

Description

The GM7900 series of fixed-negative voltage monolithic integrated circuit voltage regulators is designed to complement Series GM7800 in a wide range of applications.

These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5A of output current.

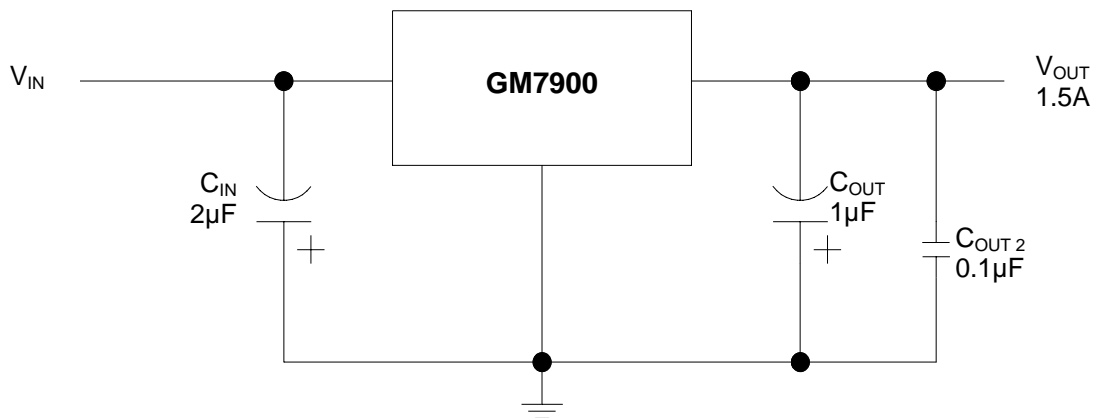
The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and current and also as the power pass element in precision regulators.

The GM7900 series are available in TO-220, TO-252, TO-263 packages.

Features

- Output current up to 1.5A
- Available Output Voltage Options from -5V to -24V
- 3-Terminal Regulators
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Protection
- TO-220, TO-252 and TO-263 Packages
- High Power Dissipation Capability

Typical Application Circuit



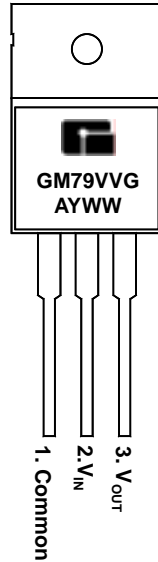
When using a negative regulator, bypass capacitors are a must on both input and output. Recommended values are $2\mu F$ on the input and $1\mu F$ on the output. It is considered good practice to include a $0.1\mu F$ capacitor on the output to improve the transient response. These capacitors may be mylar, ceramic, or tantalum, provided that they have good high frequency characteristics.

Marking Information and Pin Configurations (Top View) – Green Products

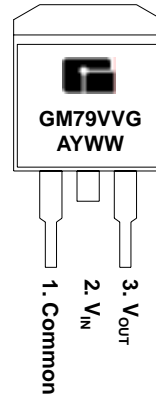
TO 252
(D-PAK)



TO 220



TO 263
(D²-PAK)



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

Ordering Information – Green Products

Ordering Number	V _{OUT}	Package	Shipping
GM7900TA3TG	00 = -5.0V -6.0V -8.0V -9.0V -10.0V -12.0V -15.0V -18.0V -24.0V	TO-263	50 Units/Tube
GM7900TA3RG		TO-263	800 Units / Reel
GM7900TB3TG		TO-220	50 Units/Tube
GM7900TC3TG		TO-252	80 Units/Tube
GM7900TC3RG		TO-252	2,500 Units / Reel

Absolute Maximum Ratings

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage	GM7905 to GM7920	V _I	-35	V
	GM7924		-40	
Continuous total dissipation at 25°C free air temperature			2	W
Continuous total dissipation at (or below) 25°C case temperature			15	W
Operating Ambient Temperature		T _A	0 to 150	°C
Storage Temperature		T _{stg}	- 60 to 150	°C
Lead Temperature 1.6mm (1/6 inch) from case for 10 seconds			260	°C

Recommended Operating Conditions

PARAMETER		SYMBOL	MIN	MAX	UNITS
Input Voltage	GM7905	V _I	-7	-25	V
	GM7906		-8	-25	
	GM7908		-10.5	-25	
	GM7909		-11.5	-25	
	GM7912		-14.5	-30	
	GM7915		-17.5	-30	
	GM7918		-21	-33	
	GM7920		-23	-34	
	GM7924		-27	-38	
Output Current		I _O		1.5	A
Operating virtual junction temperature		T _J	0	125	°C

