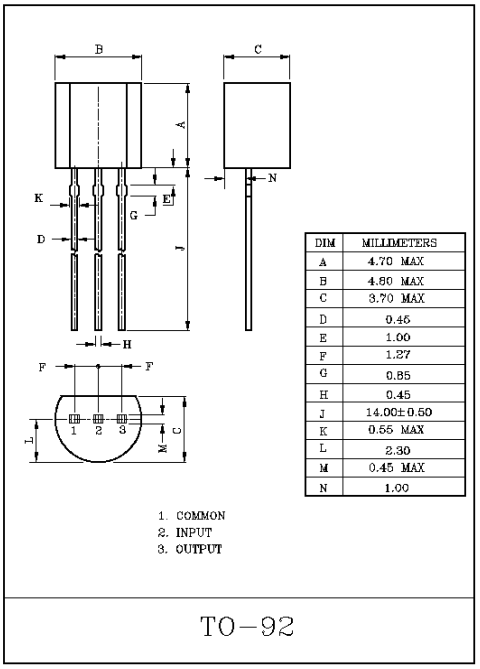
THREE TERMINAL NEGATIVE VOLTAGE REGULATORS
5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 20V, 24V

FEATURES:

- Best Suited to a Power Supply for TTL and CMOS.
- Built-in Overcurrent Protective Circuit.
- Built-in Thermal Protective Circuit.
- Max. Output Current 150mA (T_j=25℃).
- Packaged in TO-92.



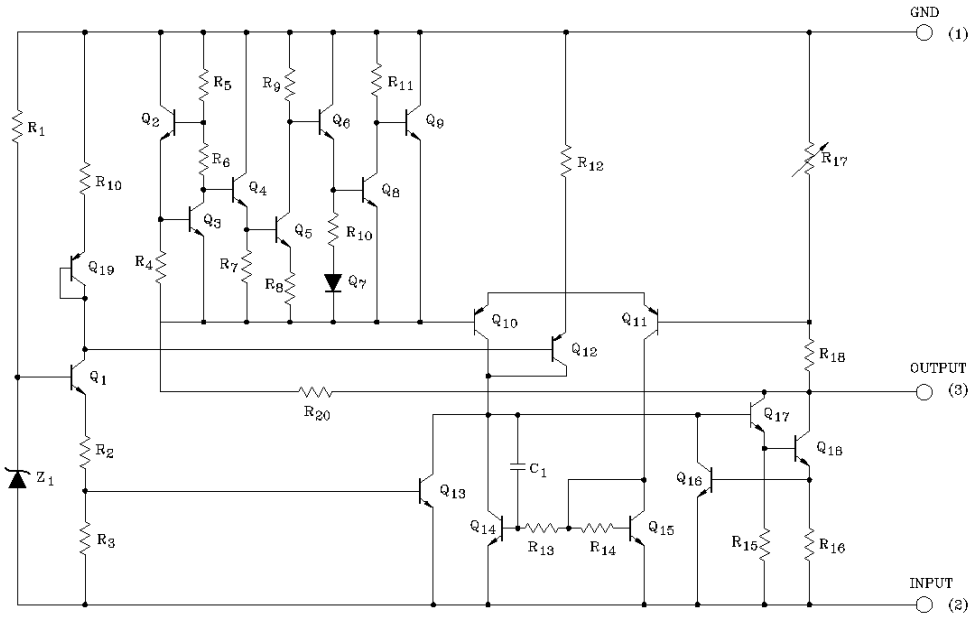
DIM	MILLIMETERS
A	4.70 MAX
B	4.60 MAX
C	3.70 MAX
D	0.45
E	1.00
F	1.27
G	0.85
H	0.45
J	14.00±0.50
K	0.55 MAX
L	2.30
M	0.45 MAX
N	1.00

TO-92

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage	KIA79S05P~ KIA79S15P	V_{IN}	-35	V
	KIA79S18P~ KIA79S24P		-40	
Power Dissipation (Tc=25℃)		P_D	600	mW
Operating Junction Temperature		T_j	-30~150	℃
Operating Temperature		T_{opr}	-30~75	℃
Storage temperature		T_{stg}	-55~150	℃

