MC79M00 Series

500 mA Negative Voltage Regulators

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

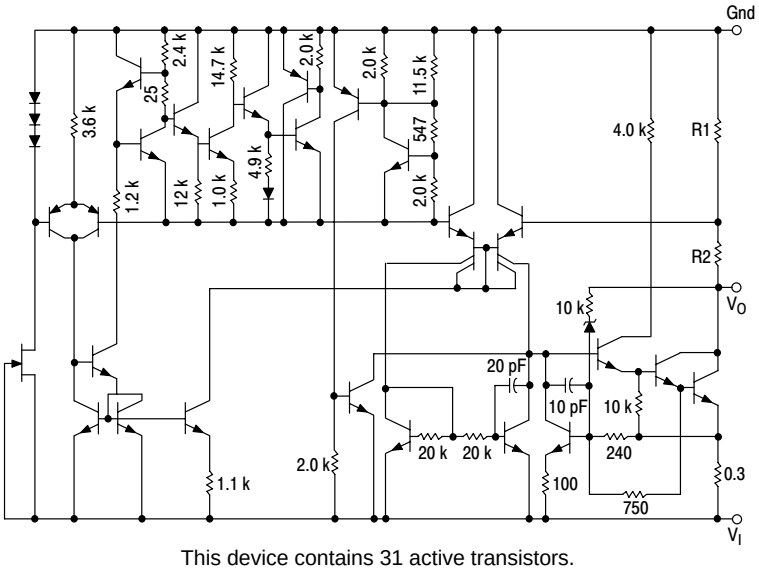
Available in fixed output voltage options of −5.0, −8.0, −12 and −15 V, these regulators employ current limiting, thermal shutdown, and safe−area compensation − making them remarkably rugged under most operating conditions. With adequate heatsinking they can deliver output currents in excess of 0.5 A.

- 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
- Pb−Free Package May be Available. The G−Suffix Denotes a Pb−Free Lead Finish

DEVICE TYPE/NOMINAL OUTPUT VOLTAGE

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

Representative Schematic Diagram



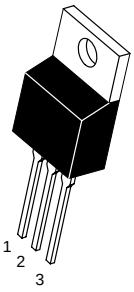
This device contains 31 active transistors.

ON Semiconductor®

http://onsemi.com

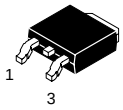
THREE−TERMINAL NEGATIVE FIXED VOLTAGE REGULATORS

TO−220−3
T SUFFIX
PLASTIC PACKAGE
CASE 221A

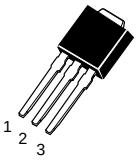


Heatsink surface connected to Pin 2.

Pin 1. Ground
2. Input
3. Output



DPAK−3
DT SUFFIX
PLASTIC PACKAGE
CASE 369A



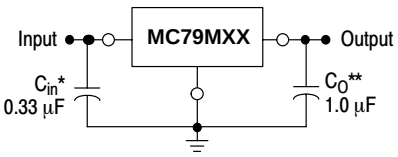
DPAK−3
DT−1 SUFFIX
PLASTIC PACKAGE
CASE 369

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

ORDERING INFORMATION

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

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.

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 369 and 369A (DPAK)			
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

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 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)	Reg_{line}				mV
−7.0 Vdc ≥ V_I ≥ −25 Vdc		−	7.0	50	
−8.0 Vdc ≥ V_I ≥ −18 Vdc		−	2.0	30	
Load Regulation, T_J = 25°C (Note 1)	Reg_{load}				mV
5.0 mA ≤ I_O ≤ 500 mA		−	30	100	
Output Voltage	V_O				Vdc
−7.0 Vdc ≥ V_I ≥ −25 Vdc, 5.0 mA ≤ I_O ≤ 350 mA		−4.75	−	−5.25	
Input Bias Current (T_J = 25°C)	I_{IB}	−	4.3	8.0	mA
Input Bias Current Change	ΔI_{IB}				mA
−8.0 Vdc ≥ V_I ≥ −25 Vdc, I_O = 350 mA		−	−	0.4	
5.0 mA ≤ I_O ≤ 350 mA, V_I = −10 V		−	−	0.4	
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	V_I−V_O				Vdc
I_O = 500 mA, T_J = 25°C		−	1.1	−	
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$				mV/°C
I_O = 5.0 mA, 0°C ≤ T_J ≤ 125°C		−	0.2	−	

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 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	−7.7	−8.0	−8.3	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}	 − −	 5.0 3.0	 80 50	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	 −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 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	−	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°C ≤ T_J ≤ 125°C	$\Delta V_O/\Delta T$	 −	 0.4	 −	mV/°C

