Description

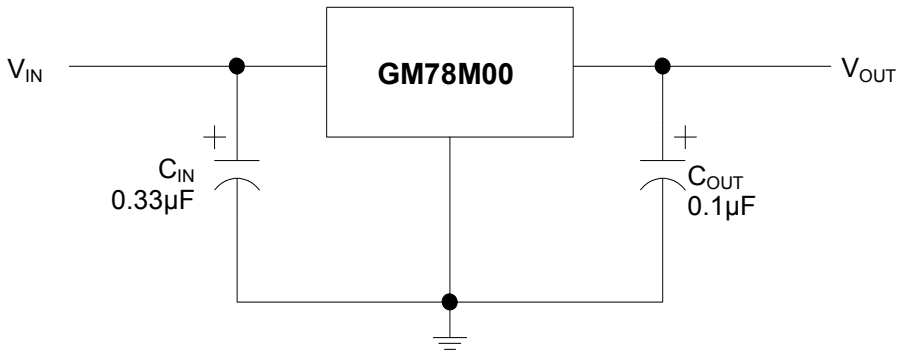
GMM78MXX series of three-terminal positive voltage regulators employ built-in current limiting, thermal shutdown, and safe-operating area protection which makes them virtually immune to damage from output overloads.

With adequate heat sink, they can deliver in excess of 0.5A output current. Typical applications would include local (on-card) regulators which can eliminate the noise and degraded performance associated with single-point regulation.

Features

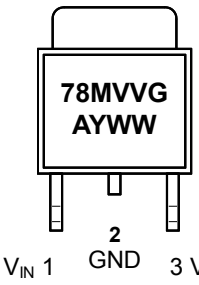
- **Maximum output current up 500mA**
- **Fixed output voltage options: 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V**
- **No external components required**
- **Internal thermal overload protection**
- **Internal short circuit current limiting**
- **Available in TO-252, TO220 and TO263 packages**

Typical Application Circuit

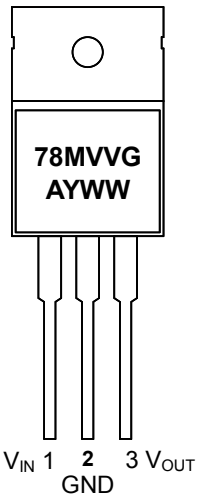


Marking Information and Pin Configurations (Top View)

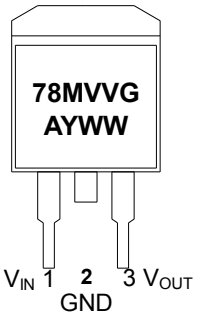
TO-252



TO 220



TO 263 (D^2-PAK)



VV: Output Voltage Codes (05: 5.0V, …12:12V)
G: Green Product
A: Assembly/Test Site Code
Y: Year
WW: Week

Ordering Information

Ordering Number	V_{OUT}	Package	Shipping
GM78M**00**TA3TG	**00** = 5.0V 6.0V 8.0V 9.0V 10.0V 12.0V 15.0V 18.0V 20.0V 24.0V	TO-263	50 Units/Tube
GM78M**00**TA3RG		TO-263	800 Units / Reel
GM78M**00**TB3TG		TO-220	50 Units/Tube
GM78M**00**TC3TG		TO-252	80 Units/Tube
GM78M**00**TC3RG		TO-252	2,500 Units / Reel

Absolute Maximum Ratings

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage	GM78M05 to GM78M20	V_{IN}	35	V
	GM78M24 to GM78M27		40	
Operating Ambient Temperature		T_A	- 40 to 125	℃
Storage Temperature		T_{stg}	- 60 to 150	℃

GM78M05 Electrical Characteristics (V_I = 10V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	4.8	5.0	5.2	V
	I_O =5mA to 350mA V_I = 7V to 20V, P ≤ 15W (TO220 package)	0°C to 125°C	4.75	5.0	5.25	
			4.75	5.0	5.25	
Input Regulation	V_I = 7V to 20V, I_O =200mA	25°C		3	100	mV
	V_I = 8V to 20V, I_O =200mA			1	50	
Ripple Rejection	V_I = 8V to 18V, f = 120KHz	0°C to 125°C	62	78		dB
Output Regulation	I_O = 5mA to 500mA	25°C		15	100	mV
	I_O = 5mA to 200mA			5	50	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		40	200	μV
Dropout Voltage		25°C		2.0	2.5	V
Bias Current		25°C		4.2	8	mA
Bias Current Change	V_I = 7V to 25V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		300		mA
Peak Output current		25°C		0.8		A

