

500 mA Negative Voltage Regulators

Available in fixed output voltage options of -5.0 V, -8.0 V, -12 V and -15 V, these regulators employ current limiting, thermal shutdown, and safe-area compensation, making them remarkably rugged under most operating conditions. With adequate heatsinking they can deliver output currents in excess of 0.5 A.

- No External Components Required
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe–Area Compensation
- Also Available in Surface Mount DPAK (DT) Package
- Pb–Free Packages are Available

| Device | Nominal Output Voltage |
|---------|------------------------|
| MC79M05 | -5.0 V |
| MC79M08 | -8.0 V |
| MC79M12 | -12 V |
| MC79M15 | -15 V |

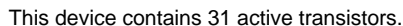


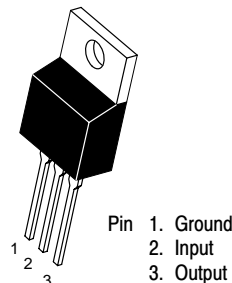
Figure 1. Representative Schematic Diagram



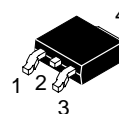
<http://onsemi.com>

THREE-TERMINAL NEGATIVE FIXED VOLTAGE REGULATORS

** C_O improve stability and transient response.

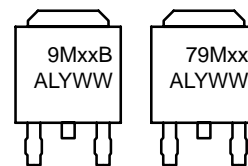
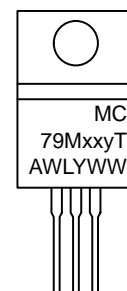


TO-220-3
T SUFFIX
CASE 221A



**DPAK-3
DT SUFFIX
CASE 369C**

MARKING DIAGRAMS



xx = 05, 08, 12, or 15
y = B or C
A = Assembly Location
WL, L = Wafer Lot
Y = Year
WW = Work Week

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

MC79M00 Series

MAXIMUM RATINGS (T_A = 25°C, unless otherwise noted.)

| Rating | Symbol | Value | Unit |
|---|------------------|--------------------|------|
| Input Voltage | V _I | –35 | Vdc |
| Power Dissipation | | | |
| Case 221A (TO–220–3) | | | |
| T _A = 25°C | P _D | Internally Limited | W |
| Thermal Resistance, Junction–to–Ambient | θ _{JA} | 65 | °C/W |
| Thermal Resistance, Junction–to–Case | θ _{JC} | 5.0 | °C/W |
| Case 369C (DPAK–3) | | | |
| T _A = 25°C | P _D | Internally Limited | W |
| Thermal Resistance, Junction–to–Ambient | θ _{JA} | 92 | °C/W |
| Thermal Resistance, Junction–to–Case | θ _{JC} | 6.0 | °C/W |
| Storage Junction Temperature | T _{stg} | –65 to +150 | °C |
| Junction Temperature | T _J | 150 | °C |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

NOTE: ESD data available upon request.

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------|------|
| Thermal Resistance, Junction–to–Ambient | R _{θJA} | 65 | °C/W |
| Thermal Resistance, Junction–to–Case | R _{θJC} | 5.0 | °C/W |

MC79M05B, C

ELECTRICAL CHARACTERISTICS (V_I = –10 V, I_O = 350 mA, T_{low} to T_{high} (Note 2), unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|--------------------------------|--------|------------|------------|-------|
| Output Voltage (T _J = 25°C) | V _O | –4.8 | –5.0 | –5.2 | Vdc |
| Line Regulation, T _J = 25°C (Note 1) –7.0 Vdc ≥ V _I ≥ –25 Vdc –8.0 Vdc ≥ V _I ≥ –18 Vdc | Reg _{line} | – – | 7.0 2.0 | 50 30 | mV |
| Load Regulation, T _J = 25°C (Note 1) 5.0 mA ≤ I _O ≤ 500 mA | Reg _{load} | – | 30 | 100 | mV |
| Output Voltage –7.0 Vdc ≥ V _I ≥ –25 Vdc, 5.0 mA ≤ I _O ≤ 350 mA | V _O | –4.75 | – | –5.25 | Vdc |
| Input Bias Current (T _J = 25°C) | I _{IB} | – | 4.3 | 8.0 | mA |
| Input Bias Current Change –8.0 Vdc ≥ V _I ≥ –25 Vdc, I _O = 350 mA 5.0 mA ≤ I _O ≤ 350 mA, V _I = –10 V | ΔI _{IB} | – – | – – | 0.4 0.4 | mA |
| Output Noise Voltage, T _A = 25°C, 10 Hz ≤ f ≤ 100 kHz | V _n | – | 40 | – | μV |
| Ripple Rejection (f = 120 Hz) | RR | 54 | 66 | – | dB |
| Dropout Voltage I _O = 500 mA, T _J = 25°C | V _I –V _O | – | 1.1 | – | Vdc |
| Average Temperature Coefficient of Output Voltage I _O = 5.0 mA, 0°C ≤ T _J ≤ 125°C | ΔV _O /ΔT | – | 0.2 | – | mV/°C |

