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September 2014

KA79MXX / LM79MXX

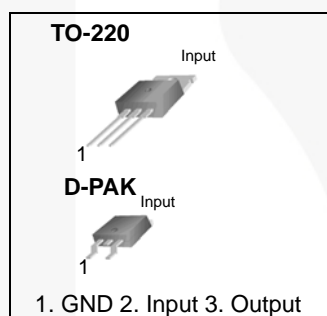
3-Terminal 0.5 A Negative Voltage Regulator

Features

- No External Components Required
- Output Current in Excess of 0.5 A
- Internal Thermal Overload
- Internal Short-Circuit Current Limiting
- Output Transistor Safe Area Compensation
- Output Voltages: -5 V, -12 V

Description

The KA79MXX / LM79MXX series of three 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.

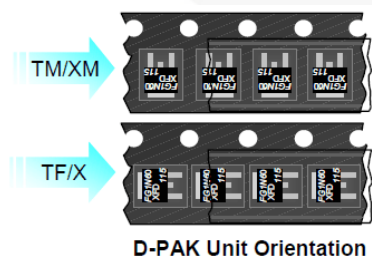


Ordering Information⁽¹⁾

Product Number	Package	Packing Method	Operating Temperature
KA79M05TU	TO-220 (Dual Gauge)	Rail	0 to +125°C
KA79M05RTM	D-PAK	Tape and Reel	
KA79M05RTF			
KA79M12RTM			
KA79M12RTF			
LM79M05CT	TO-220 (Single Gauge)	Rail	

Note:

1. Refer to below figure for TM / TF suffix of DPAK packing option.



D-PAK Unit Orientation

Block Diagram

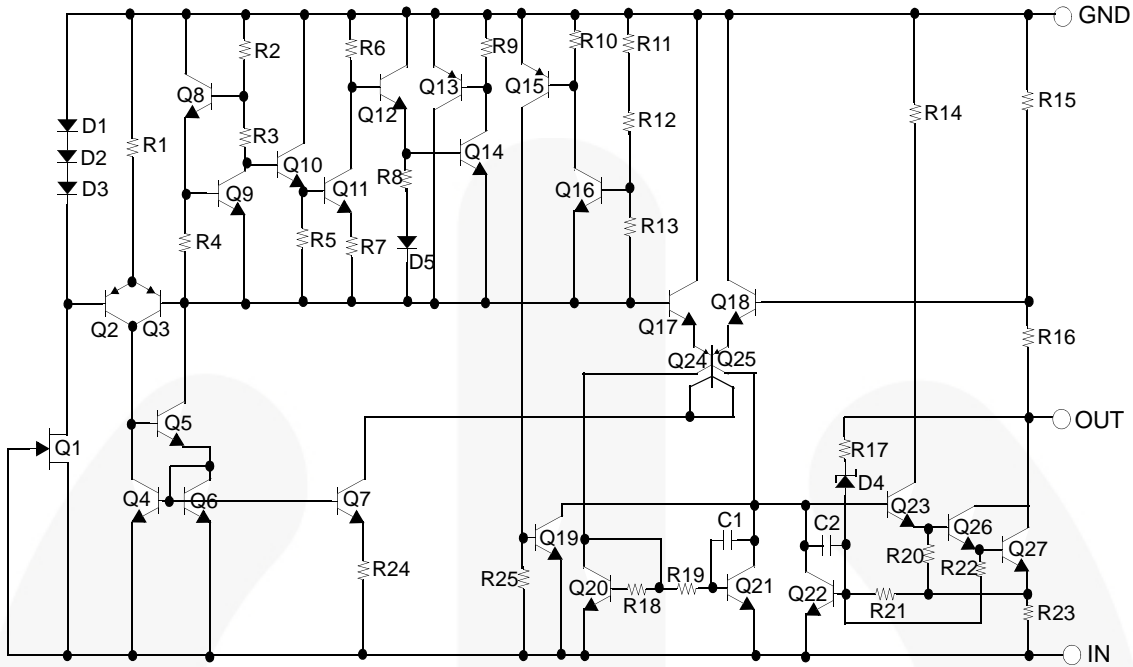


Figure 1. Block Diagram

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter		Value	Unit
V_I	Input Voltage	$V_O = -5\text{ V to } -12\text{ V}$	-35	V
$R_{\theta JC}$	Thermal Resistance, Junction-Case	TO-220	5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-Air	TO-220	65	°C/W
T_{OPR}	Operating Temperature Range		0 to +125	°C
T_{STG}	Storage Temperature Range		-65 to +150	°C

