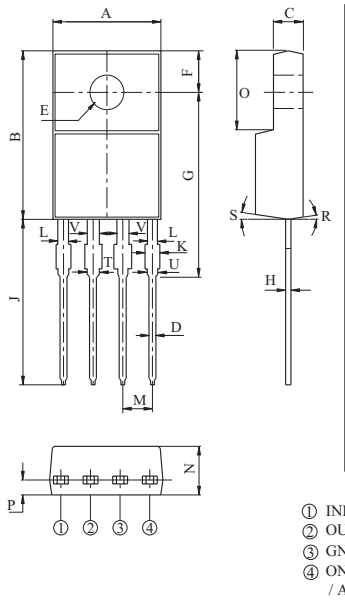
4 ,5 TERMINAL LOW DROP VOLTAGE REGULATOR
[Low Quiescent Current-Type]

The KIA78R × × ×F/PI Series are Low Dropout Voltage Regulator suitable for various electronic equipments.
The Regulator has multi function such as over current protection, overheat protection.

FEATURES

· 1.0A Output Low Drop Voltage Regulator.
· Built in ON/OFF Control Terminal. (Active High)
· Built in Over Current Protection, Over Heat Protection Function.
· Low Quiescent Current (Output OFF mode) : 0.5μA(Typ.)
· Low Standby Current : 800μA(Typ.)



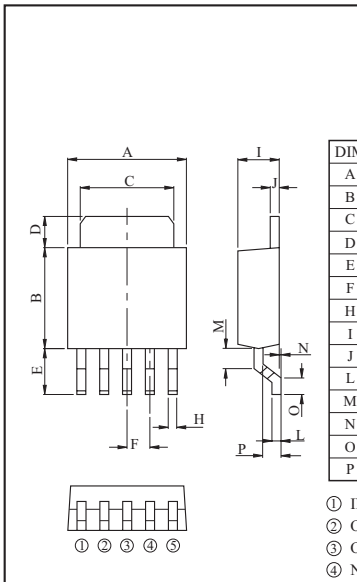
DIM	MILLIMETERS
A	10.00±0.20
B	15.00±0.20
C	2.70±0.20
D	0.60±0.10
E	Φ3.20±0.20
F	3.50±0.10
G	15.70±0.20
H	0.40±0.10
J	14.3+0.2/-0.1
K	1.45±0.10
L	1.00±0.10
M	2.54
N	4.50±0.20
O	7.5± 0.1
P	1.50±0.10
R	5°
S	8°
T	1.30±0.1
U	3-1.00±0.1
V	1.30±0.1

① INPUT (V_{IN})
② OUTPUT (V_O)
③ GND
④ ON/OFF CONTROL (V_C) / ADJUSTABLE

TO-220IS-4

LINE UP

ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA78R000F/PI	Adjustable (1.25~15V)	F : DPAK-5 PI : TO-220IS-4
KIA78R015F/PI	1.5	
KIA78R018F/PI	1.8	
KIA78R020F/PI	2.0	
KIA78R025F/PI	2.5	
KIA78R030F/PI	3.0	
KIA78R033F/PI	3.3	
KIA78R050F/PI	5.0	



DIM	MILLIMETERS
A	6.6±0.2
B	6.1±0.2
C	5.0±0.2
D	1.10±0.2
E	2.70±0.2
F	1.27±0.1
H	0.5+0.2/-0.1
I	2.30±0.2
J	0.5±0.1
L	0.50±0.1
M	0.8±0.2
N	0 ~0.25
O	0.7MIN
P	1.00±0.1

