

6427525 N E C ELECTRONICS INC 05E 22470 D
BIPOLAR ANALOG INTEGRATED CIRCUITS

μ PC79M00H SERIES

T-58-11-13

THREE TERMINAL NEGATIVE VOLTAGE REGULATORS

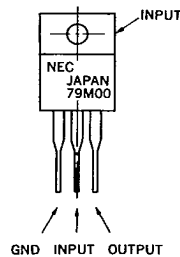
DESCRIPTION

The μ PC79M00H series are monolithic three terminal negative regulators which employ internally current limiting, thermal shut down, and safe-area compensation, make them essentially indestructible. They are intended as fixed-voltage regulator in a wide range of application including local on card regulator for elimination of distribution problems associated with single point regulation.

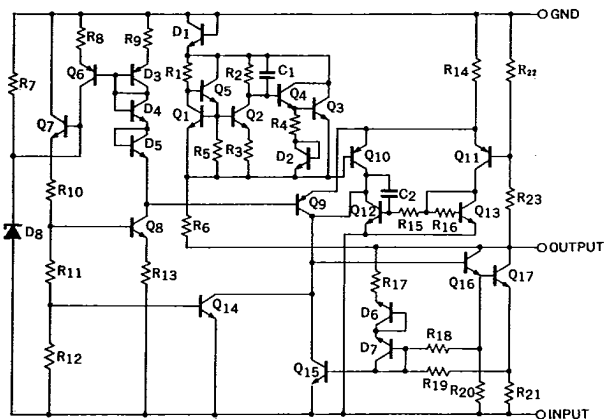
FEATURES

- Output current in excess of 0.5 A.
- No external component required.
- Internal thermal overload protection.
- Internal short circuit current limiting.
- Low noise.

CONNECTION DIAGRAM



EQUIVALENT CIRCUIT



μPC79M00H SERIES

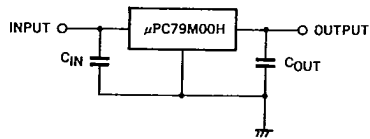
6427525 N E C ELECTRONICS INC

05E 22471 D

T-58-1173

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Input Voltage μPC79M05H/08H/12H/15H	-35	V
μPC79M24H	-40	V
Internal Power Dissipation	Internally Limited	
Operating Temperature Range	-20 to +85	°C
Storage Temperature Range	-55 to +150	°C
Operating Junction Temperature Range	-20 to +150	°C
Thermal Resistance (Junction to Case)	6.25	°C/W
Thermal Resistance (Junction to Ambient)	83	°C/W

TYPICAL CONNECTION

C_{IN} : 2.2 μF (Required if regulator is located an appreciable distance from power supply filter.)

C_{OUT} : More them 1 μF (recommended mylar capacitor.)

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL		MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	μPC79M05H	-7	-10	-25	V
		μPC79M08H	-10.5	-14	-25	
		μPC79M12H	-14.5	-19	-30	
		μPC79M15H	-17.5	-23	-30	
		μPC79M18H	-21	-27	-33	
		μPC79M24H	-27	-33	-38	
Output Current	I_O	All	5		350	mA
Operating Junction Temperature Range	$T_{opt(j)}$	All	-20		125	°C

μPC79M00H SERIES

05E 22472

T-58-11-13

D

6427525 N E C ELECTRONICS INC

ELECTRICAL CHARACTERISTICS μPC79M05H ($V_{IN} = -10\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-4.8 -4.75	-5.0	-5.2 -5.25	V	$T_J = 25^\circ\text{C}$ $-7\text{ V} \leq V_{IN} \leq -25\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		18 10	50 30	mV	$T_J = 25^\circ\text{C}$, $-7\text{ V} \leq V_{IN} \leq -25\text{ V}$ $T_J = 25^\circ\text{C}$, $-8\text{ V} \leq V_{IN} \leq -18\text{ V}$
Load Regulation	REG_L		15 10	100	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.3	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-8\text{ V} \leq V_{IN} \leq -25\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_n		45	200	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	72		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-8\text{ V} \leq V_{IN} \leq -18\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		500		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -25\text{ V}$
Peak Output Current	I_{Opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		0.2		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