GM78M06 Electrical Characteristics (V_I = 11V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	5.75	6	6.25	V
	I_O =5mA to 350mA V_I = 8V to 21V, P ≤ 15W (TO220 package)	0°C to 125°C	5.7	6	6.3	
Input Regulation	V_I = 8V to 25V, I_O =200mA	25°C		5	150	mV
	V_I = 9V to 25V, I_O =200mA			1.5	50	
Ripple Rejection	V_I = 9V to 19V, f = 120KHz	0°C to 125°C	59	76		dB
Output Regulation	I_O = 5mA to 500mA	25°C		18	120	mV
	I_O = 5mA to 200mA			10	60	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		45		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.3	8	mA
Bias Current Change	V_I = 8V to 25V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		270		mA
Peak Output current		25°C		0.8		A

GM78M08 Electrical Characteristics (V_I = 14V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	7.7	8	8.3	V
	I_O =5mA to 350mA V_I = 10.5V to 23V, P ≤ 15W (TO220 package)	0°C to 125°C	7.6	8	8.4	
Input Regulation	V_I = 10.5V to 25V, I_O =200mA	25°C		6	160	mV
	V_I = 11V to 25V, I_O =200mA			2	80	
Ripple Rejection	V_I = 11.5V to 21.5V, f = 120KHz	0°C to 125°C	55	72		dB
Output Regulation	I_O = 5mA to 500mA	25°C		20	160	mV
	I_O = 5mA to 200mA			10	80	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		52		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.5	8	mA
Bias Current Change	V_I = 10.5V to 25V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		250		mA
Peak Output current		25°C		0.8		A

GM78M09 Electrical Characteristics (V_I = 16V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	8.65	9	9.35	V
	I_O =5mA to 350mA V_I = 11.5V to 24V, P ≤ 15W (TO220 package)	0°C to 125°C	8.55	9	9.45	
Input Regulation	V_I = 11V to 27V, I_O =200mA	25°C		7	180	mV
	V_I = 13V to 27V, I_O =200mA			2	90	
Ripple Rejection	V_I = 12V to 22V, f = 120KHz	0°C to 125°C	55	70		dB
Output Regulation	I_O = 5mA to 500mA	25°C		20	180	mV
	I_O = 5mA to 200mA			10	90	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		60		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.6	8	mA
Bias Current Change	V_I = 11.5V to 27V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		250		mA
Peak Output current		25°C		0.8		A

GM78M10 Electrical Characteristics (V_I = 17V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	9.6	10	10.4	V
	I_O =5mA to 350mA V_I = 12.5V to 25V, P ≤ 15W (TO220 package)	0°C to 125°C	9.5	10	10.5	
Input Regulation	V_I = 12.5V to 28V, I_O =200mA	25°C		7	200	mV
	V_I = 14V to 27V, I_O =200mA			2	100	
Ripple Rejection	V_I = 13V to 23V, f = 120KHz	0°C to 125°C	55	71		dB
Output Regulation	I_O = 5mA to 500mA	25°C		20	200	mV
	I_O = 5mA to 200mA			10	100	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		70		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.6	8	mA
Bias Current Change	V_I = 12.5V to 28V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		250		mA
Peak Output current		25°C		0.8		A

GM78M12 Electrical Characteristics (V_I = 19V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	11.5	12	12.5	V
	I_O =5mA to 350mA V_I = 14.5V to 27V, P ≤ 15W (TO220 package)	0°C to 125°C	11.4	12	12.6	
Input Regulation	V_I = 14.5V to 30V, I_O =200mA	25°C		10	240	mV
	V_I = 16V to 30V, I_O =200mA			3	120	
Ripple Rejection	V_I = 15V to 25V, f = 120KHz	0°C to 125°C	55	71		dB
Output Regulation	I_O = 5mA to 500mA	25°C		25	240	mV
	I_O = 5mA to 200mA			10	120	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		75		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.6	8	mA
Bias Current Change	V_I = 14.5V to 30V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		240		mA
Peak Output current		25°C		0.8		A

