NEC

BIPOLAR ANALOG INTEGRATED CIRCUITS
μPC78M00A SERIES

THREE TERMINAL POSITIVE VOLTAGE REGULATORS

DESCRIPTION

μPC78M00A series are monolithic three terminal positive regulators which employ internally current limiting, thermal shut down, output transistor safe operating area protection make them essentially indestructible.

They are improved for load regulation, as comparison of conventional μPC78M00 series.

FEATURES

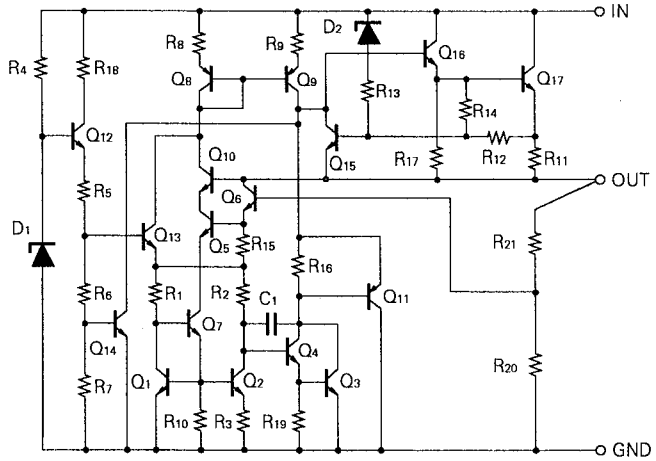
- Wide operation temperature range.
- Good regulation (line, load).
- Built-in some protection circuits.
  (over current protection, SOA protection and thermal shut down)

ORDER INFORMATION

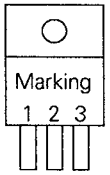
TYPE NUMBER	OUTPUT VOLTAGE	PACKAGE	QUALITY GRADE
μPC78M05AHF	5 V	MP-45G(ISOLATED TO-220)	Standard
μPC78M06AHF	6 V		
μPC78M07AHF	7 V		
μPC78M08AHF	8 V		
μPC78M09AHF	9 V		
μPC78M10AHF	10 V		
μPC78M12AHF	12 V		
μPC78M15AHF	15 V		
μPC78M18AHF	18 V		
μPC78M24AHF	24 V		

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

EQUIVALENT CIRCUIT



CONNECTION DIAGRAM



1. IN
2. GND
3. OUT

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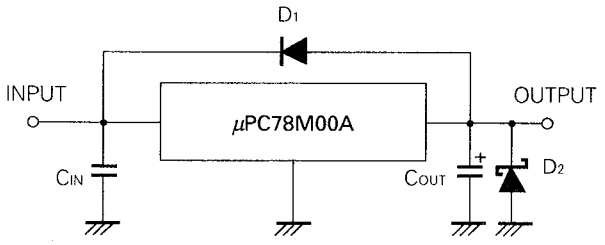
ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Voltage	V_{IN}	35/40 (Note1)	V
Internal Power Dissipation	P_T	15 (Note2)	W
Operating Ambient Temperature Range	T_{opt}	− 30 to + 85	°C
Operating Junction Temperature Range	$T_{opt(j)}$	− 30 to + 150	°C
Storage Temperature Range	T_{stg}	− 55 to + 150	°C
Thermal Resistance (junction to case)	$R_{th(j-c)}$	7	°C/W
Thermal Resistance (junction to ambient)	$R_{th(j-a)}$	65	°C/W

(Note1) μPC78M05A, 06, 07, 08, 09, 10, 12, 15, 18 : 35 V, μPC78M24A : 40 V

(Note2) Internally limited

TYPICAL CONNECTION



C_1 : Required if regulator is located an appreciable distance from power supply filter.

