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September 2014

# KA79MXX / LM79MXX

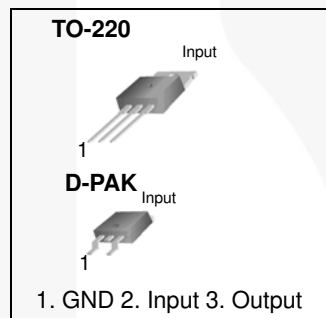
## 3-Terminal 0.5 A Negative Voltage Regulator

### 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.

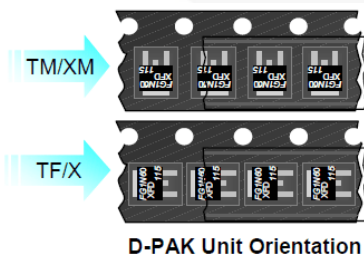


### Ordering Information<sup>(1)</sup>

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.



KA79MXX / LM79MXX — 3-Terminal 0.5 A Negative Voltage Regulator

## Block Diagram

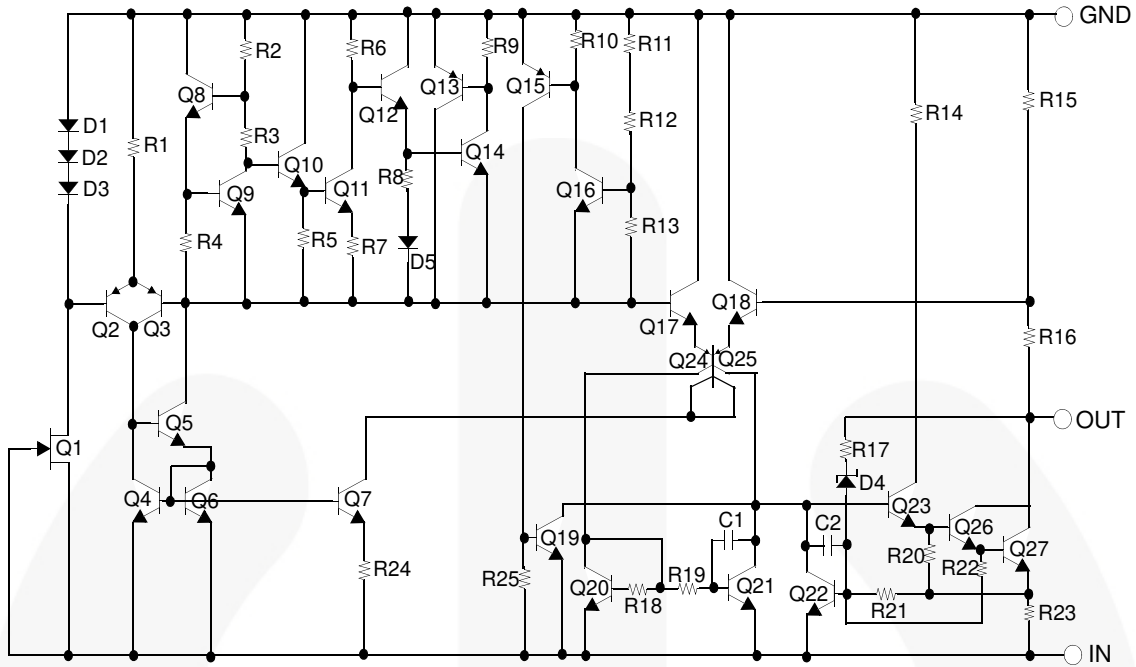


Figure 1. Block Diagram

## 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	$V_O = -5 \text{ V to } -12 \text{ V}$	V
$R_{\theta JC}$	Thermal Resistance, Junction-Case	TO-220	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-Air	TO-220	$^{\circ}\text{C/W}$
$T_{OPR}$	Operating Temperature Range	0 to +125	$^{\circ}\text{C}$
$T_{STG}$	Storage Temperature Range	-65 to +150	$^{\circ}\text{C}$

