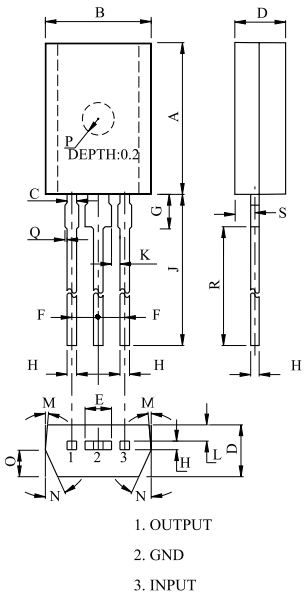
KIA78L05BP/F~ KIA78L24BP/F

BIPOLAR LINEAR INTEGRATED CIRCUIT

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

FEATURES

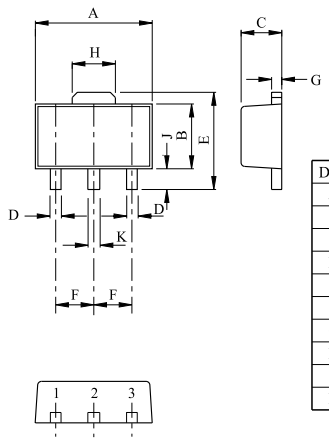
- Suitable for C-MOS, TTL, DTL, HTL Power Supply.
- Internal Short-Circuit Current Limiting.
- Internal Thermal Overload Protection.
- Maximum Output Current of 150mA (Tj=25℃).
- Suitable for MLCC, Tantalum and Low ESR Electrolytic Capacitors.
- Suffix U : Qualified to AEC-Q100(Grade 3)
  : Automotive and standard product are electrically and thermally the same, except where specified. ex) KIA78L**BF-RTF/PU.



DIM	MILLIMETERS
A	7.20 MAX
B	5.20 MAX
C	0.60 MAX
D	2.60 MAX
E	1.15 MAX
F	1.27
G	1.70 MAX
H	0.55 MAX
J	14.00±0.50
K	0.35 MIN
L	0.75±0.10
M	4°
N	25°
O	1.25
P	Φ1.50
Q	0.10 MAX
R	12.50±0.50
S	1.00

1. OUTPUT
2. GND
3. INPUT

TO-92L



DIM	MILLIMETERS
A	4.70 MAX
B	2.50±0.20
C	1.70 MAX
D	0.45+0.15/-0.10
E	4.25 MAX
F	1.50±0.10
G	0.40 TYP
H	1.75 MAX
J	0.75 MIN
K	0.5+0.10/-0.05

1. OUTPUT
2. GND (CASE)
3. INPUT

SOT-89

LINE-UP

ITEM	OUTPUT VOLTAGE (Typ.)	UNIT
KIA78L05BP/F	5	BP : TO-92L F : SOT-89
KIA78L06BP/F	6	
KIA78L08BP/F	8	
KIA78L09BP/F	9	
KIA78L10BP/F	10	
KIA78L12BP/F	12	
KIA78L15BP/F	15	
KIA78L18BP/F	18	
KIA78L20BP/F	20	
KIA78L24BP/F	24	

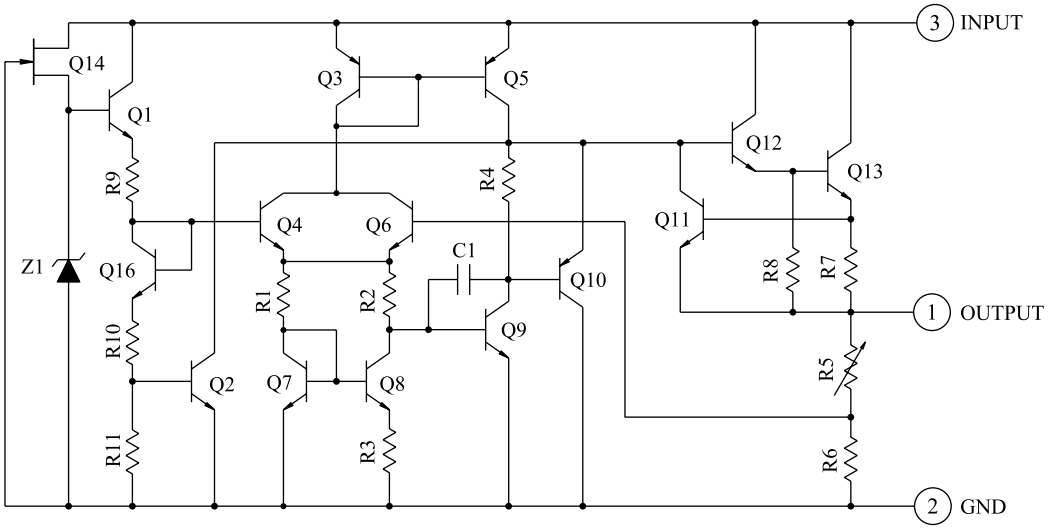
MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage	KIA78L05~15	V_{IN}	35	V
	KIA78L18~24		40	
Power Dissipation	BP	P_D	800	mW
	F		500	
Operating Junction Temperature		T_j	-30 150	℃
Operating Temperature		T_{opr}	-40 85	℃
Storage Temperature		T_{stg}	-55 150	℃