MC79M12B, C
ELECTRICAL CHARACTERISTICS (V_I = −19 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	−11.5	−12	−12.5	Vdc
Line Regulation, T_J = 25°C (Note 1) −14.5 Vdc ≥ V_I ≥ −30 Vdc −15 Vdc ≥ V_I ≥ −25 Vdc	Reg_{line}	 − −	 5.0 3.0	 80 50	mV
Load Regulation, T_J = 25°C (Note 1) 5.0 mA ≤ I_O ≤ 500 mA	Reg_{load}	 −	 30	 240	mV
Output Voltage −14.5 Vdc ≥ V_I ≥ −30 Vdc, 5.0 mA ≤ I_O ≤ 350 mA	V_O	 −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 Vdc ≥ V_I ≥ −30 Vdc, I_O = 350 mA 5.0 mA ≤ I_O ≤ 350 mA, V_I = −19 V	ΔI_{IB}	 − −	 − −	 0.4 0.4	mA
Output Noise Voltage, T_A = 25°C, 10 Hz ≤ f ≤ 100 kHz	V_n	−	75	−	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°C ≤ T_J ≤ 125°C	$\Delta V_O/\Delta T$	 −	 −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

ELECTRICAL CHARACTERISTICS (V_I = −23 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	−14.4	−15	−15.6	Vdc
Line Regulation, T_J = 25°C (Note 1) −17.5 Vdc ≥ V_I ≥ −30 Vdc −18 Vdc ≥ V_I ≥ −28 Vdc	Reg_{line}	 – –	 5.0 3.0	 80 50	mV
Load Regulation, T_J = 25°C (Note 1) 5.0 mA ≤ I_O ≤ 500 mA	Reg_{load}	–	30	240	mV
Output Voltage −17.5 Vdc ≥ V_I ≥ −30 Vdc, 5.0 mA ≤ I_O ≤ 350 mA	V_O	−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 ≥ V_I ≥ −30 Vdc, I_O = 350 mA 5.0 mA ≤ I_O ≤ 350 mA, V_I = −23 V	ΔI_{IB}	 – –	 – –	 0.4 0.4	mA
Output Noise Voltage, T_A = 25°C, 10 Hz ≤ f ≤ 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°C ≤ T_J ≤ 125°C	$\Delta V_O/\Delta T$	–	−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

