

- **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 | Rated | 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

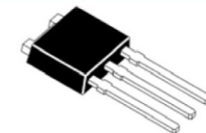
78M05 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=10\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

| 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 | |

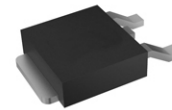
78M06 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=11\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

| 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 | |

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



TO-251



TO-252



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 | |

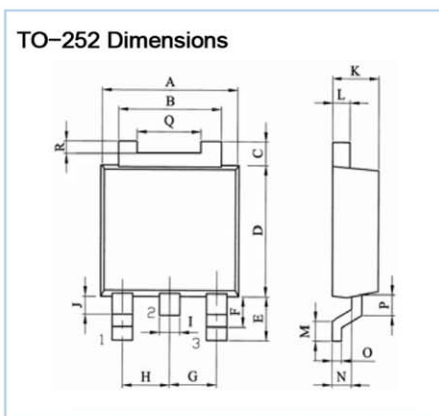


78M20 Electrical characteristics (Unless otherwise specified $0 \leq T_J \leq +125^\circ\text{C}$, $V_I=29\text{V}$, $I_O=350\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$)

| 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 IN 2 GND 3 OUT 4 GND

Unit : mm

| Size Symbol | TO-252 | | Size 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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