Marking (SOT-89 Package)

Type No.	Marking	Type No.	Marking	Type No.	Marking
KIA78L05F	8A	KIA78L10F	8F	KIA78L20F	8K
KIA78L06F	8B	KIA78L12F	8G	KIA78L24F	8L
KIA78L08F	8D	KIA78L15F	8I		
KIA78L09F	8E	KIA78L18F	8J		

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS

KIA78L05BP/F

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

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

ELECTRICAL CHARACTERISTICS

KIA78L06BP/F

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

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

ELECTRICAL CHARACTERISTICS

KIA78L08BP/F

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

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

ELECTRICAL CHARACTERISTICS

KIA78L09BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		8.64	9.0	9.36	V
Input Regulation	Reg line	Fig.1	T_j=25℃	11.4V≦V_{IN}≦24V	-	80	200	mV
				12V≦V_{IN}≦24V	-	20	160	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	17	90	mV
				1.0mA≦I_{OUT}≦40mA	-	8.0	45	
Output Voltage	V_{OUT}	Fig.1	11.4V≦V_{IN}≦24V 1.0mA≦I_{OUT}≦40mA		8.55	-	9.45	V
			V_{IN}=15V, 1.0mA≦I_{OUT}≦70mA		8.55	-	9.45	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	11.5V≦V_{IN}≦26V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	65	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	21	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 12V≦V_{IN}≦24V, T_j=25℃		36	44	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	-0.85	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA78L10BP/F

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

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

ELECTRICAL CHARACTERISTICS

KIA78L12BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		11.5	12	12.5	V
Input Regulation	Reg line	Fig.1	T_j=25℃	14.5V≦V_{IN}≦27V	-	120	250	mV
				16V≦V_{IN}≦27V	-	100	200	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	20	100	mV
				1.0mA≦I_{OUT}≦40mA	-	10	50	
Output Voltage	V_{OUT}	Fig.1	14.5V≦V_{IN}≦27V 1.0mA≦I_{OUT}≦40mA		11.4	-	12.6	V
			V_{IN}=19V, 1.0mA≦I_{OUT}≦70mA		11.4	-	12.6	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	16V≦V_{IN}≦27V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	80	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	24	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 15V≦V_{IN}≦25V, T_j=25℃		36	41	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	1.0	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA78L15BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		14.4	15	15.6	V
Input Regulation	Reg line	Fig.1	T_j=25℃	17.5V≦V_{IN}≦30V	-	130	300	mV
				20V≦V_{IN}≦30V	-	110	250	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	25	150	mV
				1.0mA≦I_{OUT}≦40mA	-	12	75	
Output Voltage	V_{OUT}	Fig.1	17.5V≦V_{IN}≦30V 1.0mA≦I_{OUT}≦40mA		14.25	-	15.75	V
			V_{IN}=23V, 1.0mA≦I_{OUT}≦70mA		14.25	-	15.75	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	20V≦V_{IN}≦30V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	90	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	30	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 18.5V≦V_{IN}≦28.5V, T_j=25℃		34	40	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	-1.3	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA78L18BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		17.3	18	18.7	V
Input Regulation	Reg line	Fig.1	T_j=25℃	21.4V≦V_{IN}≦33V	-	32	325	mV
				22V≦V_{IN}≦33V	-	27	275	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	30	170	mV
				1.0mA≦I_{OUT}≦40mA	-	15	75	
Output Voltage	V_{OUT}	Fig.1	21.4V≦V_{IN}≦33V 1.0mA≦I_{OUT}≦40mA		17.1	-	18.9	V
			V_{IN}=27V, 1.0mA≦I_{OUT}≦70mA		17.1	-	18.9	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	22V≦V_{IN}≦33V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	150	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	45	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 23V≦V_{IN}≦33V, T_j=25℃		32	38	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	-1.5	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA78L20BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		19.2	20	20.8	V
Input Regulation	Reg line	Fig.1	T_j=25℃	23.5V≦V_{IN}≦35V	-	33	330	mV
				24V≦V_{IN}≦35V	-	28	285	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	33	180	mV
				1.0mA≦I_{OUT}≦40mA	-	17	90	
Output Voltage	V_{OUT}	Fig.1	23.5V≦V_{IN}≦35V 1.0mA≦I_{OUT}≦40mA		19.0	-	21.0	V
			V_{IN}=29V, 1.0mA≦I_{OUT}≦70mA		19.0	-	21.0	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	24V≦V_{IN}≦35V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	170	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	49	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 25V≦V_{IN}≦35V, T_j=25℃		31	37	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	-1.7	-	mV/℃

