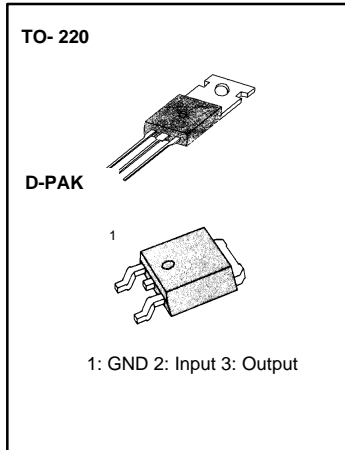


3-TERMINAL 0.5A NEGATIVE VOLTAGE REGULATORS

The KA79MXX series of 3-Terminal medium current negative voltage regulators are monolithic integrated circuits designed as fixed voltage regulators. These regulators employ internal current limiting, thermal shutdown and safe-area compensation making them essentially indestructible.

FEATURES

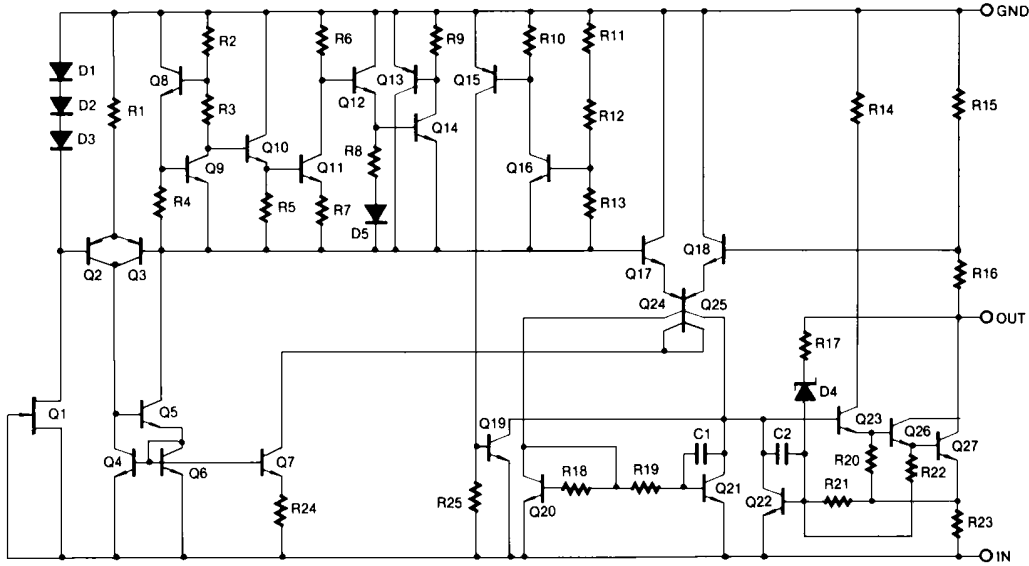
- No external components required
- Output current in excess of 0.5A
- Internal thermal-overload
- Internal short circuit current limiting
- Output transistor safe-area compensation
- Output Voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V



ORDERING INFORMATION

Device	Package	Operating Temperature
KA79MXX	TO-220	0 ~ +125 °C
KA79MXXR	D-PAK	0 ~ +125 °C

SCHEMATIC DIAGRAM



Rev. C

ABSOLUTE MAXIMUM RATINGS ($T_A = +25\text{ }^\circ\text{C}$, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Input Voltage(for $V_O = -5\text{V}$ to -18V) (for $V_O = -24\text{V}$)	V_I	-35	V
	V_I	-40	V
Thermal Resistance Junction-Cases	$R_{\theta JC}$	5	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-Air	$R_{\theta JA}$	65	$^\circ\text{C}/\text{W}$
Operating Temperature Range	T_{OPR}	0 ~ +125	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	65 ~ +125	$^\circ\text{C}$

LM79M05/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0\text{ }^\circ\text{C} \leq T_J \leq +125\text{ }^\circ\text{C}$, $I_O = 350\text{mA}$, $V_I = 10\text{V}$, unless otherwise specified, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$)

Characteristic	Symbol	Test condition	MIN	TYP	MAX	Unit
Output Voltage	V_O	$T_J = +25\text{ }^\circ\text{C}$	-4.8	-5	-5.2	V
		$I_O = 5$ to 350mA $V_I = -7$ to -25V	-4.75	-5	-5.25	
Line Regulation	ΔV_O	$T_J = +25\text{ }^\circ\text{C}$	$V_I = -7$ to -25V	7.0	50	mV
			$V_I = -8$ to -25V	2.0	30	
Load Regulation	ΔV_O	$I_O = 5\text{mA}$ to 500mA $T_J = 25\text{ }^\circ\text{C}$		30	100	mV
Quiescent Current	I_Q	$T_J = 25\text{ }^\circ\text{C}$		3.0	6.0	mA
Quiescent Current Change	ΔI_Q	$I_O = 5$ to 350mA			0.4	mA
		$I_O = 200\text{mA}$ $V_I = -8\text{V}$ to -25V			0.4	
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-0.2		mV/ $^\circ\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz}$, 100KHz $T_J = +25\text{ }^\circ\text{C}$		40		μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = -8$ to -18V	54	60		dB
Dropout Voltage	V_D	$T_J = +25\text{ }^\circ\text{C}$, $I_O = 500\text{mA}$		1.1		V
Short Circuit Current	I_{SC}	$T_J = +25\text{ }^\circ\text{C}$, $V_I = -35\text{V}$		140		mA
Peak Current	I_{PK}	$T_J = +25\text{ }^\circ\text{C}$		650		mA

