

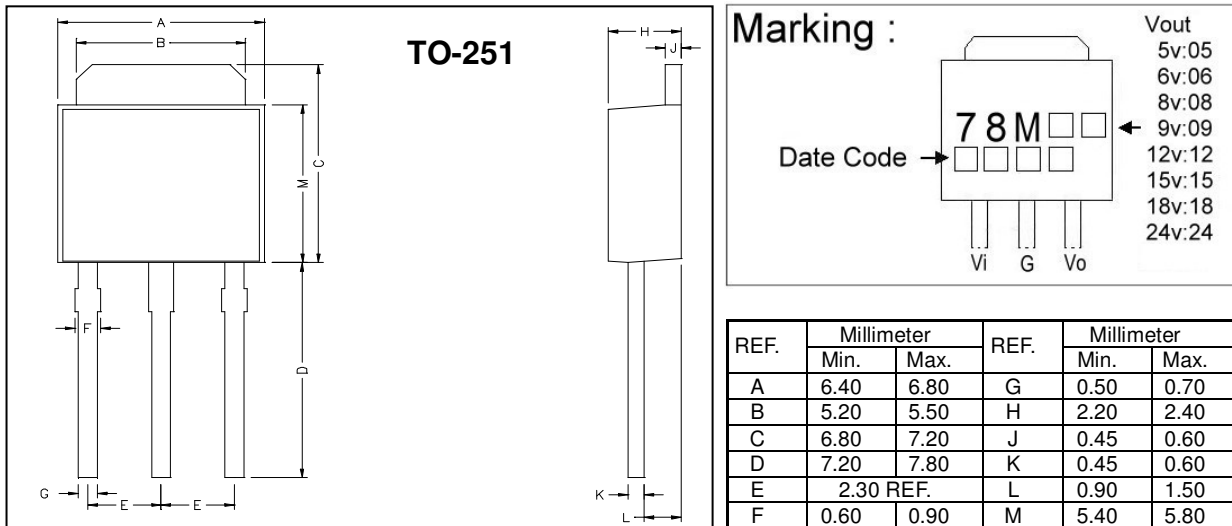
## GI78MXX

### 3-TERMINAL POSITIVE VOLTAGE REGULATOR

#### Description

The GI78MXX series of three-terminal positive regulators are available in the TO-252 package and with 5V, 6V, 8V, 9V, 12V, 15V, 18V and 24V fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 0.5A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. GI78MXX is characterized for operation from 0°C to +125°C.

#### Package Dimensions



#### Absolute Maximum Ratings

Parameter	Ratings	Unit
Input Voltage	35V	V
Operating Temperature Range	0 ~ +125	°C
Output Current	500	mA
Storage Temperature Range	-65 ~ +150	°C
Total Power Dissipation	1.0*	W

\*Reduced by 8mW for each increase in Ta of 1°C over 25°C (without heat sink)