ELECTRICAL CHARACTERISTICS

KIA78L24BP/F

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	Fig.1	T_j=25℃		23	24	25	V
Input Regulation	Reg line	Fig.1	T_j=25℃	27.5V≦V_{IN}≦38V	-	35	350	mV
				28V≦V_{IN}≦38V	-	30	300	
Load Regulation	Reg load	Fig.1	T_j=25℃	1.0mA≦I_{OUT}≦100mA	-	40	200	mV
				1.0mA≦I_{OUT}≦40mA	-	20	100	
Output Voltage	V_{OUT}	Fig.1	27.5V≦V_{IN}≦38V 1.0mA≦I_{OUT}≦40mA		22.8	-	25.2	V
			V_{IN}=33V, 1.0mA≦I_{OUT}≦70mA		22.8	-	25.2	
Quiescent Current	I_B	Fig.1	T_j=25℃		-	3.5	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	Fig.1	28V≦V_{IN}≦38V		-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	Fig.2	Ta=25℃, 10Hz≦f≦100kHz		-	200	-	μV_{rms}
Long Term Stability	$\Delta V_{OUT}/\Delta t$	Fig.1			-	56	-	mV/ 1.0kHrs
Ripple Rejection Ratio	R · R	Fig.3	f=120Hz, 29V≦V_{IN}≦39V, T_j=25℃		31	35	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT} \rvert$	Fig.1	T_j=25℃		-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	Fig.1	I_{OUT}=5mA		-	-2.0	-	mV/℃