C_2 : More than 0.1 μF

D_1 : Needed for $V_{IN} < V_O$

D_2 : Needed for $V_O < GND$

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL		MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	μPC78M05AHF	7	10	25	V
		μPC78M06AHF	8.5	11	25	
		μPC78M07AHF	9.5	12	25	
		μPC78M08AHF	10.5	14	25	
		μPC78M09AHF	11.5	15	25	
		μPC78M10AHF	12.5	17	28	
		μPC78M12AHF	14.5	19	30	
		μPC78M15AHF	17.5	23	30	
		μPC78M18AHF	21	27	30	
		μPC78M24AHF	27	33	38	
Output Current	I_O	All	5		350	mA
Operating Junction Temperature Range	$T_{opt(j)}$	All	− 30		+ 125	°C

ELECTRICAL CHARACTERISTICS μPC78M05A

(V_{IN} = 10 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	4.8	5.0	5.2	V
		7 V ≦ V_{IN} ≦ 20 V, 5 mA ≦ I_O ≦ 350 mA	4.75		5.25	
		− 30 °C ≦ T_j ≦ + 125 °C	4.75		5.25	
Line Regulation	REG_{IN}	T_j = 25 °C, 7 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		3	20	mV
		T_j = 25 °C, 8 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		1	15	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		3	20	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		1	10	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	8 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		40		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 8 V ≦ V_{IN} ≦ 18 V, I_O = 300 mA	68	84		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 0.8		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M06A

(V_{IN} = 11 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	5.76	6.0	6.24	V
		8.5 V ≦ V_{IN} ≦ 21 V, 5 mA ≦ I_O ≦ 350 mA	5.7		6.3	
		− 30 °C ≦ T_j ≦ + 125 °C	5.7		6.3	
Line Regulation	REG_{IN}	T_j = 25 °C, 8.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		4	20	mV
		T_j = 25 °C, 9 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		1.2	15	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		4.8	25	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		2.4	15	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	9 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		45		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 9 V ≦ V_{IN} ≦ 19 V, I_O = 300 mA	67	83		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.0		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M07A

(V_{IN} = 12 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	6.72	7.0	7.28	V
		9.5 V ≦ V_{IN} ≦ 22 V, 5 mA ≦ I_O ≦ 350 mA	6.65		7.35	
		− 30 °C ≦ T_j ≦ + 125 °C	6.65		7.35	
Line Regulation	REG_{IN}	T_j = 25 °C, 9.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		5	25	mV
		T_j = 25 °C, 10 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		1.5	20	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		5.6	30	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		2.8	15	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	9.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		50		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f =120 Hz, 10 V ≦ V_{IN} ≦ 20 V, I_O = 300 mA	66	82		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.1		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M08A

(V_{IN} = 14 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	7.7	8.0	8.3	V
		10.5 V ≦ V_{IN} ≦ 23 V, 5 mA ≦ I_O ≦ 350 mA	7.6		8.4	
		− 30 °C ≦ T_j ≦ + 125 °C	7.6		8.4	
Line Regulation	REG_{IN}	T_j = 25 °C, 10.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		6	30	mV
		T_j = 25 °C, 11 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		2	25	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		6.4	35	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		3.2	20	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.2	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	10.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		55		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 11.5 V ≦ V_{IN} ≦ 21.5 V, I_O = 300 mA	66	81		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.3		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M09A

(V_{IN} = 15 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	8.64	9.0	9.36	V
		11.5 V ≦ V_{IN} ≦ 24 V, 5 mA ≦ I_O ≦ 350 mA	8.55		9.45	
		− 30 °C ≦ T_j ≦ + 125 °C	8.55		9.45	
Line Regulation	REG_{IN}	T_j = 25 °C, 11.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		6.5	35	mV
		T_j = 25 °C, 12 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA		2	30	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		7.2	40	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		3.6	20	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.2	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	11.5 V ≦ V_{IN} ≦ 25 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		60		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 12 V ≦ V_{IN} ≦ 22 V, I_O = 300 mA	65	80		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.4		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M10A

(V_{IN} = 17 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	9.6	10.0	10.4	V
		12.5 V ≦ V_{IN} ≦ 25 V, 5 mA ≦ I_O ≦ 350 mA	9.5		10.5	
		− 30 °C ≦ T_j ≦ + 125 °C	9.5		10.5	
Line Regulation	REG_{IN}	T_j = 25 °C, 12.5 V ≦ V_{IN} ≦ 28 V, I_O = 200 mA		7	35	mV
		T_j = 25 °C, 14 V ≦ V_{IN} ≦ 28 V, I_O = 200 mA		2	30	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		8	40	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		4	20	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.3	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	12.5 V ≦ V_{IN} ≦ 28 V			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		65		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 13 V ≦ V_{IN} ≦ 23 V, I_O = 300 mA	64	79		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.6		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M12A

