

Description

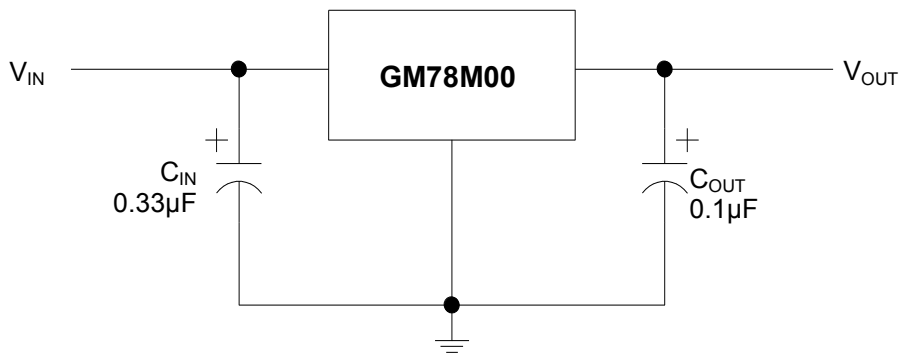
GMM78MXX series of three-terminal positive voltage regulators employ built-in current limiting, thermal shutdown, and safe-operating area protection which makes them virtually immune to damage from output overloads.

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.

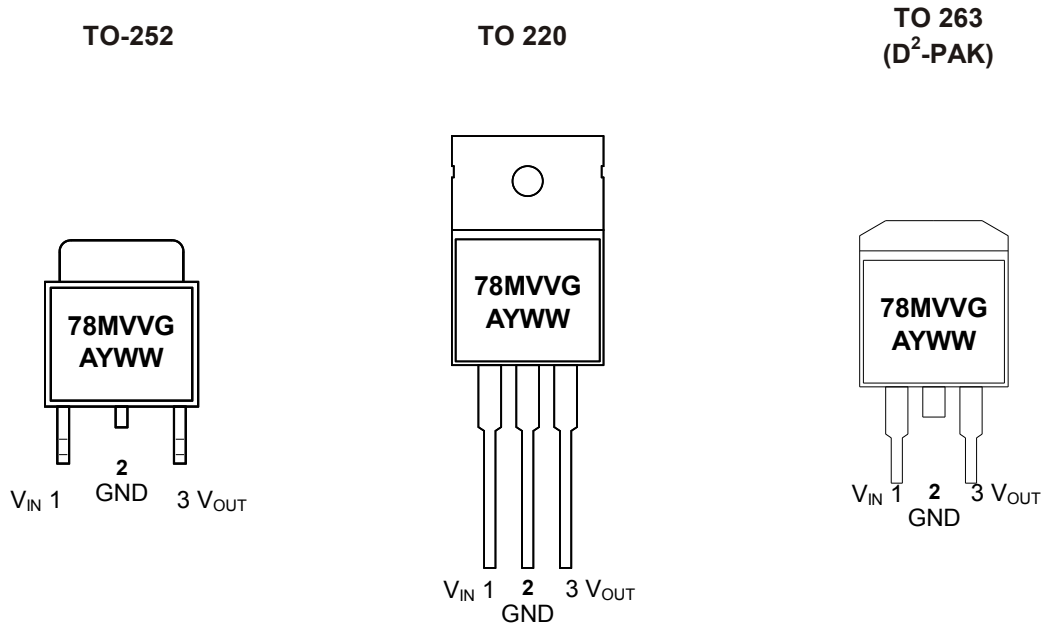
Features

- ◆ Maximum output current up to 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)



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
GM78M00TA3TG	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
GM78M00TA3RG		TO-263	800 Units / Reel
GM78M00TB3TG		TO-220	50 Units/Tube
GM78M00TC3TG		TO-252	80 Units/Tube
GM78M00TC3RG		TO-252	2,500 Units / Reel
		TO-252	

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	°C
Storage Temperature		T_{stg}	- 60 to 150	°C

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, $P \leq 15W$ (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 Output 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, $P \leq 15W$ (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 Output 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, $P \leq 15W$ (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, $P \leq 15W$ (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, $P \leq 15W$ (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, $P \leq 15W$ (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, $P \leq 15W$ (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, $P \leq 15W$ (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

