D2216, JUNE 1976 – REVISED SEPTEMBER 1991

- 3-Terminal Regulators
- Output Current Up to 500 mA
- No External Components
- High Power Dissipation Capability
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Direct Replacements for Fairchild μA79M00 Series

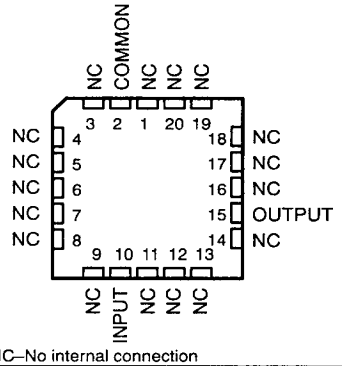
NOMINAL OUTPUT VOLTAGE	0°C TO 125°C OPERATING TEMPERATURE RANGE	−55°C TO 150°C OPERATING TEMPERATURE RANGE
−5 V	uA79M05C	uA79M05M
−6 V	uA79M06C	
−8 V	uA79M08C	
−12 V	uA79M12C	uA79M12M
−15 V	uA79M15C	
−20 V	uA79M20C	
−24 V	uA79M24C	
Package	KC	FK, JG

description

This series of fixed-negative-voltage monolithic integrated-circuit voltage regulators is designed to complement the uA78M00 series in a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 500 mA of output current. The internal current limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents and also as the power pass element in precision regulators.

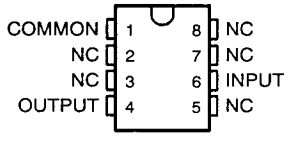
terminal assignments

uA79M_M . . . FK PACKAGE
(TOP VIEW)



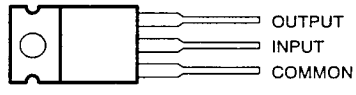
NC–No internal connection

uA79M_M . . . JG PACKAGE
(TOP VIEW)



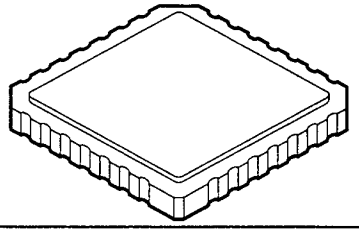
NC–No internal connection

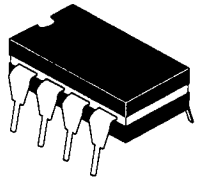
uA79M_C . . . KC PACKAGE
(TOP VIEW)

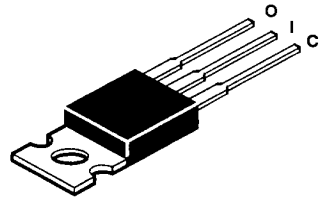


The input terminal is in electrical contact with the mounting base.

