μA79M00 SERIES
NEGATIVE-VOLTAGE REGULATORS

SLVS060E – JUNE 1976 – REVISED APRIL 2000

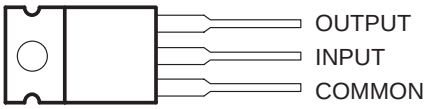
- **3-Terminal Regulators**
- **Output Current up to 500 mA**
- **No External Components**
- **High Power-Dissipation Capability**
- **Internal Short-Circuit Current Limiting**
- **Output Transistor Safe-Area Compensation**
- **Direct Replacements for Fairchild μA79M00 Series**

description

This series of fixed-negative-voltage monolithic integrated-circuit voltage regulators is designed to complement the μA78M00 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 delivers 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.

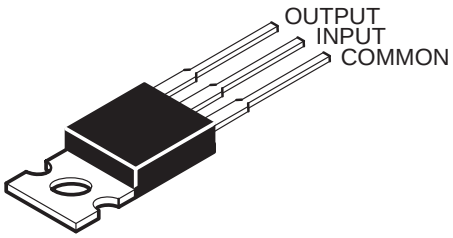
The μA79M00C series is characterized for operation over the virtual junction temperature range of 0°C to 125°C.

KC PACKAGE
(TOP VIEW)

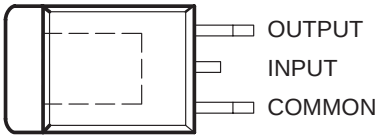


The INPUT terminal is in electrical contact with the mounting base.

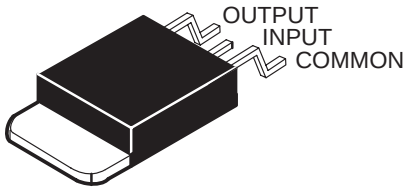
TO-220AB



KTP PACKAGE
(TOP VIEW)



