



DESCRIPTION

Three-terminal fixed output voltage regulator.

The A78MXX is available in TO-252 Package.

FEATURES

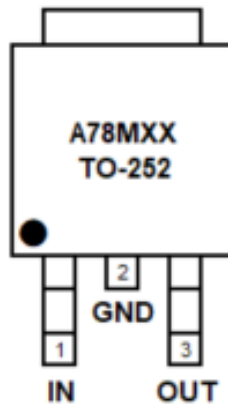
- main purposes
The role of regulator and protection for a variety of electrical appliances, electronic equipment, regulator circuit
- Available in TO-252 Package

ORDERING INFORMATION

Package Type	Part Number	
TO-252 SPQ: 2,500pcs/Reel	D	A78MXXDR
		A78MXXDVR
Note	XX: Output Voltage 05=5V, 24=24V V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	IN	Input
2	GND	Ground
3	OUT	Output



ABSOLUTE MAXIMUM RATINGS

Operating temperature range applies unless otherwise specified

V_i , Input Voltage ($T_A=25^\circ\text{C}$)	
(A78M05~A78M15)	35V
(A78M18~A78M24)	40V
I_o , Output Current	0.5A
P_D , Total Power Dissipation ($T_A=25^\circ\text{C}$) ^{NOTE1}	1.3W
P_D , Ambient Temperature ($T_C=25^\circ\text{C}$) ^{NOTE2}	12W
T_{OP} , Work (Tube Shell) Temperature	$-40^\circ\text{C} \sim +125^\circ\text{C}$
T_{STG} , Storage Temperature	$-55^\circ\text{C} \sim +150^\circ\text{C}$

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: In a well-ventilated.

NOTE2: When the device is installed in $T_C > 25^\circ\text{C}$ the radiator should be a derating.

ELECTRICAL CHARACTERISTICS

A78M05

$0^\circ\text{C} \leq T_J \leq +125^\circ\text{C}$, $V_i=10\text{V}$, $I_o=350\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V_o	$T_J=25^\circ\text{C}$	4.8	5	5.2	V	
		$5\text{mA} \leq I_o \leq 350\text{mA}$, $7\text{V} \leq V_i \leq 20\text{V}$	4.75	5	5.25		
Voltage Regulation	S_v	$T_J=25^\circ\text{C}$, $I_o=200\text{mA}$	$7\text{V} \leq V_i \leq 25\text{V}$	-	-	100	mV
			$8\text{V} \leq V_i \leq 25\text{V}$	-	-	50	
Current Regulation	S_i	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_o \leq 500\text{mA}$	-	-	100	mV
			$5\text{mA} \leq I_o \leq 200\text{mA}$	-	-	50	
Quiescent Current	I_q	$T_J=25^\circ\text{C}$	-	-	6	mA	
Quiescent Current Change	ΔI_q	$5\text{mA} \leq I_o \leq 350\text{mA}$	-	-	0.5	mA	
		$I_o=200\text{mA}$, $8\text{V} \leq V_i \leq 25\text{V}$	-	-	0.8		
Input-Output Differential Pressure	V_i-V_o	$T_J=25^\circ\text{C}$, $I_o=500\text{mA}$	-	2	-	V	
Ripple Rejection Ratio	S_{rip}	$I_o=300\text{mA}$, $8\text{V} \leq V_i \leq 18\text{V}$, $f=120\text{Hz}$	-	78	-	dB	



A78M06

0°C ≤ T_J ≤ +125°C, V_I = 11V, I_O = 350mA, C_I = 0.33μF, C_O = 0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J = 25°C	5.75	6	6.25	V	
		5mA ≤ I _O ≤ 350mA, 8V ≤ V _I ≤ 21V	5.7	6	6.3		
Voltage Regulation	S _V	T _J = 25°C, I _O = 200mA	8V ≤ V _I ≤ 25V	-	-	100	mV
			9V ≤ V _I ≤ 25V	-	-	50	
Current Regulation	S _I	T _J = 25°C	5mA ≤ I _O ≤ 500mA	-	-	120	mV
			5mA ≤ I _O ≤ 200mA	-	-	60	
Quiescent Current	I _Q	T _J = 25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O = 200mA, 9V ≤ V _I ≤ 25V	-	-	0.8		
Input-Output Differential Pressure	V _I - V _O	T _J = 25°C, I _O = 500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O = 300mA, 9V ≤ V _I ≤ 19V, f = 120Hz	-	75	-	dB	

A78M08

0°C ≤ T_J ≤ +125°C, V_I = 14V, I_O = 350mA, C_I = 0.33μF, C_O = 0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J = 25°C	7.7	8	8.3	V	
		5mA ≤ I _O ≤ 350mA, 10.5V ≤ V _I ≤ 23V	7.6	8	8.4		
Voltage Regulation	S _V	T _J = 25°C, I _O = 200mA	10.5V ≤ V _I ≤ 25V	-	-	100	mV
			11V ≤ V _I ≤ 25V	-	-	50	
Current Regulation	S _I	T _J = 25°C	5mA ≤ I _O ≤ 500mA	-	-	160	mV
			5mA ≤ I _O ≤ 200mA	-	-	80	
Quiescent Current	I _Q	T _J = 25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O = 200mA, 10.5V ≤ V _I ≤ 25V	-	-	0.8		
Input-Output Differential Pressure	V _I - V _O	T _J = 25°C, I _O = 500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O = 300mA, 9V ≤ V _I ≤ 19V, f = 120Hz	-	73	-	dB	



