

500 mA 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

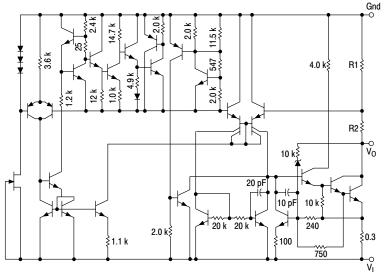
MC79M05	-5.0 V	MC79M12	–12 V
MC79M08	–8.0 V	MC79M15	−15 V

ORDERING INFORMATION

Device	Output Voltage Tolerance	Operating Temperature Range	Package
MC79MXXBDT, BDT-1		T 400 to 14250C	DPAK
MC79MXXBT	4.007	$T_J = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	Plastic Power
MC79MXXCDT, CDT-1	4.0%	T 00 to 14250C	DPAK
MC79MXXCT		$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	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



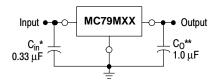
DT SUFFIX PLASTIC PACKAGE CASE 369A (DPAK)



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.
 - ** CO improve stability and transient response.

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

Rating	Symbol	Value	Unit
Input Voltage	VI	-35	Vdc
Power Dissipation			
Case 221A			
$T_A = 25^{\circ}C$	P _D	Internally Limited	W
Thermal Resistance, Junction-to-Ambient	θ_{JA}	65	°C/W
Thermal Resistance, Junction-to-Case	$\theta_{\sf JC}$	5.0	°C/W
Case 369 and 369A (DPAK)			
$T_A = 25^{\circ}C$	P _D	Internally Limited	W
Thermal Resistance, Junction-to-Ambient	θ_{JA}	92	°C/W
Thermal Resistance, Junction-to-Case	$\theta_{\sf JC}$	6.0	°C/W
Storage Junction Temperature	T _{stg}	-65 to +150	°C
Junction Temperature	T _J	150	°C

NOTE: ESD data available upon request.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.0	°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	Тур	Max	Unit
Output Voltage (T _J = 25°C)	V _O	-4.8	-5.0	-5.2	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 1) $-7.0 \text{ Vdc} \ge V_I \ge -25 \text{ Vdc}$ $-8.0 \text{ Vdc} \ge V_I \ge -18 \text{ Vdc}$	Reg _{line}	_ _	7.0 2.0	50 30	mV
Load Regulation, $T_J = 25^{\circ}C$ (Note 1) 5.0 mA $\leq I_O \leq 500$ mA	Reg _{load}	_	30	100	mV
Output Voltage $ -7.0 \text{ Vdc} \ge V_l \ge -25 \text{ Vdc}, 5.0 \text{ mA} \le I_O \le 350 \text{ mA} $	Vo	-4.75	_	-5.25	Vdc
Input Bias Current (T _J = 25°C)	I _{IB}	_	4.3	8.0	mA
Input Bias Current Change $-8.0~\text{Vdc} \ge \text{V}_{\text{I}} \ge -25~\text{Vdc}, \text{ I}_{\text{O}} = 350~\text{mA}$ $5.0~\text{mA} \le \text{I}_{\text{O}} \le 350~\text{mA}, \text{ V}_{\text{I}} = -10~\text{V}$	Δl _{IB}	_ _	_ _	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^{\circ}C$, 10 Hz \leq f \leq 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, $0^{\circ}C \le T_J \le 125^{\circ}C$	$\Delta V_O/\Delta T$	_	0.2	_	mV/°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°C < T_J < 125°C
C = T_{low} to T_{high}, 0°C < T_J < 125°C

MC79M08B, 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	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	-7.7	-8.0	-8.3	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 1) $-7.0 \text{ Vdc} \ge V_I \ge -25 \text{ Vdc}$ $-8.0 \text{ Vdc} \ge V_I \ge -18 \text{ Vdc}$	Reg _{line}	_ _	5.0 3.0	80 50	mV
Load Regulation, $T_J = 25^{\circ}C$ (Note 1) 5.0 mA $\leq I_O \leq 500$ mA	Reg _{load}	_	30	100	mV
Output Voltage $ -7.0 \text{ Vdc} \geq V_{\text{I}} \geq -25 \text{ Vdc}, 5.0 \text{ mA} \leq I_{\text{O}} \leq 350 \text{ mA} $	Vo	-7.6	-8.0	-8.4	Vdc
Input Bias Current (T _J = 25°C)	I _{IB}	_	_	8.0	mA
Input Bias Current Change $-8.0~\text{Vdc} \geq \text{V}_{\text{I}} \geq -25~\text{Vdc},~\text{I}_{\text{O}} = 350~\text{mA} \\ 5.0~\text{mA} \leq \text{I}_{\text{O}} \leq 350~\text{mA},~\text{V}_{\text{I}} = -10~\text{V}$	Δl _{IB}	_ _	_ _	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz	V _n	-	60	-	μV
Ripple Rejection (f = 120 Hz)	RR	54	63	-	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, $0^{\circ}C \le T_J \le 125^{\circ}C$	$\Delta V_O/\Delta T$	_	0.4	_	mV/°C

MC79M12B, C **ELECTRICAL CHARACTERISTICS** ($V_I = -19 \text{ V}$, $I_O = 350 \text{ mA}$, T_{low} to T_{high} [Note 2], unless otherwise noted.)

Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	-11.5	-12	-12.5	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 1) -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, $T_J = 25^{\circ}C$ (Note 1) 5.0 mA $\leq I_O \leq 500$ mA	Reg _{load}	-	30	240	mV
Output Voltage $-14.5 \text{ Vdc} \geq \text{V}_{\text{I}} \geq -30 \text{ Vdc}, 5.0 \text{ mA} \leq \text{I}_{\text{O}} \leq 350 \text{ mA}$	Vo	-11.4	-	-12.6	Vdc
Input Bias Current (T _J = 25°C)	I _{IB}	_	4.4	8.0	mA
Input Bias Current Change $-14.5~\text{Vdc} \ge \text{V}_{\text{I}} \ge -30~\text{Vdc}, \text{ I}_{\text{O}} = 350~\text{mA}$ $5.0~\text{mA} \le \text{I}_{\text{O}} \le 350~\text{mA}, \text{ V}_{\text{I}} = -19~\text{V}$	$\Delta I_{ m lB}$	_ _	_ _	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz	V _n	_	75	_	μV
Ripple Rejection (f = 120 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 $I_O = 5.0$ mA, $0^{\circ}C \le T_J \le 125^{\circ}C$	ΔV _O /ΔΤ	-	-0.8	-	mV/°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°C < T_J < 125°C
C = T_{low} to T_{high}, 0°C < T_J < 125°C

MC79M15B, C $\textbf{ELECTRICAL CHARACTERISTICS} \ (V_{I} = -23 \ V, \ I_{O} = 350 \ \text{mA}, \ T_{low} \ \text{to} \ T_{high} \ [\text{Note 2}], \ \text{unless otherwise noted.})$

Characteristic	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	-14.4	-15	-15.6	Vdc
Line Regulation, $T_J = 25^{\circ}C$ (Note 1) -17.5 Vdc $\geq V_l \geq -30$ Vdc -18 Vdc $\geq V_l \geq -28$ Vdc	Reg _{line}	_ _	5.0 3.0	80 50	mV
Load Regulation, $T_J = 25$ °C (Note 1) 5.0 mA $\leq I_O \leq 500$ mA	Reg _{load}	_	30	240	mV
Output Voltage $-17.5 \text{ Vdc} \ge V_l \ge -30 \text{ Vdc}, 5.0 \text{ mA} \le I_O \le 350 \text{ mA}$	Vo	-14.25	-	-15.75	Vdc
Input Bias Current (T _J = 25°C)	I _{IB}	_	4.4	8.0	mA
Input Bias Current Change -17.5 Vdc \geq V $_{I}$ \geq -30 Vdc, I $_{O}$ = 350 mA 5.0 mA \leq I $_{O}$ \leq 350 mA, V $_{I}$ = -23 V	Δl _{IB}	_ _	-	0.4 0.4	mA
Output Noise Voltage, $T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz	V _n	_	90	_	μV
Ripple Rejection (f = 120 Hz)	RR	54	60	_	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, $0^{\circ}C \le T_J \le 125^{\circ}C$	ΔV _O /ΔΤ	_	-1.0	_	mV/°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°C < T_J < 125°C
C = T_{low} to T_{high}, 0°C < T_J < 125°C

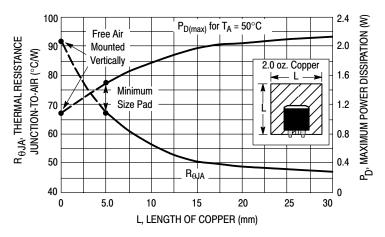
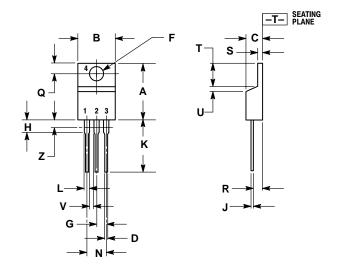


Figure 1. DPAK Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length

PACKAGE DIMENSIONS

T SUFFIX

PLASTIC PACKAGE CASE 221A-09 ISSUE AA

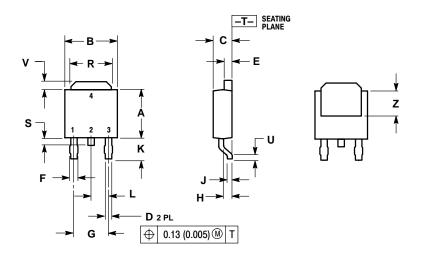


- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.570	0.620	14.48	15.75
В	0.380	0.405	9.66	10.28
С	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
Н	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
٧	0.045		1.15	
Z		0.080		2.04

DT SUFFIX

PLASTIC PACKAGE CASE 369A-13 (DPAK) ISSUE Z



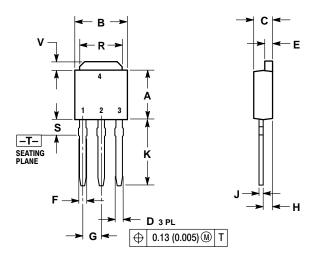
- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

	INC	HES	MILLIM	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.250	5.97	6.35
В	0.250	0.265	6.35	6.73
С	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
Е	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58	BSC
Н	0.034	0.040	0.87	1.01
_	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	
٧	0.030	0.050	0.77	1.27
Z	0.138		3.51	

PACKAGE DIMENSIONS

DT-1 SUFFIX

PLASTIC PACKAGE CASE 369-07 (DPAK) IŠSUE M



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

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.250	5.97	6.35
В	0.250	0.265	6.35	6.73
С	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
Н	0.034	0.040	0.87	1.01
J	0.018	0.023	23 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

Notes

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