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

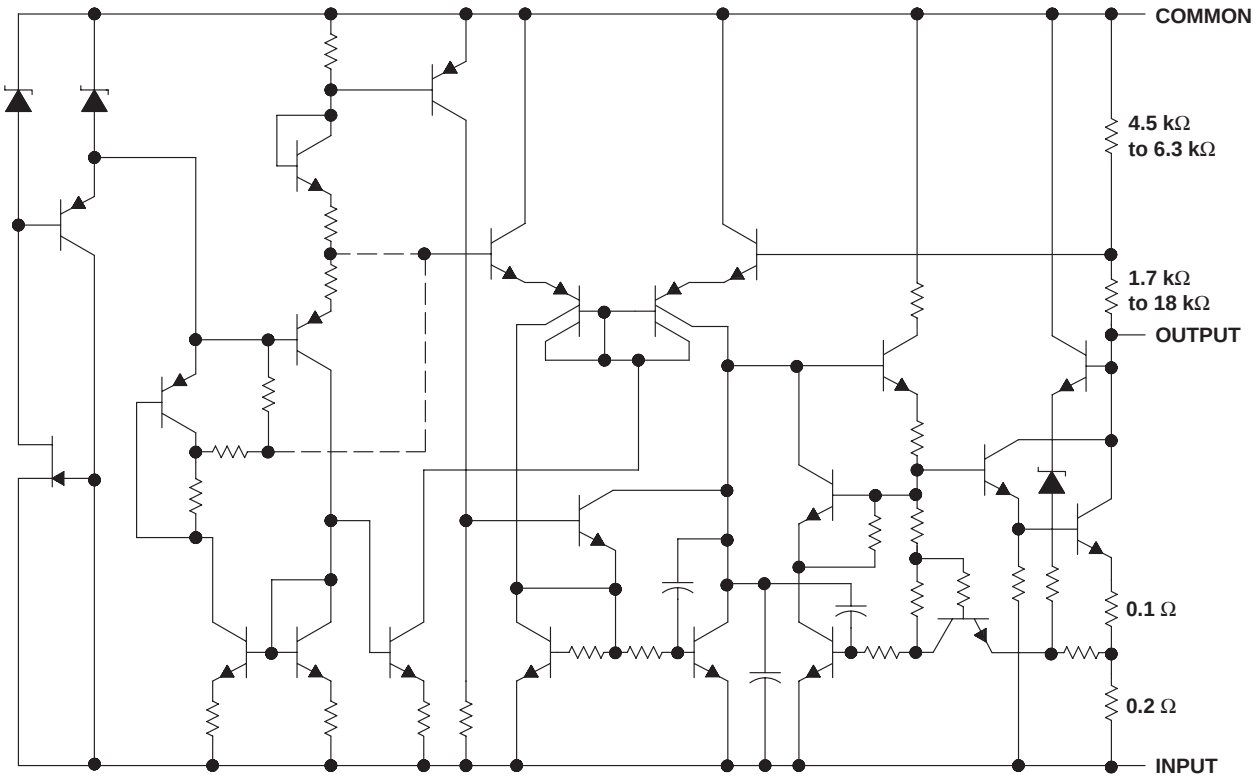


AVAILABLE OPTIONS

T_J	$V_{O(NOM)}$ (V)	PACKAGED DEVICES		CHIP FORM (Y)
		HEAT-SINK MOUNTED (KC)	PLASTIC FLANGE MOUNTED (KTP)	
0°C to 125°C	–5	μA79M05CKC	μA79M05CKTP	μA79M05Y
	–6	—	μA79M06CKTP	μA79M06Y
	–8	—	μA79M08CKTP	μA79M08Y
	–12	—	μA79M12CKTP	μA79M12Y
	–15	—	μA79M15CKTP	μA79M15Y
	–20	—	μA79M20CKTP	μA79M20Y
	–24	—	μA79M24CKTP	μA79M24Y

The KTP package also is available in tape and reel. Add the suffix R to device type (e.g., μA79M05CKTPR). Chip forms are tested at 25°C.

schematic



Resistor values shown are nominal.

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

		μA79MxxC	UNIT
Input voltage	μA79M20C, μA79M24C	–40	V
	All others	–35	
Package thermal impedance, θ_{JA} (see Notes 1 and 2)	KC package	22	°C/W
	KTP package	28	
Operating free-air, T_A; case, T_C; or virtual junction, T_J, temperature range		0 to 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 affect 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	μA79M05C	–7	–25	V
	μA79M06C	–8	–25	
	μA79M08C	–10.5	–25	
	μA79M12C	–14.5	30	
	μA79M15C	–17.5	–30	
	μA79M20C	–23	–35	
	μA79M24C	–27	–38	
Output current, I_O			500	mA
Operating virtual junction temperature, T_J		0	125	°C