Fig.1 Standard Test Circuit & Application Circuit

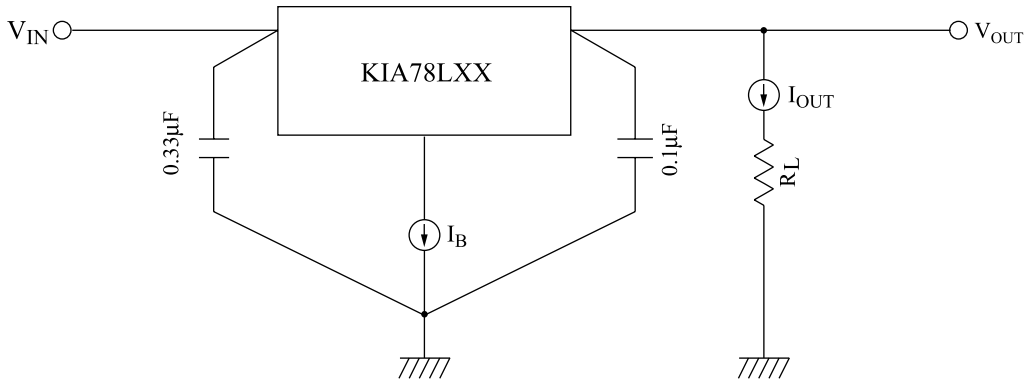


Fig.2 V_{NO} Test Circuit

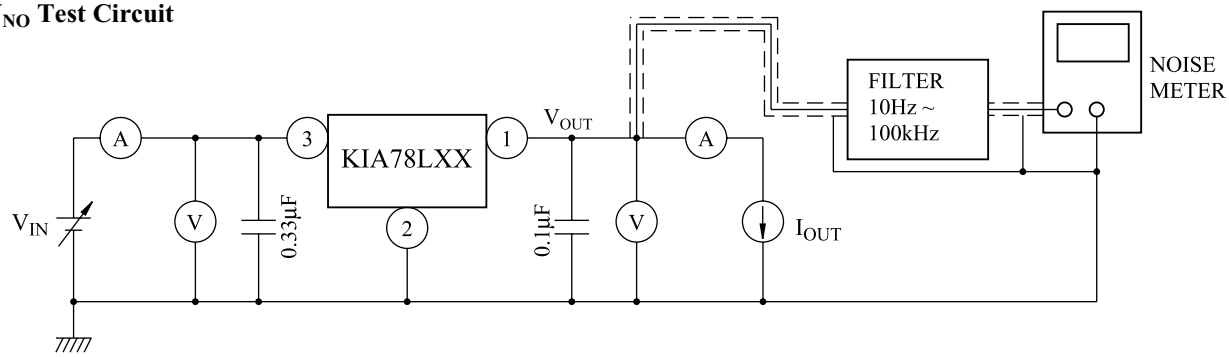
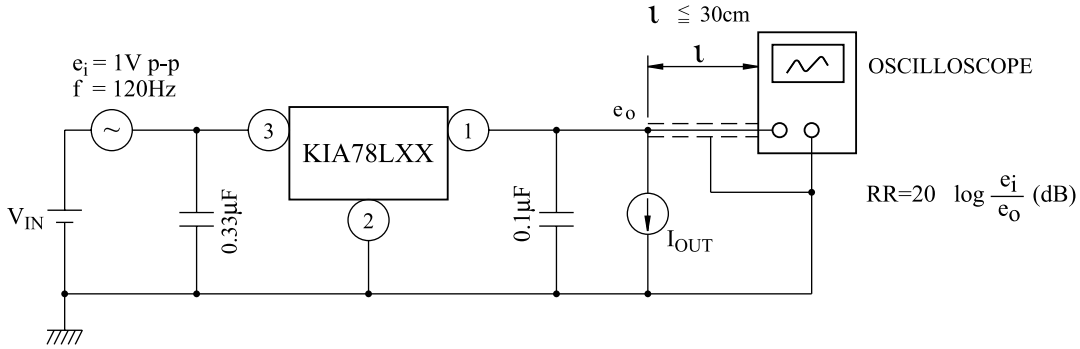
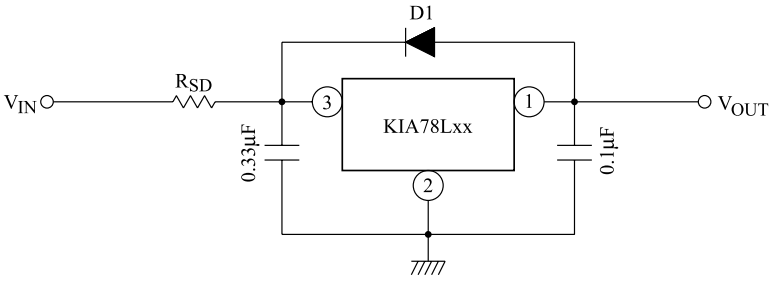