(V_{IN} = 19 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	11.5	12.0	12.5	V
		14.5 V ≦ V_{IN} ≦ 27 V, 5 mA ≦ I_O ≦ 350 mA	11.4		12.6	
		− 30 °C ≦ T_j ≦ + 125 °C	11.4		12.6	
Line Regulation	REG_{IN}	T_j = 25 °C, 14.5 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA		8	40	mV
		T_j = 25 °C, 16 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA		2	30	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		9.6	50	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		4.8	25	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.3	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	14.5 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		70		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f =120 Hz, 15 V ≦ V_{IN} ≦ 25 V, I_O = 300 mA	62	78		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 1.9		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M15A

(V_{IN} = 23 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	14.4		15.6	V
		17.5 V ≦ V_{IN} ≦ 30 V, 5 mA ≦ I_O ≦ 350 mA	14.25		15.75	
		− 30 °C ≦ T_j ≦ + 125 °C	14.25		15.75	
Line Regulation	REG_{IN}	T_j = 25 °C, 17.5 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA		10	50	mV
		T_j = 25 °C, 20 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA		3	40	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		12	60	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		6	30	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.4	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	17.5 V ≦ V_{IN} ≦ 30 V, I_O = 300 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		85		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 18.5 V ≦ V_{IN} ≦ 28.5 V, I_O = 300 mA	60	75		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 2.4		mV/°C

ELECTRICAL CHARACTERISTICS μPC78M18A

(V_{IN} = 27 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	17.3	18.0	18.7	V
		21 V ≦ V_{IN} ≦ 33 V, 5 mA ≦ I_O ≦ 350 mA	17.1		18.9	
		− 30 °C ≦ T_j ≦ + 125 °C	17.1		18.9	
Line Regulation	REG_{IN}	T_j = 25 °C, 21 V ≦ V_{IN} ≦ 33 V, I_O = 200 mA		10	50	mV
		T_j = 25 °C, 24 V ≦ V_{IN} ≦ 30 V, I_O = 200 mA		4	40	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		14.4	75	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		7.2	40	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.6	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	21 V ≦ V_{IN} ≦ 33 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		100		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 22 V ≦ V_{IN} ≦ 32 V, I_O = 300 mA	57	73		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 2.9		mV/°C

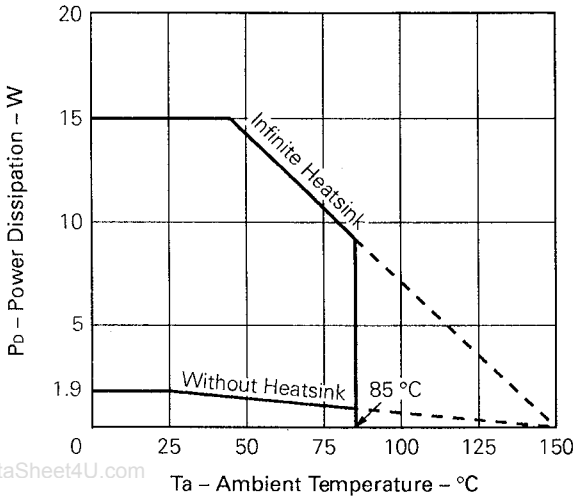
ELECTRICAL CHARACTERISTICS μPC78M24A

(V_{IN} = 33 V, I_O = 350 mA, 0 °C ≦ T_j ≦ + 125 °C)

