



**MOTOROLA**

# Three-Terminal Negative Voltage Regulators

The MC79M00 series of fixed output negative voltage regulators are intended as complements to the popular MC78M00 series devices.

Available in fixed output voltage options of -5.0, -8.0, -12 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

### DEVICE TYPE/NOMINAL OUTPUT VOLTAGE

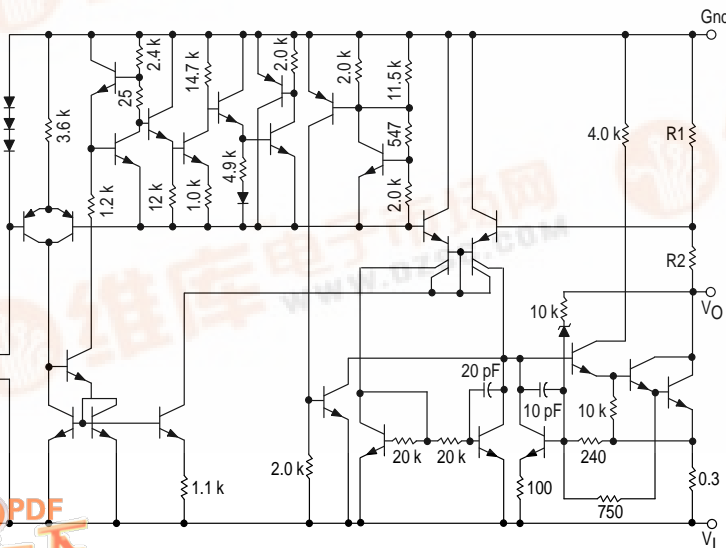
MC79M05	-5.0 V	MC79M12	-12 V
MC79M08	-8.0 V	MC79M15	-15 V

### ORDERING INFORMATION

Device	Output Voltage Tolerance	Operating Temperature Range	Package
MC79MXXBDT, BDT-1	4.0%	$T_J = -40^\circ \text{ to } +125^\circ \text{C}$	DPAK
MC79MXXBT			Plastic Power
MC79MXXCDT, CDT-1	4.0%	$T_J = 0^\circ \text{ to } +125^\circ \text{C}$	DPAK
MC79MXXCT			Plastic Power

XX indicates nominal voltage.

### Representative Schematic Diagram



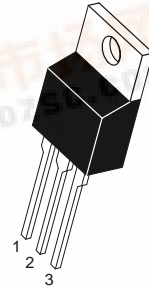
This device contains 31 active transistors.

## MC79M00 Series

### THREE-TERMINAL NEGATIVE FIXED VOLTAGE REGULATORS

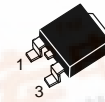
**T SUFFIX**  
PLASTIC PACKAGE  
CASE 221A

Heatsink surface connected to Pin 2.

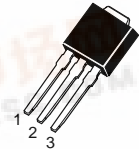


- Pin 1. Ground  
2. Input  
3. Output

**DT SUFFIX**  
PLASTIC PACKAGE  
CASE 369A  
(DPAK)

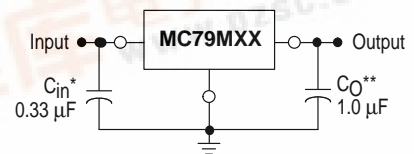


**DT-1 SUFFIX**  
PLASTIC PACKAGE  
CASE 369  
(DPAK)



Heatsink surface (shown as terminal 4 in case outline drawing) is connected to Pin 2.

### STANDARD APPLICATION



A common ground is required between the input and the output voltages. The input voltage must remain typically 1.1 V more negative even during the high point of the input ripple voltage.

XX, These two digits of the type number indicate nominal voltage.

\*  $C_{in}$  is required if regulator is located an appreciable distance from power supply filter.

\*\*  $C_o$  improve stability and transient response.

## MC79M00

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

Rating	Symbol	Value	Unit
Input Voltage	$V_I$	-35	Vdc
Power Dissipation			
Case 221A			
$T_A = 25^\circ\text{C}$	$P_D$	Internally Limited	W
Thermal Resistance, Junction-to-Ambient	$\theta_{JA}$	65	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$\theta_{JC}$	5.0	$^\circ\text{C/W}$
Case 369 and 369A (DPAK)			
$T_A = 25^\circ\text{C}$	$P_D$	Internally Limited	W
Thermal Resistance, Junction-to-Ambient	$\theta_{JA}$	92	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$\theta_{JC}$	6.0	$^\circ\text{C/W}$
Storage Junction Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$

NOTE: ESD data available upon request.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.0	$^\circ\text{C/W}$