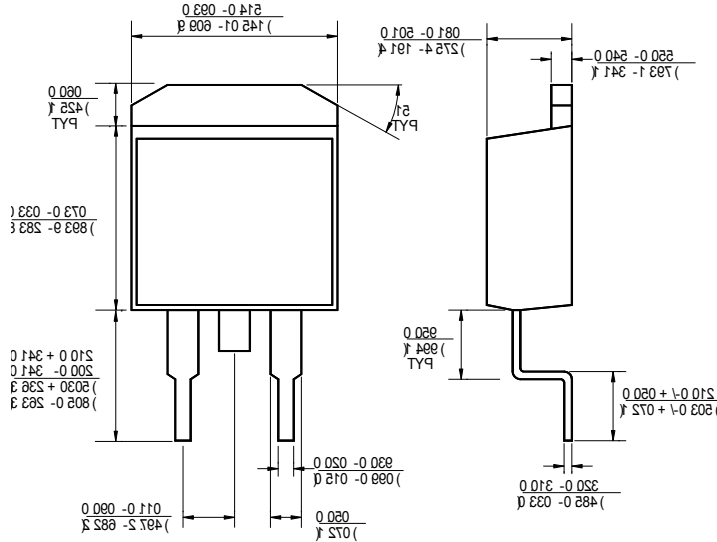
GM78M20 Electrical Characteristics ($V_I = 29V$, $I_O = 350mA$ unless otherwise noted)

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, $P \leq 15W$ (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

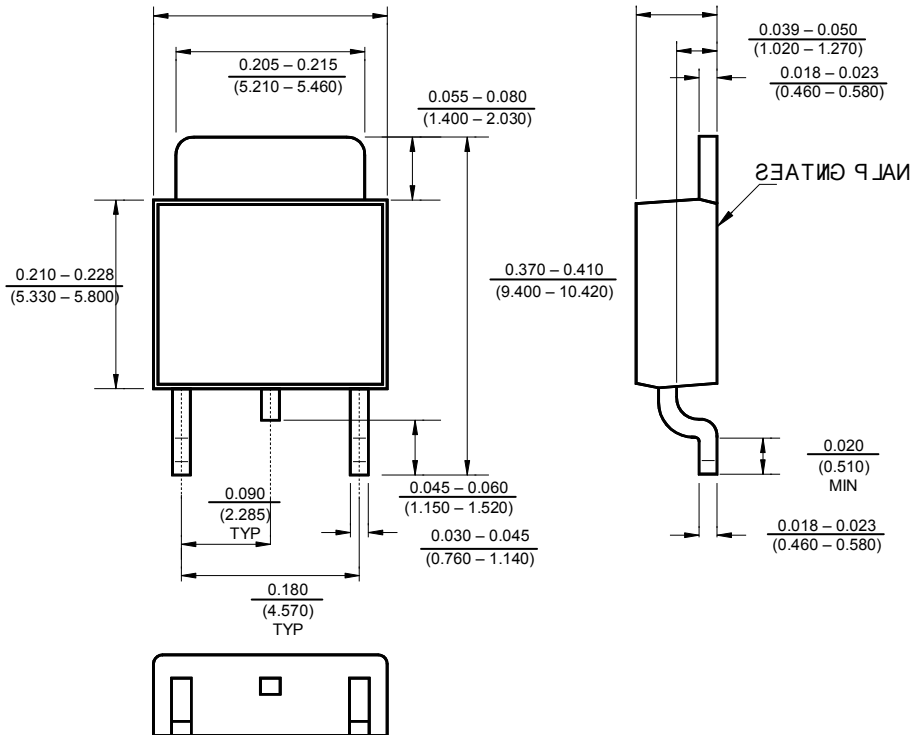
GM78M24 Electrical Characteristics ($V_I = 33V$, $I_O = 350mA$ unless otherwise noted)

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, $P \leq 15W$ (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

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

Note:

Pb-free products:

- ◆ RoHS compliant and compatible with the current requirements 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)