

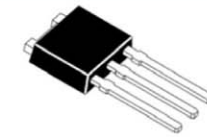
- **The implementation of standards:**
 Seven post-secondary level: (Enterprise standard number: Q/PS QZJ07-2004)
 QZJ840+15 "Seven special" Technical conditions
 Prussians level: (Enterprise standard number: Q/PS 005-2004)
 GB4589.1-89 (IIClass) GB/T12750-91
 Industrial Grade: (Enterprise standard number: Q/PS 005-2004)
 GB4589.1-89 (IIClass) GB/T12750-91
- **Main purposes:**
 The role of regulator and protection for a variety of electrical appliances, electronic equipment, regulator circuit
- **Maximum Ratings**

Parameter		Symbol	Ratings	Unit
Input voltage ($T_A=25^\circ\text{C}$)	78M05~78M15	V_I	35	V
	78M18~78M24		40	
Output current		I_O	0.5	A
Total power dissipation ($T_A=25^\circ\text{C}$) ¹⁾		P_D	1.3	W
Ambient temperature ($T_C=25^\circ\text{C}$) ²⁾		P_D	12	W
Work (tube shell) temperature		T_{OP}	-40~125	$^\circ\text{C}$
Storage temperature		T_{stg}	-55~150	$^\circ\text{C}$

In a well-ventilated

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

Three-terminal fixed output
voltage regulator
12W, 0.5A, 5V~24V



TO-251



TO-252

78M05 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=10\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	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	Srip	$I_O=300\text{mA}$, $8\text{V} \leq V_I \leq 18\text{V}$, $f=120\text{Hz}$	—	78	—	dB	

78M06 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=11\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	5.75	6	6.25	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $8\text{V} \leq V_I \leq 21\text{V}$	5.7	6	6.3		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$8\text{V} \leq V_I \leq 25\text{V}$	—	—	100	mV
			$9\text{V} \leq V_I \leq 25\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	120	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$	—	—	60	
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	
		$I_O=200\text{mA}$, $9\text{V} \leq V_I \leq 25\text{V}$	—	—	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	Srip	$I_O=300\text{mA}$, $9\text{V} \leq V_I \leq 19\text{V}$, $f=120\text{Hz}$	—	75	—	dB	

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78M08 Electrical characteristics (Unless otherwise specified $0 \leq T_j \leq +125^\circ\text{C}$, $V_i=14\text{V}$, $I_o=350\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_o	$T_j=25^\circ\text{C}$	7.7	8	8.3	V	
		$5\text{mA} \leq I_o \leq 350\text{mA}$, $10.5\text{V} \leq V_i \leq 23\text{V}$	7.6	8	8.4		
Voltage Regulation	S_v	$T_j=25^\circ\text{C}$ $I_o=200\text{mA}$	$10.5\text{V} \leq V_i \leq 25\text{V}$	—	—	100	mV
			$11\text{V} \leq V_i \leq 25\text{V}$	—	—	50	
Current Regulation	S_i	$T_j=25^\circ\text{C}$	$5\text{mA} \leq I_o \leq 500\text{mA}$	—	—	160	mV
			$5\text{mA} \leq I_o \leq 200\text{mA}$,	—	—	80	
Quiescent Current	I_Q	$T_j=25^\circ\text{C}$	—	—	6	mA	
Quiescent Current Change	ΔI_Q	$5\text{mA} \leq I_o \leq 350\text{mA}$ $I_o=200\text{mA}$, $10.5\text{V} \leq V_i \leq 25\text{V}$	—	—	0.5	mA	
			—	—	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	Srip	$I_o=300\text{mA}$, $9\text{V} \leq V_i \leq 19\text{V}$, $f=120\text{Hz}$	—	73	—	dB	

78M09 Electrical characteristics (Unless otherwise specified $0 \leq T_j \leq +125^\circ\text{C}$, $V_i=15\text{V}$, $I_o=350\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_o	$T_j=25^\circ\text{C}$	8.6	9	9.4	V	
		$5\text{mA} \leq I_o \leq 350\text{mA}$, $11.5\text{V} \leq V_i \leq 24\text{V}$	8.55	9	9.45		
Voltage Regulation	S_v	$T_j=25^\circ\text{C}$ $I_o=200\text{mA}$	$11.5\text{V} \leq V_i \leq 25\text{V}$	—	—	100	mV
			$12\text{V} \leq V_i \leq 25\text{V}$	—	—	50	
Current Regulation	S_i	$T_j=25^\circ\text{C}$	$5\text{mA} \leq I_o \leq 500\text{mA}$	—	—	180	mV
			$5\text{mA} \leq I_o \leq 200\text{mA}$,	—	—	90	
Quiescent Current	I_Q	$T_j=25^\circ\text{C}$	—	—	6	mA	
Quiescent Current Change	ΔI_Q	$5\text{mA} \leq I_o \leq 350\text{mA}$ $I_o=200\text{mA}$, $11.5\text{V} \leq V_i \leq 25\text{V}$	—	—	0.5	mA	
			—	—	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	Srip	$I_o=300\text{mA}$, $12.5\text{V} \leq V_i \leq 23\text{V}$, $f=120\text{Hz}$	—	71	—	dB	