Fig.3 Ripple Rejection Test Circuit



APPLICAION CIRCUIT

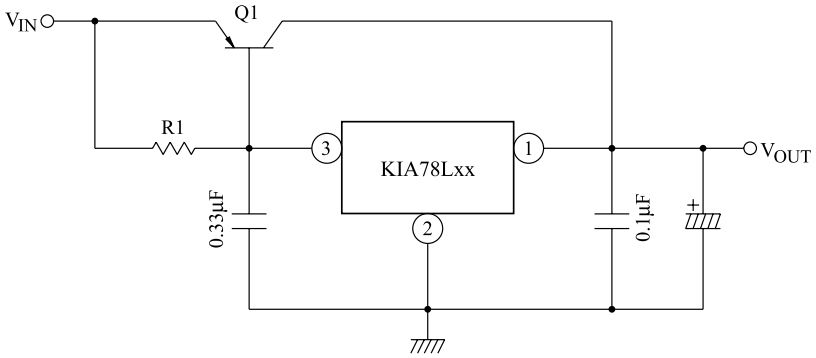
(1) STANDARD APPLICATION



D1 : Protection Diode High speed diode D1 should be connected as shown in the figure if the condition $V_{IN}<V_{OUT}$ might occur by surge voltage or power supply ON/OFF

R_{SD} : Power limiting resistor for large V_{IN}, resistor R_{SD} is needed to limit IC power dissipation

(2) A. CURRENT BOOST VOLTAGE REGULATOR



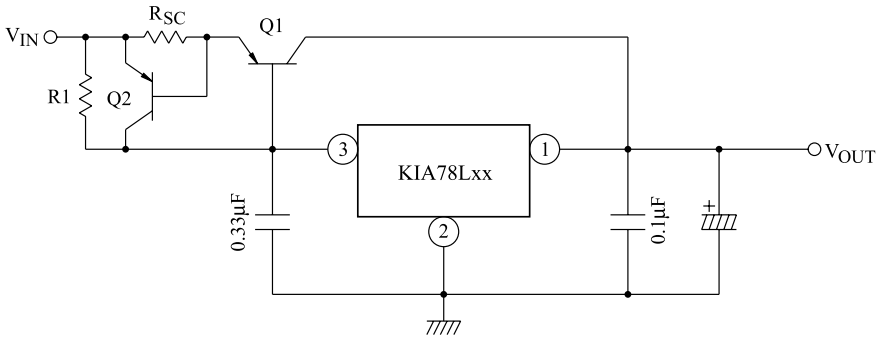
Heat sink is needed for Q1

$$R1 \leqq \frac{V_{BE1}}{I_{B(MAX)}}$$

where, V_{BE1} : V_{BE} of external transistor Q1

$I_{B(MAX)}$: Quiescent current of IC

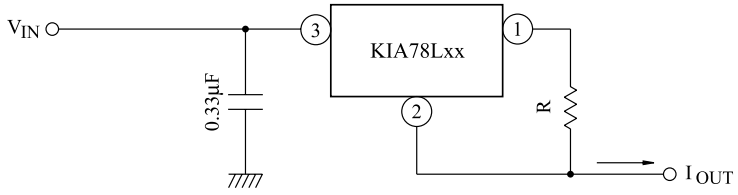
B. SHORT-CIRCUIT PROTECTION



$$R_{SC} = \frac{V_{BE2}}{I_{SC}}$$

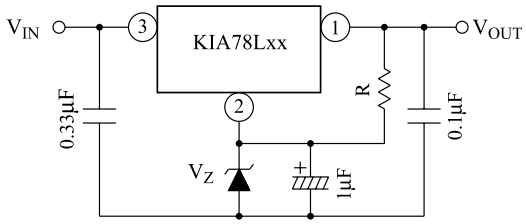
where, I_{SC} : Short-Circuit current

(3) CURRENT REGULATOR

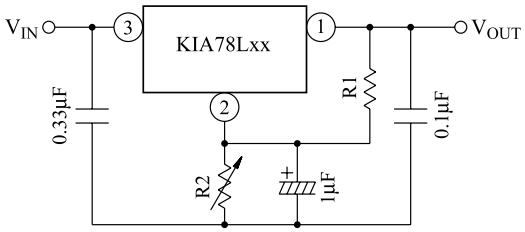


$$I_{OUT} = \frac{V_{OUT}}{R} + I_B$$

(4) VOLTAGE BOOST REGULATOR

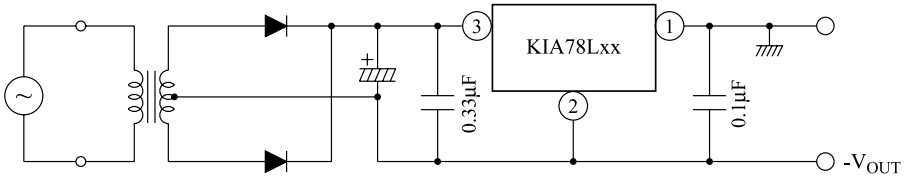


$V_{OUT} = V_Z + V_{OUT}$ (of IC)
A little of current in resistor R is needed.