Electrical Characteristics (KA79M05 / KA79M05R / LM79M05)

Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{ mA}$, $V_I = -10\text{ V}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_O = 0.1\text{ }\mu\text{F}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	$T_J = +25^{\circ}\text{C}$	-4.80	-5.00	-5.20	V
		$I_O = 5\text{ mA to }350\text{ mA}$, $V_I = -7\text{ V to }-25\text{ V}$	-4.75	-5.00	-5.25	
ΔV_O	Line Regulation ⁽²⁾	$T_J = +25^{\circ}\text{C}$	$V_I = -7\text{ V to }-25\text{ V}$	7	50	mV
			$V_I = -8\text{ V to }-25\text{ V}$	2	30	
ΔV_O	Load Regulation ⁽²⁾	$I_O = 5\text{ mA to }500\text{ mA}$, $T_J = +25^{\circ}\text{C}$		30	100	mV
I_Q	Quiescent Current	$T_J = +25^{\circ}\text{C}$		3.0	6.0	mA
ΔI_Q	Quiescent Current Change	$I_O = 5\text{ mA to }350\text{ mA}$			0.4	mA
		$I_O = 200\text{ mA}$, $V_I = -8\text{ V to }-25\text{ V}$			0.4	
$\Delta V_O/\Delta T$	Output Voltage Drift	$I_O = 5\text{ mA}$		-0.2		mV/ $^{\circ}\text{C}$
V_N	Output Noise Voltage	$f = 10\text{ Hz to }100\text{ kHz}$, $T_A = +25^{\circ}\text{C}$		40		μV
RR	Ripple Rejection	$f = 120\text{ Hz}$, $V_J = -8\text{ V to }-18\text{ V}$		54	60	dB
V_D	Dropout Voltage	$T_J = +25^{\circ}\text{C}$, $I_O = 500\text{ mA}$		1.1		V
I_{SC}	Short-Circuit Current	$T_J = +25^{\circ}\text{C}$, $V_I = -35\text{ V}$		140		mA
I_{PK}	Peak Current	$T_J = +25^{\circ}\text{C}$		650		mA

Note:

2. 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.

Electrical Characteristics (KA79M12R)

Refer to test circuit, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $I_O = 350\text{ mA}$, $V_I = -19\text{ V}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_O = 0.1\text{ }\mu\text{F}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	$T_J = +25^{\circ}\text{C}$	-11.5	-12.0	-12.5	V
		$I_O = 5\text{ mA to }350\text{ mA}$, $V_I = -14.5\text{ V to }-30\text{ V}$	-11.4	-12.0	-12.6	
ΔV_O	Line Regulation ⁽³⁾	$T_J = +25^{\circ}\text{C}$	$V_I = -14.5\text{ V to }-30\text{ V}$	8.0	80	mV
			$V_I = -15\text{ V to }-25\text{ V}$	3.0	50	
ΔV_O	Load Regulation ⁽³⁾	$T_J = +25^{\circ}\text{C}$	$I_O = 5.0\text{ mA to }500\text{ mA}$	30	240	mV
I_Q	Quiescent Current	$T_J = +25^{\circ}\text{C}$		3	6	mA
ΔI_Q	Quiescent Current Change	$I_O = 5\text{ mA to }350\text{ mA}$			0.4	mA
		$V_I = -14.5\text{ V to }-30\text{ V}$			0.4	
$\Delta V_O/\Delta T$	Output Voltage Drift	$I_O = 5\text{ mA}$		-0.8		mV/ $^{\circ}\text{C}$
V_N	Output Noise Voltage	$f = 10\text{ Hz to }100\text{ kHz}$, $T_A = +25^{\circ}\text{C}$		75		μV
RR	Ripple Rejection	$f = 120\text{ Hz}$, $V_I = -15\text{ V to }-25\text{ V}$	54	60		dB
V_D	Dropout Voltage	$I_O = 500\text{ mA}$, $T_J = +25^{\circ}\text{C}$		1.1		V
I_{SC}	Short Circuit Current	$V_I = -35\text{ V}$, $T_J = +25^{\circ}\text{C}$		140		mA
I_{PK}	Peak Current	$T_J = +25^{\circ}\text{C}$		650		mA