GM7905 Electrical Characteristics ($V_I = -10V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-4.8	-5.0	-5.2	V
	$I_O = 5mA$ to 1A $V_I = -7V$ to -20V, P 15W	0°C to 125°C	-4.75	-5.0	-5.25	
Input Regulation	$V_I = -7V$ to -25V	25°C		12.5	50	mV
	$V_I = -8V$ to -12V			4	15	
Ripple Rejection	$V_I = -8V$ to -18V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		15	100	mV
	$I_O = 250mA$ to 750mA			5	50	
Temperature Coefficient of Output Voltage	$I_O = 5mA$	0°C to 125°C		-0.4		mV/°C
Output Noise Voltage	$f = 10Hz$ to 100KHz	25°C		125		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		1.5	2.0	mA
Bias Current Change	$V_I = -7V$ to -25V	0°C to 125°C		0.15	0.5	mA
	$I_O = 5mA$ to 1A			0.08	0.5	
Peak Output Current		25°C		2.1		A

GM7906 Electrical Characteristics ($V_I = -11V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-5.75	-6.0	-6.25	V
	$I_O = 5mA$ to 1A $V_I = -8V$ to -21V, P 15W	0°C to 125°C	-5.70	-6.0	-6.30	
Input Regulation	$V_I = -8V$ to -25V	25°C		12.5	120	mV
	$V_I = -9V$ to -13V			4	60	
Ripple Rejection	$V_I = -9V$ to -19V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5mA	25°C		15	120	mV
	$I_O = 250mA$ to 750mA			5	60	
Temperature Coefficient of Output Voltage	$I_O = 5mA$	0°C to 125°C		-0.4		mV/°C
Output Noise Voltage	$f = 10Hz$ to 100KHz	25°C		150		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		1.5	2	mA
Bias Current Change	$V_I = -8V$ to -25V	0°C to 125°C		0.15	1.3	mA
	$I_O = 5mA$ to 1A			0.08	0.5	
Short Circuit Output Current		25°C		550		mA
Peak Output Current		25°C		2.1		A

Note *: This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Note 1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

GM7908 Electrical Characteristics ($V_I = -14V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-7.7	-8.0	-8.3	V
	$I_O = 5mA$ to 1A $V_I = -10.5V$ to -23V, P 15W	0°C to 125°C	-7.6	-8.0	-8.4	
Input Regulation	$V_I = -10.5V$ to -25V	25°C		12.5	160	mV
	$V_I = -11V$ to -17V			4	80	
Ripple Rejection	$V_I = -11.5V$ to -21.5V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		15	160	mV
	$I_O = 250mA$ to 750mA			5	80	
Temperature Coefficient of Output Voltage	$I_O = 5mA$	0°C to 125°C		-0.8		mV/°C
Output Noise Voltage	$f = 10Hz$ to 100KHz	25°C		200		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		1.5	2	mA
Bias Current Change	$V_I = -10.5V$ to -25V	0°C to 125°C		0.15	1	mA
	$I_O = 5mA$ to 1A			0.08	0.5	
Peak Output Current		25°C		2.1		A

GM7909 Electrical Characteristics ($V_I = -15V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	8.64	9.0	9.36	V
	$I_O = 5mA$ to 1A $V_I = -11.5V$ to -25V, P 15W	0°C to 125°C	8.55	9.0	9.45	
Input Regulation	$V_I = -11.5V$ to -25V	25°C		12.5	180	mV
	$V_I = -14.5V$ to -22V			4	90	
Ripple Rejection	$V_I = -12.5V$ to -24V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		15	180	mV
	$I_O = 250mA$ to 750mA			5	90	
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		225		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		1.5	2	mA
Bias Current Change	$V_I = -11.5V$ to -25V	0°C to 125°C		0.15	1	mA
	$I_O = 5mA$ to 1A			0.08	0.5	
Peak Output Current		25°C		2.2		A

Note *: This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Note 1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

