

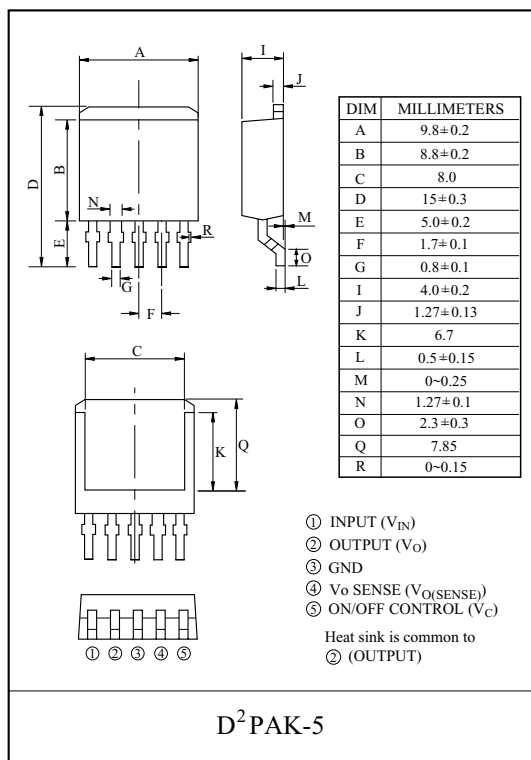
4,5 TERMINAL LOW DROP VOLTAGE REGULATOR [Low Quiescent Current-Type]

The KIA78R × × × FP 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) : 0.5 μ A(Typ.)
- Low Standby Current : 800 μ A(Typ.)



LINE UP

ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA78R015FP	1.5	D ² PAK-5
KIA78R018FP	1.8	
KIA78R020FP	2.0	
KIA78R025FP	2.5	
KIA78R030FP	3.0	
KIA78R033FP	3.3	
KIA78R050FP	5.0	

MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

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)	P_{D1}	2.0	W
Power Dissipation 2 (Infinite heatsink)	P_{D2}	35	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Operating Temperature	T_{opr}	-20 ~ 80	$^\circ\text{C}$
Storage Temperature	T_{stg}	-30 ~ 150	$^\circ\text{C}$
Soldering Temperature	T_{sol}	260	$^\circ\text{C}$

KIA78R015FP~KIA78R050FP

KIA78R015FP~KIA78R050FP (D²PAK-5)