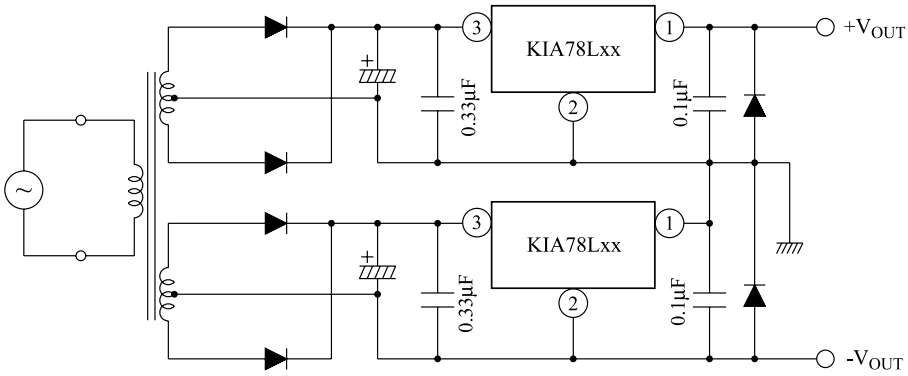


$$V_{OUT} = R2 \left(I_B + \frac{V_{OUT}\ (\text{of IC})}{R1} \right) + V_{OUT}\ (\text{of IC})$$

(5) NEGATIVE REGULATOR



(6) POSITIVE AND NEGATIVE REGULATOR



PRECAUTIONS FOR USE

When such a high voltage as exceeds 10V beyond the fixed output voltage (Typ. value) of IC is applied to the output terminal of IC, the IC may be destroyed. In such a case, it is advised to prevent an excessive voltage from being applied to the IC by connecting a zener diode between the output terminal and the GND. Especially, in the current boost circuit as shown in example (2) of application circuits, an input voltage may be suddenly applied to the output terminal of IC in the form of steps, and that in case of light load, an excessive voltage may be transiently applied to the output terminal of IC: So that great care should be taken to this matter.
In this case, in addition to the above, it may become necessary to consider such a countermeasure as the output capacitor in use is replaced with a capacitor of larger capacitance, or as R1 (a resistor for IC bias current) or bypass is replaced with a resistor of smaller resistance according to circumstance or as the input voltage is gradually raised.