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

2. B = T_{low} to T_{high}, –40°C < T_J < 125°C C = T_{low} to T_{high}, 0°C < T_J < 125°C.

MC79M00 Series

MC79M08B, C

ELECTRICAL CHARACTERISTICS ($V_I = -10\text{ V}$, $I_O = 350\text{ mA}$, T_{low} to T_{high} (Note 4), unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|----------------------------|--------|------------|------------|----------------------|
| Output Voltage ($T_J = 25^\circ\text{C}$) | V_O | -7.7 | -8.0 | -8.3 | Vdc |
| Line Regulation, $T_J = 25^\circ\text{C}$ (Note 3) -7.0 Vdc $\geq V_I \geq$ -25 Vdc -8.0 Vdc $\geq V_I \geq$ -18 Vdc | Reg_{line} | - - | 5.0 3.0 | 80 50 | mV |
| Load Regulation, $T_J = 25^\circ\text{C}$ (Note 3) 5.0 mA $\leq I_O \leq$ 500 mA | Reg_{load} | - | 30 | 100 | mV |
| Output Voltage -7.0 Vdc $\geq V_I \geq$ -25 Vdc, 5.0 mA $\leq I_O \leq$ 350 mA | V_O | -7.6 | -8.0 | -8.4 | Vdc |
| Input Bias Current ($T_J = 25^\circ\text{C}$) | I_{IB} | - | - | 8.0 | mA |
| Input Bias Current Change -8.0 Vdc $\geq V_I \geq$ -25 Vdc, $I_O = 350\text{ mA}$ 5.0 mA $\leq I_O \leq$ 350 mA, $V_I = -10\text{ V}$ | ΔI_{IB} | - - | - - | 0.4 0.4 | mA |
| Output Noise Voltage, $T_A = 25^\circ\text{C}$, 10 Hz $\leq f \leq$ 100 kHz | V_n | - | 60 | - | μV |
| Ripple Rejection ($f = 120\text{ Hz}$) | RR | 54 | 63 | - | dB |
| Dropout Voltage $I_O = 500\text{ mA}$, $T_J = 25^\circ\text{C}$ | $V_I - V_O$ | - | 1.1 | - | Vdc |
| Average Temperature Coefficient of Output Voltage $I_O = 5.0\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ | $\Delta V_O / \Delta T$ | - | 0.4 | - | mV/ $^\circ\text{C}$ |

- Load and line regulation are specified at constant temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.
- B = T_{low} to T_{high} , $-40^\circ\text{C} < T_J < 125^\circ\text{C}$
C = T_{low} to T_{high} , $0^\circ\text{C} < T_J < 125^\circ\text{C}$