ELECTRICAL CHARACTERISTICS μPC79M08H ($V_{IN} = -14\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-7.7 -7.6	-8.0	-8.3 -8.4	V	$T_J = 25^\circ\text{C}$ $-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		20 15	80 50	mV	$T_J = 25^\circ\text{C}$, $-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$ $T_J = 25^\circ\text{C}$, $-11\text{ V} \leq V_{IN} \leq -21\text{ V}$
Load Regulation	REG_L		20 15	160	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.3	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-10.5\text{ V} \leq V_{IN} \leq -25\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_n		65	220	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	66		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-11.5\text{ V} \leq V_{IN} \leq -21.5\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		500		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -25\text{ V}$
Peak Output Current	I_{Opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		0.3		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

8

μPC79M00H SERIES

6427525 N E C ELECTRONICS INC

05E 22473

D

T-58-11-13

ELECTRICAL CHARACTERISTICS μPC79M12H ($V_{IN} = -19\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-11.5 -11.4	-12.0	-12.5 -12.6	V	$T_J = 25^\circ\text{C}$ $-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		25 20	80 50	mV	$T_J = 25^\circ\text{C}$, $-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ $T_J = 25^\circ\text{C}$, $-15\text{ V} \leq V_{IN} \leq -25\text{ V}$
Load Regulation	REG_L		35 25	240	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.4	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-14.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_n		125	280	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	64		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-15\text{ V} \leq V_{IN} \leq -25\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		400		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -30\text{ V}$
Peak Output Current	I_{opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		0.4		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

ELECTRICAL CHARACTERISTICS μPC79M15H ($V_{IN} = -23\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-14.4 -14.25	-15	-15.6 -15.75	V	$T_J = 25^\circ\text{C}$ $-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		30 25	80 50	mV	$T_J = 25^\circ\text{C}$, $-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ $T_J = 25^\circ\text{C}$, $-18\text{ V} \leq V_{IN} \leq -28\text{ V}$
Load Regulation	REG_L		50 35	240	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.4	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-17.5\text{ V} \leq V_{IN} \leq -30\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_n		150	360	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	62		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-18.5\text{ V} \leq V_{IN} \leq -28.5\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		400		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -30\text{ V}$
Peak Output Current	I_{opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		0.6		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

μPC79M00H SERIES
05E 22474 D
T-58-11-13

6427525 N E C ELECTRONICS INC

ELECTRICAL CHARACTERISTICS μPC79M18H ($V_{IN} = -27\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-17.3 -17.1	-18.0	-18.7 -18.9	V	$T_J = 25^\circ\text{C}$ $-21\text{ V} \leq V_{IN} \leq -33\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		30 25	80 50	mV	$T_J = 25^\circ\text{C}$, $-21\text{ V} \leq V_{IN} \leq -33\text{ V}$ $T_J = 25^\circ\text{C}$, $-24\text{ V} \leq V_{IN} \leq -30\text{ V}$
Load Regulation	REG_L		60 45	300	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.4	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-21\text{ V} \leq V_{IN} \leq -33\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_N		200	440	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	60		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-22\text{ V} \leq V_{IN} \leq -32\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		350		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -33\text{ V}$
Peak Output Current	I_{Opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		0.8		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

ELECTRICAL CHARACTERISTICS μPC79M24H ($V_{IN} = -33\text{ V}$, $I_O = 350\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{IN} = 2.2\text{ }\mu\text{F}$, $C_{OUT} = 1\text{ }\mu\text{F}$)