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS

KIA79S05P

(Unless otherwise specified, V_{IN}=-10V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-5.2	-5.0	-4.8	V
Input Regulation	Reg line	1	T_j=25℃	-20V≦V_{IN}≦-7.0V	-	55	150	mV
				-20V≦V_{IN}≦-8.0V	-	45	100	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	11	60	mV
				1.0mA≦I_{OUT}≦40mA	-	5.0	30	
Output Voltage	V_{OUT}	1	-20V≦V_{IN}≦-7.0V 1.0mA≦I_{OUT}≦40mA		-5.25	-	-4.75	V
			V_{IN}=-10V, 1.0mA≦I_{OUT}≦70mA		-5.25	-	-4.75	
Quiescent Current	I_B	1	T_j=25℃		-	3.1	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_{BI}	1	-20V≦V_{IN}≦-8.0V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	40	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	12	-	mV/ 1.0kHrs
Ripple Rejection Ratio	RR	2	-18V≦V_{IN}≦-8.0V, T_j=25℃, f=120Hz		41	49	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.6	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S06P

(Unless otherwise specified, V_{IN}=-11V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-6.24	-6.0	-5.76	V
Input Regulation	Reg line	1	T_j=25℃	-21V≦V_{IN}≦-8.1V	-	50	150	mV
				-21V≦V_{IN}≦-9.0V	-	45	110	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	12	70	mV
				1.0mA≦I_{OUT}≦40mA	-	5.5	35	
Output Voltage	V_{OUT}	1	-21V≦V_{IN}≦-8.1V 1.0mA≦I_{OUT}≦40mA		-6.3	-	-5.7	V
			V_{IN}=-11V, 1.0mA≦I_{OUT}≦70mA		-6.3	-	-5.7	
Quiescent Current	I_B	1	T_j=25℃		-	3.1	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_{BI}	1	-20V≦V_{IN}≦-9.0V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	40	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	14	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-19V≦V_{IN}≦-9.0V, T_j=25℃, f=120Hz		39	47	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.7	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S08P

(Unless otherwise specified, V_{IN}=-14V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-8.3	-8.0	-7.7	V
Input Regulation	Reg line	1	T_j=25℃	-23V≦V_{IN}≦-10.5V	-	20	175	mV
				-23V≦V_{IN}≦-11V	-	12	125	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	15	80	mV
				1.0mA≦I_{OUT}≦40mA	-	7.0	40	
Output Voltage	V_{OUT}	1	-23V≦V_{IN}≦-10.5V 1.0mA≦I_{OUT}≦40mA		-8.4	-	-7.6	V
			V_{IN}=-14V, 1.0mA≦I_{OUT}≦70mA		-8.4	-	-7.6	
Quiescent Current	I_B	1	T_j=25℃		-	3.1	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-23V≦V_{IN}≦-11V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	60	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	20	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-23V≦V_{IN}≦-12V, T_j=25℃, f=120Hz		37	45	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.8	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S09P

(Unless otherwise specified, V_{IN}=-15V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-9.36	-9.0	-8.64	V
Input Regulation	Reg line	1	T_j=25℃	-24V≦V_{IN}≦-11.4V	-	80	200	mV
				-24V≦V_{IN}≦-12V	-	20	160	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	17	90	mV
				1.0mA≦I_{OUT}≦40mA	-	8.0	45	
Output Voltage	V_{OUT}	1	-24V≦V_{IN}≦-11.4V 1.0mA≦I_{OUT}≦40mA		-9.45	-	-8.55	V
			V_{IN}=-15V, 1.0mA≦I_{OUT}≦70mA		-9.45	-	-8.55	
Quiescent Current	I_B	1	T_j=25℃		-	3.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-24V≦V_{IN}≦-12V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	65	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	21	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-24V≦V_{IN}≦-12V, T_j=25℃, f=120Hz		36	44	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.85	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S10P

