection	V_I = 8 V to 18 V, f = 120 Hz		49		dB
Output voltage regulation	I_O = 1 mA to 100 mA		15		mV
	I_O = 1 mA to 40 mA		8		
Output noise voltage	f = 10 Hz to 100 kHz		42		μV
Dropout voltage			1.7		V
Bias current			3.8		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 12 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA78L06Y MIN	μA78L06Y TYP	μA78L06Y MAX	UNIT
Output voltage			6.2		V
Input voltage regulation	V_I = 8.5 V to 20 V		35		mV
	V_I = 9 V to 20 V		29		
Ripple rejection	V_I = 10 V to 20 V, f = 120 Hz		48		dB
Output voltage regulation	I_O = 1 mA to 100 mA		16		mV
	I_O = 1 mA to 40 mA		9		
Output noise voltage	f = 10 Hz to 100 kHz		46		μV
Dropout voltage			1.7		V
Bias current			3.9		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 14 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	µA78L08Y MIN	µA78L08Y TYP	µA78L08Y MAX	UNIT
Output voltage			8		V
Input voltage regulation	V_I = 10.5 V to 23 V		42		mV
	V_I = 11 V to 23 V		36		
Ripple rejection	V_I = 13 V to 23 V, f = 120 Hz		46		dB
Output voltage regulation	I_O = 1 mA to 100 mA		18		mV
	I_O = 1 mA to 40 mA		10		
Output noise voltage	f = 10 Hz to 100 kHz		54		µV
Dropout voltage			1.7		V
Bias current			4		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 16 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	µA78L09Y MIN	µA78L09Y TYP	µA78L09Y MAX	UNIT
Output voltage			9		V
Input voltage regulation	V_I = 12 V to 24 V		45		mV
	V_I = 13 V to 24 V		40		
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz		45		dB
Output voltage regulation	I_O = 1 mA to 100 mA		19		mV
	I_O = 1 mA to 40 mA		11		
Output noise voltage	f = 10 Hz to 100 kHz		58		µV
Dropout voltage			1.7		V
Bias current			4.1		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 14 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	µA78L10Y MIN	µA78L10Y TYP	µA78L10Y MAX	UNIT
Output voltage			10		V
Input voltage regulation	V_I = 13 V to 25 V		51		mV
	V_I = 14 V to 25 V		42		
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz		44		dB
Output voltage regulation	I_O = 1 mA to 100 mA		20		mV
	I_O = 1 mA to 40 mA		11		
Output noise voltage	f = 10 Hz to 100 kHz		62		µV
Dropout voltage			1.7		V
Bias current			4.2		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 19 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†		μA78L12Y		UNIT
		MIN	TYP	MAX	
Output voltage			12		V
Input voltage regulation	V_I = 14.5 V to 27 V		55		mV
	V_I = 16 V to 27 V		49		
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz		42		dB
Output voltage regulation	I_O = 1 mA to 100 mA		22		mV
	I_O = 1 mA to 40 mA		13		
Output noise voltage	f = 10 Hz to 100 kHz		70		μV
Dropout voltage			1.7		V
Bias current			4.3		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = 23 V, I_O = 40 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†		μA78L15Y		UNIT
		MIN	TYP	MAX	
Output voltage			15		V
Input voltage regulation	V_I = 17.5 V to 30 V		65		mV
	V_I = 20 V to 30 V		58		
Ripple rejection	V_I = 18.5 V to 28.5 V, f = 120 Hz		39		dB
Output voltage regulation	I_O = 1 mA to 100 mA		25		mV
	I_O = 1 mA to 40 mA		15		
Output noise voltage	f = 10 Hz to 100 kHz		82		μV
Dropout voltage			1.7		V
Bias current			4.6		mA

† Pulse-testing techniques maintain T_J as close to T_A as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.