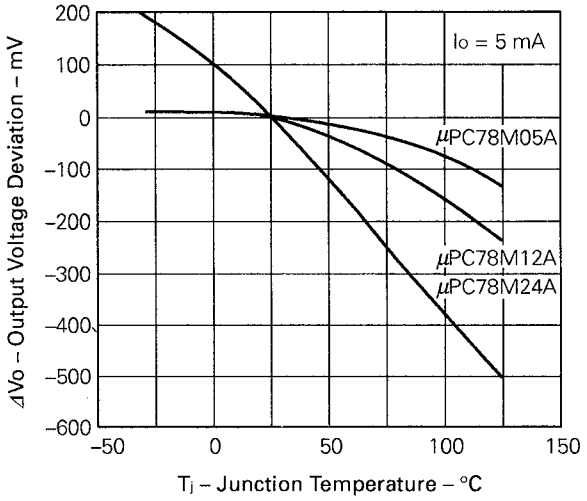
CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	T_j = 25 °C	23.0	24.0	25.0	V
		27 V ≦ V_{IN} ≦ 38 V, 5 mA ≦ I_O ≦ 350 mA	22.8		25.2	
		− 30 °C ≦ T_j ≦ + 125 °C	22.8		25.2	
Line Regulation	REG_{IN}	T_j = 25 °C, 27 V ≦ V_{IN} ≦ 38 V, I_O = 200 mA		10	50	mV
		T_j = 25 °C, 28 V ≦ V_{IN} ≦ 38 V, I_O = 200 mA		5	40	
Load Regulation	REG_L	T_j = 25 °C, 5 mA ≦ I_O ≦ 500 mA		19.2	100	mV
		T_j = 25 °C, 5 mA ≦ I_O ≦ 200 mA		9.6	50	
Quiescent Current	I_{BIAS}	T_j = 25 °C		4.8	6.0	mA
Quiescent Current Change	ΔI_{BIAS}	27 V ≦ V_{IN} ≦ 38 V, I_O = 200 mA			0.8	mA
		5 mA ≦ I_O ≦ 350 mA			0.5	
Output Noize Voltage	V_n	T_j = 25 °C, 10 Hz ≦ f ≦ 100 kHz		120		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	T_j = 25 °C, f = 120 Hz, 28 V ≦ V_{IN} ≦ 38 V, I_O = 300 mA	52	68		dB
Dropout Voltage	V_{DIF}	T_j = 25 °C		2.0		V
Short Circuit Current	I_{Oshort}	T_j = 25 °C, V_{IN} = 35 V		430		mA
Peak Output Current	I_{Opeak}	T_j = 25 °C		1.0		A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA		− 3.8		mV/°C

TYPICAL CHARACTERISTICS (T_a = 25 °C)

