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September 2014

KA79MXX / LM79MXX

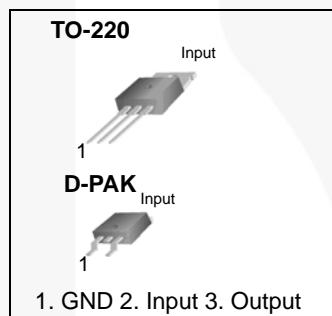
3-Terminal 0.5 A Negative Voltage Regulator

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.

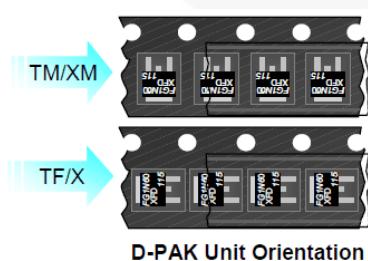


Ordering Information⁽¹⁾

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

Note:

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



Block Diagram

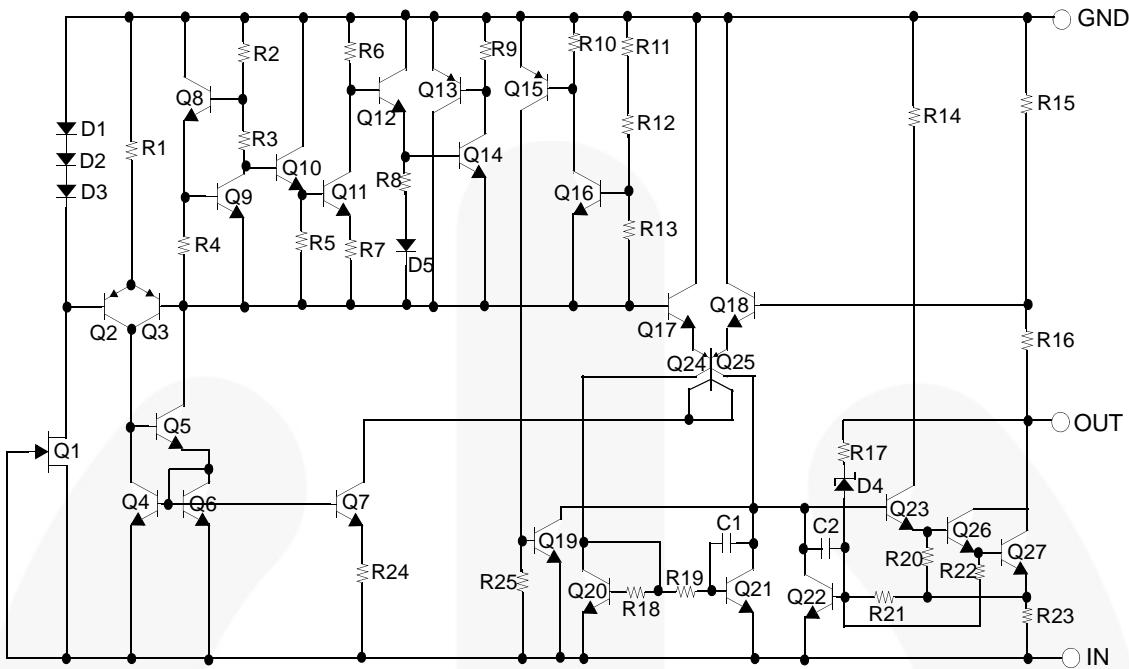


Figure 1. Block Diagram

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 $^{\circ}\text{C/W}$ | |
| $R_{\theta JA}$ | Thermal Resistance, Junction-Air | TO-220 65 $^{\circ}\text{C/W}$ | |
| 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 | |
| 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/°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, $0^\circ\text{C} \leq T_J \leq +125^\circ\text{C}$, $I_O = 350 \text{ mA}$, $V_I = -19 \text{ V}$, $C_I = 0.33 \mu\text{F}$, $C_O = 0.1 \mu\text{F}$ unless otherwise specified.