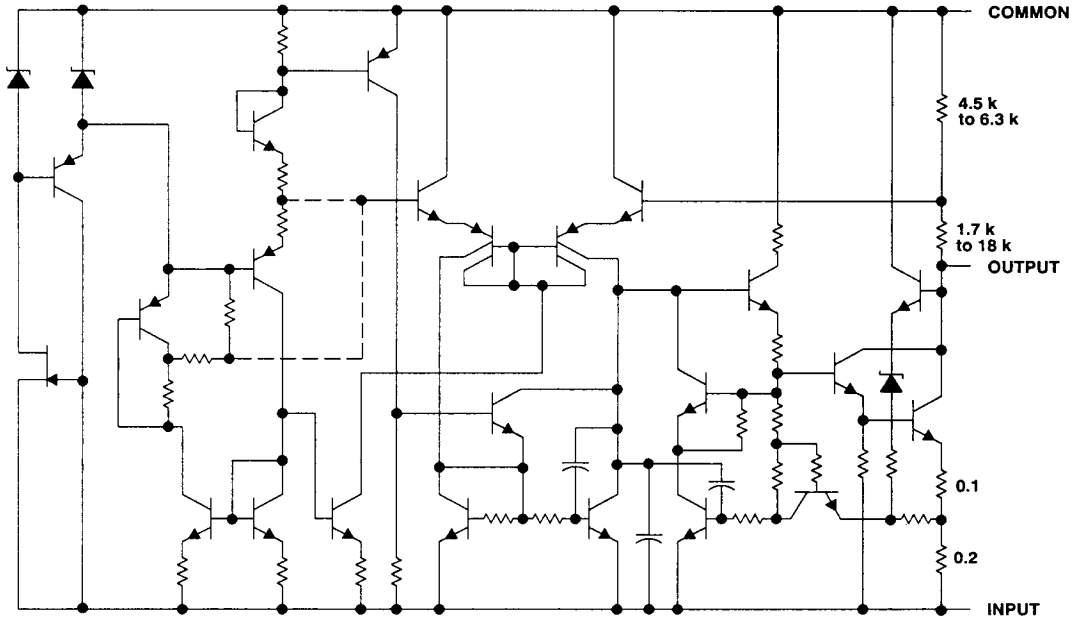
TO-220AB







schematic



Resistor values shown are nominal and in Ω.

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

			uA79M05C THRU uA79M12C	uA79M05M AND uA79M12M	UNIT
Input voltage		uA79M20, uA79M24	−40		V
		All others	−35	− 35	
Continuous total dissipation (see Note 1)			See Dissipation Rating Tables 1 and 2		
Operating free-air, case, or virtual junction temperature range			0 to 150	−55 to 150	°C
Storage temperature range			−65 to 150	−65 to 150	°C
Case temperature for 60 seconds		FK package		260	°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds		JG package		300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		KC package	260		°C

NOTE 1: To avoid exceeding the design maximum virtual junction temperature, these ratings should not be exceeded. 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.

DISSIPATION RATING TABLE 1–FREE-AIR TEMPERATURE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 125°C$ POWER RATING
FK	1375 mW	11 mW/°C	880 mW	275 mW
JG	1050 mW	8.4 mW/°C	672 mW	210 mW
KC	2000 mW	16 mW/°C	1280 mW	400 mW

DISSIPATION RATING TABLE 2–CASE TEMPERATURE

PACKAGE	$T_C \le 120°C$ POWER RATING	DERATING FACTOR ABOVE $T_C = 120°C$	$T_C = 125°C$ POWER RATING
KC	7.5 W	250 mW/°C	6.25 W

recommended operating conditions

		MIN	MAX	UNIT
Input voltage, V_I	uA79M05C, uA79M05M	−7	−25	V
	uA79M06C	−8	−25	
	uA79M08C	−10.5	−25	
	uA79M12C, uA79M12M	−14.5	30	
	uA79M15C	−17.5	−30	
	uA79M20C	−23	−35	
	uA79M24C	−27	−38	
Output current, I_O			500	mA
Operating virtual junction temperature, T_J	uA79M05C thru uA79M24C	0	125	°C
	uA79M05M, uA79M12M	−55	150	

electrical characteristics at specified virtual junction temperature, $V_I = -10$ V, $I_O = 350$ mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	uA79M05C			uA79M05M			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage‡			25°C	−4.8	−5	−5.2	−4.8	−5	−5.2	V
	I_O = 5 mA to 350 mA, V_I = −7 V to −25 V		−55°C to 150°C				−4.75		−5.25	
			0°C to 125°C	−4.75		−5.25				
Input regulation	V_I = −7 V to −25 V		25°C		7	50		7	50	mV
	V_I = −8 V to −18 V				3	30		3	30	
Ripple rejection	V_I = −8 V to −18 V, f = 120 Hz	I_O = 100 mA	−55°C to 150°C				50*			dB
			0°C to 125°C	50						
		I_O = 300 mA	25°C	54	60		54*	60		
Output regulation	I_O = 5 mA to 500 mA		25°C		75	100		75	100	mV
	I_O = 5 mA to 350 mA				50			50		
Temperature coefficient of output voltage	I_O = 5 mA		−55°C to 150°C						−1.5*	mV/°C
			0°C to 125°C		−0.4					
Output noise voltage	f = 10 Hz to 100 kHz		25°C		125			125	400*	μV
Dropout voltage			25°C		1.1			1.1	2.3	V
Bias current			25°C		1	2		1	2	mA
Bias current change	V_I = −8 V to −25 V		−55°C to 150°C						0.4	mA
			0°C to 125°C			0.4				
	I_O = 5 mA to 350 mA		−55°C to 150°C						0.4	
			0°C to 125°C			0.4				
Short-circuit output current	V_I = −30 V		25°C		140				600	mA
Peak output current			25°C		0.65		0.5	0.65	1.4*	A

*On products compliant to MIL-STD-883, Class B, this parameter is not production tested.