**Electrical Characteristics (KA79M05 / KA79M05R / LM79M05)**

Refer to test circuit,  $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$ ,  $I_O = 350 \text{ mA}$ ,  $V_I = -10 \text{ V}$ ,  $C_I = 0.33 \mu\text{F}$ ,  $C_O = 0.1 \mu\text{F}$  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		
$\Delta V_O$	Line Regulation <sup>(2)</sup>	$T_J = +25^{\circ}\text{C}$	$V_I = -7 \text{ V to } -25 \text{ V}$		7	50	mV
			$V_I = -8 \text{ V to } -25 \text{ V}$		2	30	
$\Delta V_O$	Load Regulation <sup>(2)</sup>	$I_O = 5 \text{ mA to } 500 \text{ mA}$ , $T_J = +25^{\circ}\text{C}$		30	100	mV	
$I_Q$	Quiescent Current	$T_J = +25^{\circ}\text{C}$		3.0	6.0	mA	
$\Delta I_Q$	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		$\mu\text{V}$	
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		
$\Delta V_O$	Line Regulation <sup>(3)</sup>	$T_J = +25^{\circ}\text{C}$	$V_I = -14.5\text{ V to }-30\text{ V}$	8.0	80	mV	
			$V_I = -15\text{ V to }-25\text{ V}$	3.0	50		
$\Delta V_O$	Load Regulation <sup>(3)</sup>	$T_J = +25^{\circ}\text{C}$	$I_O = 5.0\text{ mA to }500\text{ mA}$		30	240	mV
$I_Q$	Quiescent Current	$T_J = +25^{\circ}\text{C}$		3	6	mA	
$\Delta I_Q$	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		$\mu\text{V}$	
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

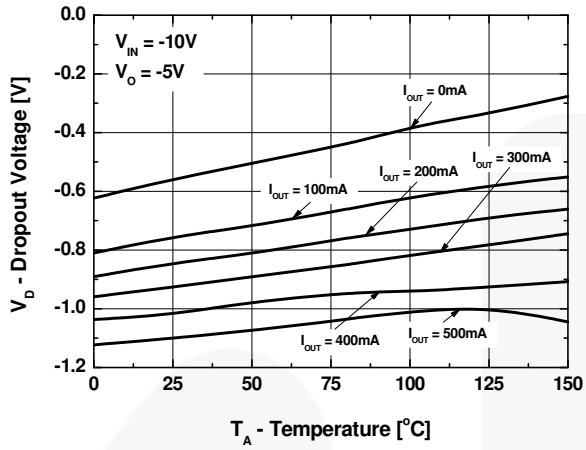


Figure 2. Dropout Voltage

Typical Applications

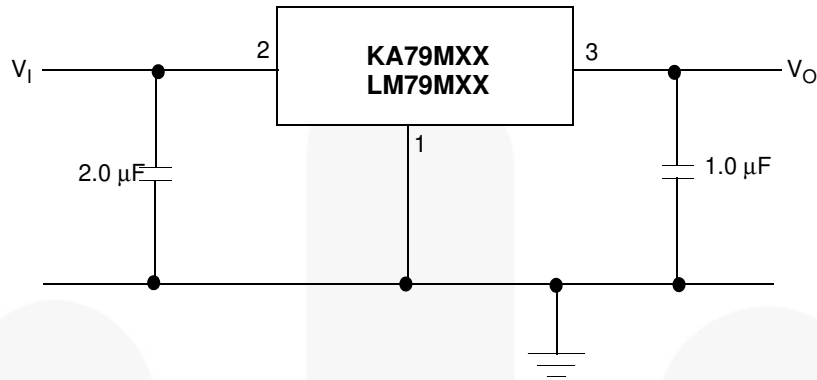


Figure 3. Fixed Output Regulator

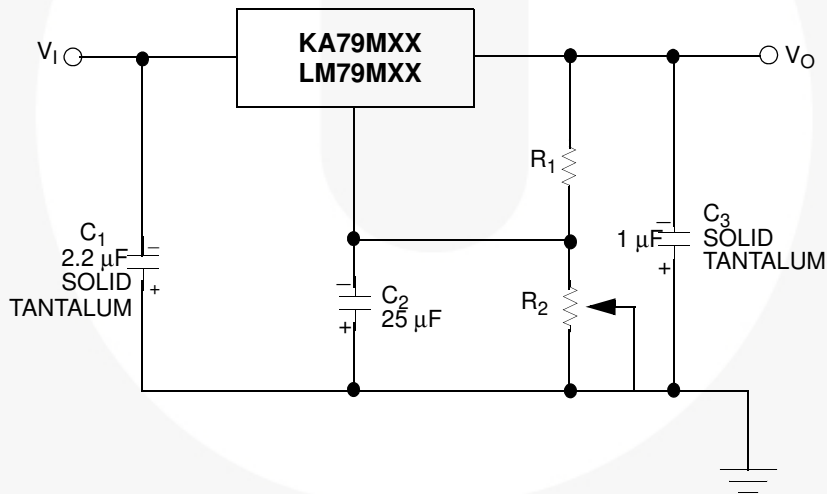


Figure 4. Variable Output

Notes:

4. To specify an output voltage, substitute voltage value for "XX".
5. C<sub>1</sub> 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 μF aluminium electrolytic may be substituted.
6. C<sub>2</sub> improves transient response and ripple rejection. Do not increase beyond 50 μF.



