78M05--78M24

- **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(IClass) 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 ($T_A=25℃$)	78M05～78M15	V_I	35	V
	78M18～78M24		40	
Output current		I_O	0.5	A
Total power dissipation ($T_A=25℃$)[1]		P_D	1.3	W
Ambient temperature ($T_C=25℃$)[2]		P_D	12	W
Work (tube shell) temperature		T_{OP}	-40~125	℃
Storage temperature		T_{stg}	-55~150	℃

In a well-ventilated
When the device is installed in $T_C>25℃$ 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≤T_J≤+125℃， V_I=10V, I_o=350mA, C_i=0.33μF, C_o=0.1μF)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25℃$		4.8	5	5.2	V
		5mA≤I_O≤350mA，7V≤V_I≤20V		4.75	5	5.25	
Voltage Regulation	S_V	$T_J=25℃$ $I_O=200mA$	7V≤V_I≤25V	—	—	100	mV
			8V≤V_I≤25V	—	—	50	
Current Regulation	S_I	$T_J=25℃$	5mA≤I_0≤500mA	—	—	100	mV
			5mA≤I_0≤200mA，	—	—	50	
Quiescent Current	I_Q	$T_J=25℃$		—	—	6	mA
Quiescent Current Change	$△I_Q$	5mA≤I_O≤350mA		—	—	0.5	mA
		$I_O=200mA$，8V≤V_I≤25V		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25℃$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，8V≤V_I≤18V，f=120Hz		—	78	—	dB

78M06 Electrical characteristics (Unless otherwise specified 0≤T_J≤+125℃， V_I=11V, I_o=350mA, C_i=0.33μF, C_o=0.1μF)

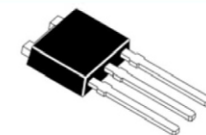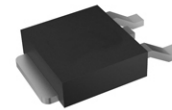| Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25℃$		5.75	6	6.25	V
		5mA≤I_O≤350mA，8V≤V_I≤21V		5.7	6	6.3	
Voltage Regulation	S_V	$T_J=25℃$ $I_O=200mA$	8V≤V_I≤25V	—	—	100	mV
			9V≤V_I≤25 V	—	—	50	
Current Regulation	S_I	$T_J=25℃$	5mA≤I_0≤500mA	—	—	120	mV
			5mA≤I_0≤200mA，	—	—	60	
Quiescent Current	I_Q	$T_J=25℃$		—	—	6	mA
Quiescent Current Change	$△I_Q$	5mA≤I_O≤350mA		—	—	0.5	mA
		$I_O=200mA$，9V≤V_I≤25V		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25℃$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，9V≤V_I≤19V，f=120Hz		—	75	—	dB

78M08 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125°C$, $V_I=14V$, $I_0=350mA$, $C_i=0.33\mu F$, $C_0=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25°C$		7.7	8	8.3	V
		$5mA \leq I_O \leq 350mA$，$10.5V \leq V_I \leq 23V$		7.6	8	8.4	
Voltage Regulation	S_V	$T_J=25°C$ $I_O=200mA$	$10.5V \leq V_I \leq 25V$	—	—	100	mV
			$11V \leq V_I \leq 25V$	—	—	50	
Current Regulation	S_I	$T_J=25°C$	$5mA \leq I_0 \leq 500mA$	—	—	160	mV
			$5mA \leq I_0 \leq 200mA$，	—	—	80	
Quiescent Current	I_Q	$T_J=25°C$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leq I_0 \leq 350mA$		—	—	0.5	mA
		$I_O=200mA$，$10.5V \leq V_I \leq 25V$		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25°C$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，$9V \leq V_I \leq 19V$，$f=120Hz$		—	73	—	dB

78M09 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125°C$, $V_I=15V$, $I_0=350mA$, $C_i=0.33\mu F$, $C_0=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25°C$		8.6	9	9.4	V
		$5mA \leq I_O \leq 350mA$，$11.5V \leq V_I \leq 24V$		8.55	9	9.45	
Voltage Regulation	S_V	$T_J=25°C$ $I_O=200mA$	$11.5V \leq V_I \leq 25V$	—	—	100	mV
			$12V \leq V_I \leq 25V$	—	—	50	
Current Regulation	S_I	$T_J=25°C$	$5mA \leq I_0 \leq 500mA$	—	—	180	mV
			$5mA \leq I_0 \leq 200mA$，	—	—	90	
Quiescent Current	I_Q	$T_J=25°C$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leq I_0 \leq 350mA$		—	—	0.5	mA
		$I_O=200mA$，$11.5V \leq V_I \leq 25V$		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25°C$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，$12.5V \leq V_I \leq 23V$，$f=120Hz$		—	71	—	dB