MC79M12B, C

ELECTRICAL CHARACTERISTICS ($V_I = -19\text{ V}$, $I_O = 350\text{ mA}$, T_{low} to T_{high} (Note 6), unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------------------|--------|------------|------------|----------------------|
| Output Voltage ($T_J = 25^\circ\text{C}$) | V_O | -11.5 | -12 | -12.5 | Vdc |
| Line Regulation, $T_J = 25^\circ\text{C}$ (Note 5) -14.5 Vdc $\geq V_I \geq$ -30 Vdc -15 Vdc $\geq V_I \geq$ -25 Vdc | Reg_{line} | - - | 5.0 3.0 | 80 50 | mV |
| Load Regulation, $T_J = 25^\circ\text{C}$ (Note 5) 5.0 mA $\leq I_O \leq$ 500 mA | Reg_{load} | - | 30 | 240 | mV |
| Output Voltage -14.5 Vdc $\geq V_I \geq$ -30 Vdc, 5.0 mA $\leq I_O \leq$ 350 mA | V_O | -11.4 | - | -12.6 | Vdc |
| Input Bias Current ($T_J = 25^\circ\text{C}$) | I_{IB} | - | 4.4 | 8.0 | mA |
| Input Bias Current Change -14.5 Vdc $\geq V_I \geq$ -30 Vdc, $I_O = 350\text{ mA}$ 5.0 mA $\leq I_O \leq$ 350 mA, $V_I = -19\text{ V}$ | ΔI_{IB} | - - | - - | 0.4 0.4 | mA |
| Output Noise Voltage, $T_A = 25^\circ\text{C}$, 10 Hz $\leq f \leq$ 100 kHz | V_n | - | 75 | - | μV |
| Ripple Rejection ($f = 120\text{ Hz}$) | RR | 54 | 60 | - | dB |
| Dropout Voltage $I_O = 500\text{ mA}$, $T_J = 25^\circ\text{C}$ | $V_I - V_O$ | - | 1.1 | - | Vdc |
| Average Temperature Coefficient of Output Voltage $I_O = 5.0\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ | $\Delta V_O / \Delta T$ | - | -0.8 | - | mV/ $^\circ\text{C}$ |

- Load and line regulation are specified at constant temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.
- B = T_{low} to T_{high} , $-40^\circ\text{C} < T_J < 125^\circ\text{C}$
C = T_{low} to T_{high} , $0^\circ\text{C} < T_J < 125^\circ\text{C}$

MC79M00 Series

MC79M15B, C

ELECTRICAL CHARACTERISTICS ($V_I = -23\text{ V}$, $I_O = 350\text{ mA}$, T_{low} to T_{high} (Note 8), unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|----------------------------|--------|------------|------------|----------------------|
| Output Voltage ($T_J = 25^\circ\text{C}$) | V_O | -14.4 | -15 | -15.6 | Vdc |
| Line Regulation, $T_J = 25^\circ\text{C}$ (Note 7) -17.5 Vdc $\geq V_I \geq$ -30 Vdc -18 Vdc $\geq V_I \geq$ -28 Vdc | Reg_{line} | - | 5.0 3.0 | 80 50 | mV |
| Load Regulation, $T_J = 25^\circ\text{C}$ (Note 7) $5.0\text{ mA} \leq I_O \leq 500\text{ mA}$ | Reg_{load} | - | 30 | 240 | mV |
| Output Voltage -17.5 Vdc $\geq V_I \geq$ -30 Vdc, $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$ | V_O | -14.25 | - | -15.75 | Vdc |
| Input Bias Current ($T_J = 25^\circ\text{C}$) | I_{IB} | - | 4.4 | 8.0 | mA |
| Input Bias Current Change -17.5 Vdc $\geq V_I \geq$ -30 Vdc, $I_O = 350\text{ mA}$ $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$, $V_I = -23\text{ V}$ | ΔI_{IB} | - | - | 0.4 0.4 | mA |
| Output Noise Voltage, $T_A = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ | V_n | - | 90 | - | μV |
| Ripple Rejection ($f = 120\text{ Hz}$) | RR | 54 | 60 | - | dB |
| Dropout Voltage $I_O = 500\text{ mA}$, $T_J = 25^\circ\text{C}$ | $V_I - V_O$ | - | 1.1 | - | Vdc |
| Average Temperature Coefficient of Output Voltage $I_O = 5.0\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ | $\Delta V_O / \Delta T$ | - | -1.0 | - | mV/ $^\circ\text{C}$ |

7. Load and line regulation are specified at constant temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.
8. B = T_{low} to T_{high} , $-40^\circ\text{C} < T_J < 125^\circ\text{C}$
C = T_{low} to T_{high} , $0^\circ\text{C} < T_J < 125^\circ\text{C}$