| Symbol | Parameter | Conditions | | Min. | Typ. | Max. | Unit |
|-----------------------|--------------------------------|--|--|-------|-------|-------|-------|
| V_O | Output Voltage | $T_J = +25^\circ\text{C}$ | | -11.5 | -12.0 | -12.5 | V |
| | | $I_O = 5 \text{ mA}$ to 350 mA , $V_I = -14.5 \text{ V}$ to -30 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 V | | 8.0 | 80 | mV |
| | | | $V_I = -15 \text{ V}$ to -25 V | | 3.0 | 50 | |
| ΔV_O | Load Regulation ⁽³⁾ | $T_J = +25^\circ\text{C}$ | $I_O = 5.0 \text{ mA}$ to 500 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 mA | | | 0.4 | mA |
| | | | $V_I = -14.5 \text{ V}$ to -30 V | | | 0.4 | |
| $\Delta V_O/\Delta T$ | Output Voltage Drift | $I_O = 5 \text{ mA}$ | | | -0.8 | | mV/°C |
| V_N | Output Noise Voltage | $f = 10 \text{ Hz}$ to 100 kHz , $T_A = +25^\circ\text{C}$ | | | 75 | | μV |
| RR | Ripple Rejection | $f = 120 \text{ Hz}$, $V_I = -15 \text{ V}$ to -25 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

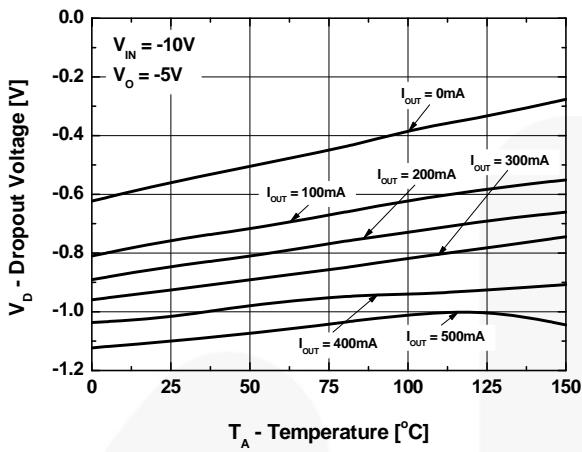


Figure 2. Dropout Voltage

Typical Applications

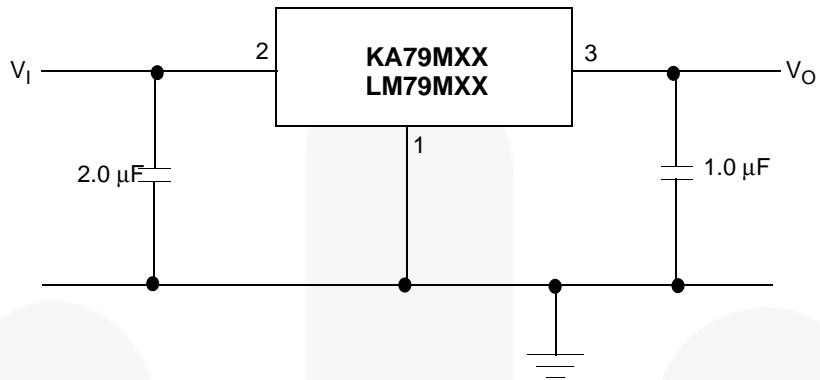


Figure 3. Fixed Output Regulator

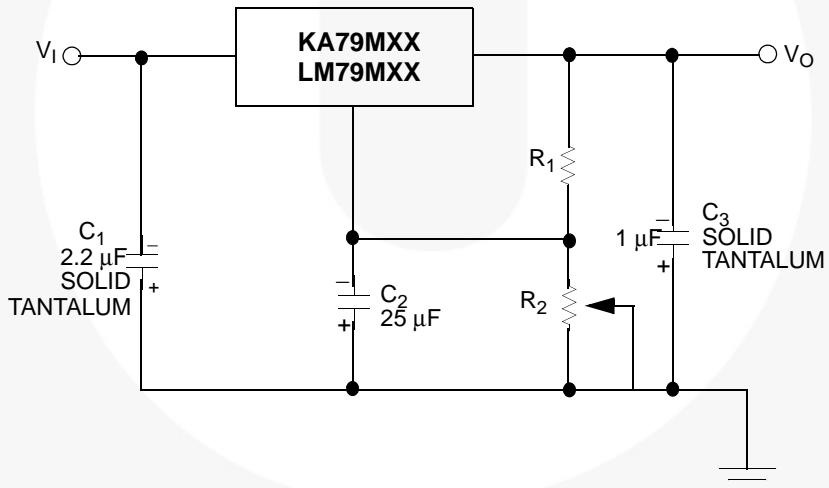


Figure 4. Variable Output

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 electrolytic are used, 25 μF aluminum electrolytic may be substituted.
6. C_2 improves transient response and ripple rejection. Do not increase beyond 50 μF .