GM78M15 Electrical Characteristics (V_I = 23V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	14.4	15	15.6	V
	I_O =5mA to 350mA V_I = 17.5V to 30V, P ≤ 15W (TO220 package)	0°C to 125°C	14.25	15	15.75	
Input Regulation	V_I = 17.5V to 30V, I_O =200mA	25°C		12	300	mV
	V_I = 20V to 30V, I_O =200mA			3	150	
Ripple Rejection	V_I = 18V to 28.5V, f = 120KHz	0°C to 125°C	53	70		dB
Output Regulation	I_O = 5mA to 500mA	25°C		25	300	mV
	I_O = 5mA to 200mA			10	150	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		90		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.7	8	mA
Bias Current Change	V_I = 17.5V to 30V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		240		mA
Peak Output current		25°C		0.8		A

GM78M18 Electrical Characteristics (V_I = 27V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	17.3	18	18.7	V
	I_O =5mA to 350mA V_I = 17.5V to 30V, P ≤ 15W (TO220 package)	0°C to 125°C	17.1	18	18.9	
Input Regulation	V_I = 21V to 33V, I_O =200mA	25°C		15	360	mV
	V_I = 24V to 30V, I_O =200mA			5	180	
Ripple Rejection	V_I = 22V to 32V, f = 120KHz	0°C to 125°C	53	69		dB
Output Regulation	I_O = 5mA to 500mA	25°C		25	360	mV
	I_O = 5mA to 200mA			10	180	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		110		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.8	8	mA
Bias Current Change	V_I = 21V to 33V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		240		mA
Peak Output current		25°C		0.8		A

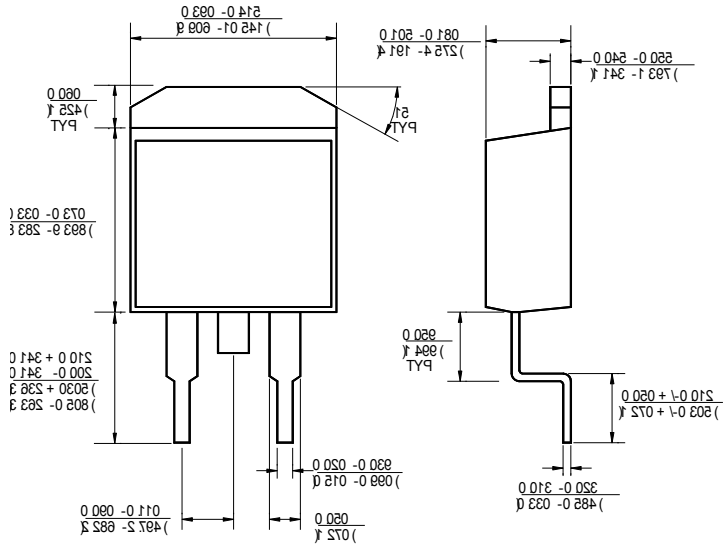
GM78M20 Electrical Characteristics (V_I = 29V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	19.2	20	20.8	V
	I_O =5mA to 350mA V_I =23V to 35V, P ≤ 15W (TO220 package)	0°C to 125°C	19	20	21	
Input Regulation	V_I = 23V to 35V, I_O =200mA	25°C		18	400	mV
	V_I = 25V to 35V, I_O =200mA			7	200	
Ripple Rejection	V_I = 24V to 34V, f = 120KHz	0°C to 125°C	51	66		dB
Output Regulation	I_O = 5mA to 500mA	25°C		25	400	mV
	I_O = 5mA to 200mA			7	200	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		110		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		4.9	8	mA
Bias Current Change	V_I = 23V to 35V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		240		mA
Peak Output current		25°C		0.8		A