A78M09

0°C ≤ T_J ≤ +125°C, V_I=15V, I_O=350mA, C_I=0.33μF, C_O=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J =25°C	8.6	9	9.4	V	
		5mA ≤ I _O ≤ 350mA, 11.5V ≤ V _I ≤ 24V	8.55	9	9.45		
Voltage Regulation	S _V	T _J =25°C, I _O =200mA	11.5V ≤ V _I ≤ 25V	-	-	100	mV
			12V ≤ V _I ≤ 25V	-	-	50	
Current Regulation	S _I	T _J =25°C	5mA ≤ I _O ≤ 500mA	-	-	180	mV
			5mA ≤ I _O ≤ 200mA	-	-	90	
Quiescent Current	I _Q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O =200mA, 11.5V ≤ V _I ≤ 25V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _O	T _J =25°C, I _O =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O =300mA, 12.5V ≤ V _I ≤ 23V, f=120Hz	-	71	-	dB	

A78M10

0°C ≤ T_J ≤ +125°C, V_I=17V, I_O=350mA, C_I=0.33μF, C_O=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J =25°C	9.6	10	10.4	V	
		5mA ≤ I _O ≤ 350mA, 12.5V ≤ V _I ≤ 25V	9.5	10	10.5		
Voltage Regulation	S _V	T _J =25°C, I _O =200mA	12.5V ≤ V _I ≤ 25V	-	-	100	mV
			13V ≤ V _I ≤ 25V	-	-	50	
Current Regulation	S _I	T _J =25°C	5mA ≤ I _O ≤ 500mA	-	-	200	mV
			5mA ≤ I _O ≤ 200mA	-	-	100	
Quiescent Current	I _Q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O =200mA, 12.5V ≤ V _I ≤ 25V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _O	T _J =25°C, I _O =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O =300mA, 13V ≤ V _I ≤ 23V, f=120Hz	-	71	-	dB	



A78M12

0°C ≤ T_J ≤ +125°C, V_I=19V, I_o=350mA, C_i=0.33μF, C_o=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _o	T _J =25°C	11.5	12	12.5	V	
		5mA ≤ I _o ≤ 350mA, 14.5V ≤ V _I ≤ 27V	11.5	12	12.6		
Voltage Regulation	S _v	T _J =25°C, I _o =200mA	14.5V ≤ V _I ≤ 30V	-	-	100	mV
			16V ≤ V _I ≤ 30V	-	-	50	
Current Regulation	S _i	T _J =25°C	5mA ≤ I _o ≤ 500mA	-	-	240	mV
			5mA ≤ I _o ≤ 200mA	-	-	120	
Quiescent Current	I _q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _q	5mA ≤ I _o ≤ 350mA	-	-	0.5	mA	
		I _o =200mA, 14.5V ≤ V _I ≤ 30V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _o	T _J =25°C, I _o =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _o =300mA, 15V ≤ V _I ≤ 25V, f=120Hz	-	71	-	dB	

A78M15

0°C ≤ T_J ≤ +125°C, V_I=23V, I_o=350mA, C_i=0.33μF, C_o=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _o	T _J =25°C	14.4	15	15.6	V	
		5mA ≤ I _o ≤ 350mA, 17.5V ≤ V _I ≤ 30V	14.25	15	15.75		
Voltage Regulation	S _v	T _J =25°C, I _o =200mA	17.5V ≤ V _I ≤ 30V	-	-	100	mV
			20V ≤ V _I ≤ 30V	-	-	50	
Current Regulation	S _i	T _J =25°C	5mA ≤ I _o ≤ 500mA	-	-	300	mV
			5mA ≤ I _o ≤ 200mA	-	-	150	
Quiescent Current	I _q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _q	5mA ≤ I _o ≤ 350mA	-	-	0.5	mA	
		I _o =200mA, 17.5V ≤ V _I ≤ 30V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _o	T _J =25°C, I _o =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _o =300mA, 18.5V ≤ V _I ≤ 28.5V, f=120Hz	-	70	-	dB	



A78M18

0°C ≤ T_J ≤ +125°C, V_I=26V, I_O=350mA, C_I=0.33μF, C_O=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J =25°C	17.3	18	18.7	V	
		5mA ≤ I _O ≤ 350mA, 20.5V ≤ V _I ≤ 33V	17.1	18	18.9		
Voltage Regulation	S _V	T _J =25°C, I _O =200mA	21V ≤ V _I ≤ 33V	-	-	100	mV
			24V ≤ V _I ≤ 33V	-	-	50	
Current Regulation	S _I	T _J =25°C	5mA ≤ I _O ≤ 500mA	-	-	360	mV
			5mA ≤ I _O ≤ 200mA	-	-	180	
Quiescent Current	I _Q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O =200mA, 21V ≤ V _I ≤ 33V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _O	T _J =25°C, I _O =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O =300mA, 22V ≤ V _I ≤ 32V, f=120Hz	-	69	-	dB	