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

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

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electrical characteristics at specified virtual junction temperature, $V_I = -11$ V, $I_O = 350$ mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	MIN	TYP	MAX	UNIT
Output voltage‡			25°C	−5.75	−6	−6.25	V
	I_O = 5 mA to 350 mA,	V_I = −8 V to −25 V	0°C to 125°C	−5.7		−6.3	
Input regulation	V_I = −8 V to −25 V		25°C		7	60	mV
	V_I = −9 V to −19 V				3	40	
Ripple rejection	V_I = −9 V to −19 V,	I_O = 100 mA	0°C to 125°C	50			dB
	f = 120 Hz	I_O = 300 mA	25°C	54	60		
Output regulation	I_O = 5 mA to 500 mA		25°C		80	120	mV
	I_O = 5 mA to 350 mA				55		
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		−0.4		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		150		μV
Dropout voltage			25°C		1.1		V
Bias current			25°C		1	2	mA
Bias current change	V_I = −9 V to −25 V		0°C to 125°C			0.4	mA
	I_O = 5 mA to 350 mA		0°C to 125°C			0.4	
Short-circuit output current	V_I = −30 V		25°C		140		mA
Peak output current			25°C		0.65		A

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

‡ 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 = 350 mA (unless otherwise noted)

PARAMETER	TEST CONDITONS		T_J†	MIN	TYP	MAX	UNIT
Output voltage‡			25°C	−7.7	−8	−8.3	V
	I_O = 5 mA to 350 mA,	V_I = −10.5 V to −25 V	0°C to 125°C	−7.6		−8.4	
Input regulation	V_I = −10.5 V to −25 V		25°C		8	80	mV
	V_I = −11 V to −21 V				4	50	
Ripple rejection	V_I = −11.5 V to −21.5 V, f = 120 Hz	I_O = 100 mA	0°C to 125°C	50			dB
		I_O = 300 mA	25°C	54	59		
Output regulation	I_O = 5 mA to 500 mA		25°C		90	160	mV
	I_O = 5 mA to 350 mA				60		
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		−0.6		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		200		μV
Dropout voltage	I_O = 5 mA		25°C		1.1		V
Bias current			25°C		1	2	mA
Bias current change	V_I = −10.5 V to −25 V		0°C to 125°C			0.4	mA
	I_O = 5 mA to 350 mA		0°C to 125°C			0.4	
Short-circuit output current	V_I = −30 V		25°C		140		mA
Peak output current			25°C		0.65		A

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

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

electrical characteristics at specified virtual junction temperature, $V_I = -19$ V, $I_O = 350$ mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	uA79M12C			uA79M12M			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage‡			25°C	−11.5	−12	−12.5	−11.5	−12	−12.5	V
	I_O = 5 mA to 350 mA, V_I = −14.5 V to −30 V		−55°C to 150°C				−11.4		−12.6	
			0°C to 125°C	−11.4		−12.6				
Input regulation	V_I = −14.5 V to −30 V		25°C		9	80		9	80	mV
	V_I = −15 V to −25 V				5	50		5	50	
Ripple rejection	V_I = −15V to −25 V, f = 120 Hz	I_O = 100 mA	−55°C to 150°C				50*			dB
			0°C to 125°C	50						
		I_O = 300 mA	25°C	54	60		54*	60		
Output regulation	I_O = 5 mA to 500 mA		25°C		65	240		65	240	mV
	I_O = 5 mA to 350 mA				45			45		
Temperature coefficient of output voltage	I_O = 5 mA		−55°C to 150°C						−3.6*	mV/°C
			0°C to 125°C		−0.8					
Output noise voltage	f = 10 Hz to 100 kHz		25°C		300			300	960*	μV
Dropout voltage			25°C		1.1			1.1	2.3	V
Bias current			25°C		1.5	3		1.5	3	mA
Bias current change	V_I = −14.5 V to −30 V		−55°C to 150°C						0.4	mA
			0°C to 125°C			0.4				
	I_O = 5 mA to 350 mA		−55°C to 150°C						0.4	
			0°C to 125°C			0.4				
Short-circuit output current	V_I = −30 V		25°C		140				600	mA
Peak output current			25°C		0.65		0.5*	0.65	1.4*	A

*On products compliant to MIL-STD-883, Class B, this parameter is not production tested.