① INPUT (V_{IN})
② ON/OFF CONTROL (V_C)
③ OUTPUT (V_O)
④ N.C / ADJUSTABLE
⑤ GND

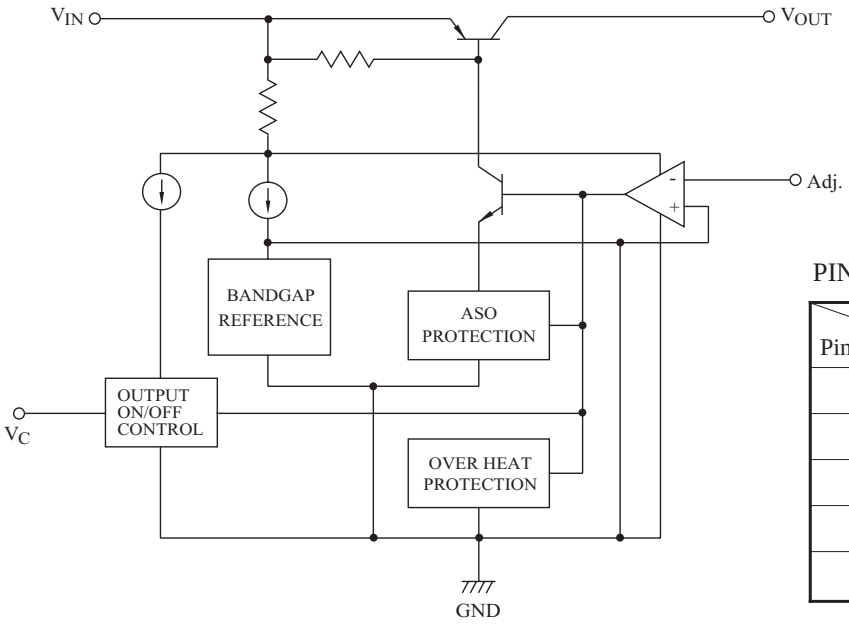
Heat Sink is common to ⑤(GND)

DPAK-5

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage		V_{IN}	16	V
ON/OFF Control Voltage		V_C	16	V
Output Current		I_{OUT}	1	A
Power Dissipation 1 (No heatsink)	F	P_{D1}	1.3	W
	PI		1.5	
Power Dissipation 2 (Infinite heatsink)	F	P_{D2}	13	W
	PI		15	
Junction Temperature		T_j	150	℃
Operating Temperature		T_{opr}	-20～80	℃
Storage Temperature		T_{stg}	-30～150	℃
Soldering Temperature		T_{sol}	260	℃

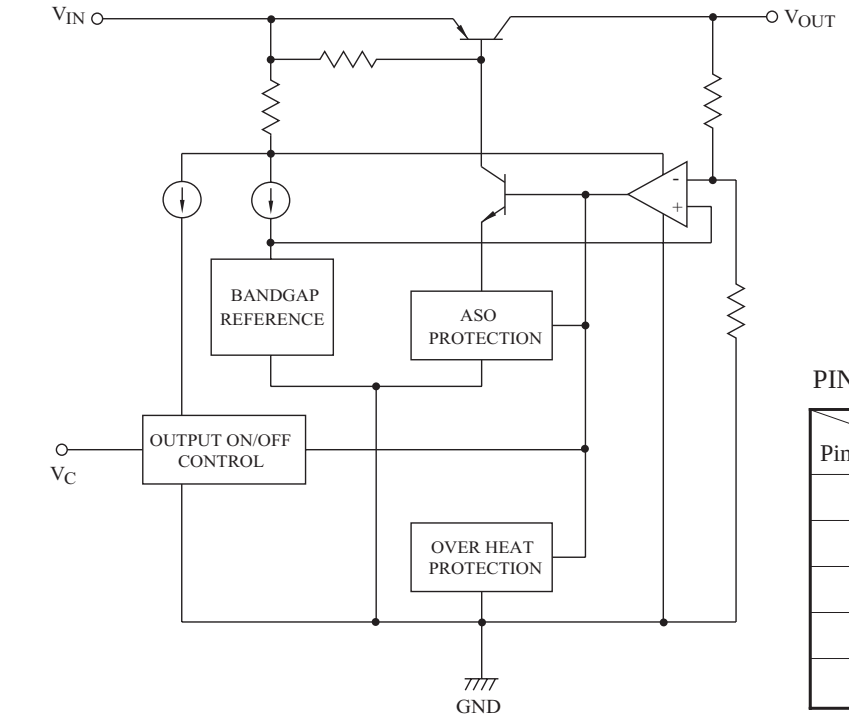
BLOCK DIAGRAM - 1 (Adjustable-Type)



PIN CONNECTION

Item / Pin No.	KIA78R000PI (TO-220IS-4)	KIA78R000F (DPAK-5)
1	V_{IN}	V_{IN}
2	V_{OUT}	V_C
3	GND	V_{OUT}
4	Adj	Adj
5	-	GND

BLOCK DIAGRAM - 2 (Fixed-Type)



PIN CONNECTION

Item / Pin No.	KIA78R***PI (TO-220IS-4)	KIA78R***F (DPAK-5)
1	V_{IN}	V_{IN}
2	V_{OUT}	V_C
3	GND	V_{OUT}
4	V_C	N.C
5	-	GND

