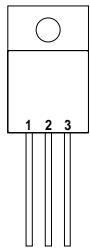


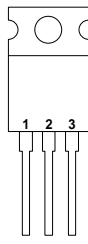
Pin 1 – Ground
Pin 2 – V_{OUT}
Case – V_{IN}

K Package – TO-3



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

G Package – TO-257



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

T Package – TO-220

3 AMP FIXED NEGATIVE VOLTAGE REGULATORS

FEATURES

- 0.01%/V LINE REGULATION
- 0.5% LOAD REGULATION
- $\pm 1\%$ 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)	G-Pack (TO-257)	T-Pack (TO-220)	Temp. Range	Note:
IP1R17Axx-zz	✓	✓		-55 to +150°C	xx = Voltage Code (05, 12, 15) zz = Package Code (G, K, T)
IP1R17xx-zz	✓	✓		"	
IP3R17Azz-xx	✓		✓	0 to +125°C	eg. IP1R17AK-05 IP3R17G-12
IP3R17zz-xx	✓		✓	"	

ABSOLUTE MAXIMUM RATINGS ($T_{case} = 25^{\circ}C$ 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

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Test Conditions ²	IP1R17A-05 IP3R17A-05			IP1R17-05 IP3R17-05			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_O Output Voltage		-5.05	-5	-4.95	-5.15	-5	-4.85	V
	$I_O = -5\text{mA to } -3\text{A}$ $P \leq P_{MAX}$ $V_{IN} = -8\text{V to } -20\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-5.15		-4.85	-5.25		-4.75	V
$\frac{\Delta V_O}{\Delta V_I}$ Line Regulation	$V_{IN} = -7.5\text{V to } -35\text{V}$		3	15	6	30	mV	
	$I_O = -5\text{mA}^3$ $T_J = \text{Over Temp. Range } ^1$		6	30	12	60		
$\frac{\Delta V_O}{\Delta I_O}$ Load Regulation	$I_O = -5\text{mA to } -3\text{A}^3$		5	25	10	50	mV	
	$T_J = \text{Over Temp. Range } ^1$		10	50	20	100		
I_Q Quiescent Current	$I_O = -5\text{mA}$ $T_J = \text{Over Temp. Range } ^1$			5		5	mA	
ΔI_Q Quiescent Current Change	$I_O = -5\text{mA to } -3\text{A}$ $T_J = \text{Over Temp. Range } ^1$			10		10	mA	
	$I_O = -5\text{mA}$ $V_{IN} = -7.5\text{V to } -35\text{V}$ $T_J = \text{Over Temp. Range } ^1$			5		5		
V_D Dropout Voltage	$I_O = -3\text{A}$ $\Delta V_{OUT} = 100\text{mV}$ $T_J = \text{Over Temp. Range } ^1$		2.2	3	2.2	3	V	
Ripple Rejection	$I_O = -1\text{A}$ $f = 120\text{Hz}$ $T_J = \text{Over Temp. Range } ^1$	60	80		60	80	dB	
Thermal Regulation	$t_p = 20\text{ms}$ $\Delta P = P_{MAX}$		0.002	0.01	0.002	0.02	%/W	
I_{PEAK} Peak Output Current	$V_{IN} = -10\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-6.5	-4.5		-6.5	-4.5	A	
I_{SC} Short Circuit Current	$V_{IN} = -10\text{V}$		-4			-4	A	
	$V_{IN} = -35\text{V}$		-1			-1		
e_n Output Noise Voltage	$f = 10\text{Hz to } 100\text{kHz}$		40		40		μV	
$R_{\theta JC}$ Thermal Resistance Junction to Case	K Package		1.5	2.5	1.5	2.5	$^\circ\text{C/W}$	
	G, T Package		3	4	3	4		

Notes

- 1) Applies over full temperature range:-
 $T_J = -55$ to $+150^\circ\text{C}$ for IP1R17A-05 / IP1R17-05
 $T_J = 0$ to $+125^\circ\text{C}$ for IP3R17A-05 / IP3R17-05
All other specifications apply at $T_C = 25^\circ\text{C}$ unless otherwise stated.
- 2) Test conditions unless otherwise stated:-
 $V_{IN} = -10\text{V}$, $I_{OUT} = -1.5\text{A}$.
Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 30W for the TO-3 Package, and 20W for the TO-220 and TO-257 Packages.
- 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 ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Test Conditions ²	IP1R17A-12 IP3R17A-12			IP1R17-12 IP3R17-12			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_O Output Voltage		-12.12	-12	-11.88	-12.36	-12	-11.64	V
	$I_O = -5\text{mA to } -3\text{A}$ $P \leq P_{\text{MAX}}$ $V_{\text{IN}} = -15\text{V to } -27\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-12.36		-11.64	-12.60		-11.40	V
$\frac{\Delta V_O}{\Delta V_I}$ Line Regulation	$V_{\text{IN}} = -14.5\text{V to } -35\text{V}$		5	30		10	60	mV
	$I_O = -5\text{mA}^3$ $T_J = \text{Over Temp. Range } ^1$		10	60		20	120	
$\frac{\Delta V_O}{\Delta I_O}$ Load Regulation	$I_O = -5\text{mA to } -3\text{A}^3$		10	60		20	120	mV
	$T_J = \text{Over Temp. Range } ^1$		20	120		40	240	
I_Q Quiescent Current	$I_O = -5\text{mA}$ $T_J = \text{Over Temp. Range } ^1$			5			5	mA
ΔI_Q Quiescent Current Change	$I_O = -5\text{mA to } -3\text{A}$ $T_J = \text{Over Temp. Range } ^1$			10			10	mA
	$I_O = -5\text{mA}$ $V_{\text{IN}} = -14.5\text{V to } -35\text{V}$ $T_J = \text{Over Temp. Range } ^1$			5			5	
V_D Dropout Voltage	$I_O = -3\text{A}$ $\Delta V_{\text{OUT}} = 250\text{mV}$ $T_J = \text{Over Temp. Range } ^1$		2.2	3		2.2	3	V
Ripple Rejection	$I_O = -1\text{A}$ $f = 120\text{Hz}$ $T_J = \text{Over Temp. Range } ^1$	52	72		52	72		dB
Thermal Regulation	$t_p = 20\text{ms}$ $\Delta P = P_{\text{MAX}}$		0.002	0.01		0.002	0.02	%/W
I_{PEAK} Peak Output Current	$V_{\text{IN}} = -17\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-6.5	-4.5		-6.5	-4.5		A
I_{SC} Short Circuit Current	$V_{\text{IN}} = -17\text{V}$		-2.5			-2.5		A
	$V_{\text{IN}} = -35\text{V}$		-1			-1		
e_n Output Noise Voltage	$f = 10\text{Hz to } 100\text{kHz}$		75			75		μV
$R_{\theta\text{JC}}$ Thermal Resistance Junction to Case	K Package		1.5	2.5		1.5	2.5	$^\circ\text{C/W}$
	G, T Package		3	4		3	4	