78M10 Electrical characteristics (Unless otherwise specified $0 \leq T_j \leq +125^\circ\text{C}$, $V_i=17\text{V}$, $I_o=350\text{mA}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_o	$T_j=25^\circ\text{C}$	9.6	10	10.4	V	
		$5\text{mA} \leq I_o \leq 350\text{mA}$, $12.5\text{V} \leq V_i \leq 25\text{V}$	9.5	10	10.5		
Voltage Regulation	S_v	$T_j=25^\circ\text{C}$ $I_o=200\text{mA}$	$12.5\text{V} \leq V_i \leq 25\text{V}$	—	—	100	mV
			$13\text{V} \leq V_i \leq 25\text{V}$	—	—	50	
Current Regulation	S_i	$T_j=25^\circ\text{C}$	$5\text{mA} \leq I_o \leq 500\text{mA}$	—	—	200	mV
			$5\text{mA} \leq I_o \leq 200\text{mA}$,	—	—	100	
Quiescent Current	I_Q	$T_j=25^\circ\text{C}$	—	—	6	mA	
Quiescent Current Change	ΔI_Q	$5\text{mA} \leq I_o \leq 350\text{mA}$ $I_o=200\text{mA}$, $12.5\text{V} \leq V_i \leq 25\text{V}$	—	—	0.5	mA	
			—	—	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	Srip	$I_o=300\text{mA}$, $13\text{V} \leq V_i \leq 23\text{V}$, $f=120\text{Hz}$	—	71	—	dB	



78M12 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=19\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	11.5	12	12.5	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $14.5\text{V} \leq V_I \leq 27\text{V}$	11.5	12	12.6		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$14.5\text{V} \leq V_I \leq 30\text{V}$	—	—	100	mV
			$16\text{V} \leq V_I \leq 30\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	240	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$,	—	—	120	
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	
		$I_O=200\text{mA}$, $14.5\text{V} \leq V_I \leq 30\text{V}$	—	—	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	Srip	$I_O=300\text{mA}$, $15\text{V} \leq V_I \leq 25\text{V}$, $f=120\text{Hz}$	—	71	—	dB	

78M15 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=23\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	14.4	15	15.6	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $17.5\text{V} \leq V_I \leq 30\text{V}$	14.25	15	15.75		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$17.5\text{V} \leq V_I \leq 30\text{V}$	—	—	100	mV
			$20\text{V} \leq V_I \leq 30\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	300	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$,	—	—	150	
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	
		$I_O=200\text{mA}$, $17.5\text{V} \leq V_I \leq 30\text{V}$	—	—	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	Srip	$I_O=300\text{mA}$, $18.5\text{V} \leq V_I \leq 28.5\text{V}$, $f=120\text{Hz}$	—	70	—	dB	

78M18 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=26\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	17.3	18	18.7	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $20.5\text{V} \leq V_I \leq 33\text{V}$	17.1	18	18.9		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$21\text{V} \leq V_I \leq 33\text{V}$	—	—	100	mV
			$24\text{V} \leq V_I \leq 33\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	360	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$,	—	—	180	
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	
		$I_O=200\text{mA}$, $21\text{V} \leq V_I \leq 33\text{V}$	—	—	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	Srip	$I_O=300\text{mA}$, $22\text{V} \leq V_I \leq 32\text{V}$, $f=120\text{Hz}$	—	69	—	dB	

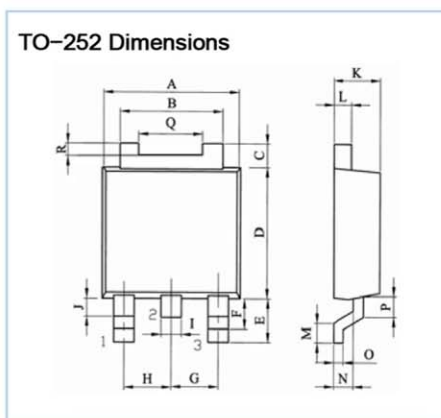


78M20 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=29\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	19.2	20	20.8	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $23\text{V} \leq V_I \leq 35\text{V}$	19	20	21		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$23\text{V} \leq V_I \leq 35\text{V}$	—	—	100	mV
			$24\text{V} \leq V_I \leq 35\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	400	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$,	—	—	200	
Quiescent Current	I_Q	$T_J=25^\circ\text{C}$	—	—	6	mA	
Quiescent Current Change	ΔI_Q	$5\text{mA} \leq I_O \leq 350\text{mA}$ $I_O=200\text{mA}$, $23\text{V} \leq V_I \leq 35\text{V}$	—	—	0.5	mA	
			—	—	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	Srip	$I_O=300\text{mA}$, $24\text{V} \leq V_I \leq 34\text{V}$, $f=120\text{Hz}$	—	69	—	dB	

78M24 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=33\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

Parameter name	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	V_O	$T_J=25^\circ\text{C}$	23	24	25	V	
		$5\text{mA} \leq I_O \leq 350\text{mA}$, $27\text{V} \leq V_I \leq 38\text{V}$	22.8	24	25.2		
Voltage Regulation	S_V	$T_J=25^\circ\text{C}$ $I_O=200\text{mA}$	$27\text{V} \leq V_I \leq 38\text{V}$	—	—	100	mV
			$28\text{V} \leq V_I \leq 38\text{V}$	—	—	50	
Current Regulation	S_I	$T_J=25^\circ\text{C}$	$5\text{mA} \leq I_O \leq 500\text{mA}$	—	—	480	mV
			$5\text{mA} \leq I_O \leq 200\text{mA}$,	—	—	240	
Quiescent Current	I_Q	$T_J=25^\circ\text{C}$	—	—	6	mA	
Quiescent Current Change	ΔI_Q	$5\text{mA} \leq I_O \leq 350\text{mA}$ $I_O=200\text{mA}$, $27\text{V} \leq V_I \leq 38\text{V}$	—	—	0.5	mA	
			—	—	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	Srip	$I_O=300\text{mA}$, $28\text{V} \leq V_I \leq 38\text{V}$; $f=120\text{Hz}$	—	67	—	dB	



1 OUT 2 GND 3 IN 4 GND

Unit : mm

Symbol	TO-252		Symbol	TO-252	
	min	max		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

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