ELECTRICAL CHARACTERISTICS

KIA78R000F/PI (Unless otherwise specified, V_{IN}=2.8V, Tj=25℃)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	-	2.3	-	15	V
Output Voltage	V_{OUT}	V_{IN}=2.8V, I_{OUT}=0.5A	1.225	1.25	1.275	V
		2.8V ≦V_{IN} ≦12V, 5mA ≦I_{OUT} ≦1A, 0℃ ≦Tj ≦125℃	1.21	1.25	1.29	
Line Regulation	Reg Line	2.8V ≦V_{IN} ≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=2.8V, 5mA ≦I_{OUT} ≦1A,	-	5	20	mV
Quiescent Current	I_B	2.8V ≦V_{IN} ≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		2.8V ≦V_{IN} ≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	I_{Bstart}	V_{IN}=2.1V, I_{OUT}=0A	-	0.7	5	mA
		V_{IN}=2.5V, I_{OUT}=1A	-	10	30	
Output Noise Voltage	V_{NO}	V_{IN}=2.8V, I_{OUT}=50mA, 10Hz ≦f≦100kHz	-	110	-	μVrms
Ripple Rejection	R · R	2.8V ≦V_{IN} ≦12V, I_{OUT}=50mA, f=120Hz	53	65	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	

ELECTRICAL CHARACTERISTICS

KIA78R015F/PI (Unless otherwise specified, V_{IN}=3.8V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=3.8V, I_{OUT}=0.5A	1.45	1.5	1.55	V
		2.8V ≦V_{IN} ≦12V, 5mA ≦I_{OUT} ≦1A, 0℃ ≦Tj ≦125℃	1.434	1.5	1.566	
Line Regulation	Reg Line	2.8V ≦V_{IN} ≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=3.8V, 5mA ≦I_{OUT} ≦1A	-	5	20	mV
Quiescent Current	I_B	2.8V ≦V_{IN} ≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		2.8V ≦V_{IN} ≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	I_{Bstart}	V_{IN}=2.1V, I_{OUT}=0A	-	0.7	5	mA
		V_{IN}=2.5V, I_{OUT}=1A	-	10	30	
Output Noise Voltage	V_{NO}	V_{IN}=3.8V, I_{OUT}=50mA, 10Hz ≦f≦100kHz	-	75	-	μVrms
Ripple Rejection	R · R	2.8V ≦V_{IN} ≦12V, I_{OUT}=50mA, f=120Hz	53	65	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.5	0.7	V
		I_{OUT}=1A	-	0.6	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 2.8V ≦V_{IN} ≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=3.8V, I_{OUT}=0.1A	-	20	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=3.8V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R018F/PI (Unless otherwise specified, V_{IN}=3.8V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=3.8V, I_{OUT}=0.5A	1.75	1.8	1.85	V
		2.8V≦V_{IN}≦12V, 5mA≦I_{OUT}≦1A, 0℃≦Tj≦125℃	1.732	1.8	1.868	
Line Regulation	Reg Line	2.8V≦V_{IN}≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=3.8V, 5mA≦I_{OUT}≦1A	-	5	20	mV
Quiescent Current	I_Q	2.8V≦V_{IN}≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		2.8V≦V_{IN}≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	0.7	5	mA
		V_{IN}=2.5V, I_{OUT}=1A	-	10	30	
Output Noise Voltage	V_{NO}	V_{IN}=3.8V, I_{OUT}=50mA, 10Hz≦f≦100kHz	-	75	-	μVrms
Ripple Rejection	R · R	2.8V≦V_{IN}≦12V, I_{OUT}=50mA, f=120Hz	53	65	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 2.8V≦V_{IN}≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=3.8V, I_{OUT}=0.1A	-	20	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=3.8V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R020F/PI (Unless otherwise specified, V_{IN}=4V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=4V, I_{OUT}=0.5A	1.95	2.0	2.05	V
		3.0V≦V_{IN}≦12V, 5mA≦I_{OUT}≦1A, 0℃≦Tj≦125℃	1.93	2.0	2.07	
Line Regulation	Reg Line	3.0V≦V_{IN}≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=4V, 5mA≦I_{OUT}≦1A	-	5	20	mV
Quiescent Current	I_Q	3.0V≦V_{IN}≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		3.0V≦V_{IN}≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	0.7	5	mA
		V_{IN}=2.6V, I_{OUT}=1A	-	10	30	
Output Noise Voltage	V_{NO}	V_{IN}=4V, I_{OUT}=50mA, 10Hz≦f≦100kHz	-	80	-	μVrms
Ripple Rejection	R · R	3.0V≦V_{IN}≦12V, I_{OUT}=50mA, f=120Hz	52	65	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 3.0V≦V_{IN}≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=4V, I_{OUT}=0.1A	-	25	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=4V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R025F/PI (Unless otherwise specified, V_{IN}=4.5V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=4.5V, I_{OUT}=0.5A	2.438	2.5	2.562	V
		3.5V ≦V_{IN} ≦12V, 5mA ≦I_{OUT} ≦1A, 0℃ ≦Tj ≦125℃	2.412	2.5	2.588	
Line Regulation	Reg Line	3.5V ≦V_{IN} ≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=4.5V, 5mA ≦I_{OUT} ≦1A	-	5	20	mV
Quiescent Current	I_Q	3.5V ≦V_{IN} ≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		3.5V ≦V_{IN} ≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	0.9	5	mA
		V_{IN}=2.7V, I_{OUT}=1A	-	12	30	
Output Noise Voltage	V_{NO}	V_{IN}=4.5V, I_{OUT}=50mA, 10Hz ≦f≦100kHz	-	95	-	μVrms
Ripple Rejection	R · R	3.5V ≦V_{IN} ≦12V, I_{OUT}=50mA, f=120Hz	53	64	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 3.5V ≦V_{IN} ≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=4.5V, I_{OUT}=0.1A	-	30	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=4.5V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R030F/PI (Unless otherwise specified, V_{IN}=5V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=5.0V, I_{OUT}=0.5A	2.925	3.0	3.075	V
		4.0V ≦V_{IN} ≦12V, 5mA ≦I_{OUT} ≦1A, 0℃ ≦Tj ≦125℃	2.895	3.0	3.105	
Line Regulation	Reg Line	4.0V ≦V_{IN} ≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=5.0V, 5mA ≦I_{OUT} ≦1A	-	5	20	mV
Quiescent Current	I_Q	4.0V ≦V_{IN} ≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		4.0V ≦V_{IN} ≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	1.1	5	mA
		V_{IN}=2.8V, I_{OUT}=1A	-	13	30	
Output Noise Voltage	V_{NO}	V_{IN}=5.0V, I_{OUT}=50mA, 10Hz ≦f≦100kHz	-	110	-	μVrms
Ripple Rejection	R · R	4.0V ≦V_{IN} ≦12V, I_{OUT}=50mA, f=120Hz	50	63	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 4.0V ≦V_{IN} ≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=4.5V, I_{OUT}=0.1A	-	35	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=5.0V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R033F/PI (Unless otherwise specified, V_{IN}=5.3V, Tj=25℃)