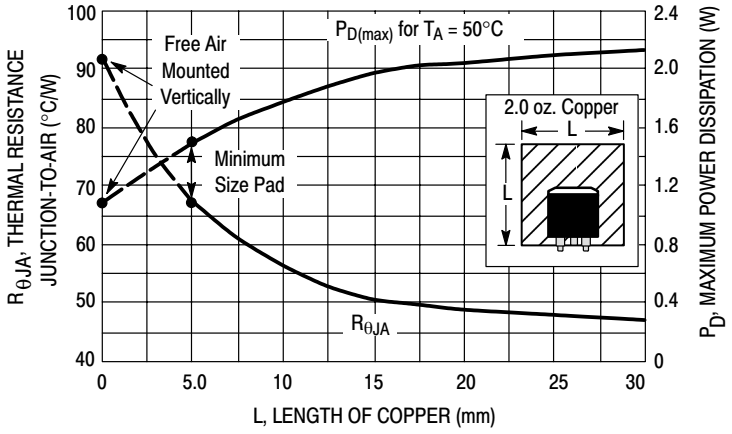


Figure 1. DPAK−3 Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length

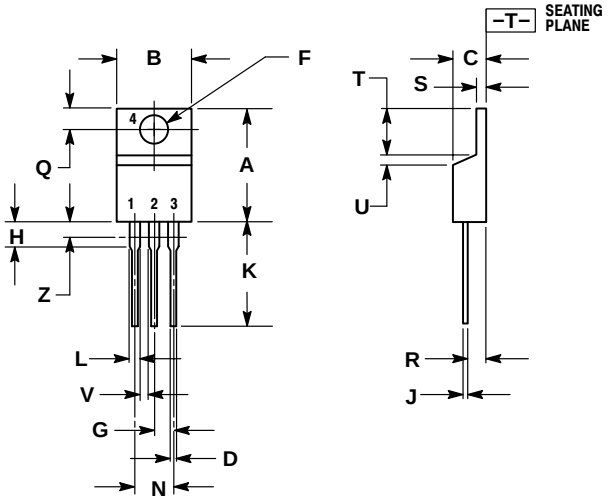
ORDERING INFORMATION

Device	Output Voltage Tolerance	Operating Temperature Range	Package	Shipping†
MC79M05BDT	4.0%	T_J = −40° to +125°C	DPAK−3	75 Units/Rail
MC79M05BDTRK				2500 Units/Reel
MC79M05BT			TO−220−3	50 Units/Rail
MC79M05CDT		T_J = 0° to +125°C	DPAK−3	75 Units/Rail
MC79M05CDTRK				2500 Units/Reel
MC79M05CT			TO−220−3	50 Units/Rail
MC79M08BDT	4.0%	T_J = −40° to +125°C	DPAK−3	75 Units/Rail
MC79M08BDTRK				2500 Units/Reel
MC79M08BT			TO−220−3	50 Units/Rail
MC79M08CDT		T_J = 0° to +125°C	DPAK−3	75 Units/Rail
MC79M08CDTRK				2500 Units/Reel
MC79M08CT			TO−220−3	50 Units/Rail
MC79M12BDT	4.0%	T_J = −40° to +125°C	DPAK−3	75 Units/Rail
MC79M12BDTRK				2500 Units/Reel
MC79M12BT			TO−220−3	50 Units/Rail
MC79M12CDT		T_J = 0° to +125°C	DPAK−3	75 Units/Rail
MC79M12CDTRK				2500 Units/Reel
MC79M12CT			TO−220−3	50 Units/Rail
MC79M15BDT	4.0%	T_J = −40° to +125°C	DPAK−3	75 Units/Rail
MC79M15BDTRK				2500 Units/Reel
MC79M15BT			TO−220−3	50 Units/Rail
MC79M15CDT		T_J = 0° to +125°C	DPAK−3	75 Units/Rail
MC79M15CDTG			DPAK−3 (Pb−Free)	
MC79M15CDTRK			DPAK−3	2500 Units/Reel
MC79M15CT				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.

PACKAGE DIMENSIONS

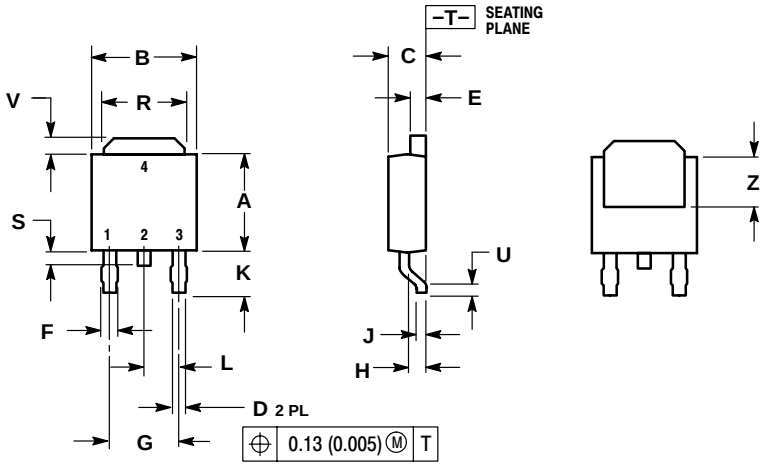
TO−220
PLASTIC PACKAGE
T SUFFIX
CASE 221A−09
ISSUE AA



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.

	INCHES		MILLIMETERS	
DIM	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

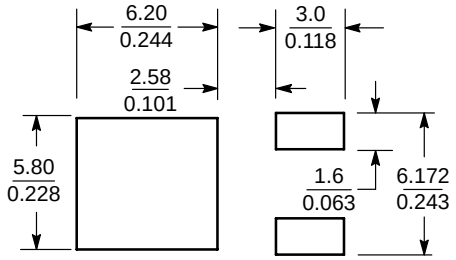
DPAK−3
PLASTIC PACKAGE
DT SUFFIX
CASE 369A−13
ISSUE AB



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

	INCHES		MILLIMETERS	
DIM	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	---

SOLDERING FOOTPRINT*



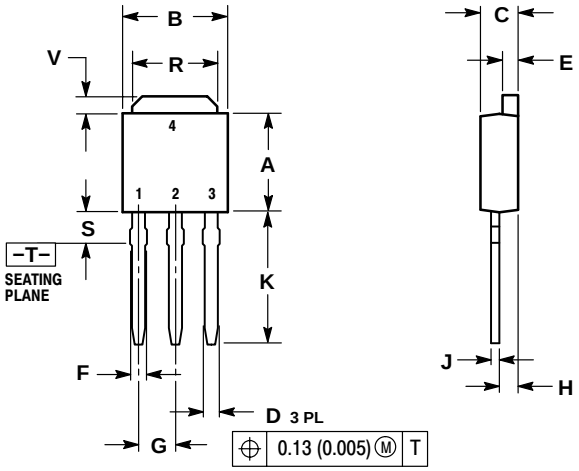
SCALE 3:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

DPAK−3

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

PACKAGE DIMENSIONS

DPAK−3
PLASTIC PACKAGE
DT−1 SUFFIX
CASE 369−07
ISSUE M



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

	INCHES		MILLIMETERS	
DIM	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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

MC79M00/D