

## THREE TERMINAL NEGATIVE VOLTAGE REGULATOR

## DESCRIPTION

$\mu$ PC79M00 series are monolithic three terminal negative regulators which employ internally current limiting, thermal shut down, output transistor safe operating area protection make them essentially indestructible.

They are intended as fixed voltage regulators in a wide range of application including local on card regulation for elimination of distribution problems associated wide single point regulation.

## FEATURES

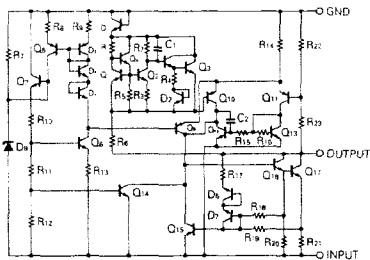
- Output current out of 500 mA.
- Built-in some protection circuits.  
(over current protection, SOA protection and thermal shut down)
- Low noise.

## ORDERING INFORMATION

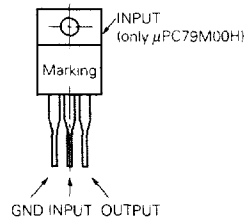
TYPE NUMBER	OUTPUT VOLTAGE	PACKAGE	QUALITY GRADE
$\mu$ PC79M05H	-5 V	TO-220	Standard
$\mu$ PC79M05HF		MP-45G (ISOLATED TO-220)	
$\mu$ PC79M08H	-8 V	TO-220	
$\mu$ PC79M08HF		MP-45G (ISOLATED TO-220)	
$\mu$ PC79M12H	-12 V	TO-220	
$\mu$ PC79M12HF		MP-45G (ISOLATED TO-220)	
$\mu$ PC79M15H	-15 V	TO-220	
$\mu$ PC79M15HF		MP-45G (ISOLATED TO-220)	
$\mu$ PC79M18H	-18 V	TO-220	
$\mu$ PC79M18HF		MP-45G (ISOLATED TO-220)	
$\mu$ PC79M24H	-24 V	TO-220	
$\mu$ PC79M24HF		MP-45G (ISOLATED TO-220)	

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number 1E1-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

## EQUIVALENT CIRCUIT



## CONNECTION DIAGRAM



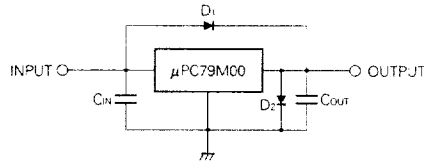
**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

PARAMETER	SYMBOL	RATING		UNIT
		μPC79M00H	μPC79M00HF	
Input Voltage	V <sub>IN</sub>	-35 / -40 (Note1)		V
Internal Power Dissipation	P <sub>T</sub>	20 (Note2)	15 (Note2)	V
Operating Ambient Temperature Range	T <sub>OpT</sub>	-20 to +85		°C
Operating Junction Temperature Range	T <sub>OpT(j)</sub>	-20 to +150		°C
Storage Temperature Range	T <sub>Stg</sub>	-55 to +150		°C
Thermal Resistance (junction to case)	R <sub>th(j-c)</sub>	6.25	7	°C/W
Thermal Resistance (junction to ambient)	R <sub>th(j-a)</sub>	83	65	°C/W

(Note1) μPC79M05, 08, 12, 15, 18: -35 V, μPC79M24: -40 V

(Note2) Internally limited

**TYPICAL CONNECTION**



C<sub>IN</sub> : More than 2 μF.

C<sub>OUT</sub> : More than 1 μF.

D<sub>1</sub> : Needed for V<sub>IN</sub> > V<sub>O</sub>.

D<sub>2</sub> : Needed for V<sub>O</sub> > GND.

