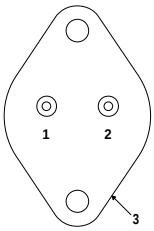
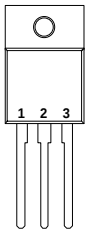
# IP1R18A SERIES
# IP1R18 SERIES
# IP3R18A SERIES
# IP3R18 SERIES




Pin 1 – $V_{IN}$
Pin 2 – $V_{OUT}$
Case – Ground

**K Package – TO–3**




Pin 1 – $V_{IN}$
Pin 2 – Ground
Pin 3 – $V_{OUT}$
Case – Ground

**V Package – TO–218**

# 5 AMP POSITIVE VOLTAGE REGULATORS

## FEATURES

- **0.01%/V LINE REGULATION**
- **0.5% LOAD REGULATION**
- **1% OUTPUT TOLERANCE (–A VERSIONS)**
- **AVAILABLE IN 5V, 12V AND 15V OPTIONS**
- **COMPLETE SERIES OF PROTECTIONS:**
  - **CURRENT LIMITING**
  - **THERMAL SHUTDOWN**
  - **SOA CONTROL**

### Order Information

| Part Number | K–Pack (TO–3) | V–Pack (TO–218) | Temp. Range |
|---|---|---|---|
| IP1R18Axx–zz | ✔ | | -55 to +150°C |
| IP1R18xx–zz | ✔ | | ” |
| IP3R18Azz–xx | ✔ | ✔ | 0 to +125°C |
| IP3R18zz–xx | ✔ | ✔ | ” |

**Note:**

xx = Voltage Code (05, 12, 15)
zz = Package Code (K, V)

eg.
IP1R18AK–05
IP3R18V–12

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | | |
|---|---|---|
| $V_I$ | DC Input Voltage | 35V |
| $P_D$ | Power Dissipation | Internally limited |
| $T_J$ | Operating Junction Temperature Range | See Table Above |
| $T_{STG}$ | Storage Temperature Range | –65°C to +150°C |
| $T_L$ | Lead Temperature (Soldering, 10 sec) | 300°C |

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Prelim. 9/00

## ELECTRICAL CHARACTERISTICS ($T_J$ = 25°C unless otherwise stated)

| Parameter | | Test Conditions [2] | IP1R18A–05 IP3R18A–05 Min. | Typ. | Max. | IP1R18–05 IP3R18–05 Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|---|---|
| | | | 4.95 | 5 | 5.05 | 4.85 | | 5.15 | V |
| $V_O$ | Output Voltage | $I_O$ = 5mA to 5A<br>$P_{OUT} \leq$ 50W $V_{IN}$ = 8V to 20V<br>$T_J$ = Over Temp. Range [1] | 4.85 | | 5.15 | 4.75 | | 5.25 | V |
| $\frac{\Delta V_O}{\Delta V_I}$ | Line Regulation | $V_{IN}$ = 7.5V to 35V | | 3 | 15 | | 6 | 30 | mV |
| | | $I_O$ = 5mA [3] $T_J$ = Over Temp. Range [1] | | 6 | 30 | | 12 | 60 | |
| $\frac{\Delta V_O}{\Delta I_O}$ | Load Regulation | $I_O$ = 5mA to 5A [3] | | 5 | 25 | | 10 | 50 | mV |
| | | $T_J$ = Over Temp. Range [1] | | 10 | 50 | | 20 | 100 | |
| $I_Q$ | Quiescent Current | $I_O$ = 5mA $T_J$ = Over Temp. Range [1] | | | 7 | | | 7 | mA |
| $\Delta I_Q$ | Quiescent Current Change | $I_O$ = 5mA to 5A<br>$T_J$ = Over Temp. Range [1] | | | 10 | | | 10 | mA |
| | | $I_O$ = 5mA $V_{IN}$ = 7.5V to 35V<br>$T_J$ = Over Temp. Range [1] | | | 3 | | | 3 | |
| $V_D$ | Dropout Voltage | $I_O$ = 5A $\Delta V_{OUT}$ = 100mV<br>$T_J$ = Over Temp. Range [1] | | 2.5 | 3 | | 2.5 | 3 | V |
| | Ripple Rejection | $I_O$ = 1A f = 120Hz<br>$T_J$ = Over Temp. Range [1] | 60 | 80 | | 60 | 80 | | dB |
| | Thermal Regulation | $t_p$ = 20ms $\Delta P$ = 50W | | 0.002 | 0.01 | | 0.002 | 0.02 | %/W |
| $I_{PEAK}$ | Peak Output Current | $V_{IN}$ = 10V $T_J$ = Over Temp. Range [1] | | 8 | 12 | | 8 | 12 | A |
| $I_{SC}$ | Short Circuit Current | $V_{IN}$ = 10V | | 7 | | | 7 | | A |
| | | $V_{IN}$ = 35V | | 2 | | | 2 | | |
| $e_n$ | Output Noise Voltage | f = 10Hz to 100kHz | | 40 | | | 40 | | µV |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | K Package | | 1.0 | 1.5 | | 1.0 | 1.5 | °C/W |
| | | V Package | | 1.0 | 1.5 | | 1.0 | 1.5 | |