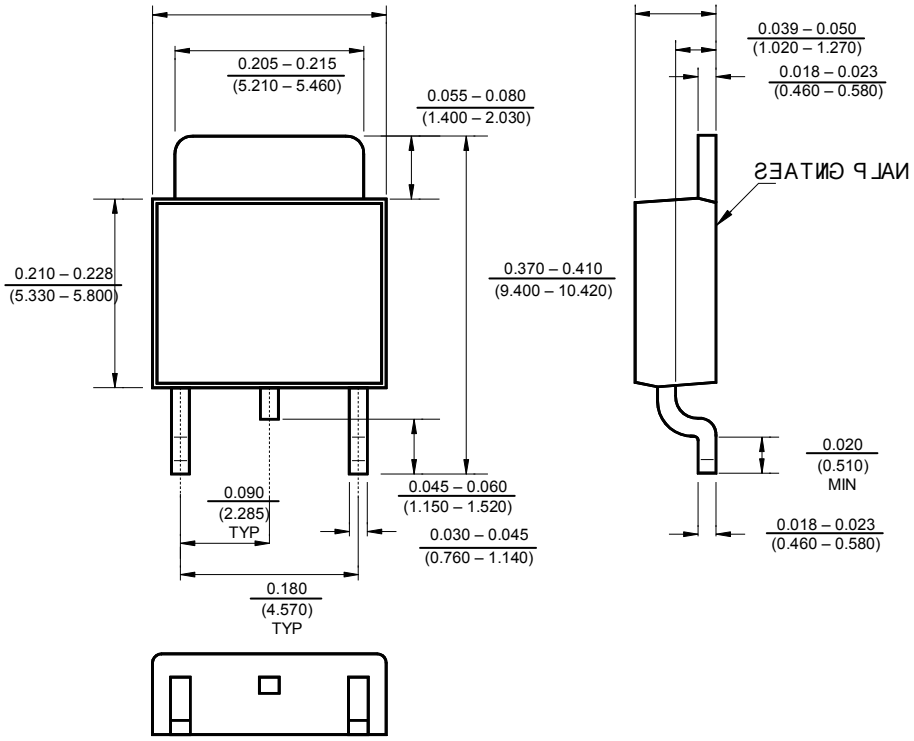
GM78M24 Electrical Characteristics (V_I = 33V, I_O = 350mA unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage		25°C	23	24	25	V
	I_O =5mA to 350mA V_I =27V to 38V, P ≤ 15W (TO220 package)	0°C to 125°C	22.8	24	25.2	
Input Regulation	V_I = 27V to 38V, I_O =200mA	25°C		20	480	mV
	V_I = 28V to 38V, I_O =200mA			10	240	
Ripple Rejection	V_I = 28V to 38V, f = 120KHz	0°C to 125°C	50	66		dB
Output Regulation	I_O = 5mA to 500mA	25°C		25	480	mV
	I_O = 5mA to 200mA			10	240	
Temperature Coefficient of Out put Voltage	I_O = 5mA	0°C to 125°C		-1.0		mV/°C
Output Noise Voltage	f = 10Hz to 100KHz	25°C		110		μV
Dropout Voltage		25°C		2.0		V
Bias Current		25°C		5.0	8	mA
Bias Current Change	V_I = 27V to 38V, I_O = 200mA	0°C to 125°C			0.8	mA
	I_O = 5mA to 350mA				0.5	
Short Circuit Output Current		25°C		240		mA
Peak Output current		25°C		0.8		A

Package Outline Dimensions – TO263



Package Outline Dimensions – TO252



Ordering Number

GM	78M	05	TA3	R	G
APM Gamma Micro	Circuit Type	Output Voltages 05: 5.0V 06: 6.0V 08: 8.0V 09: 9.0V 10: 10V 12: 12V 15: 15V 18: 18V 20: 20V 24: 24V	Package Type TA3: TO263 TB3: TO220 TC3: TO252	Shipping Type R: Taping & Reel T: Tube	Blank: Pb-free G:Green

Note:

Pb-free products:

- RoHS compliant and compatible with the current require-ments of IPC/JEDEC J-STD-020.
- Suitable for use in Pb-free soldering processes with 100% matte tin (Sn) plating.

Green products:

- Lead-free (RoHS compliant)
- Halogen free(Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)