GM7912 Electrical Characteristics ($V_I = -19V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-11.5	-12	-12.5	V
	$I_O = 5mA$ to 1A $V_I = -14.5V$ to -27V, P 15W	0°C to 125°C	-11.4	-12	-12.6	
Input Regulation	$V_I = -14.5V$ to -30V	25°C		5	80	mV
	$V_I = -16V$ to -22V			3	30	
Ripple Rejection	$V_I = -15V$ to -25V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		15	200	mV
	$I_O = 250mA$ to 750mA			5	75	
Temperature Coefficient of Output Voltage	$I_O = 5mA$	0°C to 125°C		-0.8		mV/°C
Output Noise Voltage	$f = 10Hz$ to 100KHz	25°C		300		μV
Dropout Voltage	$I_O = 1A$	25°C		1.5		V
Bias Current		25°C		2	3	mA
Bias Current Change	$V_I = -14.5V$ to -30V	0°C to 125°C		0.04	0.5	mA
	$I_O = 5mA$ to 1A			0.06	0.5	
Peak Output Current		25°C		2.1		A

GM7915 Electrical Characteristics ($V_I = -23V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-14.4	-15	-15.6	V
	$I_O = 5mA$ to 1A $V_I = -17.5V$ to -30V, P 15W	0°C to 125°C	-14.25	-15	-15.75	
Input Regulation	$V_I = -17.5V$ to -30V	25°C		5	100	mV
	$V_I = -20V$ to -26V			3	50	
Ripple Rejection	$V_I = 15V$ to 25V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		15	200	mV
	$I_O = 250mA$ to 750mA			5	75	
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		375		μV
Dropout Voltage	$I_O = 1A$	25°C		1.5		V
Bias Current		25°C		2	3	mA
Bias Current Change	$V_I = -17.5V$ to -30V	0°C to 125°C		0.04	0.5	mA
	$I_O = 5mA$ to 1A			0.06	0.5	
Peak Output Current		25°C		2.1		A

Note *: This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Note 1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

GM7918 Electrical Characteristics ($V_I = -27V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-17.3	18	-18.7	V
	$I_O = 5mA$ to 1A $V_I = -21V$ to -33V, P 15W	0°C to 125°C	17.1	-18	-18.9	
Input Regulation	$V_I = -21V$ to -33V	25°C		5	360	mV
	$V_I = -24V$ to -30V			3	180	
Ripple Rejection	$V_I = -22V$ to -32V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		30	360	mV
	$I_O = 250mA$ to 750mA			10	180	
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		450		μV
Dropout Voltage	$I_O = 1A$	25°C		1.5		V
Bias Current		25°C		2	3	mA
Bias Current Change	$V_I = -21V$ to -33V	0°C to 125°C		0.04	1	mA
	$I_O = 5mA$ to 1A			0.06	0.5	
Peak Output Current		25°C		2.1		A

GM7920 Electrical Characteristics ($V_I = -31V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-19.2	20	-20.8	V
	$I_O = 5mA$ to 1A $V_I = -23V$ to -34V, P 15W	0°C to 125°C	-19	-20	-21	
Input Regulation	$V_I = -23V$ to -34V	25°C		5	400	mV
	$V_I = -26V$ to -31V			3	200	
Ripple Rejection	$V_I = -24V$ to -33V, $f = 120KHz$	0°C to 125°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		50	400	mV
	$I_O = 250mA$ to 750mA			15	120	
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		500		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		2	3	mA
Bias Current Change	$V_I = -23V$ to -34V	0°C to 125°C		0.04	1	mA
	$I_O = 5mA$ to 1A			0.06	0.5	
Peak Output Current		25°C		2.1		A

Note *: This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Note 1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

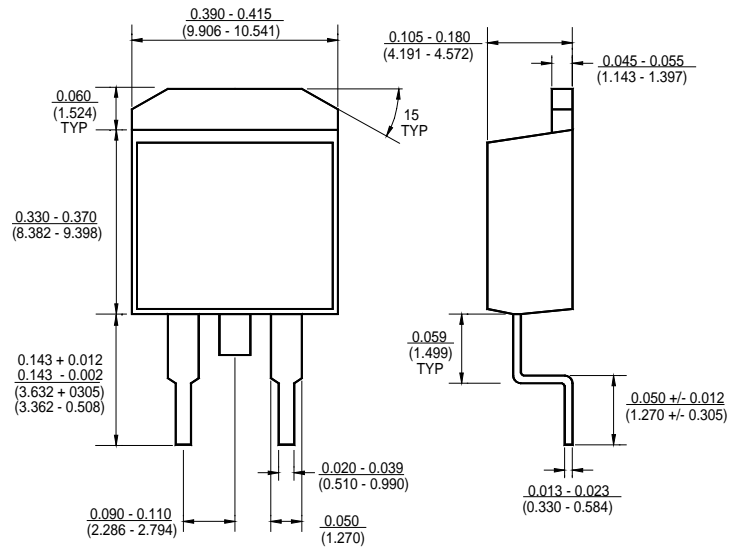
GM7924 Electrical Characteristics ($V_I = -33V$, $I_O = 500mA$ unless otherwise noted)