(Unless otherwise specified, V_{IN}=-16V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-10.4	-10.0	-9.6	V
Input Regulation	Reg line	1	T_j=25℃	-25V≦V_{IN}≦-12.5V	-	80	230	mV
				-25V≦V_{IN}≦-13V	-	30	170	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	18	90	mV
				1.0mA≦I_{OUT}≦40mA	-	8.5	45	
Output Voltage	V_{OUT}	1	-25V≦V_{IN}≦-12.5V 1.0mA≦I_{OUT}≦40mA		-10.5	-	-9.5	V
			V_{IN}=-16V, 1.0mA≦I_{OUT}≦70mA		-10.5	-	-9.5	
Quiescent Current	I_B	1	T_j=25℃		-	3.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-25V≦V_{IN}≦-13V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	70	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	22	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-24V≦V_{IN}≦-13V, T_j=25℃, f=120Hz		36	43	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.9	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S12P

(Unless otherwise specified, V_{IN}=-19V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃ ≦ T_j ≦ 125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-12.5	-12.0	-11.5	V
Input Regulation	Reg line	1	T_j=25℃	-27V ≦ V_{IN} ≦ -14.5V	-	120	250	mV
				-27V ≦ V_{IN} ≦ -16V	-	100	200	
Load Regulation	Reg load	1	T_j=25℃	1.0mA ≦ I_{OUT} ≦ 100mA	-	20	100	mV
				1.0mA ≦ I_{OUT} ≦ 40mA	-	10	50	
Output Voltage	V_{OUT}	1	-27V ≦ V_{IN} ≦ -14.5V 1.0mA ≦ I_{OUT} ≦ 40mA		-12.6	-	-11.4	V
			V_{IN}=-19V, 1.0mA ≦ I_{OUT} ≦ 70mA		-12.6	-	-11.4	
Quiescent Current	I_B	1	T_j=25℃		-	3.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-27V ≦ V_{IN} ≦ -16V		-	-	1.5	mA
	ΔI_{BO}		1.0mA ≦ I_{OUT} ≦ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz ≦ f ≦ 100kHz		-	80	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	24	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-25V ≦ V_{IN} ≦ -15V, T_j=25℃, f=120Hz		37	42	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-1.0	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S15P

(Unless otherwise specified, V_{IN}=-23V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃ ≤ T_j ≤ 125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-15.6	-15.0	-14.4	V
Input Regulation	Reg line	1	T_j=25℃	-30V ≦ V_{IN} ≦ -17.5V	-	130	300	mV
				-30V ≦ V_{IN} ≦ -20V	-	110	250	
Load Regulation	Reg load	1	T_j=25℃	1.0mA ≦ I_{OUT} ≦ 100mA	-	25	150	mV
				1.0mA ≦ I_{OUT} ≦ 40mA	-	12	75	
Output Voltage	V_{OUT}	1	-30V ≦ V_{IN} ≦ -17.5V 1.0mA ≦ I_{OUT} ≦ 40mA		-15.75	-	-14.25	V
			V_{IN}=-23V, 1.0mA ≦ I_{OUT} ≦ 70mA		-15.75	-	-14.25	
Quiescent Current	I_B	1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-30V ≦ V_{IN} ≦ -20V		-	-	1.5	mA
	ΔI_{BO}		1.0mA ≦ I_{OUT} ≦ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz ≦ f ≦ 100kHz		-	90	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	30	-	mV/ 1.0kHrs
Ripple Rejection Ratio	RR	2	-28.5V ≦ V_{IN} ≦ -18.5V, T_j=25℃, f=120Hz		34	39	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-1.3	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S18P

(Unless otherwise specified, V_{IN}=-27V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-18.7	-18.0	-17.3	V
Input Regulation	Reg line	1	T_j=25℃	-33V≦V_{IN}≦-20.7V	-	32	325	mV
				-33V≦V_{IN}≦-21V	-	27	275	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	30	170	mV
				1.0mA≦I_{OUT}≦40mA	-	15	75	
Output Voltage	V_{OUT}	1	-33V≦V_{IN}≦-20.9V 1.0mA≦I_{OUT}≦40mA		-18.9	-	-17.1	V
			V_{IN}=-27V, 1.0mA≦I_{OUT}≦70mA		-18.9	-	-17.1	
Quiescent Current	I_B	1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-33V≦V_{IN}≦-21V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	150	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	45	-	mV/ 1.0kHrs
Ripple Rejection Ratio	RR	2	-33V≦V_{IN}≦-23V, T_j=25℃, f=120Hz		33	48	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-1.5	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA79S20P