### MC79M05B, C

#### ELECTRICAL CHARACTERISTICS ( $V_I = -10\text{ V}$ , $I_O = 350\text{ mA}$ , $T_{low}$ to $T_{high}$ [Note 2], unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Output Voltage ( $T_J = 25^\circ\text{C}$ )	$V_O$	-4.8	-5.0	-5.2	Vdc
Line Regulation, $T_J = 25^\circ\text{C}$ (Note 1) -7.0 Vdc $\geq V_I \geq$ -25 Vdc -8.0 Vdc $\geq V_I \geq$ -18 Vdc	$Reg_{line}$	-	7.0 2.0	50 30	mV
Load Regulation, $T_J = 25^\circ\text{C}$ (Note 1) 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	$V_O$	-4.75	-	-5.25	Vdc
Input Bias Current ( $T_J = 25^\circ\text{C}$ )	$I_{IB}$	-	4.3	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, $V_I = -10\text{ V}$	$\Delta I_{IB}$	-	-	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^\circ\text{C}$ , 10 Hz $\leq f \leq$ 100 kHz	$V_n$	-	40	-	$\mu\text{V}$
Ripple Rejection ( $f = 120\text{ Hz}$ )	RR	54	66	-	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 $I_O = 5.0\text{ mA}$ , $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$	$\Delta V_O / \Delta T$	-	0.2	-	mV/ $^\circ\text{C}$

NOTES: 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  $T_{high}$ ,  $-40^\circ\text{C} < T_J < 125^\circ\text{C}$

C =  $T_{low}$  to  $T_{high}$ ,  $0^\circ\text{C} < T_J < 125^\circ\text{C}$

## MC79M00

### MC79M08B, C

**ELECTRICAL CHARACTERISTICS** ( $V_I = -10\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $T_{\text{low}}$  to  $T_{\text{high}}$  [Note 2], 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 1) -7.0 Vdc $\geq V_I \geq -25\text{ Vdc}$ -8.0 Vdc $\geq V_I \geq -18\text{ Vdc}$	Reg <sub>line</sub>	-	5.0 3.0	80 50	mV
Load Regulation, $T_J = 25^\circ\text{C}$ (Note 1) $5.0\text{ mA} \leq I_O \leq 500\text{ mA}$	Reg <sub>load</sub>	-	30	100	mV
Output Voltage -7.0 Vdc $\geq V_I \geq -25\text{ Vdc}$ , $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$	$V_O$	-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 $\geq V_I \geq -25\text{ Vdc}$ , $I_O = 350\text{ mA}$ $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$ , $V_I = -10\text{ V}$	$\Delta I_{IB}$	-	-	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	$V_n$	-	60	-	$\mu\text{V}$
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/ $^\circ\text{C}$

### MC79M12B, C

**ELECTRICAL CHARACTERISTICS** ( $V_I = -19\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $T_{\text{low}}$  to  $T_{\text{high}}$  [Note 2], 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 1) -14.5 Vdc $\geq V_I \geq -30\text{ Vdc}$ -15 Vdc $\geq V_I \geq -25\text{ Vdc}$	Reg <sub>line</sub>	-	5.0 3.0	80 50	mV
Load Regulation, $T_J = 25^\circ\text{C}$ (Note 1) $5.0\text{ mA} \leq I_O \leq 500\text{ mA}$	Reg <sub>load</sub>	-	30	240	mV
Output Voltage -14.5 Vdc $\geq V_I \geq -30\text{ Vdc}$ , $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$	$V_O$	-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 $\geq V_I \geq -30\text{ Vdc}$ , $I_O = 350\text{ mA}$ $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$ , $V_I = -19\text{ V}$	$\Delta I_{IB}$	-	-	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	$V_n$	-	75	-	$\mu\text{V}$
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/ $^\circ\text{C}$

**NOTES:** 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 =  $T_{\text{low}}$  to  $T_{\text{high}}$ ,  $-40^\circ\text{C} < T_J < 125^\circ\text{C}$   
C =  $T_{\text{low}}$  to  $T_{\text{high}}$ ,  $0^\circ\text{C} < T_J < 125^\circ\text{C}$

# MC79M00

## MC79M15B, C

### ELECTRICAL CHARACTERISTICS ( $V_I = -23\text{ V}$ , $I_O = 350\text{ mA}$ , $T_{\text{low}}$ to $T_{\text{high}}$ [Note 2], unless otherwise noted.)

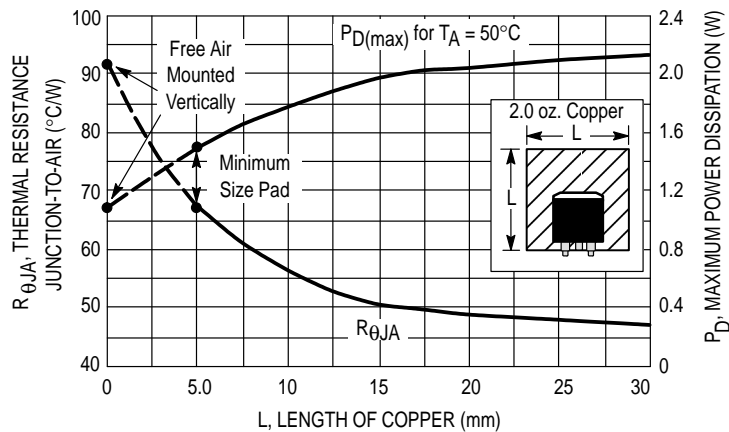
Characteristic	Symbol	Min	Typ	Max	Unit
Output Voltage ( $T_J = 25^\circ\text{C}$ )	$V_O$	-14.4	-15	-15.6	Vdc
Line Regulation, $T_J = 25^\circ\text{C}$ (Note 1) -17.5 Vdc $\geq V_I \geq$ -30 Vdc -18 Vdc $\geq V_I \geq$ -28 Vdc	Reg <sub>line</sub>	-	5.0 3.0	80 50	mV
Load Regulation, $T_J = 25^\circ\text{C}$ (Note 1) $5.0\text{ mA} \leq I_O \leq 500\text{ mA}$	Reg <sub>load</sub>	-	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, $I_O = 350\text{ mA}$ $5.0\text{ mA} \leq I_O \leq 350\text{ mA}$ , $V_I = -23\text{ V}$	$\Delta I_{IB}$	-	-	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	-	$\mu\text{V}$
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/ $^\circ\text{C}$