APPLICATION INFORMATION

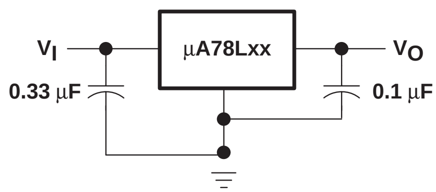


Figure 1. Fixed-Output Regulator

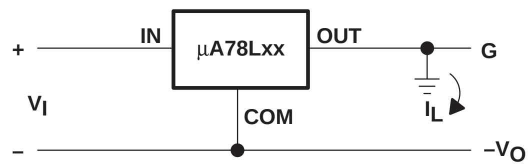


Figure 2. Positive Regulator in Negative Configuration (V_I Must Float)

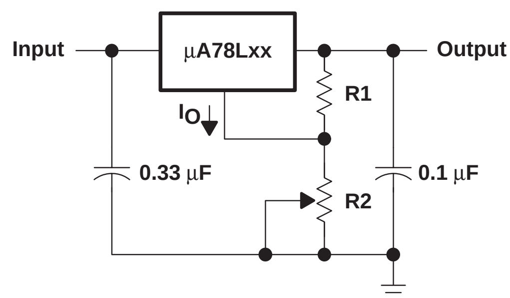
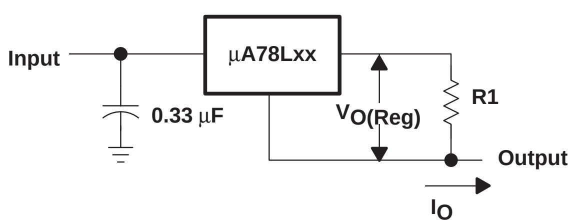


Figure 3. Adjustable-Output Regulator



$I_O = (V_O/R1) + I_O$ Bias Current

Figure 4. Current Regulator

APPLICATION INFORMATION

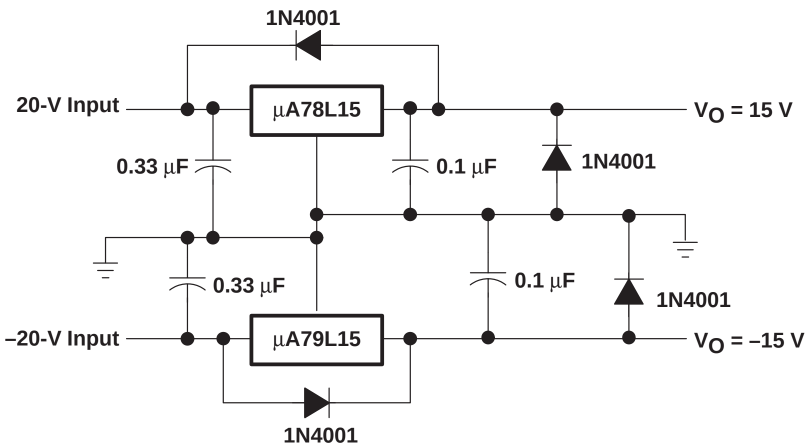


Figure 5. Regulated Dual Supply

operation with a load common to a voltage of opposite polarity

In many cases, a regulator powers a load that is not connected to ground but, instead, is connected to a voltage source of opposite polarity (e.g., operational amplifiers, level-shifting circuits, etc.). In these cases, a clamp diode should be connected to the regulator output as shown in Figure 6. This protects the regulator from output polarity reversals during startup and short-circuit operation.

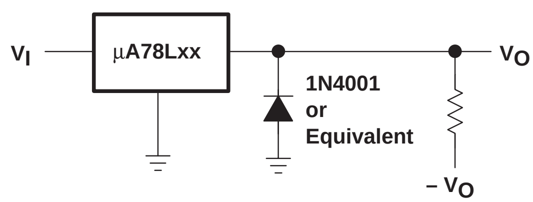


Figure 6. Output Polarity-Reversal-Protection Circuit

reverse-bias protection

Occasionally, the input voltage to the regulator can collapse faster than the output voltage. This can occur, for example, when the input supply is crowbarred during an output overvoltage condition. If the output voltage is greater than approximately 7 V, the emitter-base junction of the series-pass element (internal or external) could break down and be damaged. To prevent this, a diode shunt can be employed as shown in Figure 7.

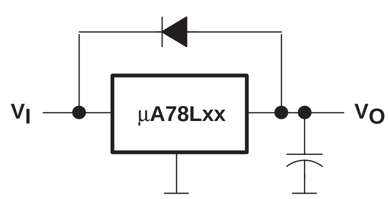


Figure 7. Reverse-Bias-Protection Circuit

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Customers are responsible for their applications using TI components.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.