Note:

3. 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 Performance Characteristics

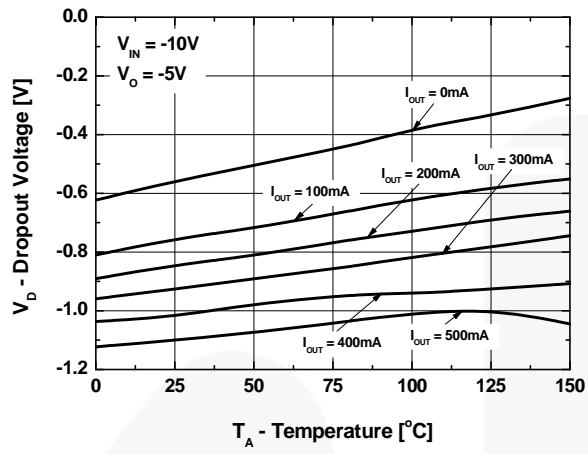


Figure 2. Dropout Voltage

Typical Applications

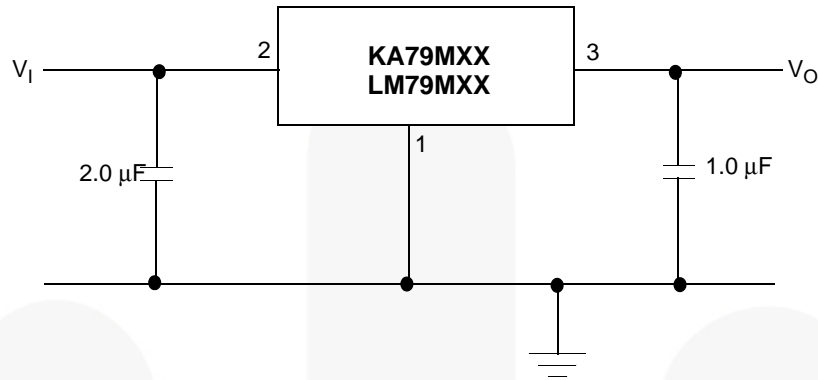


Figure 3. Fixed Output Regulator

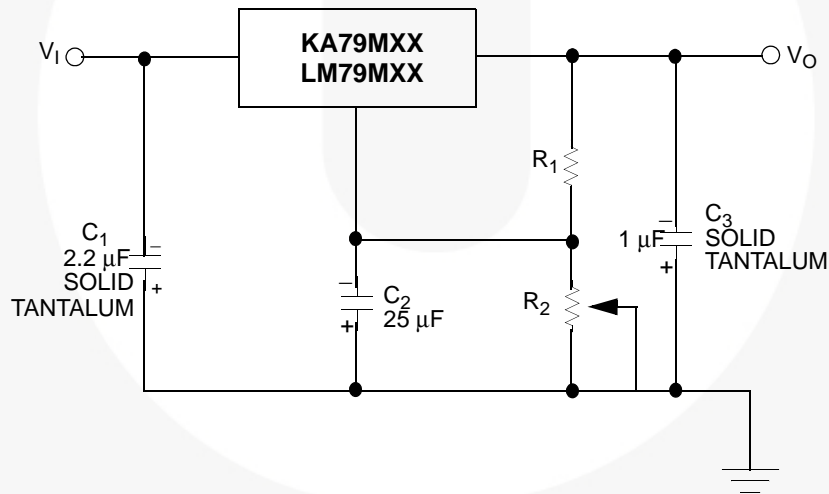


Figure 4. Variable Output

Notes:

4. To specify an output voltage, substitute voltage value for "XX".
5. C_1 is required if the regulator is located an appreciable distance from the power supply filter. For value given, capacitor must be solid tantalum. If aluminium electronics are used, $25\ \mu\text{F}$ aluminum electrolytic may be substituted.
6. C_2 improves transient response and ripple rejection. Do not increase beyond $50\ \mu\text{F}$.