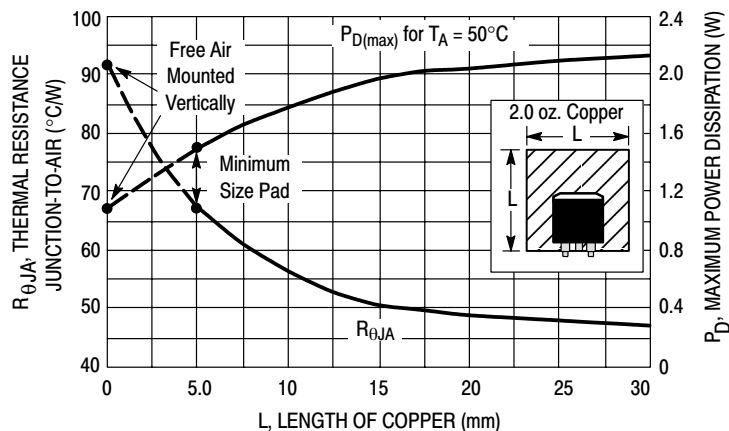


Figure 1. DPAK-3 Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length

MC79M00 Series

ORDERING INFORMATION

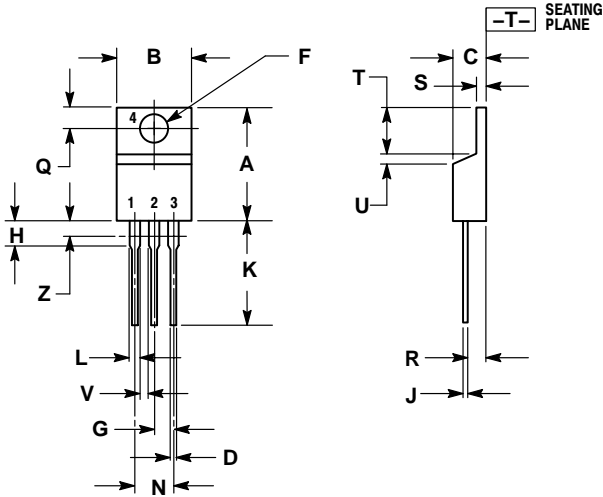
| Device | Output Voltage Tolerance | Operating Temperature Range | Package | Shipping [†] |
|---------------|--------------------------|--|--------------------|-----------------------|
| MC79M05BDT | 4.0% | $T_J = -40^\circ \text{ to } +125^\circ\text{C}$ | DPAK-3 | 75 Units / Rail |
| MC79M05BDTRK | | | | 2500 / Tape & Reel |
| MC79M05BT | | $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ | TO-220-3 | 50 Units / Rail |
| MC79M05CDT | | | DPAK-3 | 75 Units / Rail |
| MC79M05CDTRK | | | | 2500 / Tape & Reel |
| MC79M05CT | | | TO-220-3 | 50 Units / Rail |
| MC79M05CTG | | | TO-220-3 (Pb-Free) | 50 Units / Rail |
| MC79M08BDT | | $T_J = -40^\circ \text{ to } +125^\circ\text{C}$ | DPAK-3 | 75 Units / Rail |
| MC79M08BDTRK | | | | 2500 / Tape & Reel |
| MC79M08BT | | $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ | TO-220-3 | 50 Units / Rail |
| MC79M08CDT | | | DPAK-3 | 75 Units / Rail |
| MC79M08CDTRK | | | | 2500 / Tape & Reel |
| MC79M08CT | | | TO-220-3 | 50 Units / Rail |
| MC79M12BDT | | $T_J = -40^\circ \text{ to } +125^\circ\text{C}$ | DPAK-3 | 75 Units / Rail |
| MC79M12BDTG | | | DPAK-3 (Pb-Free) | 75 Units / Rail |
| MC79M12BDTRK | | | DPAK-3 | 2500 / Tape & Reel |
| MC79M12BT | | | TO-220-3 | 50 Units / Rail |
| MC79M12CDT | | $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ | DPAK-3 | 75 Units / Rail |
| MC79M12CDTG | | | DPAK-3 (Pb-Free) | 75 Units / Rail |
| MC79M12CDTRK | | | DPAK-3 | 2500 / Tape & Reel |
| MC79M12CT | | | TO-220-3 | 50 Units / Rail |
| MC79M12CTG | | | TO-220-3 (Pb-Free) | 50 Units / Rail |
| MC79M15BDT | | $T_J = -40^\circ \text{ to } +125^\circ\text{C}$ | DPAK-3 | 75 Units / Rail |
| MC79M15BDTRK | | | | 2500 / Tape & Reel |
| MC79M15BT | | $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ | TO-220-3 | 50 Units / Rail |
| MC79M15CDT | | | DPAK-3 | 75 Units / Rail |
| MC79M15CDTG | | | DPAK-3 (Pb-Free) | 75 Units / Rail |
| MC79M15CDTRK | | | DPAK-3 | 2500 / Tape & Reel |
| MC79M15CDTRKG | | | DPAK-3 (Pb-Free) | 2500 / Tape & Reel |
| MC79M15CT | | | DPAK-3 | 50 Units / Rail |
| MC79M15CTG | | | DPAK-3 (Pb-Free) | 50 Units / Rail |