#### Electrical Characteristics

**GI78M05** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=10V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	4.80	5.0	5.20	V	Io=350mA 7.5V ≤ Vin ≤ 20V, 5mA ≤ Io ≤ 350mA
	4.75	-	5.25		
ΔVO (Line Regulation)	-	3	100	mV	7V ≤ Vin ≤ 25V, Io=200mA
	-	1	50		8V ≤ Vin ≤ 12V, Io=200mA
ΔVO (Load Regulation)	-	30	100	mV	5mA ≤ Io ≤ 500mA
	-	12	50		5mA ≤ Io ≤ 200mA
IQ	-	3.0	6.0	mA	Io=0mA
ΔIQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		8V ≤ Vin ≤ 25V, Io=200mA
Vn	-	40	-	μV	10Hz ≤ f ≤ 100KHz
RR	62	-	-	dB	8V ≤ Vin ≤ 18V, f=120Hz, Io=100mA, eiN=1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	400	-	mA	Vin=25V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-1.0	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M06** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=11V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	5.76	6.0	6.24	V	Io=350mA
	5.70	-	6.30		8.5V ≤ Vin ≤ 21V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	3	100	mV	8V ≤ Vin ≤ 25V, Io=200mA
	-	1	50		9V ≤ Vin ≤ 25V, Io=200mA
ΔVO (Load Regulation)	-	30	120	mV	5mA ≤ Io ≤ 500mA
	-	15	60		5mA ≤ Io ≤ 200mA
IQ	-	3.0	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		9V ≤ Vin ≤ 25V, Io=200mA
Vn	-	60	-	μV	10Hz ≤ f ≤ 100KHz
RR	60	-	-	dB	9V ≤ Vin ≤ 19V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	400	-	mA	Vin=25V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.5	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M08** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=14V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	7.68	8.0	8.32	V	Io=350mA
	7.60	-	8.40		10.5V ≤ Vin ≤ 23V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	4	100	mV	10.5V ≤ Vin ≤ 25V, Io=200mA
	-	1	50		11V ≤ Vin ≤ 12V, Io=200mA
ΔVO (Load Regulation)	-	30	160	mV	5mA ≤ Io ≤ 500mA
	-	15	80		5mA ≤ Io ≤ 200mA
IQ	-	3.0	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		10.5V ≤ Vin ≤ 25V, Io=200mA
Vn	-	80	-	μV	10Hz ≤ f ≤ 100KHz
RR	56	-	-	dB	11.5V ≤ Vin ≤ 21.5V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	400	-	mA	Vin=25V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.5	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M09** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=15V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	8.64	9.0	9.36	V	Io=350mA
	8.55	-	9.45		11.5V ≤ Vin ≤ 24V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	4	100	mV	11.5V ≤ Vin ≤ 26V, Io=200mA
	-	2	50		12V ≤ Vin ≤ 25V, Io=200mA
ΔVO (Load Regulation)	-	30	180	mV	5mA ≤ Io ≤ 500mA
	-	15	90		5mA ≤ Io ≤ 200mA
IQ	-	3.5	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		12V ≤ Vin ≤ 25V, Io=200mA
Vn	-	90	-	μV	10Hz ≤ f ≤ 100KHz
RR	56	-	-	dB	13V ≤ Vin ≤ 23V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	170	-	mA	Vin=30V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.5	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M12** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=19V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	11.52	12.0	12.48	V	Io=350mA
	11.40	-	12.60		15V ≤ Vin ≤ 27V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	5	100	mV	14.5V ≤ Vin ≤ 30V, Io=200mA
	-	3	50		16V ≤ Vin ≤ 30V, Io=200mA
ΔVO (Load Regulation)	-	30	240	mV	5mA ≤ Io ≤ 500mA
	-	15	120		5mA ≤ Io ≤ 200mA
IQ	-	3.5	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		14.5V ≤ Vin ≤ 30V, Io=200mA
Vn	-	110	-	μV	10Hz ≤ f ≤ 100KHz
RR	55	-	-	dB	15V ≤ Vin ≤ 25V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	170	-	mA	Vin=30V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.5	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M15** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=23V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	14.40	15.0	15.60	V	Io=350mA
	14.25	-	15.75		17.5V ≤ Vin ≤ 30V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	6	100	mV	17.5V ≤ Vin ≤ 30V, Io=200mA
	-	3	50		20V ≤ Vin ≤ 30V, Io=200mA
ΔVO (Load Regulation)	-	30	300	mV	5mA ≤ Io ≤ 500mA
	-	15	150		5mA ≤ Io ≤ 200mA
IQ	-	4.5	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		17.5V ≤ Vin ≤ 30V, Io=200mA
Vn	-	130	-	μV	10Hz ≤ f ≤ 100KHz
RR	54	-	-	dB	18.5V ≤ Vin ≤ 28.5V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	170	-	mA	Vin=30V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.6	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