electrical characteristics at specified virtual junction temperature, V_I = –10 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M05C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –7 V to –25 V,	I_O = 5 mA to 350 mA		–4.8	–5	–5.2	V
			T_J = 0°C to 125°C	–4.75		–5.25	
Input voltage regulation	V_I = –7 V to –25 V				7	50	mV
	V_I = –8 V to –18 V				3	30	
Ripple rejection	V_I = –8 V to –18 V, f = 120 Hz	I_O = 100 mA,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	60		
Output voltage regulation	I_O = 5 mA to 500 mA				75	100	mV
	I_O = 5 mA to 350 mA				50		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–0.4		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				125		μV
Dropout voltage					1.1		V
Bias current					1	2	mA
Bias current change	V_I = –8 V to –18 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –11 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M06C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –8 V to –25 V,	I_O = 5 mA to 350 mA		–5.75	–6	–6.25	V
			T_J = 0°C to 125°C	–5.7		–6.3	
Input voltage regulation	V_I = –8 V to –25 V				7	60	mV
	V_I = –9 V to –19 V				3	40	
Ripple rejection	V_I = –9 V to –19 V, f = 120 Hz	I_O = 100 mA,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	60		
Output voltage regulation	I_O = 5 mA to 500 mA				80	120	mV
	I_O = 5 mA to 350 mA				55		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–0.4		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				150		μV
Dropout voltage					1.1		V
Bias current					1	2	mA
Bias current change	V_I = –9 V to –25 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –19 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M08C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –10.5 V to –25 V,	I_O = 5 mA to 350 mA		–7.7	–8	–8.3	V
			T_J = 0°C to 125°C	–7.6		–8.4	
Input voltage regulation	V_I = –10.5 V to –25 V				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,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	59		
Output voltage regulation	I_O = 5 mA to 500 mA				90	160	mV
	I_O = 5 mA to 350 mA				60		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–0.6		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				200		μV
Dropout voltage	I_O = 5 mA				1.1		V
Bias current					1	2	mA
Bias current change	V_I = –10.5 V to –25 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –19 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M12C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –14.5 V to –30 V,	I_O = 5 mA to 350 mA		–11.5	–12	–12.5	V
			T_J = 0°C to 125°C	–11.4		–12.6	
Input voltage regulation	V_I = –14.5 V to –30 V				9	80	mV
	V_I = –15 V to –25 V				5	50	
Ripple rejection	V_I = –15V to –25 V, f = 120 Hz	I_O = 100 mA,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	60		
Output voltage regulation	I_O = 5 mA to 500 mA				65	240	mV
	I_O = 5 mA to 350 mA				45		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				300		μV
Dropout voltage					1.1		V
Bias current					1.5	3	mA
Bias current change	V_I = –14.5 V to –30 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –23 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M15C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –17.5 V to –30 V,	I_O = 5 mA to 350 mA		–14.4	–15	–15.6	V
			T_J = 0°C to 125°C	–14.25		–15.75	
Input voltage regulation	V_I = –17.5 V to –30 V				9	80	mV
	V_I = –18 V to –28 V				7	50	
Ripple rejection	V_I = –18.5 V to –28.5 V, f = 120 Hz	I_O = 100 mA,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	59		
Output voltage regulation	I_O = 5 mA to 500 mA				65	240	mV
	I_O = 5 mA to 350 mA				45		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				375		μV
Dropout voltage	I_O = 5 mA				1.1		V
Bias current					1.5	3	mA
Bias current change	V_I = –17.5 V to –30 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –29 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M20C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –23 V to –35 V,	I_O = 5 mA to 350 mA		–19.2	–20	–20.8	V
			T_J = 0°C to 125°C	–19		–21	
Input voltage regulation	V_I = –23 V to –35 V				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,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	58		
Output voltage regulation	I_O = 5 mA to 500 mA				75	300	mV
	I_O = 5 mA to 350 mA				50		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				500		μV
Dropout voltage					1.1		V
Bias current					1.5	3.5	mA
Bias current change	V_I = –23 V to –35 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –33 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†			μA79M24C			UNIT
				MIN	TYP	MAX	
Output voltage	V_I = –27 V to –38 V,	I_O = 5 mA to 350 mA		–23	–24	–25	V
			T_J = 0°C to 125°C	–22.8		–25.2	
Input voltage regulation	V_I = –27 V to –38 V				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,	T_J = 0°C to 125°C	50			dB