Fig. 4

V_{OUT} - I_{OUT}

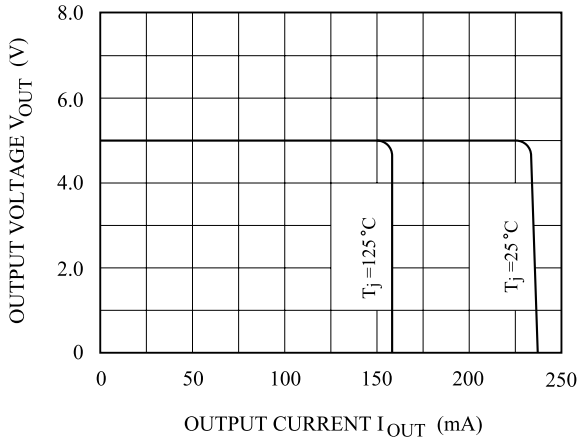


Fig. 5

$|V_{IN} - V_{OUT}|$ - T_j

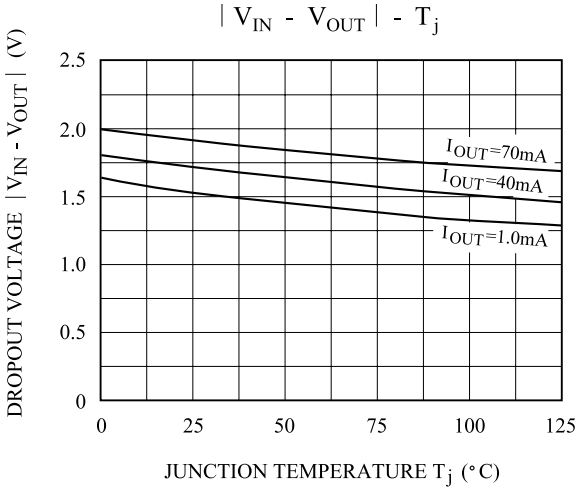


Fig. 6

V_{OUT} - V_{IN}

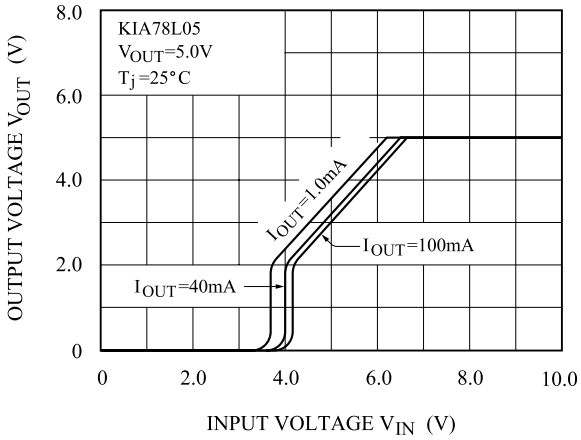


Fig. 7

I_B - V_{IN}

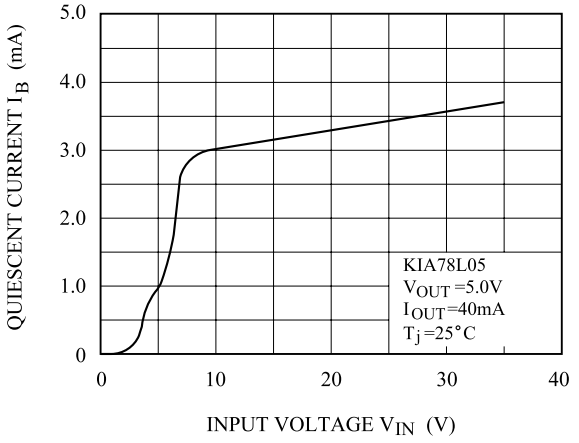


Fig. 8

P_D - Ta (BP-Type : TO-92L)

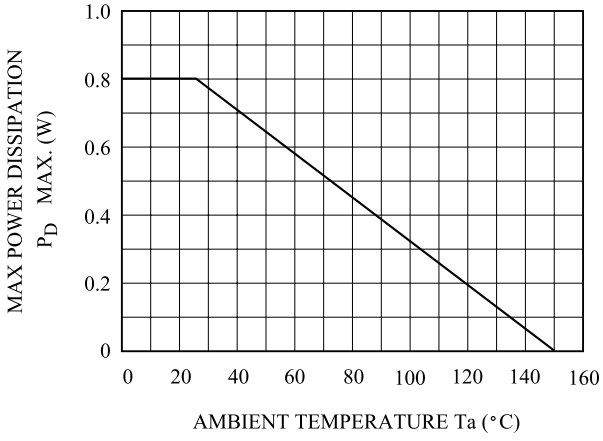
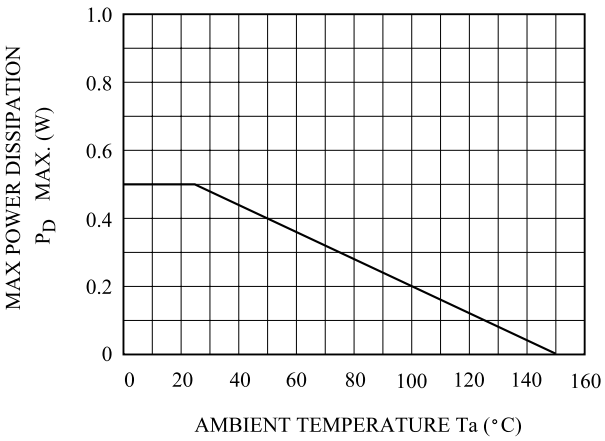


Fig. 9

P_D - Ta (F-Type : SOT-89)



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