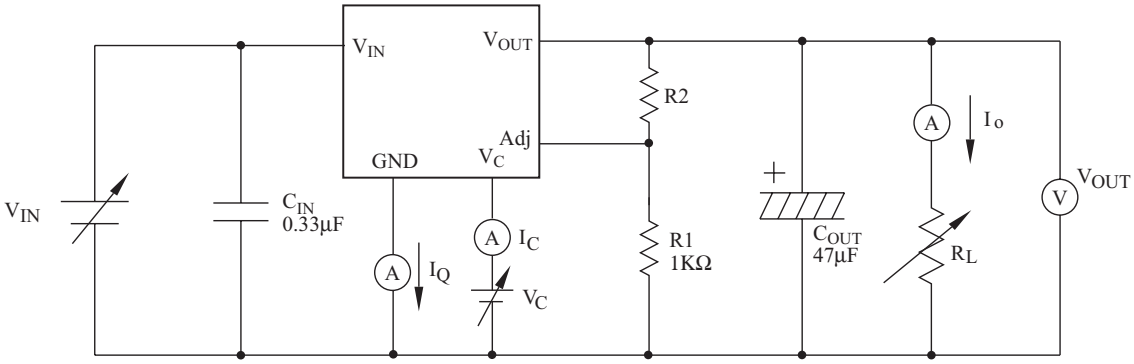
CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=5.3V, I_{OUT}=0.5A	3.218	3.3	3.382	V
		4.3V≦V_{IN}≦12V, 5mA≦I_{OUT}≦1A, 0℃≦Tj≦125℃	3.184	3.3	3.416	
Line Regulation	Reg Line	4.3V≦V_{IN}≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=5.3V, 5mA≦I_{OUT}≦1A	-	5	20	mV
Quiescent Current	I_Q	4.3V≦V_{IN}≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		4.3V≦V_{IN}≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	1.1	5	mA
		V_{IN}=2.9V, I_{OUT}=1A	-	13	30	
Output Noise Voltage	V_{NO}	V_{IN}=5.3V, I_{OUT}=50mA, 10Hz≦f≦100kHz	-	115	-	μVrms
Ripple Rejection	R · R	4.3V≦V_{IN}≦12V, I_{OUT}=50mA, f=120Hz	48	61	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 4.3V≦V_{IN}≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=5.3V, I_{OUT}=0.1A	-	35	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=5.3V, V_C=0V	-	0.1	2	μA