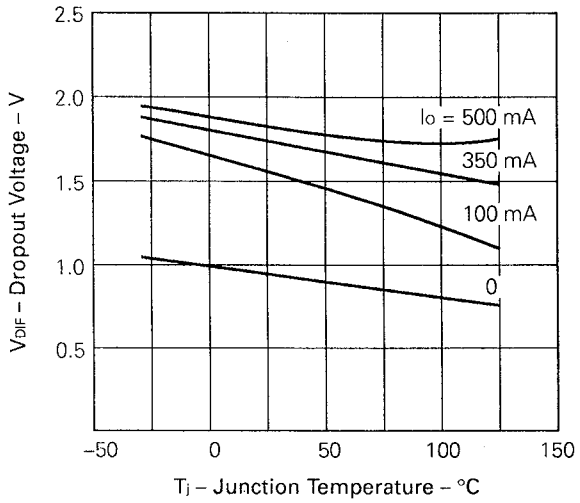
P_D – T_a



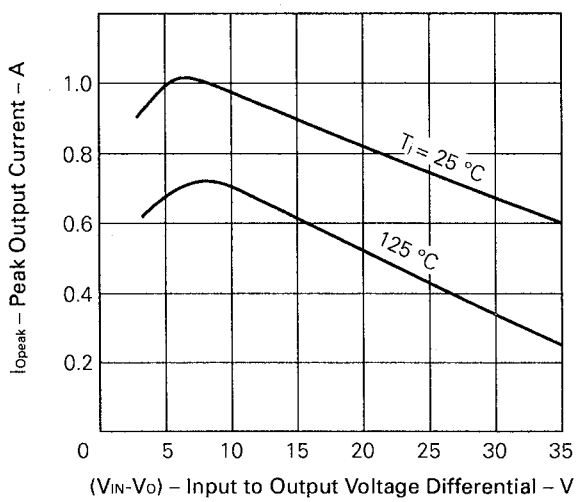
ΔVo – T_j



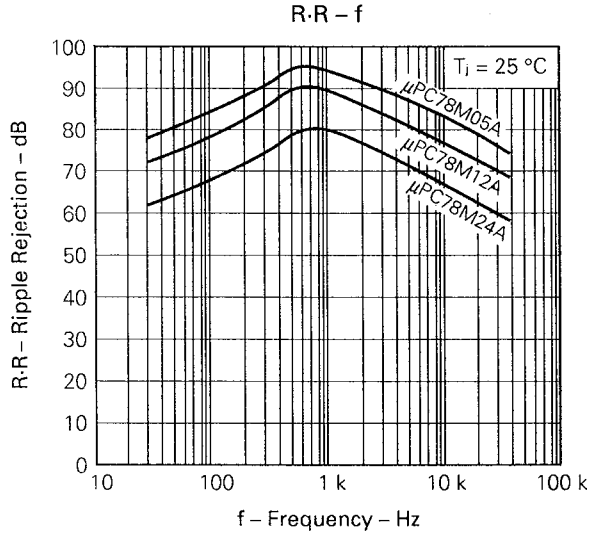
V_{DIF} – T_j



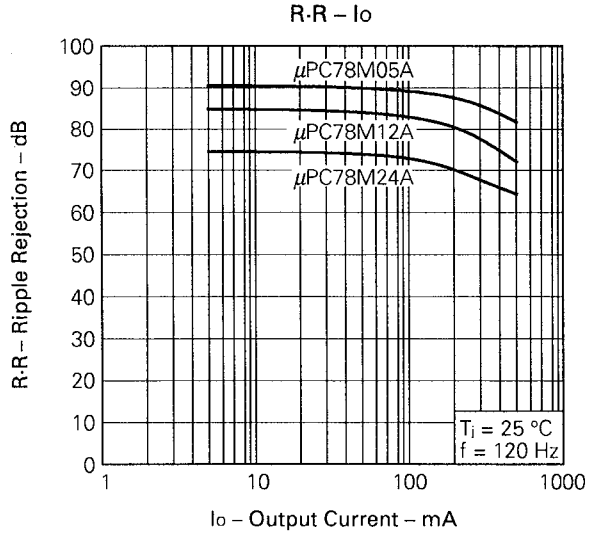
I_{Opeak} – (V_{IN}-V_O)