Physical Dimensions

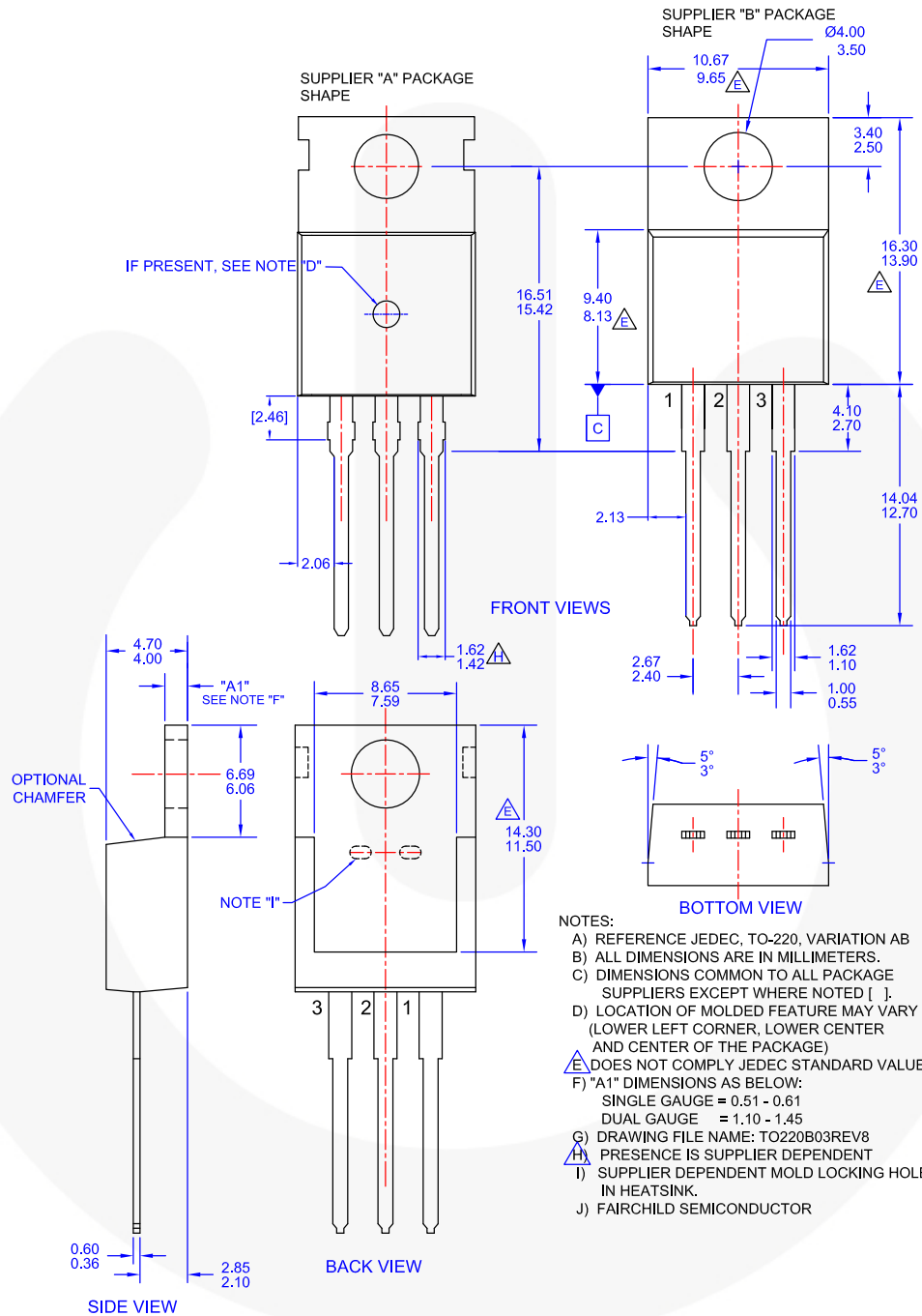


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB





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