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M06/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -11\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$	- 5.75	- 6.0	- 6.25	V	
		$I_O = 5$ to 350mA $V_I = -8.0$ to -25V	- 5.7	- 6.0	- 6.3		
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = -8$ to -25V		7.0	60	mV
			$V_I = -9$ to -19V		2.0	40	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		30	120	mV	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		3	6	mA	
Quiescent Current Change	ΔI_Q	$I_O = 5$ to 350mA $V_I = -8\text{V}$ to -25V			0.4	mA	
					0.4		
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		0.4		mV/ $^{\circ}\text{C}$	
Output Noise Voltage	V_N	$f = 10\text{Hz}$ to 100KHz , $T_A = +25^{\circ}\text{C}$		50		μV	
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = -9$ to -19V	54	60		dB	
Dropout Voltage	V_D	$I_O = 500\text{mA}$, $T_J = +25^{\circ}\text{C}$		1.1		V	
Short Circuit Current	I_{SC}	$V_I = -35\text{V}$, $T_J = +25^{\circ}\text{C}$		140		mA	
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		650		mA	

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M08/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -14\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$	- 7.7	- 8.0	- 8.3	V	
		$I_O = 5$ to 350mA $V_I = -10.5$ to -25V	- 7.6	- 8.0	- 8.4		
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = -10.5$ to -25V		7.0	80	mV
			$V_I = -11$ to -21V		2.0	50	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		30	160	mV	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		3	6	mA	
Quiescent Current Change	ΔI_Q	$I_O = 5$ to 350mA $V_I = -8\text{V}$ to -25V			0.4	mA	
					0.4		
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-0.6		mV/ $^{\circ}\text{C}$	
Output Noise Voltage	V_N	$f = 10\text{Hz}$ to 100KHz , $T_A = +25^{\circ}\text{C}$		60		μV	
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = -9$ to -19V	54	59		dB	
Dropout Voltage	V_D	$I_O = 500\text{mA}$, $T_J = +25^{\circ}\text{C}$		1.1		V	
Short Circuit Current	I_{SC}	$V_I = -35\text{V}$, $T_J = +25^{\circ}\text{C}$		140		mA	
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		650		mA	

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M12/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0\text{ }^{\circ}\text{C} \leq T_J \leq +125\text{ }^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -19\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J = +25\text{ }^{\circ}\text{C}$	-11.5	-12	-12.5	V	
		$I_O = 5\text{ to }350\text{mA}$ $V_I = -14.5\text{ to }-30\text{V}$	-11.4	-1.2	-12.6		
Line Regulation	ΔV_O	$T_J = +25\text{ }^{\circ}\text{C}$	$V_I = -14.5\text{ to }-30\text{V}$	8.0	80	mV	
		-	$V_I = -15\text{ to }-25\text{V}$	3.0	50		
Load Regulation	ΔV_O	$T_J = +25\text{ }^{\circ}\text{C}$	$I_O = 5.0\text{mA to }500\text{mA}$		30	240	mV
Quiescent Current	I_Q	$T_J = +25\text{ }^{\circ}\text{C}$		3	6	mA	
Quiescent Current Change	ΔI_Q	$I_O = 5\text{ to }350\text{mA}$			0.4	mA	
		$V_I = -14.5\text{V to }-30\text{V}$			0.4		
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-0.8		mV/ $^{\circ}\text{C}$	
Output Noise Voltage	V_N	$f = 10\text{Hz to }100\text{KHz}, T_A = +25\text{ }^{\circ}\text{C}$		75		μV	
Ripple Rejection	RR	$f = 120\text{Hz}, V_I = -15\text{ to }-25\text{V}$		54	60	dB	
Dropout Voltage	V_D	$I_O = 500\text{mA}, T_J = +25\text{ }^{\circ}\text{C}$		1.1		V	
Short Circuit Current	I_{SC}	$V_I = -35\text{V}, T_J = +25\text{ }^{\circ}\text{C}$		140		mA	
Peak Current	I_{PK}	$T_J = +25\text{ }^{\circ}\text{C}$		650		mA	