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	TYPE NUMBER	MIN.	TYP.	MAX.	UNIT
Input Voltage	V <sub>IN</sub>	μPC79M05	-7	-10	-25	V
		μPC79M08	-10.5	-14	-25	
		μPC79M12	-14.5	-19	-30	
		μPC79M15	-17.5	-23	-30	
		μPC79M18	-21	-27	-33	
		μPC79M24	-27	-33	-38	
Output Current	I <sub>O</sub>	All	5		350	mA
Operating Junction Temperature Range	T <sub>OpT(j)</sub>	All	-20		+125	°C

**ELECTRICAL CHARACTERISTICS μPC79M05**

( $V_{IN} = -10\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-4.8	-5.0	-5.2	V	$T_j = 25\text{ }^\circ\text{C}$
		-4.75		-5.25		$-7\text{ V} \leq V_{IN} \leq -25\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		18	50	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-7\text{ V} \leq V_{IN} \leq -25\text{ V}$
			10	30		$T_j = 25\text{ }^\circ\text{C}$ , $-8\text{ V} \leq V_{IN} \leq -18\text{ V}$
Load Regulation	$REG_L$		15	100	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			10			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.3	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-8\text{ V} \leq V_{IN} \leq -25\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		45	200	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	72		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-8\text{ V} \leq V_{IN} \leq -18\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{Oshort}$		500		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -25\text{ V}$
Peak Output Current	$I_{Opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T$		0.2		mV/°C	$I_o = 5\text{ mA}$

**ELECTRICAL CHARACTERISTICS μPC79M08**

( $V_{IN} = -14\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-7.7	-8.0	-8.3	V	$T_j = 25\text{ }^\circ\text{C}$
		-7.6		-8.4		$-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		20	80	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$
			15	50		$T_j = 25\text{ }^\circ\text{C}$ , $-11\text{ V} \leq V_{IN} \leq -21\text{ V}$
Load Regulation	$REG_L$		20	160	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			15			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.3	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		65	220	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	66		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-11.5\text{ V} \leq V_{IN} \leq -21.5\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{Oshort}$		500		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -25\text{ V}$
Peak Output Current	$I_{Opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T$		0.3		mV/°C	$I_o = 5\text{ mA}$

**ELECTRICAL CHARACTERISTICS μPC79M12**

( $V_{IN} = -19\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-11.5	-12	-12.5	V	$T_j = 25\text{ }^\circ\text{C}$
		-11.4		-12.6		$-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		25	80	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$
			20	50		$T_j = 25\text{ }^\circ\text{C}$ , $-15\text{ V} \leq V_{IN} \leq -25\text{ V}$
Load Regulation	$REG_L$		35	240	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			25			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.4	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		125	280	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	64		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-15\text{ V} \leq V_{IN} \leq -25\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{short}$		400		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -30\text{ V}$
Peak Output Current	$I_{opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o / \Delta T$		0.4		$\text{mV}/^\circ\text{C}$	$I_o = 5\text{ mA}$

**ELECTRICAL CHARACTERISTICS μPC79M15**

( $V_{IN} = -23\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-14.4	-15	-15.6	V	$T_j = 25\text{ }^\circ\text{C}$
		-14.25		-15.75		$-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		30	80	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$
			25	50		$T_j = 25\text{ }^\circ\text{C}$ , $-18\text{ V} \leq V_{IN} \leq -28\text{ V}$
Load Regulation	$REG_L$		50	240	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			35			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.4	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		150	360	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	62		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-18.5\text{ V} \leq V_{IN} \leq -28.5\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{short}$		400		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -30\text{ V}$
Peak Output Current	$I_{opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o / \Delta T$		0.6		$\text{mV}/^\circ\text{C}$	$I_o = 5\text{ mA}$