Physical Dimensions

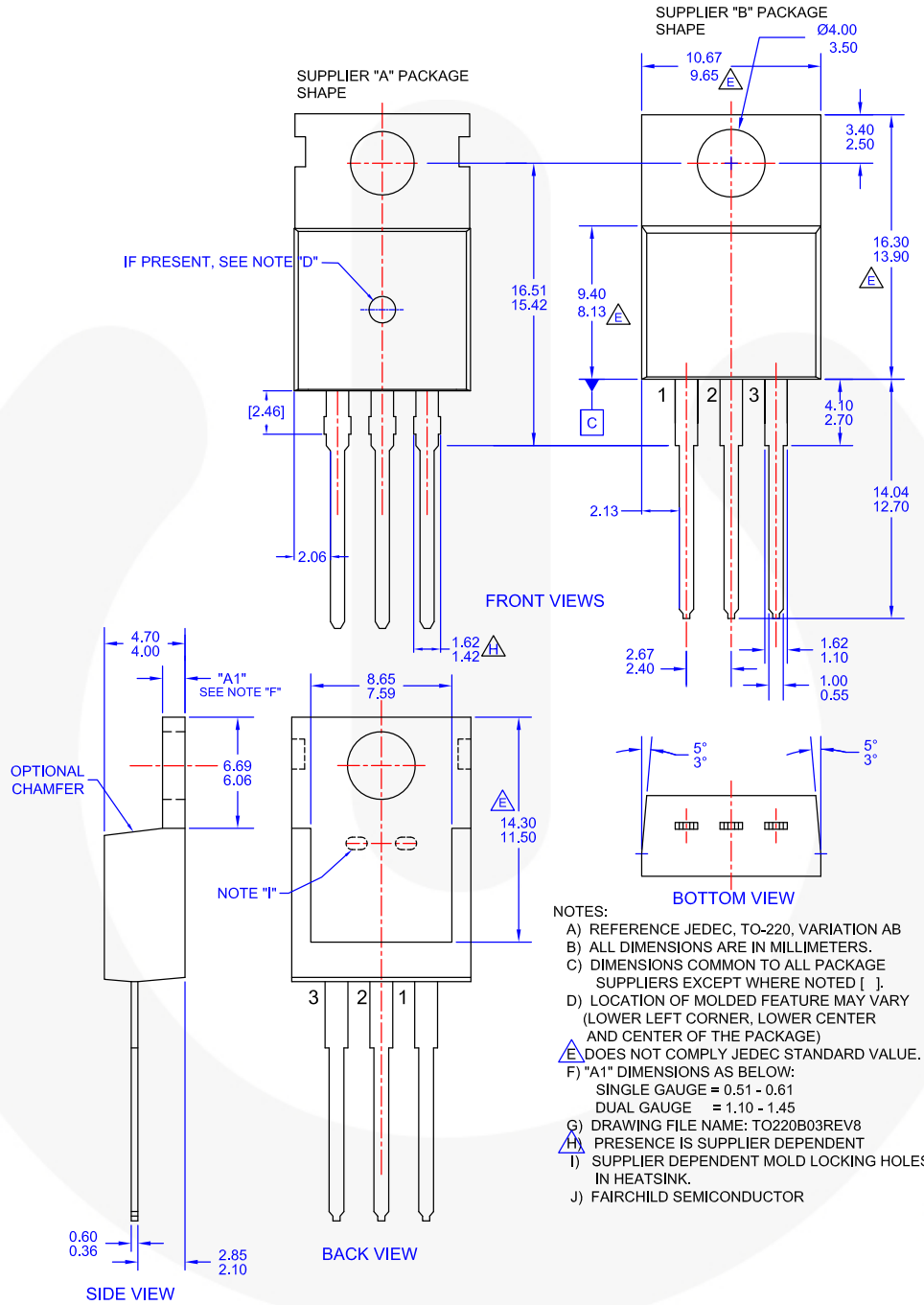
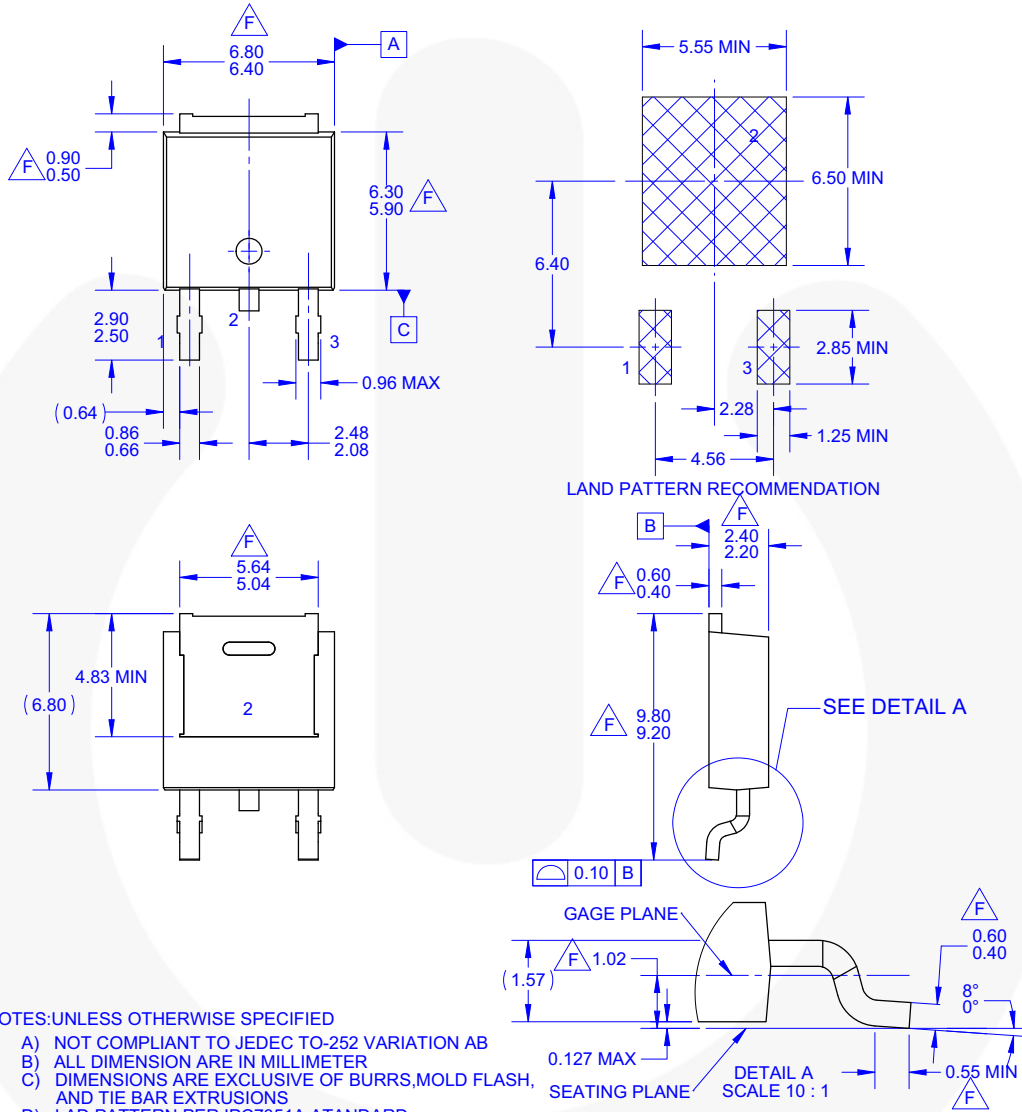


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

Physical Dimensions (Continued)








- NOTES: UNLESS OTHERWISE SPECIFIED
- A) NOT COMPLIANT TO JEDEC TO-252 VARIATION AB
  - B) ALL DIMENSION ARE IN MILLIMETER
  - C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
  - D) LAND PATTERN PER IPC7351A ATANDARD TO228P991X239-3N
  - E) DRAWING FILE NAME: MKT-TO252D03REV3.
  - F) DOES NOT COMPLY JEDEC STANDARD VALUE.
  - G) FAIRCHILD SEMICONDUCTOR.

Figure 6. 3-LEAD, TO-252, JEDEC TO-252 VAR. AB, SURFACE MOUNT (DPAK)



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