78M10 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125°C$, $V_I=17V$, $I_0=350mA$, $C_i=0.33\mu F$, $C_0=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25°C$		9.6	10	10.4	V
		$5mA \leq I_O \leq 350mA$，$12.5V \leq V_I \leq 25V$		9.5	10	10.5	
Voltage Regulation	S_V	$T_J=25°C$ $I_O=200mA$	$12.5V \leq V_I \leq 25V$	—	—	100	mV
			$13V \leq V_I \leq 25V$	—	—	50	
Current Regulation	S_I	$T_J=25°C$	$5mA \leq I_0 \leq 500mA$	—	—	200	mV
			$5mA \leq I_0 \leq 200mA$，	—	—	100	
Quiescent Current	I_Q	$T_J=25°C$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leq I_0 \leq 350mA$		—	—	0.5	mA
		$I_O=200mA$，$12.5V \leq V_I \leq 25V$		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25°C$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，$13V \leq V_I \leq 23V$，$f=120Hz$		—	71	—	dB

78M12 Electrical characteristics (Unless otherwise specified $0 \leqslant T_J \leqslant +125℃$, $V_I=19V$, $I_o=350mA$, $C_i=0.33\mu F$, $C_o=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25℃$		11.5	12	12.5	V
		$5mA \leqslant I_O \leqslant 350mA$, $14.5V \leqslant V_I \leqslant 27V$		11.5	12	12.6	
Voltage Regulation	S_V	$T_J=25℃$ $I_O=200mA$	$14.5V \leqslant V_I \leqslant 30V$	—	—	100	mV
			$16V \leqslant V_I \leqslant 30V$	—	—	50	
Current Regulation	S_I	$T_J=25℃$	$5mA \leqslant I_0 \leqslant 500mA$	—	—	240	mV
			$5mA \leqslant I_0 \leqslant 200mA$,	—	—	120	
Quiescent Current	I_Q	$T_J=25℃$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leqslant I_O \leqslant 350mA$		—	—	0.5	mA
		$I_O=200mA$, $14.5V \leqslant V_I \leqslant 30V$		—	—	0.8	
Input－output differential pressure	$V_I- V_O$	$T_J=25℃$, $I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$, $15V \leqslant V_I \leqslant 25V$, $f=120Hz$		—	71	—	dB

78M15 Electrical characteristics (Unless otherwise specified $0 \leqslant T_J \leqslant +125℃$, $V_I=23V$, $I_o=350mA$, $C_i=0.33\mu F$, $C_o=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25℃$		14.4	15	15.6	V
		$5mA \leqslant I_O \leqslant 350mA$, $17.5V \leqslant V_I \leqslant 30V$		14.25	15	15.75	
Voltage Regulation	S_V	$T_J=25℃$ $I_O=200mA$	$17.5V \leqslant V_I \leqslant 30V$	—	—	100	mV
			$20V \leqslant V_I \leqslant 30V$	—	—	50	
Current Regulation	S_I	$T_J=25℃$	$5mA \leqslant I_0 \leqslant 500mA$	—	—	300	mV
			$5mA \leqslant I_0 \leqslant 200mA$,	—	—	150	
Quiescent Current	I_Q	$T_J=25℃$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leqslant I_O \leqslant 350mA$		—	—	0.5	mA
		$I_O=200mA$, $17.5V \leqslant V_I \leqslant 30V$		—	—	0.8	
Input－output differential pressure	$V_I- V_O$	$T_J=25℃$, $I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$, $18.5V \leqslant V_I \leqslant 28.5V$, $f=120Hz$		—	70	—	dB