ELECTRICAL CHARACTERISTICS

KIA78R050F/PI (Unless otherwise specified, V_{IN}=7V, Tj=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=7V, I_{OUT}=0.5A	4.88	5.0	5.12	V
		6.0V≦V_{IN}≦12V, 5mA≦I_{OUT}≦1A, 0℃≦Tj≦125℃	4.83	5.0	5.17	
Line Regulation	Reg Line	6.0V≦V_{IN}≦12V, I_{OUT}=0.5A	-	5	20	mV
Load Regulation	Reg Load	V_{IN}=7.0V, 5mA≦I_{OUT}≦1A	-	5	20	mV
Quiescent Current	I_Q	6.0V≦V_{IN}≦12V, I_{OUT}=0A	-	0.8	1.8	mA
		6.0V≦V_{IN}≦12V, I_{OUT}=1A	-	10	20	
Starting Quiescent Current	$I_{Q(start)}$	V_{IN}=2.1V, I_{OUT}=0A	-	1.3	5	mA
		V_{IN}=3.0V, I_{OUT}=1A	-	14	30	
Output Noise Voltage	V_{NO}	V_{IN}=7.0V, I_{OUT}=50mA, 10Hz≦f≦100kHz	-	150	-	μVrms
Ripple Rejection	R · R	6.0V≦V_{IN}≦12V, I_{OUT}=50mA, f=120Hz	48	60	-	dB
Dropout Voltage	V_D	I_{OUT}=0.5A	-	0.3	0.5	V
		I_{OUT}=1A	-	0.5	-	
Quiescent Current (OFF mode)	$I_{Q(OFF)}$	V_C=0.4V, 6.0V≦V_{IN}≦12V	-	0.5	5	μA
Output Control Voltage (ON)	$V_{C(ON)}$	I_{OUT}=0.1A	2	-	-	V
Output Control Voltage (OFF)	$V_{C(OFF)}$	-	-	-	0.8	V
Output Control Current (ON)	$I_{C(ON)}$	V_{IN}=V_C=7.0V, I_{OUT}=0.1A	-	50	100	μA
Output Control Current (OFF)	$I_{C(OFF)}$	V_{IN}=7.0V, V_C=0V	-	0.1	2	μA

Fig. 1 Standard Test Circuit & Application Circuit (Adjustable-Type)



$$V_{OUT} = V_{ref} \times \left(1 + \frac{R2}{R1} \right) = 1.25 \times \left(1 + \frac{R2}{R1} \right)$$

C_{IN} : More than 0.33㎌ required if regulator is located an appreciable distance from power supply filter. You must use to prevent from the parasitic oscillation.

C_{OUT} : More than 47㎌. You must use the Low-impedance-type(low ESR) capacitor.

Fig. 2 Standard Test Circuit (Fixed-Type)

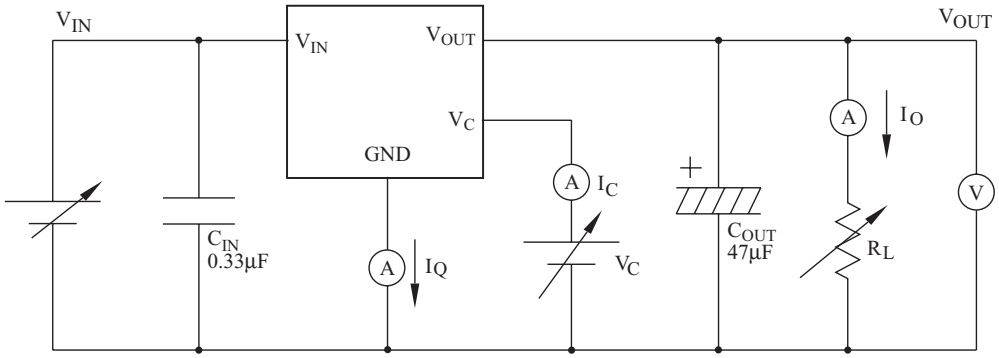


Fig. 3 Ripple Rejection Test Circuit (Adjustable-Type)