Physical Dimensions

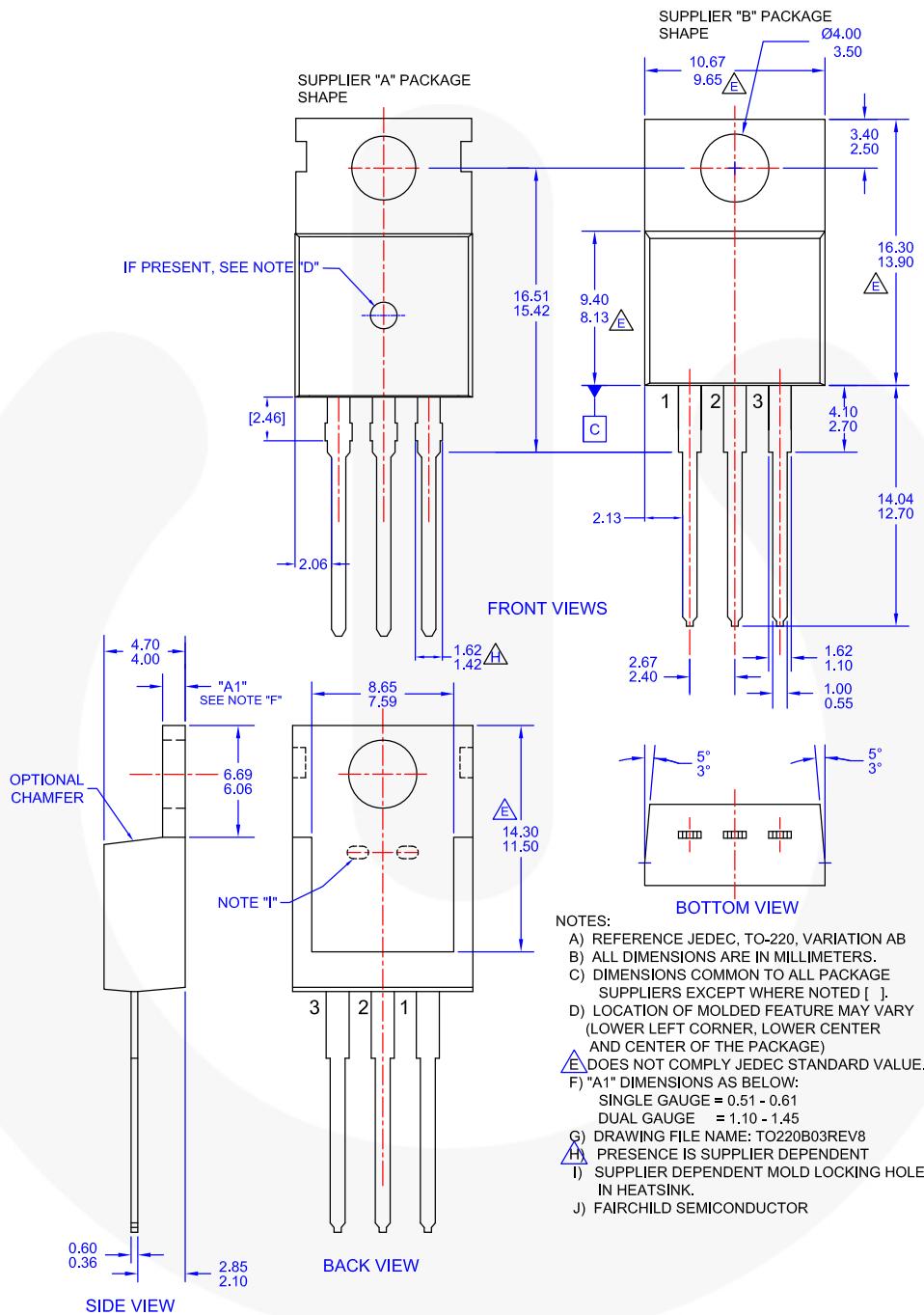


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

Physical Dimensions (Continued)