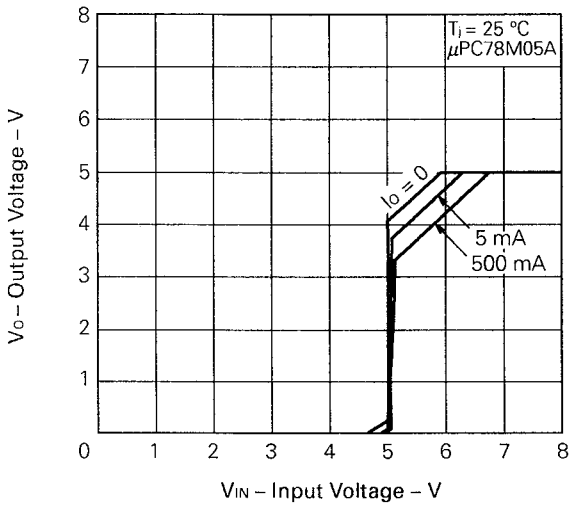
R·R – f



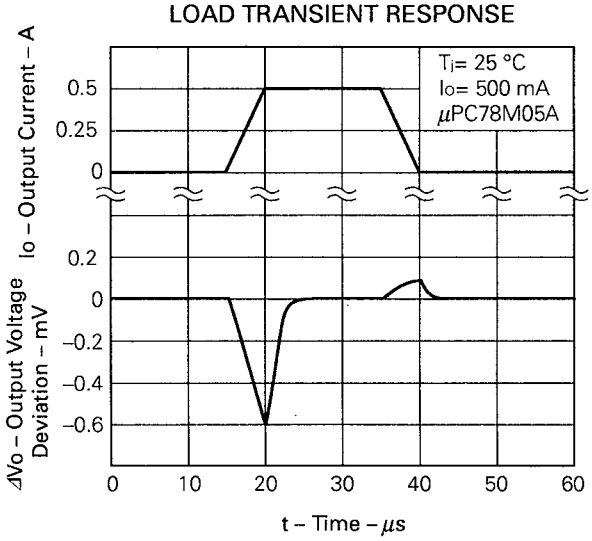
R·R – Io



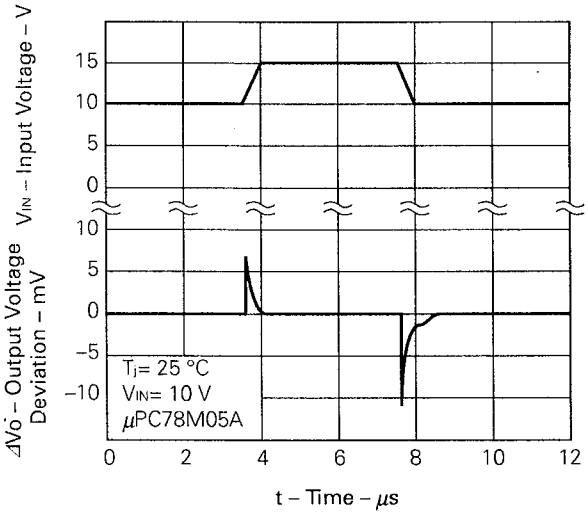
Vo – VIN



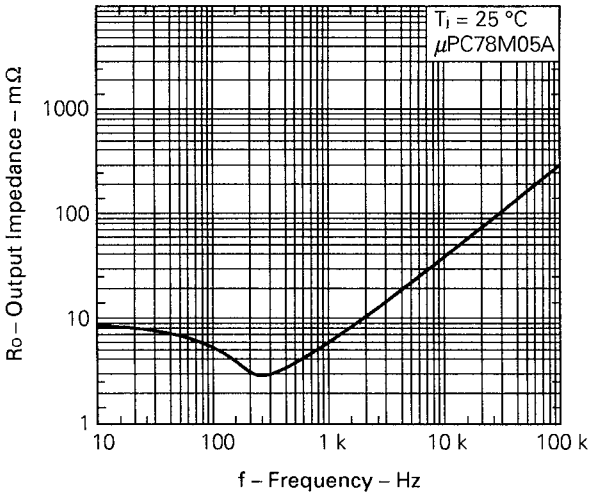
LOAD TRANSIENT RESPONSE



LINE TRANSIENT RESPONSE

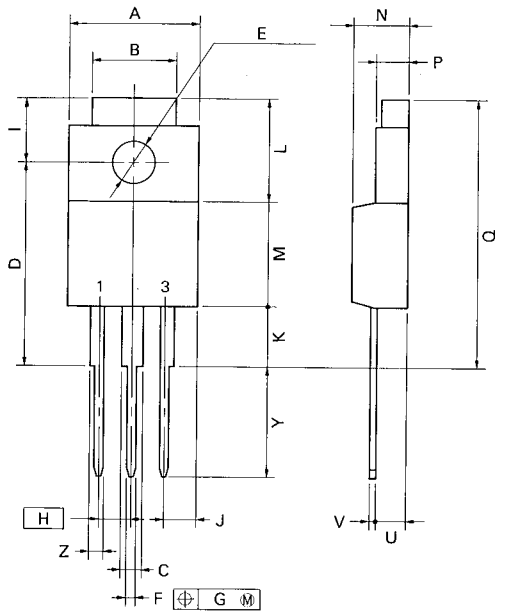


Ro – f



PACKAGE DIMENSIONS

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	$17.0^{\pm 0.3}$	$0.669^{+0.013}_{-0.012}$
E	$\phi 3.3^{\pm 0.2}$	$\phi 0.130^{\pm 0.008}$
F	$0.75^{\pm 0.10}$	$0.030^{+0.004}_{-0.005}$
G	0.25	0.010
H	2.54 (T.P.)	0.100 (T.P.)
I	$5.0^{\pm 0.3}$	$0.197^{\pm 0.012}$
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	$4.5^{\pm 0.2}$	$0.177^{\pm 0.008}$
P	$2.8^{\pm 0.2}$	$0.110^{+0.009}_{-0.008}$
Q	22.4 MAX.	0.882 MAX.
U	$2.4^{\pm 0.5}$	$0.094^{+0.021}_{-0.020}$
V	$0.65^{\pm 0.10}$	$0.026^{+0.004}_{-0.005}$
Y	$8.9^{\pm 0.7}$	$0.350^{\pm 0.028}$
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

μPC78M00AHF Series

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

[MEMO]

M4 92.6