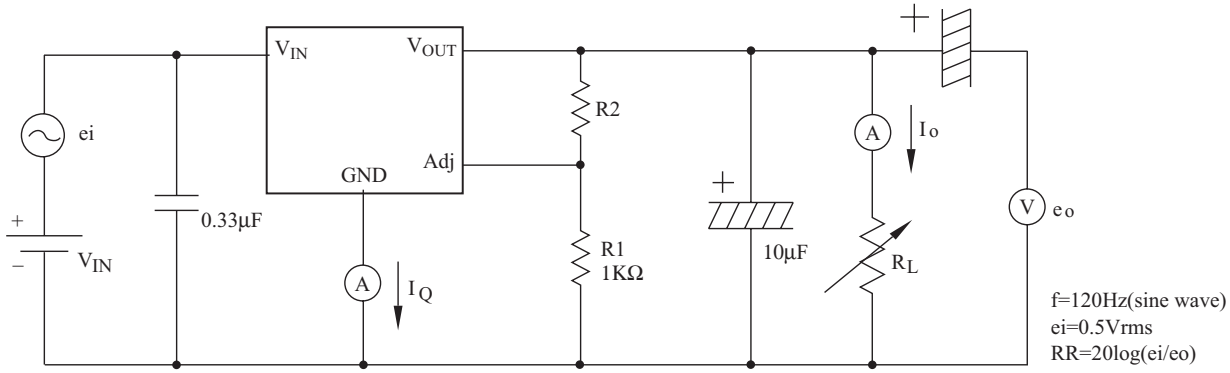


Fig. 4 Ripple Rejection Test Circuit (Fixed-Type)

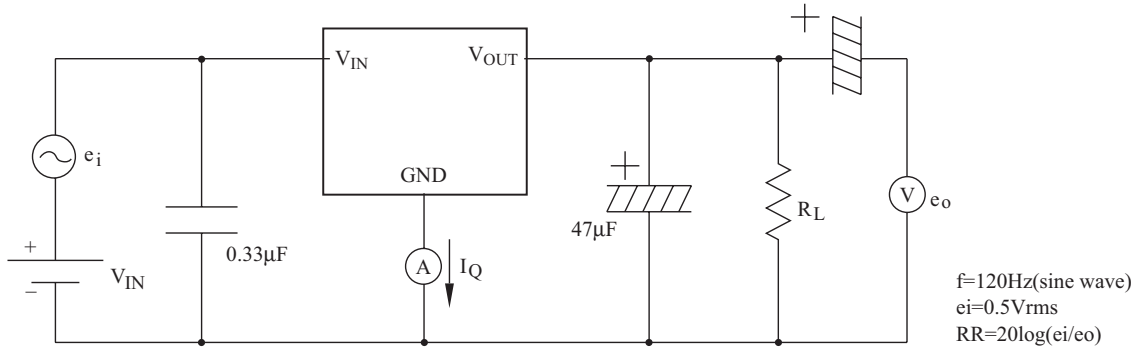
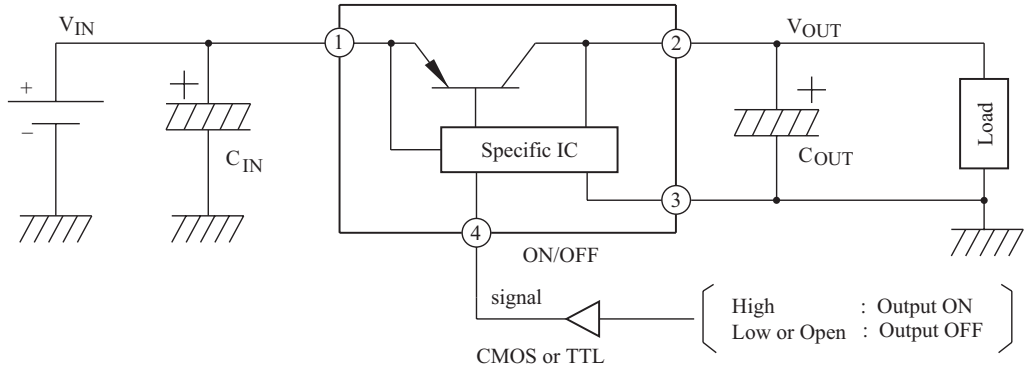


Fig. 5 Application Circuit for Standard (Fixed-Type)



C_{IN} : More than 0.33㎌ required if regulator is located an appreciable distance from power supply filter. You must use to prevent from the parasitic oscillation.