(Unless otherwise specified, V_{IN}=-29V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-20.8	-20.0	-19.2	V
Input Regulation	Reg line	1	T_j=25℃	-35V≦V_{IN}≦-23.5V	-	33	330	mV
				-35V≦V_{IN}≦-24V	-	28	285	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	33	180	mV
				1.0mA≦I_{OUT}≦40mA	-	17	90	
Output Voltage	V_{OUT}	1	-35V≦V_{IN}≦-23.5V 1.0mA≦I_{OUT}≦40mA		-21.0	-	-19.0	V
			V_{IN}=-29V, 1.0mA≦I_{OUT}≦70mA		-21.0	-	-19.0	
Quiescent Current	I_B	1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-35V≦V_{IN}≦-24V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	170	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	49	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-35V≦V_{IN}≦-27V, T_j=25℃, f=120Hz		31	37	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-1.7	-	mV/℃

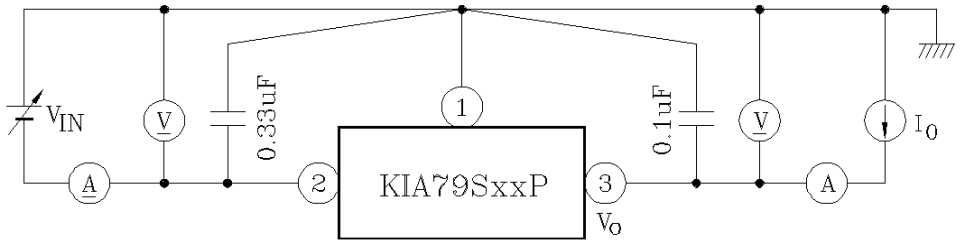
ELECTRICAL CHARACTERISTICS

KIA79S24P

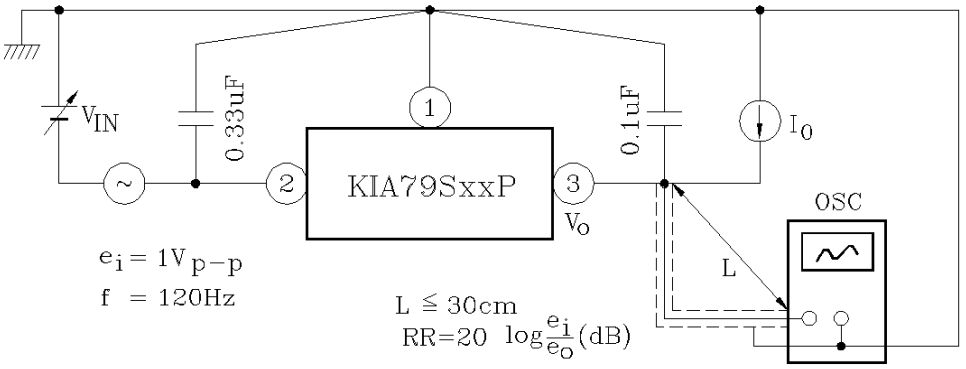
(Unless otherwise specified, V_{IN}=-33V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		-25.0	-24.0	-23.0	V
Input Regulation	Reg line	1	T_j=25℃	-38V≦V_{IN}≦-27V	-	35	350	mV
				-38V≦V_{IN}≦-28V	-	30	300	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	40	200	mV
				1.0mA≦I_{OUT}≦40mA	-	20	100	
Output Voltage	V_{OUT}	1	-38V≦V_{IN}≦-27V 1.0mA≦I_{OUT}≦40mA		-25.2	-	-22.8	V
			V_{IN}=-33V, 1.0mA≦I_{OUT}≦70mA		-25.2	-	-22.8	
Quiescent Current	I_B	1	T_j=25℃		-	3.5	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_{BI}	1	-38V≦V_{IN}≦-28V		-	-	1.5	mA
	ΔI_{BO}		1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	3	Ta=25℃, 10Hz≦f≦100kHz		-	200	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	56	-	mV/1.0kHrs
Ripple Rejection Ratio	RR	2	-35V≦V_{IN}≦-29V, T_j=25℃, f=120Hz		31	47	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25℃, I_{OUT}=40mA		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-2.0	-	mV/℃

TEST CIRCUIT 1



TEST CIRCUIT 2



TEST CIRCUIT 3