**NOTES:** 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 =  $T_{\text{low}}$  to  $T_{\text{high}}$ ,  $-40^\circ\text{C} < T_J < 125^\circ\text{C}$

C =  $T_{\text{low}}$  to  $T_{\text{high}}$ ,  $0^\circ\text{C} < T_J < 125^\circ\text{C}$

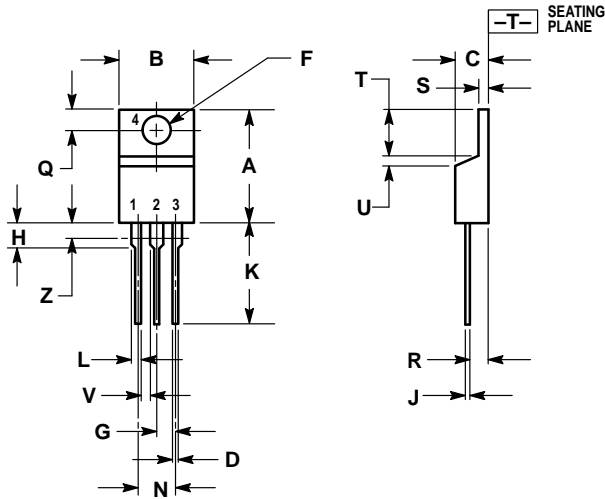
**Figure 1. DPAK Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length**



# MC79M00

## OUTLINE DIMENSIONS

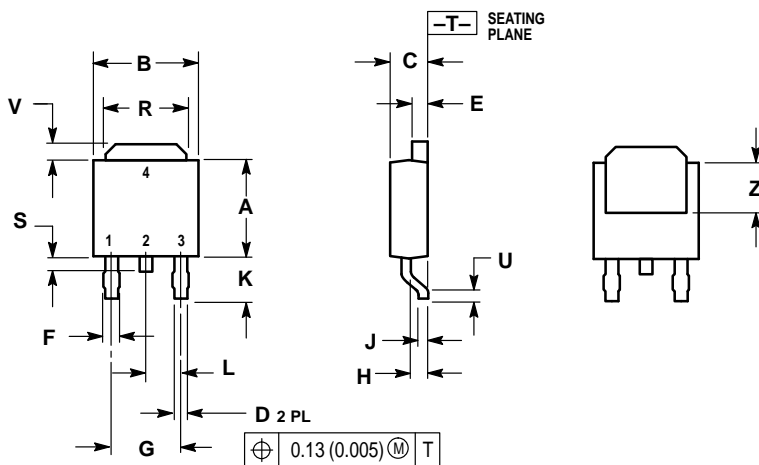
**T SUFFIX**  
**PLASTIC PACKAGE**  
**CASE 221A-06**  
**ISSUE Y**



- 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

**DT SUFFIX**  
**PLASTIC PACKAGE**  
**CASE 369A-13**  
**(DPAK)**  
**ISSUE Y**



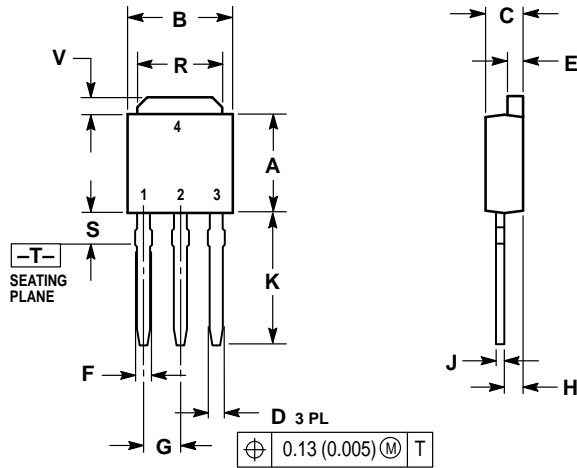
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
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	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
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	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	—	0.51	—
V	0.030	0.050	0.77	1.27
Z	0.138	—	3.51	—

# MC79M00

## OUTLINE DIMENSIONS

DT-1 SUFFIX  
 PLASTIC PACKAGE  
 CASE 369-07  
 (DPAK)  
 ISSUE K




NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
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	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

## MC79M00

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# MC79M00

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