C_{OUT} : More than 47㎌. You must use the Low-impedance-type(low ESR) capacitor.

Fig. 6 V_{OUT} - T_j

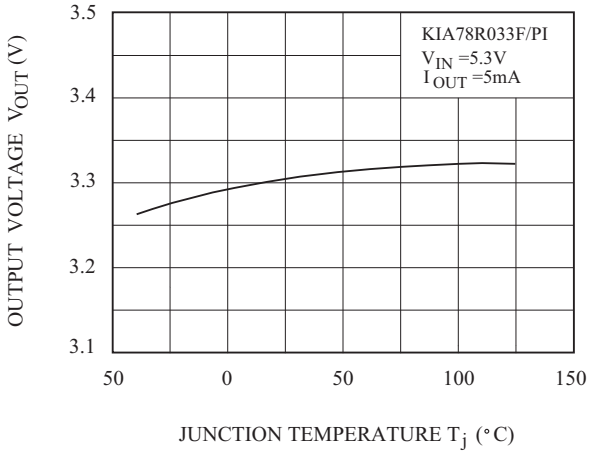


Fig. 7 V_{OUT} - V_{IN}

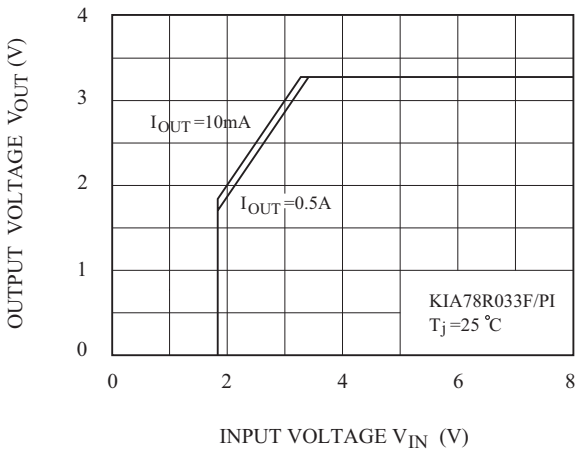


Fig. 8 I_B - V_{IN}

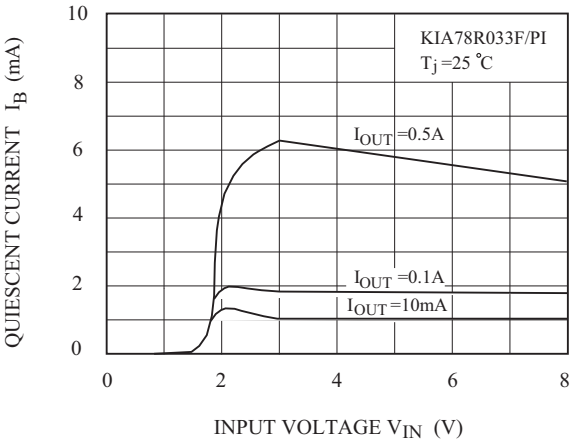


Fig. 9 I_B - T_j

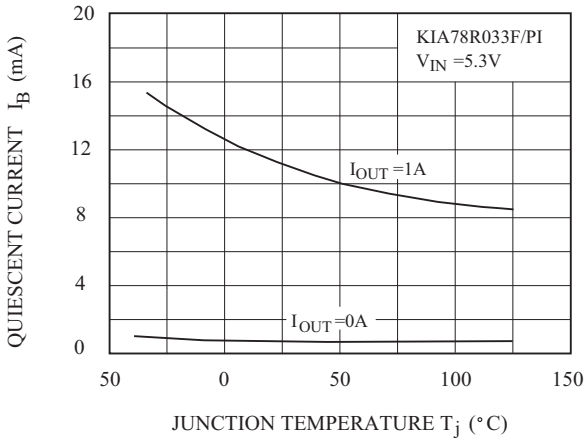


Fig. 10 I_B - I_{OUT}