A78M20

0°C ≤ T_J ≤ +125°C, V_I=29V, I_O=350mA, C_I=0.33μF, C_O=0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J =25°C	19.2	20	20.8	V	
		5mA ≤ I _O ≤ 350mA, 23V ≤ V _I ≤ 35V	19	20	21		
Voltage Regulation	S _V	T _J =25°C, I _O =200mA	23V ≤ V _I ≤ 35V	-	-	100	mV
			24V ≤ V _I ≤ 35V	-	-	50	
Current Regulation	S _I	T _J =25°C	5mA ≤ I _O ≤ 500mA	-	-	400	mV
			5mA ≤ I _O ≤ 200mA	-	-	200	
Quiescent Current	I _Q	T _J =25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O =200mA, 23V ≤ V _I ≤ 35V	-	-	0.8		
Input-Output Differential Pressure	V _I -V _O	T _J =25°C, I _O =500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O =300mA, 24V ≤ V _I ≤ 34V, f=120Hz	-	69	-	dB	



A78M24

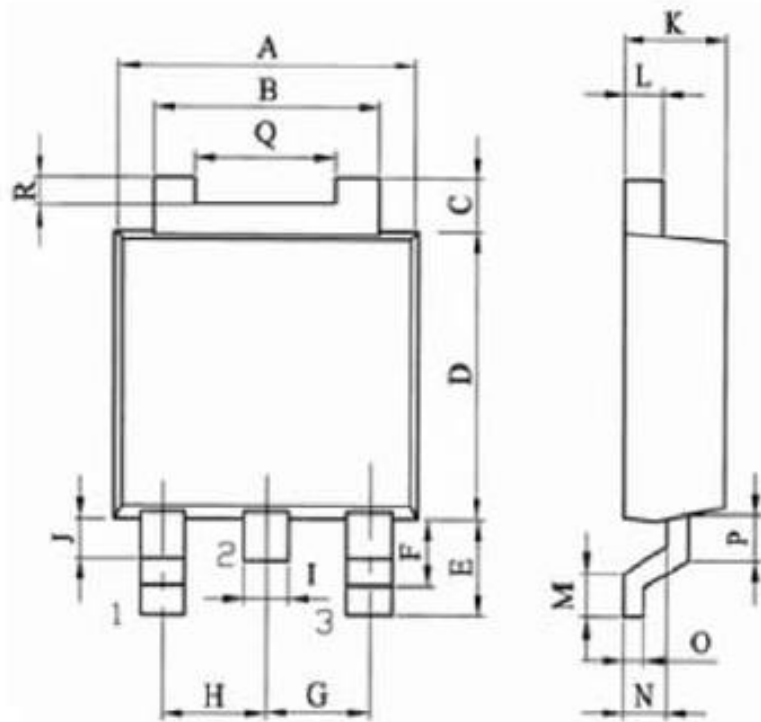
0°C ≤ T_J ≤ +125°C, V_I = 33V, I_O = 350mA, C_I = 0.33μF, C_O = 0.1μF, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	V _O	T _J = 25°C	23	24	25	V	
		5mA ≤ I _O ≤ 350mA, 27V ≤ V _I ≤ 38V	22.8	24	25.2		
Voltage Regulation	S _V	T _J = 25°C, I _O = 200mA	27V ≤ V _I ≤ 38V	-	-	100	mV
			28V ≤ V _I ≤ 38V	-	-	50	
Current Regulation	S _I	T _J = 25°C	5mA ≤ I _O ≤ 500mA	-	-	480	mV
			5mA ≤ I _O ≤ 200mA	-	-	240	
Quiescent Current	I _Q	T _J = 25°C	-	-	6	mA	
Quiescent Current Change	ΔI _Q	5mA ≤ I _O ≤ 350mA	-	-	0.5	mA	
		I _O = 200mA, 27V ≤ V _I ≤ 38V	-	-	0.8		
Input-Output Differential Pressure	V _I - V _O	T _J = 25°C, I _O = 500mA	-	2	-	V	
Ripple Rejection Ratio	S _{rip}	I _O = 300mA, 28V ≤ V _I ≤ 38V, f = 120Hz	-	67	-	dB	



PACKAGE INFORMATION

Dimension in TO-252 (Unit: mm)



1 IN 2 GND 3 OUT 4 GND

Symbol	Min	Max	Symbol	Min	Max
A	6.4	6.8	J	0.6	0.95
B	4.8	5.53	K	2.1	2.5
C	0.9	1.3	L	0.4	0.6
D	5.9	6.3	M	0.80	1.4
E	2.3	2.9	N	0.9	1.1
F	1.8	2.2	O	0.4	0.6
G	2.2	2.4	P	0.81	1.01
H	2.2	2.4	Q	3.6	4.0
I	0.66	0.92	R	0.4	0.6



IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or server property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.