Notes

- 1) Applies over full temperature range:-
 $T_J = -55$ to $+150^\circ\text{C}$ for IP1R17A-12 / IP1R17-12
 $T_J = 0$ to $+125^\circ\text{C}$ for IP3R17A-12 / IP3R17-12
 All other specifications apply at $T_C = 25^\circ\text{C}$ unless otherwise stated.
- 2) Test conditions unless otherwise stated:-
 $V_{\text{IN}} = -17\text{V}$, $I_{\text{OUT}} = -1.5\text{A}$.
 Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 30W for the TO-3 Package, and 20W for the TO-220 and TO-257 Packages.
- 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 ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Test Conditions ²	IP1R17A-15 IP3R17A-15			IP1R17-15 IP3R17-15			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_O Output Voltage	$I_O = -5\text{mA to } -3\text{A}$	-15.15	-15	-14.85	-15.45	-15	-14.55	V
	$P_{OUT} \leq P_{MAX}$ $V_{IN} = -18\text{V to } -30\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-15.45		-14.55	-15.75		-14.25	V
$\frac{\Delta V_O}{\Delta V_I}$ Line Regulation	$V_{IN} = -17.5\text{V to } -35\text{V}$		8	40		16	80	mV
	$I_O = -5\text{mA}^3$ $T_J = \text{Over Temp. Range } ^1$		16	80		32	160	
$\frac{\Delta V_O}{\Delta I_O}$ Load Regulation	$I_O = -5\text{mA to } -3\text{A}^3$		16	80		32	160	mV
	$T_J = \text{Over Temp. Range } ^1$		32	160		64	320	
I_Q Quiescent Current	$I_O = -5\text{mA}$ $T_J = \text{Over Temp. Range } ^1$			5			5	mA
ΔI_Q Quiescent Current Change	$I_O = -5\text{mA to } -3\text{A}$ $T_J = \text{Over Temp. Range } ^1$			10			10	mA
	$I_O = -5\text{mA}$ $V_{IN} = -17.5\text{V to } -35\text{V}$ $T_J = \text{Over Temp. Range } ^1$			5			5	
V_D Dropout Voltage	$I_O = -3\text{A}$ $\Delta V_{OUT} = 300\text{mV}$ $T_J = \text{Over Temp. Range } ^1$		2.2	3		2.2	3	V
Ripple Rejection	$I_O = -1\text{A}$ $f = 120\text{Hz}$ $T_J = \text{Over Temp. Range } ^1$	50	70		50	70		dB
Thermal Regulation	$t_p = 20\text{ms}$ $\Delta P = P_{MAX}$		0.002	0.01		0.002	0.02	%/W
I_{PEAK} Peak Output Current	$V_{IN} = -20\text{V}$ $T_J = \text{Over Temp. Range } ^1$	-6.5	-4.5		-6.5	-4.5		A
I_{SC} Short Circuit Current	$V_{IN} = -20\text{V}$		-2.3			-2.3		A
	$V_{IN} = -35\text{V}$		-1			-1		
e_n Output Noise Voltage	$f = 10\text{Hz to } 100\text{kHz}$		90			90		μV
$R_{\theta JC}$ Thermal Resistance Junction to Case	K Package		1.5	2.5		1.5	2.5	$^\circ\text{C/W}$
	G, T Package		3	4		3	4	

Notes

- 1) Applies over full temperature range:-
 $T_J = -55$ to $+150^\circ\text{C}$ for IP1R17A-15 / IP1R17-15
 $T_J = 0$ to $+125^\circ\text{C}$ for IP3R17A-15 / IP3R17-15
All other specifications apply at $T_C = 25^\circ\text{C}$ unless otherwise stated.
- 2) Test conditions unless otherwise stated:-
 $V_{IN} = -20\text{V}$, $I_{OUT} = -1.5\text{A}$.
Although Power Dissipation is internally limited, these specifications apply for Power Dissipation up to 30W for the TO-3 Package, and 20W for the TO-220 and TO-257 Packages.
- 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.