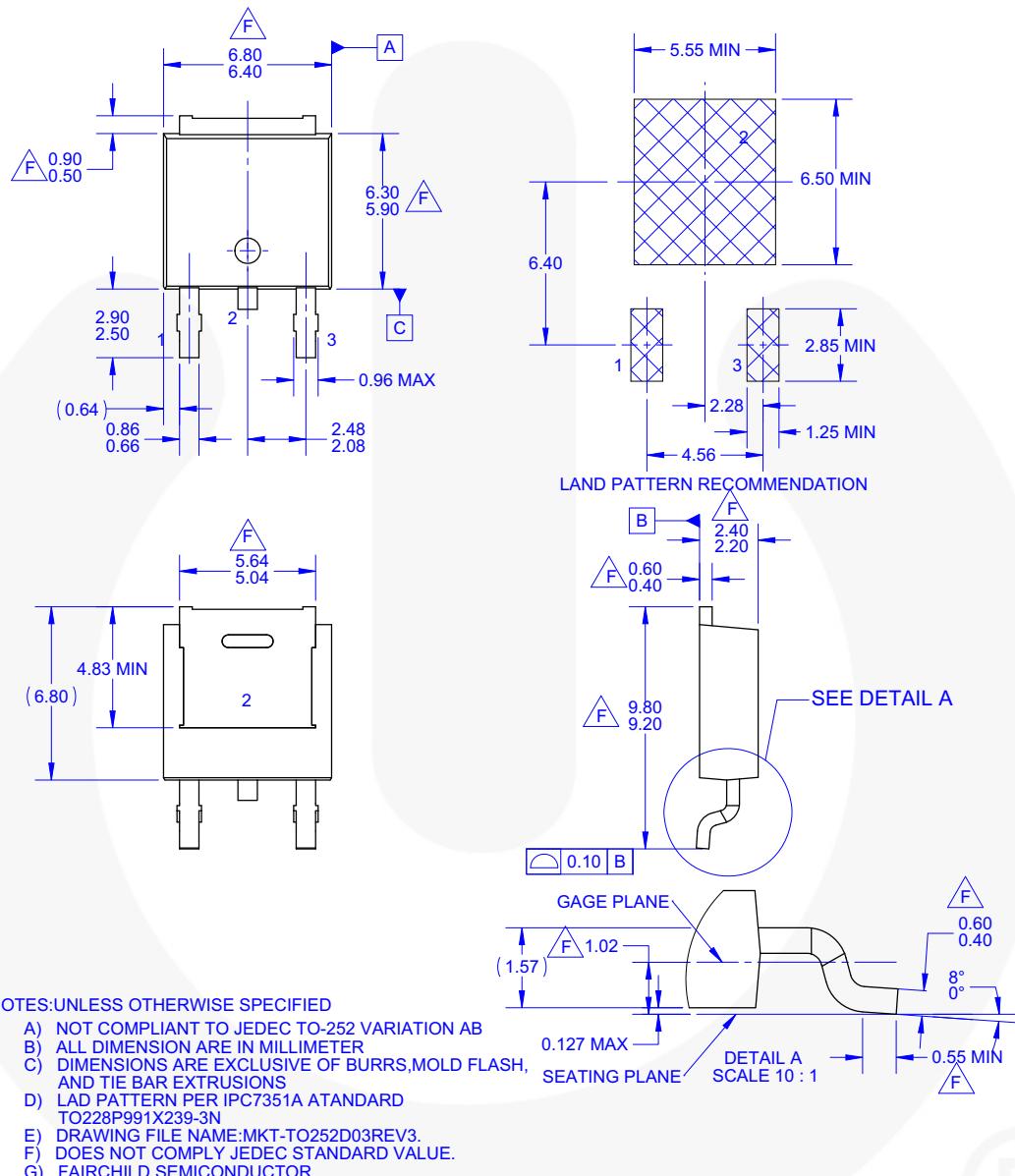


Figure 6. 3-LEAD, TO-252, JEDEC TO-252 VAR. AB, SURFACE MOUNT (DPAK)



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