**ELECTRICAL CHARACTERISTICS  $\mu$ PC79M18**

( $V_{IN} = -27\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

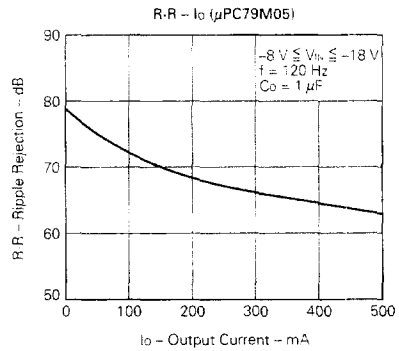
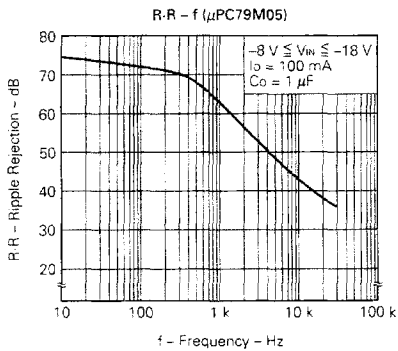
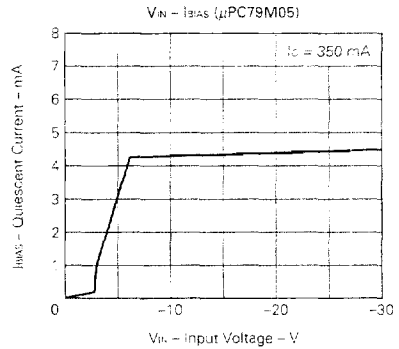
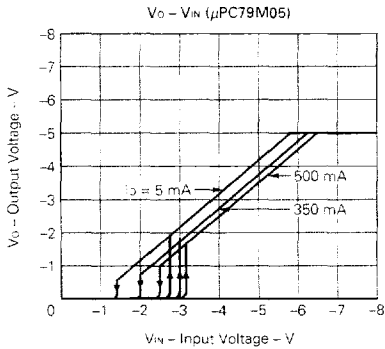
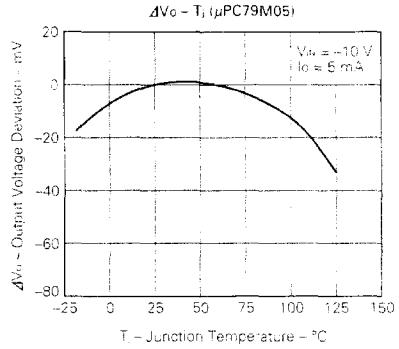
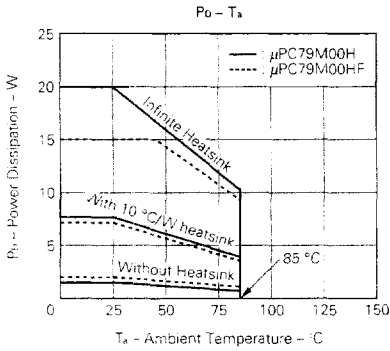
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-17.3	-18	-18.7	V	$T_j = 25\text{ }^\circ\text{C}$
		-17.1		-18.9		$-21\text{ V} \leq V_{IN} \leq -33\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		30	80	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-21\text{ V} \leq V_{IN} \leq -33\text{ V}$
			25	50		$T_j = 25\text{ }^\circ\text{C}$ , $-24\text{ V} \leq V_{IN} \leq -30\text{ V}$
Load Regulation	$REG_L$		60	300	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			45			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.4	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-21\text{ V} \leq V_{IN} \leq -33\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		200	440	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	60		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-22\text{ V} \leq V_{IN} \leq -32\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{short}$		350		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -33\text{ V}$
Peak Output Current	$I_{Opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T$		0.8		mV/ $^\circ\text{C}$	$I_o = 5\text{ mA}$