### Notes

1) Applies over full temperature range:–
   $T_J$ = –55 to +150°C for IP1R18A–05 / IP1R18–05
   $T_J$ = 0 to +125°C for IP3R18A–05 / IP3R18–05
   All other specifications apply at $T_J$ = 25°C unless otherwise stated.
2) Test conditions unless otherwise stated:–
   $V_{IN}$ = 10V , $I_{OUT}$ = 2.5A .
   Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 50W.
3) Load and Line regulation are electrically independent and are measured using pulse techniques at low duty cycle in order to maintain constant junction temperature. To determine the effects on the output voltage due to device heating, refer to thermal regulation specification.

## ELECTRICAL CHARACTERISTICS ($T_J$ = 25°C unless otherwise stated)

| Parameter | | Test Conditions [2] | IP1R18A–12 IP3R18A–12 Min. | Typ. | Max. | IP1R18–12 IP3R18–12 Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | | 11.88 | 12 | 12.12 | 11.64 | 12 | 12.36 | V |
| $V_O$ | Output Voltage | $I_O$ = 5mA to 5A<br>$P_{OUT} \leq$ 50W $V_{IN}$ = 15V to 27V<br>$T_J$ = Over Temp. Range [1] | 11.64 | | 12.36 | 11.40 | | 12.60 | V |
| $\frac{\Delta V_O}{\Delta V_I}$ | Line Regulation | $V_{IN}$ = 14.5V to 35V | | 5 | 30 | | 10 | 60 | mV |
| | | $I_O$ = 5mA [3] $T_J$ = Over Temp. Range [1] | | 10 | 60 | | 20 | 120 | |
| $\frac{\Delta V_O}{\Delta I_O}$ | Load Regulation | $I_O$ = 5mA to 5A [3] | | 10 | 60 | | 20 | 120 | mV |
| | | $T_J$ = Over Temp. Range [1] | | 20 | 120 | | 40 | 240 | |
| $I_Q$ | Quiescent Current | $I_O$ = 5mA $T_J$ = Over Temp. Range [1] | | | 7 | | | 7 | mA |
| $\Delta I_Q$ | Quiescent Current Change | $I_O$ = 5mA to 5A<br>$T_J$ = Over Temp. Range [1] | | | 10 | | | 10 | mA |
| | | $I_O$ = 5mA $V_{IN}$ = 14.5V to 35V<br>$T_J$ = Over Temp. Range [1] | | | 3 | | | 3 | |
| $V_D$ | Dropout Voltage | $I_O$ = 5A $\Delta V_{OUT}$ = 250mV<br>$T_J$ = Over Temp. Range [1] | | 2.5 | 3 | | 2.5 | 3 | V |
| | Ripple Rejection | $I_O$ = 1A f = 120Hz<br>$T_J$ = Over Temp. Range [1] | 52 | 72 | | 52 | 72 | | dB |
| | Thermal Regulation | $t_p$ = 20ms $\Delta P$ = 50W | | 0.002 | 0.01 | | 0.002 | 0.02 | %/W |
| $I_{PEAK}$ | Peak Output Current | $V_{IN}$ = 17V $T_J$ = Over Temp. Range [1] | | 8 | 12 | | 8 | 12 | A |
| $I_{SC}$ | Short Circuit Current | $V_{IN}$ = 17V | | 4 | | | 4 | | A |
| | | $V_{IN}$ = 35V | | 2 | | | 2 | | |
| $e_n$ | Output Noise Voltage | | | 75 | | | 75 | | µV |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | K Package | | 1.0 | 1.5 | | 1.0 | 1.5 | °C/W |
| | | V Package | | 1.0 | 1.5 | | 1.0 | 1.5 | |