78M18 Electrical characteristics (Unless otherwise specified $0 \leqslant T_J \leqslant +125℃$, $V_I=26V$, $I_o=350mA$, $C_i=0.33\mu F$, $C_o=0.1\mu F$)

| Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25℃$		17.3	18	18.7	V
		$5mA \leqslant I_O \leqslant 350mA$, $20.5V \leqslant V_I \leqslant 33V$		17.1	18	18.9	
Voltage Regulation	S_V	$T_J=25℃$ $I_O=200mA$	$21V \leqslant V_I \leqslant 33V$	—	—	100	mV
			$24V \leqslant V_I \leqslant 33V$	—	—	50	
Current Regulation	S_I	$T_J=25℃$	$5mA \leqslant I_0 \leqslant 500mA$	—	—	360	mV
			$5mA \leqslant I_0 \leqslant 200mA$,	—	—	180	
Quiescent Current	I_Q	$T_J=25℃$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leqslant I_O \leqslant 350mA$		—	—	0.5	mA
		$I_O=200mA$, $21V \leqslant V_I \leqslant 33V$		—	—	0.8	
Input－output differential pressure	$V_I- V_O$	$T_J=25℃$, $I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$, $22V \leqslant V_I \leqslant 32V$, $f=120Hz$		—	69	—	dB

78M20 Electrical characteristics (Unless otherwise specified $0 \leqslant T_J \leqslant +125°C$，$V_I=29V$, $I_O=350mA$, $C_I=0.33\mu F$, $C_O=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25°C$		19.2	20	20.8	V
		$5mA \leqslant I_O \leqslant 350mA$，$23V \leqslant V_I \leqslant 35V$		19	20	21	
Voltage Regulation	S_V	$T_J=25°C$	$23V \leqslant V_I \leqslant 35V$	—	—	100	mV
		$I_O=200mA$	$24V \leqslant V_I \leqslant 35V$	—	—	50	
Current Regulation	S_I	$T_J=25°C$	$5mA \leqslant I_O \leqslant 500mA$	—	—	400	mV
			$5mA \leqslant I_O \leqslant 200mA$，	—	—	200	
Quiescent Current	I_Q	$T_J=25°C$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leqslant I_O \leqslant 350mA$		—	—	0.5	mA
		$I_O=200mA$，$23V \leqslant V_I \leqslant 35V$		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25°C$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，$24V \leqslant V_I \leqslant 34V$，$f=120Hz$		—	69	—	dB

78M24 Electrical characteristics (Unless otherwise specified $0 \leqslant T_J \leqslant +125°C$，$V_I=33V$, $I_O=350mA$, $C_I=0.33\mu F$, $C_O=0.1\mu F$)

Parameter name	Symbol	Test Condition		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J=25°C$		23	24	25	V
		$5mA \leqslant I_O \leqslant 350mA$，$27V \leqslant V_I \leqslant 38V$		22.8	24	25.2	
Voltage Regulation	S_V	$T_J=25°C$	$27V \leqslant V_I \leqslant 38V$	—	—	100	mV
		$I_O=200mA$	$28V \leqslant V_I \leqslant 38V$	—	—	50	
Current Regulation	S_I	$T_J=25°C$	$5mA \leqslant I_O \leqslant 500mA$	—	—	480	mV
			$5mA \leqslant I_O \leqslant 200mA$，	—	—	240	
Quiescent Current	I_Q	$T_J=25°C$		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	$5mA \leqslant I_O \leqslant 350mA$		—	—	0.5	mA
		$I_O=200mA$，$27V \leqslant V_I \leqslant 38V$		—	—	0.8	
Input - output differential pressure	V_I- V_O	$T_J=25°C$，$I_O=500mA$		—	2	—	V
Ripple Rejection Ratio	Srip	$I_O=300mA$，$28V \leqslant V_I \leqslant 38V$；$f=120Hz$		—	67	—	dB

TO-252 Dimensions
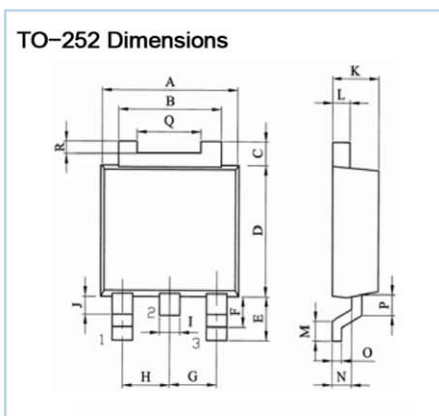
Unit： mm

Size / Symbol	TO-252 min	TO-252 max	Size / Symbol	TO-252 min	TO-252 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

1 IN   2 GND 3 OUT 4 GND

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