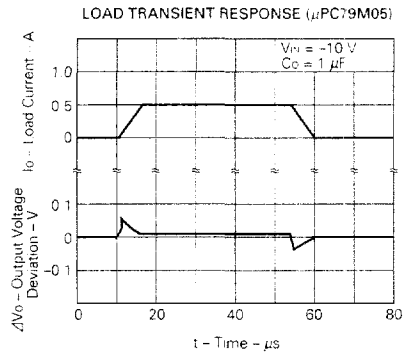
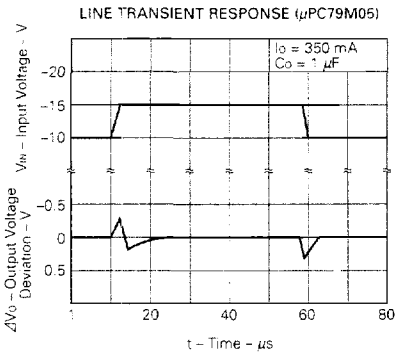
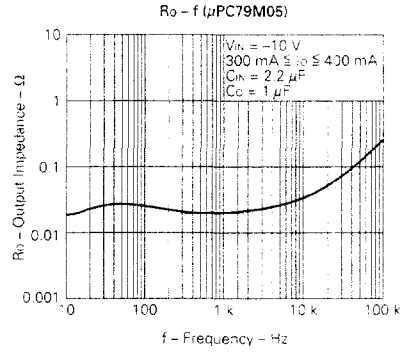
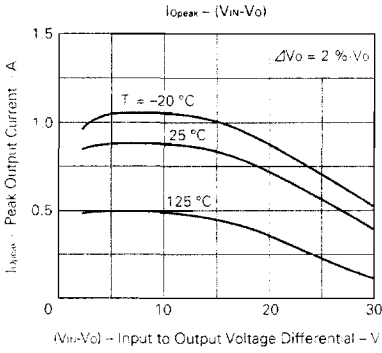
**ELECTRICAL CHARACTERISTICS  $\mu$ PC79M24**

( $V_{IN} = -33\text{ V}$ ,  $I_o = 350\text{ mA}$ ,  $0\text{ }^\circ\text{C} \leq T_j \leq +125\text{ }^\circ\text{C}$ ,  $C_{IN} = 2.2\text{ }\mu\text{F}$ ,  $C_{OUT} = 1\text{ }\mu\text{F}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	$V_o$	-23.0	-24	-25.0	V	$T_j = 25\text{ }^\circ\text{C}$
		-22.8		-25.2		$-27\text{ V} \leq V_{IN} \leq -38\text{ V}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		30	80	mV	$T_j = 25\text{ }^\circ\text{C}$ , $-27\text{ V} \leq V_{IN} \leq -38\text{ V}$
			25	50		$T_j = 25\text{ }^\circ\text{C}$ , $-30\text{ V} \leq V_{IN} \leq -36\text{ V}$
Load Regulation	$REG_L$		80	360	mV	$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 500\text{ mA}$
			50			$T_j = 25\text{ }^\circ\text{C}$ , $5\text{ mA} \leq I_o \leq 350\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.5	6.0	mA	$T_j = 25\text{ }^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.5	mA	$-27\text{ V} \leq V_{IN} \leq -38\text{ V}$
				0.4		$5\text{ mA} \leq I_o \leq 350\text{ mA}$
Output Noise Voltage	$V_n$		250	600	$\mu\text{V}_{r.m.s.}$	$T_j = 25\text{ }^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	$R \cdot R$	50	57		dB	$T_j = 25\text{ }^\circ\text{C}$ , $f = 120\text{ Hz}$ , $-28\text{ V} \leq V_{IN} \leq -38\text{ V}$ , $I_o = 100\text{ mA}$
Dropout Voltage	$V_{DIF}$		1.1		V	$T_j = 25\text{ }^\circ\text{C}$
Short Circuit Current	$I_{short}$		200		mA	$T_j = 25\text{ }^\circ\text{C}$ , $V_{IN} = -38\text{ V}$
Peak Output Current	$I_{Opeak}$	620	880	1 020	mA	$T_j = 25\text{ }^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T$		1.0		mV/ $^\circ\text{C}$	$I_o = 5\text{ mA}$

TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

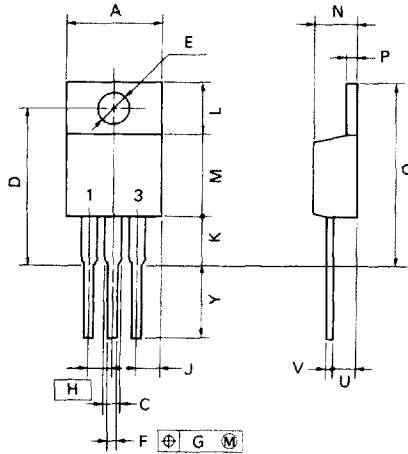




PACKAGE DIMENSIONS

μPC79M00H Series

3 PIN PLASTIC SIP (TO-220)



NOTE

Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

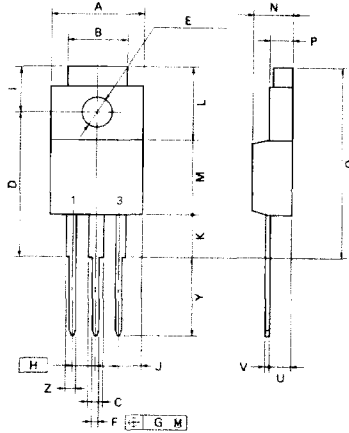
F3HP-254B

ITEM	MILLIMETERS	INCHES
A	10.4 MAX.	0.41 MAX.
C	1.2 MIN.	0.047 MIN.
D	17.2 <sup>-0.3</sup>	0.677 <sup>-0.012</sup>
E	φ3.6 <sup>-0.1</sup>	φ0.142 <sup>-0.004</sup>
F	0.75 <sup>-0.1</sup>	0.03 <sup>-0.004</sup>
G	0.25	0.01
H	2.54	0.1
J	2.66 MAX.	0.105 MAX.
K	4.9 MIN.	0.192 MIN.
L	6.5 TYP.	0.256
M	8.5 TYP.	0.335
N	4.6 <sup>-0.2</sup>	0.181 <sup>-0.008</sup>
P	1.3 <sup>-0.1</sup>	0.051 <sup>-0.004</sup>
Q	22.22 MAX.	0.875 MAX.
U	3.0 MAX.	0.119 MAX.
V	0.45 <sup>-0.1</sup>	0.018 <sup>-0.004</sup>
Y	8.8 <sup>-0.7</sup>	0.346 <sup>-0.028</sup>



μPC79M00HF Series

3PIN PLASTIC SIP (MP-45G)



P3HF-254B-1

NOTE

Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	10.4 MAX.	0.410 MAX.
B	7.0	0.276
C	1.2 MIN.	0.047 MIN.
D	17.0 <sup>+0.3</sup>	0.669 <sup>+0.012</sup>
E	φ3.3 <sup>+0.2</sup>	φ0.130 <sup>+0.008</sup>
F	0.75 <sup>+0.10</sup>	0.030 <sup>+0.004</sup>
G	0.25	0.010
H	2.54 (T.P.)	0.100 (T.P.)
I	5.0 <sup>+0.3</sup>	0.197 <sup>+0.012</sup>
J	2.66 MAX.	0.105 MAX.
K	4.8 MIN.	0.188 MIN.
L	8.5	0.335
M	8.5	0.335
N	4.5 <sup>+0.2</sup>	0.177 <sup>+0.008</sup>
P	2.8 <sup>+0.2</sup>	0.110 <sup>+0.008</sup>
Q	22.4 MAX.	0.882 MAX.
U	2.4 <sup>+0.5</sup>	0.094 <sup>+0.021</sup>
V	0.65 <sup>+0.10</sup>	0.026 <sup>+0.004</sup>
Y	8.9 <sup>+0.7</sup>	0.350 <sup>+0.028</sup>
Z	1.0 MIN.	0.039 MIN.

**RECOMMENDED SOLDERING CONDITIONS**

The following conditions (see table below) must be met when soldering this product.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

**TYPES OF THROUGH HOLE MOUNT DEVICE**

μPC79M00H / μPC79M00HF Series

Soldering process	Soldering conditions	Symbol
Wave soldering	Solder temperature : 260 °C or below. Flow Time : 10 seconds or below.	

**REFERENCE**

DOCUMENT NAME	DOCUMENT No.
Quality control of NEC semiconductor devices	TEM-1202
Quality control guide of semiconductor devices	MEI-1202
Assembly manual of semiconductor devices	IEI-1207
NEC semiconductor device reliability/quality control system	IEI-1212