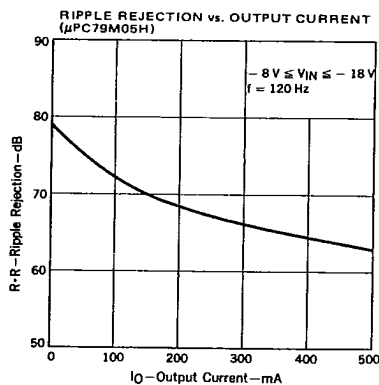
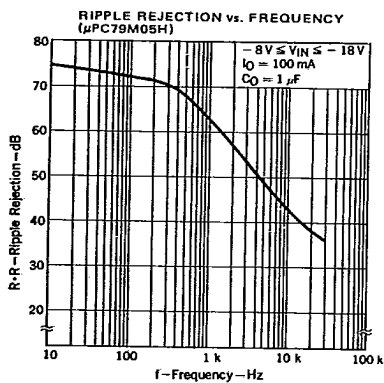
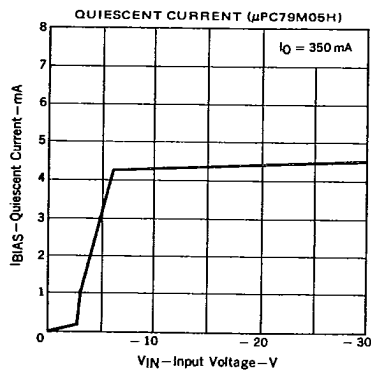
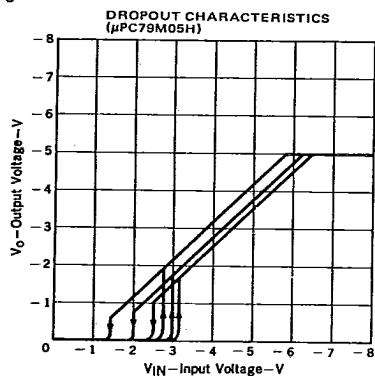
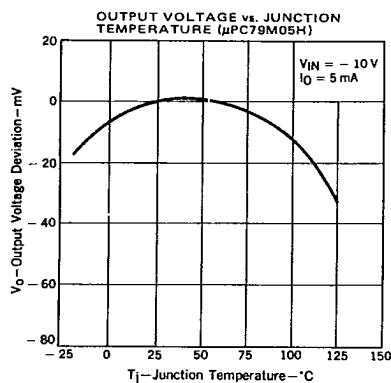
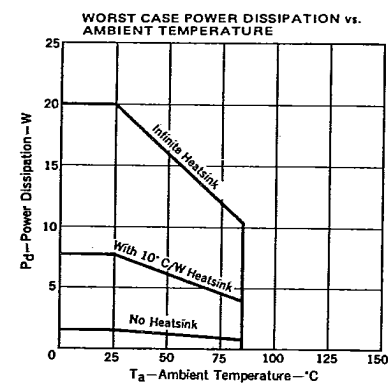
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Voltage	V_O	-23 -22.8	-24	-25 -25.2	V	$T_J = 25^\circ\text{C}$ $-27\text{ V} \leq V_{IN} \leq -38\text{ V}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG_{IN}		30 25	80 50	mV	$T_J = 25^\circ\text{C}$, $-27\text{ V} \leq V_{IN} \leq -38\text{ V}$ $T_J = 25^\circ\text{C}$, $-30\text{ V} \leq V_{IN} \leq -36\text{ V}$
Load Regulation	REG_L		80 50	360	mV	$T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 500\text{ mA}$ $T_J = 25^\circ\text{C}$, $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Quiescent Current	I_{BIAS}		4.5	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	ΔI_{BIAS}			0.5 0.4	mA	$-27\text{ V} \leq V_{IN} \leq -38\text{ V}$ $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	V_N		250	600	$\mu\text{V}_{r.m.s.}$	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	R-R	50	57		dB	$T_J = 25^\circ\text{C}$, $f = 120\text{ Hz}$, $-28\text{ V} \leq V_{IN} \leq -38\text{ V}$, $I_O = 100\text{ mA}$
Dropout Voltage	V_{DIF}		1.1		V	$T_J = 25^\circ\text{C}$
Short Circuit Current	I_{short}		200		mA	$T_J = 25^\circ\text{C}$, $V_{IN} = -38\text{ V}$
Peak Output Current	I_{Opeak}	620	880	1020	mA	$T_J = 25^\circ\text{C}$
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$		1.0		$\text{mV}/^\circ\text{C}$	$I_O = 5\text{ mA}$