Parameter	Test Condition (Note 1)		Min	Typ	Max	Unit
Output Voltage (note *)		25°C	-23	-24	-25	V
	$I_O = 5mA$ to 1A $V_I = -27V$ to -38V, P 15W	0°C to 125°C	-22.8	-24	-25.2	
Input Regulation	$V_I = -27V$ to -38V	25°C		5	480	mV
	$V_I = -30V$ to -36V			3	240	
Ripple Rejection	$V_I = -28V$ to -38V, $f = 120KHz$	25°C	54	60		dB
Output Regulation	$I_O = 5mA$ to 1.5A	25°C		85	480	mV
	$I_O = 250mA$ to 750mA			25	240	
Temperature Coefficient of Output Voltage	$I_O = 5mA$	0°C to 125°C		-1		mV/°C
Output Noise Voltage	$f = 10Hz$ to 100KHz	25°C		600		μV
Dropout Voltage	$I_O = 1A$	25°C		1.6		V
Bias Current		25°C		2	3	mA
Bias Current Change	$V_I = -27V$ to -38V	0°C to 125°C		0.04	1	mA
	$I_O = 5mA$ to 1A			0.06	0.5	
Peak Output Current		25°C		2.1		A

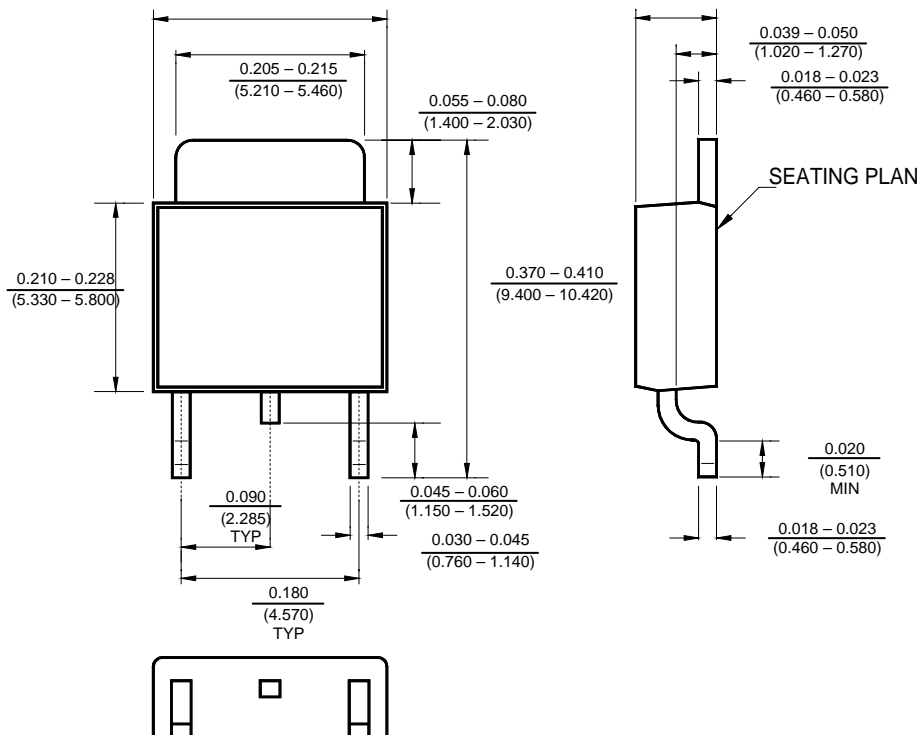
Note *: This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Note 1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Package Outline Dimensions – TO263



Package Outline Dimensions – TO252



Ordering Number

<u>GM</u>	<u>78</u>	<u>05</u>	<u>TA3</u>	<u>I</u>	<u>G</u>
APM Gamma Micro	Circuit Type	Output Voltage	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 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 SnPb or 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)