		I_O = 300 mA		54	58		
Output voltage regulation	I_O = 5 mA to 500 mA				75	300	mV
	I_O = 5 mA to 350 mA				50		
Temperature coefficient of output voltage	I_O = 5 mA,	T_J = 0°C to 125°C			–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				600		μV
Dropout voltage					1.1		V
Bias current					1.5	3.5	mA
Bias current change	V_I = –27 V to –38 V,	T_J = 0°C to 125°C				0.4	mA
	I_O = 5 mA to 350 mA,	T_J = 0°C to 125°C				0.4	
Short-circuit output current	V_I = –30 V				140		mA
Peak output current					0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –10 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M05Y			UNIT
		MIN	TYP	MAX	
Output voltage			–5		V
Input voltage regulation	V_I = –7 V to –25 V		7		mV
	V_I = –8 V to –18 V		3		
Ripple rejection	V_I = –8 V to –18 V, I_O = 300 mA, f = 120 Hz		60		dB
Output voltage regulation	I_O = 5 mA to 500 mA		75		mV
	I_O = 5 mA to 350 mA		50		
Temperature coefficient of output voltage	I_O = 5 mA		–0.4		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		125		μV
Dropout voltage			1.1		V
Bias current			1		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –11 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M06Y			UNIT
		MIN	TYP	MAX	
Output voltage			–6		V
Input voltage regulation	V_I = –8 V to –25 V		7		mV
	V_I = –9 V to –19 V		3		
Ripple rejection	V_I = –9 V to –19 V, I_O = 300 mA, f = 120 Hz		60		dB
Output voltage regulation	I_O = 5 mA to 500 mA		80		mV
	I_O = 5 mA to 350 mA		55		
Temperature coefficient of output voltage	I_O = 5 mA		–0.4		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		150		μV
Dropout voltage			1.1		V
Bias current			1		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –19 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M08Y			UNIT
		MIN	TYP	MAX	
Output voltage			–8		V
Input voltage regulation	V_I = –10.5 V to –25 V		8		mV
	V_I = –11 V to –21 V		4		
Ripple rejection	V_I = –11.5 V to –21.5 V, I_O = 300 mA, f = 120 Hz		59		dB
Output voltage regulation	I_O = 5 mA to 500 mA		90		mV
	I_O = 5 mA to 350 mA		60		
Temperature coefficient of output voltage	I_O = 5 mA		–0.6		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		200		μV
Dropout voltage	I_O = 5 mA		1.1		V
Bias current			1		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –19 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M12Y			UNIT
		MIN	TYP	MAX	
Output voltage			–12		V
Input voltage regulation	V_I = –14.5 V to –30 V		9		mV
	V_I = –15 V to –25 V		5		
Ripple rejection	V_I = –15 V to –25 V, I_O = 300 mA, f = 120 Hz		60		dB
Output voltage regulation	I_O = 5 mA to 500 mA		65		mV
	I_O = 5 mA to 350 mA		45		
Temperature coefficient of output voltage	I_O = 5 mA		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		300		μV
Dropout voltage			1.1		V
Bias current			1.5		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –23 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M15Y			UNIT
		MIN	TYP	MAX	
Output voltage			–15		V
Input voltage regulation	V_I = –17.5 V to –30 V		9		mV
	V_I = –18 V to –28 V		7		
Ripple rejection	V_I = –18.5 V to –28.5 V, I_O = 300 mA, f = 120 Hz		59		dB
Output voltage regulation	I_O = 5 mA to 500 mA		65		mV
	I_O = 5 mA to 350 mA		45		
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		375		μV
Dropout voltage	I_O = 5 mA		1.1		V
Bias current			1.5		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –29 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M20Y			UNIT
		MIN	TYP	MAX	
Output voltage			–20		V
Input voltage regulation	V_I = –23 V to –35 V		12		mV
	V_I = –24 V to –34 V		10		
Ripple rejection	V_I = –24 V to –34 V, I_O = 300 mA, f = 120 Hz		58		dB
Output voltage regulation	I_O = 5 mA to 500 mA		75		mV
	I_O = 5 mA to 350 mA		50		
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		500		μV
Dropout voltage			1.1		V
Bias current			1.5		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

electrical characteristics at specified virtual junction temperature, V_I = –33 V, I_O = 350 mA, T_J = 25°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	μA79M24Y			UNIT
		MIN	TYP	MAX	
Output voltage			–24		V
Input voltage regulation	V_I = –27 V to –38 V		12		mV
	V_I = –28 V to –38 V		12		
Ripple rejection	V_I = –28 V to –38 V, I_O = 300 mA, f = 120 Hz		58		dB
Output voltage regulation	I_O = 5 mA to 500 mA		75		mV
	I_O = 5 mA to 350 mA		50		
Temperature coefficient of output voltage	I_O = 5 mA, T_J = 0°C to 125°C		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		600		μV
Dropout voltage			1.1		V
Bias current			1.5		mA
Short-circuit output current	V_I = –30 V		140		mA
Peak output current			0.65		A

† 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 2-μF capacitor across the input and a 1-μF capacitor across the output.

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