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MC79M00 Series

PACKAGE DIMENSIONS

TO-220
PLASTIC PACKAGE
T SUFFIX
CASE 221A-09
ISSUE AA



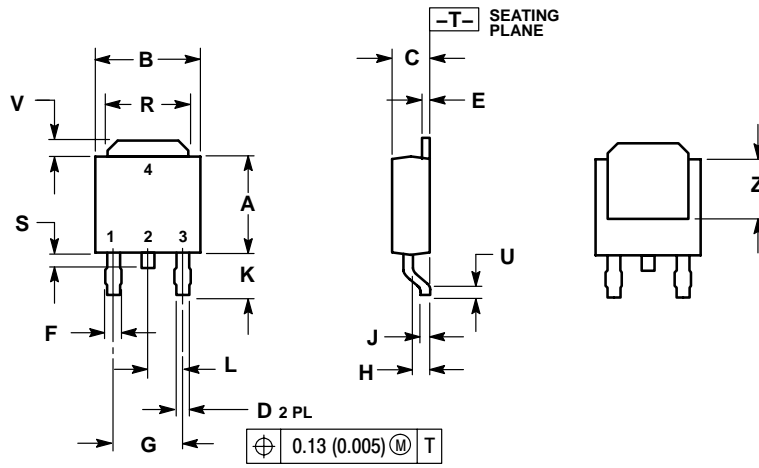
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.405 | 9.66 | 10.28 |
| C | 0.160 | 0.190 | 4.07 | 4.82 |
| D | 0.025 | 0.035 | 0.64 | 0.88 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.155 | 2.80 | 3.93 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

MC79M00 Series

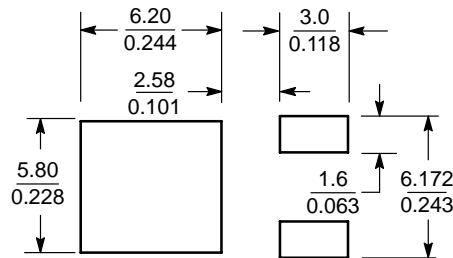
DPAK-3
DT SUFFIX
CASE 369C-01
ISSUE O



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.235 | 0.245 | 5.97 | 6.22 |
| B | 0.250 | 0.265 | 6.35 | 6.73 |
| C | 0.086 | 0.094 | 2.19 | 2.38 |
| D | 0.027 | 0.035 | 0.69 | 0.88 |
| E | 0.018 | 0.023 | 0.46 | 0.58 |
| F | 0.037 | 0.045 | 0.94 | 1.14 |
| G | 0.180 BSC | | 4.58 BSC | |
| H | 0.034 | 0.040 | 0.87 | 1.01 |
| J | 0.018 | 0.023 | 0.46 | 0.58 |
| K | 0.102 | 0.114 | 2.60 | 2.89 |
| L | 0.090 BSC | | 2.29 BSC | |
| R | 0.180 | 0.215 | 4.57 | 5.45 |
| S | 0.025 | 0.040 | 0.63 | 1.01 |
| U | 0.020 | --- | 0.51 | --- |
| V | 0.035 | 0.050 | 0.89 | 1.27 |
| Z | 0.155 | --- | 3.93 | --- |


SOLDERING FOOTPRINT*



SCALE 3:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MC79M00 Series

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