### Notes

1) Applies over full temperature range:–
   $T_J$ = –55 to +150°C for IP1R18A–12 / IP1R18–12
   $T_J$ = 0 to +125°C for IP3R18A–12 / IP3R18–12
   All other specifications apply at $T_J$ = 25°C unless otherwise stated.
2) Test conditions unless otherwise stated:–
   $V_{IN}$ = 17V , $I_{OUT}$ = 2.5A .
   Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 50W.
3) Load and Line regulation are electrically independent and are measured using pulse techniques at low duty cycle in order to maintain constant junction temperature. To determine the effects on the output voltage due to device heating, refer to thermal regulation specification.

## ELECTRICAL CHARACTERISTICS ($T_J$ = 25°C unless otherwise stated)

| Parameter | | Test Conditions [2] | IP1R18A–15 IP3R18A–15 Min. | Typ. | Max. | IP1R18–15 IP3R18–15 Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|---|---|
| | | | 14.85 | 15 | 15.15 | 14.55 | 15 | 15.45 | V |
| $V_O$ | Output Voltage | $I_O$ = 5mA to 5A<br>$P_{OUT} \leq$ 50W $V_{IN}$ = 18V to 30V<br>$T_J$ = Over Temp. Range [1] | 14.55 | | 15.45 | 14.25 | | 15.75 | V |
| $\frac{\Delta V_O}{\Delta V_I}$ | Line Regulation | $V_{IN}$ = 17.5V to 35V | | 8 | 40 | | 16 | 80 | mV |
| | | $I_O$ = 5mA [3] $T_J$ = Over Temp. Range [1] | | 16 | 80 | | 32 | 160 | |
| $\frac{\Delta V_O}{\Delta I_O}$ | Load Regulation | $I_O$ = 5mA to 5A [3] | | 16 | 80 | | 32 | 160 | mV |
| | | $T_J$ = Over Temp. Range [1] | | 32 | 160 | | 64 | 320 | |
| $I_Q$ | Quiescent Current | $I_O$ = 5mA $T_J$ = Over Temp. Range [1] | | | 7 | | | 7 | mA |
| $\Delta I_Q$ | Quiescent Current Change | $I_O$ = 5mA to 5A<br>$T_J$ = Over Temp. Range [1] | | | 10 | | | 10 | mA |
| | | $I_O$ = 5mA $V_{IN}$ = 17.5V to 35V<br>$T_J$ = Over Temp. Range [1] | | | 3 | | | 3 | |
| $V_D$ | Dropout Voltage | $I_O$ = 5A $\Delta V_{OUT}$ = 300mV<br>$T_J$ = Over Temp. Range [1] | | 2.5 | 3 | | 2.5 | 3 | V |
| | Ripple Rejection | $I_O$ = 1A f = 120Hz<br>$T_J$ = Over Temp. Range [1] | 50 | 70 | | 50 | 70 | | dB |
| | Thermal Regulation | $t_p$ = 20ms $\Delta P$ = 50W | | 0.002 | 0.01 | | 0.002 | 0.02 | %/W |
| $I_{PEAK}$ | Peak Output Current | $V_{IN}$ = 20V $T_J$ = Over Temp. Range [1] | | 8 | 12 | | 8 | 12 | A |
| $I_{SC}$ | Short Circuit Current | $V_{IN}$ = 20V | | 3.5 | | | 3.5 | | A |
| | | $V_{IN}$ = 35V | | 2 | | | 2 | | |
| $e_n$ | Output Noise Voltage | | | 90 | | | 90 | | µV |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | K Package | | 1.0 | 1.5 | | 1.0 | 1.5 | °C/W |
| | | V Package | | 1.0 | 1.5 | | 1.0 | 1.5 | |

### Notes

1) Applies over full temperature range:–
   $T_J$ = –55 to +150°C for IP1R18A–15 / IP1R18–15
   $T_J$ = 0 to +125°C for IP3R18A–15 / IP3R18–15
   All other specifications apply at $T_J$ = 25°C unless otherwise stated.
2) Test conditions unless otherwise stated:–
   $V_{IN}$ = 20V , $I_{OUT}$ = 2.5A .
   Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 50W.
3) Load and Line regulation are electrically independent and are measured using pulse techniques at low duty cycle in order to maintain constant junction temperature. To determine the effects on the output voltage due to device heating, refer to thermal regulation specification.