78M05 THRU 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

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

TO-251

TO-252

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
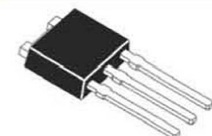
78M05 Electrical characteristics (Unless otherwise specified 0≤T_J≤+125℃，V_I=10V, I_o=350mA, C_i=0.33μF, C_o=0.1μF)

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	$\triangle I_Q$	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_0≤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	$\triangle I_Q$	5mA≤I_0≤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 $0 \leqslant T_J \leqslant +125°C$, $V_I=14V$, $I_o=350mA$, $C_i=0.33\mu F$, $C_o=0.1\mu F$)

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

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

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

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

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

78M12 Electrical characteristics (Unless otherwise specified 0≤T_J≤+125℃，V_I=19V, 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℃		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℃ I_O=200mA	14.5V≤V_I≤30V	—	—	100	mV
			16V≤V_I≤30V	—	—	50	
Current Regulation	S_I	T_J=25℃	5mA≤I_0≤500mA	—	—	240	mV
			5mA≤I_0≤200mA，	—	—	120	
Quiescent Current	I_Q	T_J=25℃		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	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℃，I_O=500mA		—	2	—	V
Ripple Rejection Ratio	Srip	I_O=300mA，15V≤V_I≤25V，f=120Hz		—	71	—	dB

78M15 Electrical characteristics (Unless otherwise specified 0≤T_J≤+125℃，V_I=23V, 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℃		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℃ I_O=200mA	17.5V≤V_I≤30V	—	—	100	mV
			20V≤V_I≤30V	—	—	50	
Current Regulation	S_I	T_J=25℃	5mA≤I_0≤500mA	---	—	300	mV
			5mA≤I_0≤200mA，	—	—	150	
Quiescent Current	I_Q	T_J=25℃		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	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℃，I_O=500mA		—	2	—	V
Ripple Rejection Ratio	Srip	I_O=300mA，18.5V≤V_I≤28.5V，f=120Hz		—	70	—	dB

78M18 Electrical characteristics (Unless otherwise specified 0≤T_J≤+125℃，V_I=26V, 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℃		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℃ I_O=200mA	21V≤V_I≤33V	—	—	100	mV
			24V≤V_I≤33V	—	—	50	
Current Regulation	S_I	T_J=25℃	5mA≤I_0≤500mA	—	—	360	mV
			5mA≤I_0≤200mA，	—	—	180	
Quiescent Current	I_Q	T_J=25℃		—	—	6	mA
Quiescent Current Change	$\triangle I_Q$	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℃，I_O=500mA		—	2	—	V
Ripple Rejection Ratio	Srip	I_O=300mA，22V≤V_I≤32V，f=120Hz		—	69	—	dB

REV.08

78M20 Electrical characteristics (Unless otherwise specified 0≤T$_J$≤+125℃，V$_I$=29V，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℃		19.2	20	20.8	V
		5mA≤I$_0$≤350mA，23V≤V$_I$≤35V		19	20	21	
Voltage Regulation	S$_V$	T$_J$=25℃ I$_O$=200mA	23V≤V$_I$≤35V	—	—	100	mV
			24V≤V$_I$≤35V	—	—	50	
Current Regulation	S$_I$	T$_J$=25℃	5mA≤I$_0$≤500mA	—	—	400	mV
			5mA≤I$_0$≤200mA，	—	—	200	
Quiescent Current	I$_Q$	T$_J$=25℃		—	—	6	mA
Quiescent Current Change	△I$_Q$	5mA≤I$_0$≤350mA		—	—	0.5	mA
		I$_0$=200mA，23V≤V$_I$≤35V		—	—	0.8	
Input－output differential pressure	V$_I$- V$_O$	T$_J$=25℃，I$_0$=500mA		—	2	—	V
Ripple Rejection Ratio	Srip	I$_0$=300mA，24V≤V$_I$≤34V，f=120Hz		—	69	—	dB

78M24 Electrical characteristics (Unless otherwise specified 0≤T$_J$≤+125℃，V$_I$=33V，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℃		23	24	25	V
		5mA≤I$_●$≤350mA，27V≤V$_I$≤38V		22.8	24	25.2	
Voltage Regulation	S$_V$	T$_J$=25℃ I$_O$=200mA	27V≤V$_I$≤38V	—	—	100	mV
			28V≤V$_I$≤38V	—	—	50	
Current Regulation	S$_I$	T$_J$=25℃	5mA≤I$_0$≤500mA	—	—	480	mV
			5mA≤I$_0$≤200mA，	—	—	240	
Quiescent Current	I$_Q$	T$_J$=25℃		—	—	6	mA
Quiescent Current Change	△I$_Q$	5mA≤I$_0$≤350mA		—	—	0.5	mA
		I$_0$=200mA，27V≤V$_I$≤38V		—	—	0.8	
Input－output differential pressure	V$_I$- V$_O$	T$_J$=25℃，I$_0$=500mA		—	2	—	V
Ripple Rejection Ratio	Srip	I$_0$=300mA，28V≤V$_I$≤38V；f=120Hz		—	67	—	dB

TO−252 Dimensions
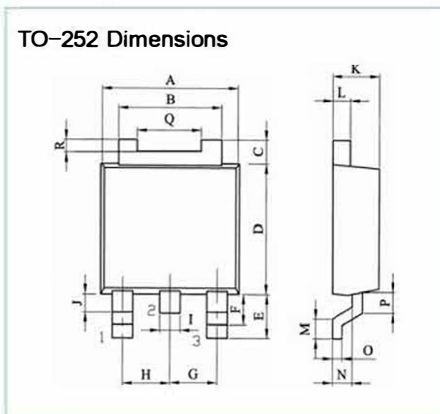
1 IN   2 GND 3 OUT 4 GND

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	●	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