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

‡ 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 = 350 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	MIN	TYP	MAX	UNIT
Output voltage‡			25°C	−14.4	−15	−15.6	V
	I_O = 5 mA to 350 mA,	V_I = −17.5 V to −30 V	0°C to 125°C	−14.25		−15.75	
Input regulation	V_I = −17.5 V to −30 V		25°C		9	80	mV
	V_I = −18 V to −28 V				7	50	
Ripple rejection	V_I = −18.5 V to −28.5 V,	I_O = 100 mA	0°C to 125°C	50			dB
	f = 120 Hz	I_O = 300 mA	25°C	54	59		
Output regulation	I_O = 5 mA to 500 mA		25°C		65	240	mV
	I_O = 5 mA to 350 mA				45		
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		−1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		375		μV
Dropout voltage	I_O = 5 mA		25°C		1.1		V
Bias current			25°C		1.5	3	mA
Bias current change	V_I = −17.5 V to −30 V		0°C to 125°C			0.4	mA
	I_O = 5 mA to 350 mA		0°C to 125°C			0.4	
Short-circuit output current	V_I = −30 V		25°C		140		mA
Peak output current			25°C		0.65		A

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

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

electrical characteristics at specified virtual junction temperature, V_I = −29 V, I_O = 350 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	MIN	TYP	MAX	UNIT
Output voltage‡	I_O = 5 mA to 350 mA, V_I = −23 V to −35 V		25°C	−19.2	−20	−20.8	V
			0°C to 125°C	−19		−21	
Input regulation	V_I = −23 V to −35 V		25°C		12	80	mV
	V_I = −24 V to −34 V				10	70	
Ripple rejection	V_I = −24 V to −34 V, f = 120 Hz	I_O = 100 mA	0°C to 125°C	50			dB
		I_O = 300 mA	25°C	54	58		
Output regulation	I_O = 5 mA to 500 mA		25°C		75	300	mV
	I_O = 5 mA to 350 mA				50		
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		−1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		500		μV
Dropout voltage			25°C		1.1		V
Bias current			25°C		1.5	3.5	mA
Bias current change	V_I = −23 V to −35 V		0°C to 125°C			0.4	mA
	I_O = 5 mA to 350 mA					0.4	
Short-circuit output current	V_I = −30 V		25°C		140		mA
Peak output current			25°C		0.65		A

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 2-μF capacitor across the input and a 1-μF capacitor across the output.

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

uA79M24C electrical characteristics at specified virtual junction temperature, V_I = −33 V, I_O = 350 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	MIN	TYP	MAX	UNIT
Output voltage‡	I_O = 5 mA to 350 mA, V_I = −27 V to −38 V		25°C	−23	−24	−25	V
			0°C to 125°C	−22.8		−25.2	
Input regulation	V_I = −27 V to −38 V		25°C		12	80	mV
	V_I = −28 V to −38 V				12	70	
Ripple rejection	V_I = −28 V to −38 V, f = 120 Hz	I_O = 100 mA	0°C to 125°C	50			dB
		I_O = 300 mA	25°C	54	58		
Output regulation	I_O = 5 mA to 500 mA		25°C		75	300	mV
	I_O = 5 mA to 350 mA				50		
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		−1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		600		μV
Dropout voltage			25°C		1.1		V
Bias current			25°C		1.5	3.5	mA
Bias current change	V_I = −27 V to −38 V		0°C to 125°C			0.4	mA
	I_O = 5 mA to 350 mA					0.4	
Short-circuit output current	V_I = −30 V		25°C		140		mA
Peak output current			25°C		0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.