8

μPC79M00H SERIES
6427525 N E C ELECTRONICS INC

05E 22475 D

T-58-11-13

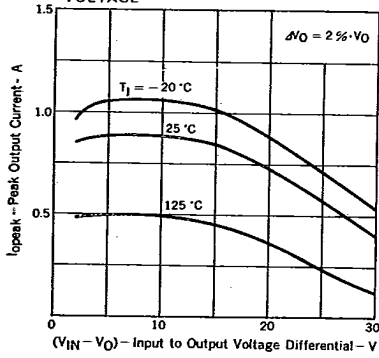
TYPICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

6427525 N E C ELECTRONICS INC

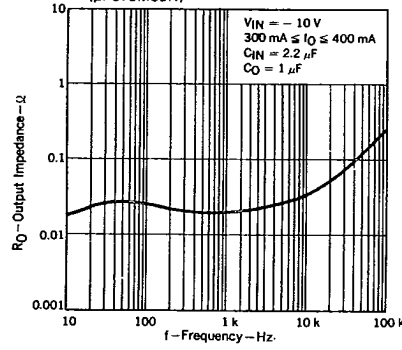
μ PC79M00H SERIES
05E 22476 D

T-58-11-13

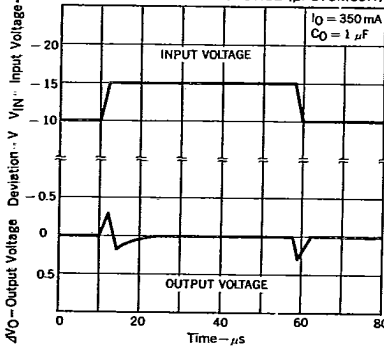
PEAK OUTPUT CURRENT AS A FUNCTION OF INPUT/OUTPUT DIFFERENTIAL VOLTAGE



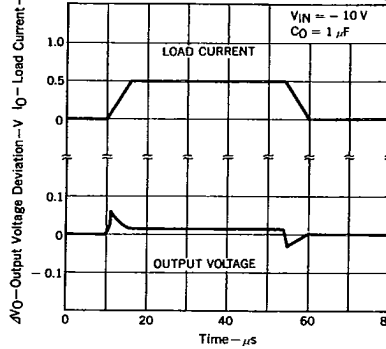
OUTPUT IMPEDANCE vs. FREQUENCY (μ PC79M05H)



LINE TRANSIENT RESPONSE (μ PC79M05H)



LOAD TRANSIENT RESPONSE (μ PC79M05H)



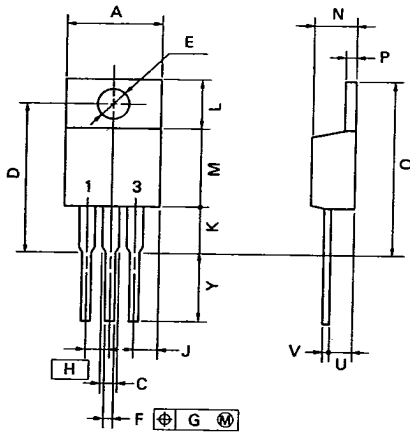
8

μPC79M00H SERIES
6427525 N E C ELECTRONICS INC

05E 22477 D

T-58-11-13

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.

P3HP-2648

ITEM	MILLIMETERS	INCHES
A	10.4 MAX.	0.41 MAX.
C	1.2 MIN.	0.047 MIN.
D	17.2 ^{±0.3}	0.681 ^{±0.012}
E	φ3.6 ^{±0.1}	φ0.142 ^{±0.008}
F	0.75 ^{±0.1}	0.03 ^{±0.004}
G	0.25	0.01
H	2.54	0.1
J	2.66 MAX.	0.105 MAX.
K	4.9 MIN.	0.205 MIN.
L	6.5 TYP.	0.256
M	8.5 TYP.	0.335
N	4.6 ^{±0.2}	0.181 ^{±0.008}
P	1.3 ^{±0.1}	0.051 ^{±0.004}
Q	22.22 MAX.	0.887 MAX.
U	3.0 MAX.	0.119 MAX.
V	0.45 ^{±0.1}	0.018 ^{±0.004}
Y	8.8 ^{±0.7}	0.335 ^{±0.028}