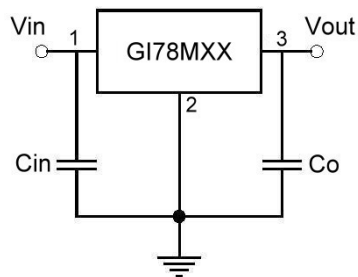
**GI78M18** (Refer to the test circuits, Ta=25°C, Io=350mA, Vin=27V, Cin=0.33μF, Co=0.1μF unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	17.28	18.0	18.72	V	Io=350mA
	17.10	-	18.90		21V ≤ Vin ≤ 33V, 5mA ≤ Io ≤ 350mA
ΔVO (Line Regulation)	-	7	100	mV	21V ≤ Vin ≤ 33V, Io=200mA
	-	3	50		24V ≤ Vin ≤ 33V, Io=200mA
ΔVO (Load Regulation)	-	30	360	mV	5mA ≤ Io ≤ 500mA
	-	15	180		5mA ≤ Io ≤ 200mA
IQ	-	4.5	6.0	mA	Io=0mA
Δ IQ	-	-	0.5	mA	5mA ≤ Io ≤ 350mA
	-	-	0.8		21V ≤ Vin ≤ 33V, Io=200mA
Vn	-	140	-	μV	10Hz ≤ f ≤ 100KHz
RR	53	-	-	dB	22V ≤ Vin ≤ 32V, f=120Hz, Io=100mA, e <sub>N</sub> =1Vrms
VD	-	2.0	-	V	Io=500mA
Isc	-	170	-	mA	Vin=30V
Ipk	-	700	-	mA	Tj=25°C
ΔVo / ΔTj	-	-0.6	-	mV/°C	Io=5mA, 0°C ≤ Tj ≤ 125°C

**GI78M24** (Refer to the test circuits,  $T_a=25^\circ\text{C}$ ,  $I_o=350\text{mA}$ ,  $V_{in}=33\text{V}$ ,  $C_{in}=0.33\mu\text{F}$ ,  $C_o=0.1\mu\text{F}$  unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
VO	23.04	24.0	24.96	V	$I_o=350\text{mA}$
	22.80	-	25.20		$27\text{V} \leq V_{in} \leq 33\text{V}$ , $5\text{mA} \leq I_o \leq 350\text{mA}$
$\Delta V_O$ (Line Regulation)	-	10	100	mV	$27\text{V} \leq V_{in} \leq 33\text{V}$ , $I_o=200\text{mA}$
	-	5	50		$28\text{V} \leq V_{in} \leq 33\text{V}$ , $I_o=200\text{mA}$
$\Delta V_O$ (Load Regulation)	-	30	480	mV	$5\text{mA} \leq I_o \leq 500\text{mA}$
	-	15	240		$5\text{mA} \leq I_o \leq 200\text{mA}$
IQ	-	4.8	6.0	mA	$I_o=0\text{mA}$
$\Delta I_Q$	-	-	0.5	mA	$5\text{mA} \leq I_o \leq 350\text{mA}$
	-	-	0.8		$27\text{V} \leq V_{in} \leq 33\text{V}$ , $I_o=200\text{mA}$
Vn	-	170	-	$\mu\text{V}$	$10\text{Hz} \leq f \leq 100\text{KHz}$
RR	50	-	-	dB	$28\text{V} \leq V_{in} \leq 38\text{V}$ , $f=120\text{Hz}$ , $I_o=100\text{mA}$ , $e_{IN}=1\text{Vrms}$
VD	-	2.0	-	V	$I_o=500\text{mA}$
Isc	-	170	-	mA	$V_{in}=30\text{V}$
Ipk	-	700	-	mA	$T_j=25^\circ\text{C}$
$\Delta V_o / \Delta T_j$	-	-0.7	-	$\text{mV}/^\circ\text{C}$	$I_o=5\text{mA}$ , $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$

## Typical Application


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