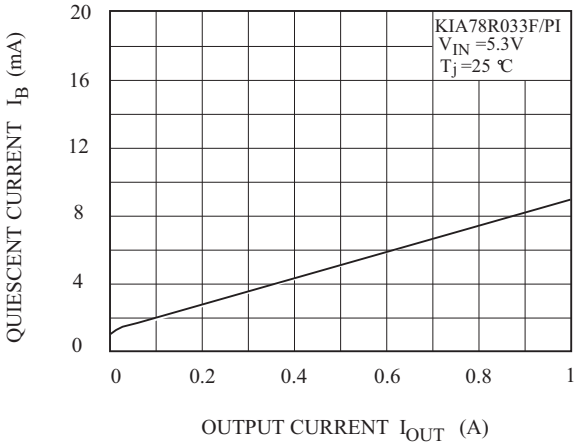


Fig. 11 V_{OUT} - I_{OUT}

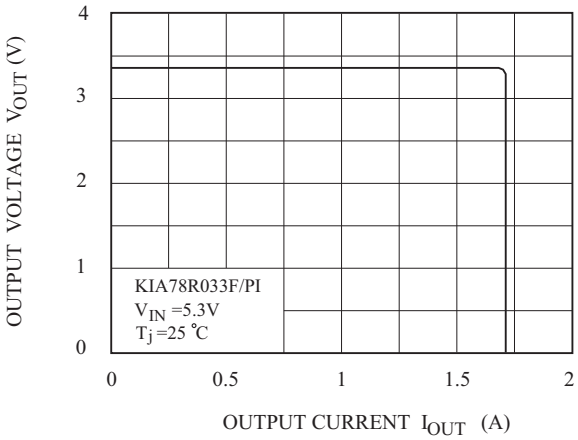


Fig.12 V_D - T_j

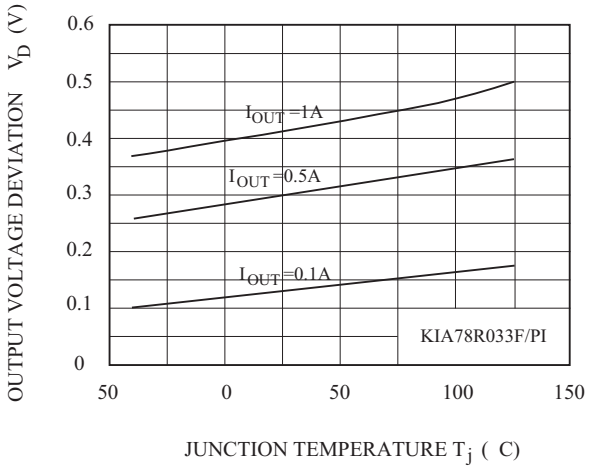


Fig.13 RR-f

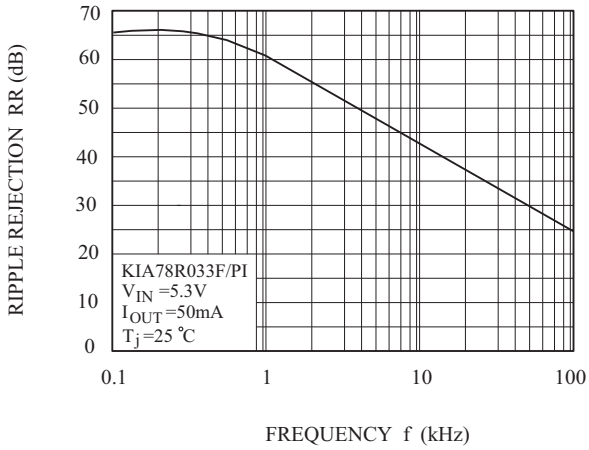


Fig.14 P_D - Ta (F-Type : DPAK-5)

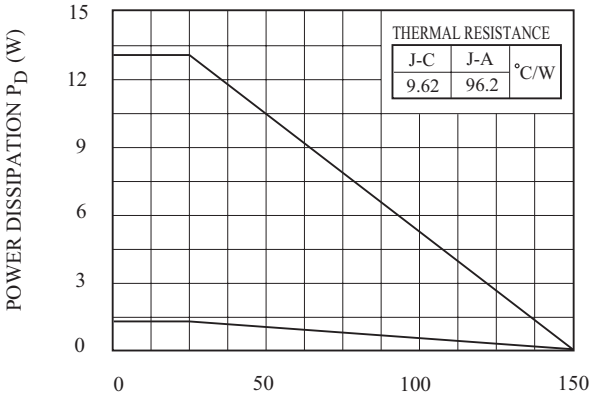


Fig.15 P_D - Ta (PI-Type : TO-220IS-4)