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M15/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0\text{ }^{\circ}\text{C} \leq T_J \leq +125\text{ }^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -23\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J = +25\text{ }^{\circ}\text{C}$	-14.4	-15	-15.6	V	
		$I_O = 5\text{ to }350\text{mA}$ $V_I = -17.5\text{ to }-30\text{V}$	-14.25	-15	-15.75		
Line Regulation	ΔV_O	$T_J = +25\text{ }^{\circ}\text{C}$	$V_I = -17.5\text{ to }-30\text{V}$	9.0	80	mV	
		-	$V_I = -18\text{ to }-28\text{V}$	5.0	50		
Load Regulation	ΔV_O	$T_J = +25\text{ }^{\circ}\text{C}$	$I_O = 5.0\text{mA to }500\text{mA}$		30	240	mV
Quiescent Current	I_Q	$T_J = +25\text{ }^{\circ}\text{C}$		3	6	mA	
Quiescent Current Change	ΔI_Q	$I_O = 5\text{ to }350\text{mA}$			0.4	mA	
		$V_I = -17.5\text{V to }-28\text{V}$			0.4		
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-1.0		mV/ $^{\circ}\text{C}$	
Output Noise Voltage	V_N	$f = 10\text{Hz to }100\text{KHz}, T_A = +25\text{ }^{\circ}\text{C}$		90		μV	
Ripple Rejection	RR	$f = 120\text{Hz}, V_I = -18.5\text{ to }-28.5\text{V}$		54	59	dB	
Dropout Voltage	V_D	$I_O = 500\text{mA}, T_J = +25\text{ }^{\circ}\text{C}$		1.1		V	
Short Circuit Current	I_{SC}	$V_I = -35\text{V}, T_J = +25\text{ }^{\circ}\text{C}$		140		mA	
Peak Current	I_{PK}	$T_J = +25\text{ }^{\circ}\text{C}$		650		mA	

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M18/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -27\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$	-17.3	-18	-18.7	V
		$I_O = 5$ to 350mA $V_I = -21$ to -33V	-17.1	-18	-18.9	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		9.0 5.0	80 80	mV
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		30	360	mV
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		3	6	mA
Quiescent Current Change	ΔI_Q	$I_O = 5$ to 350mA			0.4	mA
		$V_I = -21\text{V}$ to -33V			0.4	
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-1.0		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz}$ to 100KHz , $T_A = +25^{\circ}\text{C}$		110		μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = -22$ to -32V	54	59		dB
Dropout Voltage	V_D	$I_O = 500\text{mA}$, $T_J = +25^{\circ}\text{C}$		1.1		V
Short Circuit Current	I_{SC}	$V_I = -35\text{V}$, $T_J = +25^{\circ}\text{C}$		140		mA
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		650		mA

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79M24/R ELECTRICAL CHARACTERISTICS(Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{mA}$, $V_I = -33\text{V}$, unless otherwise specified)

Characteristic	Symbol	Test condition	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$	-23	-24	-25	V
		$I_O = 5$ to 350mA $V_I = -27$ to -38V	-22.8	-24	-25.2	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		9.0 5.0	80 70	mV
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$		30	300	mV
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		3	6	mA
Quiescent Current Change	ΔI_Q	$I_O = 5$ to 350mA			0.4	mA
		$V_I = -27\text{V}$ to -38V			0.4	
Output Voltage Drift	$\Delta V_O/\Delta T$	$I_O = 5\text{mA}$		-1.0		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz}$ to 100KHz , $T_A = +25^{\circ}\text{C}$		180		μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = -28$ to -38V	54	58		dB
Dropout Voltage	V_D	$I_O = 500\text{mA}$, $T_J = +25^{\circ}\text{C}$		1.1		V
Short Circuit Current	I_{SC}	$V_I = -35\text{V}$, $T_J = +25^{\circ}\text{C}$		140		mA
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		650		mA

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

TYPICAL APPLICATIONS

Bypass capacitors are recommended for stable operation of the KA79MXX series of regulators over the input voltage and output current ranges. Output bypass capacitors will improve the transient response of the regulator. The bypass capacitors, (2μF on the input, 1μF on the output) should be ceramic or solid tantalum which have good high frequency characteristics. If aluminum electronics are used, their values should be 10μF or larger. The bypass capacitors should be mounted with the shortest leads, and if possible, directly across the regulator terminals.

Fig. 1 Fixed Output Regulator

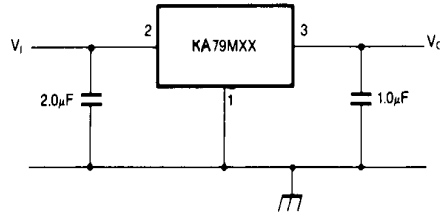
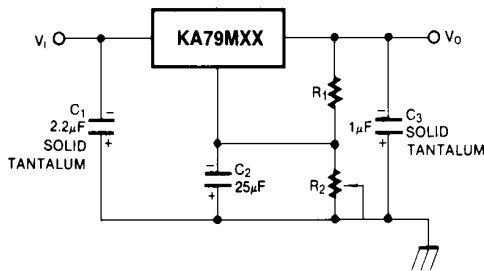


Fig. 2 Variable Output



Note

1. Required for stability. For value given, capacitor must be solid tantalum. 25μF aluminum electrolytic may be substituted.
2. C₂ improves transient response and ripple rejection. Do not increase beyond 50μF.

$$V_{OUT} = V_{SET} \left(\frac{R_1 + R_2}{R_1} \right)$$

Select R₂ as follows

KA79M 05: 300Ω, KA79M12: 750Ω, KA79M15: 11Ω

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HiSeC TM	SuperSOT TM -8	

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

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