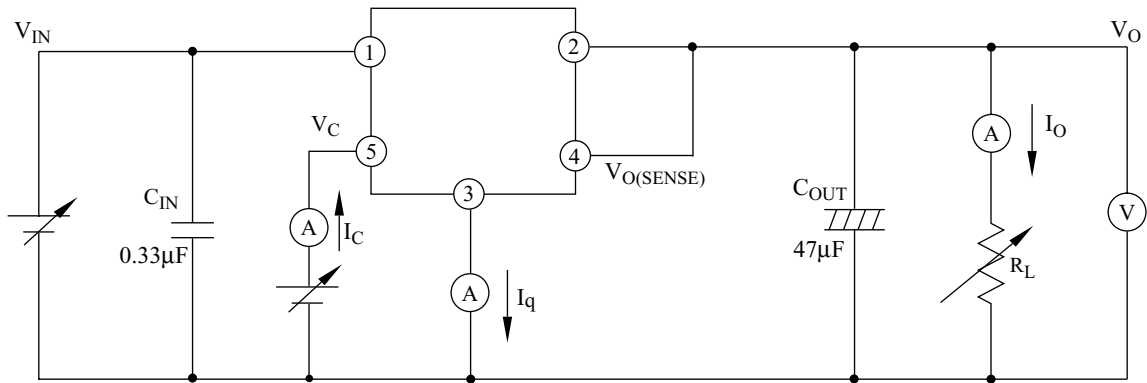
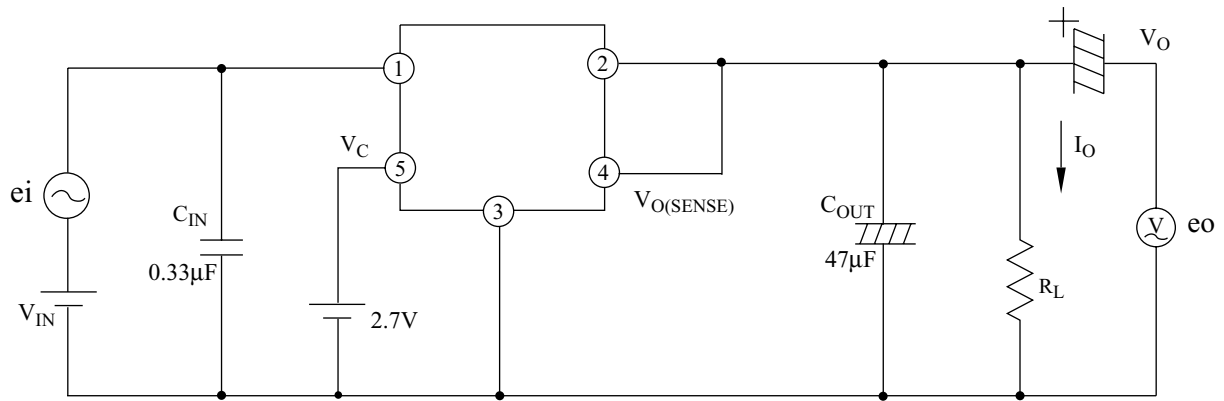
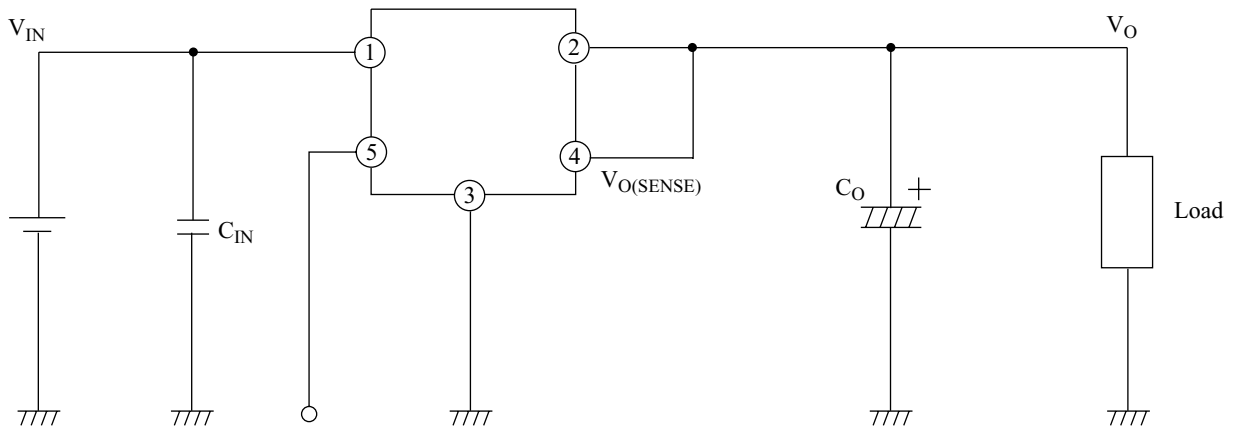


Fig. 2 Ripple Rejection Test Circuit



* Test Condition : $f=120\text{Hz}$, $e_i = 0.5\text{Vrms}$, $R.R=20.\log(e_i/e_o)$

Fig. 3 Application Circuit for Standard



On/off signal

High	: Output ON
Low	: Output OFF
Open	: Output OFF

C_{IN} : More than 0.33 μF 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 μF . You must use the Low-impedance-type(low ESR) capacitor

KIA78R015FP~KIA78R050FP

ELECTRICAL CHARACTERISTICS

KIA78R015FP (Unless otherwise specified, $V_{IN}=3.8V$, $T_j=25^\circ C$)

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
		$2.8V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	1.434	1.5	1.566	
Line Regulation	Reg Line	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=3.8V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_B	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=3.8V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	75	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $2.8V \leq V_{IN} \leq 12V$	-	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

KIA78R018FP (Unless otherwise specified, $V_{IN}=3.8V$, $T_j=25^\circ C$)

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
		$2.8V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	1.732	1.8	1.868	
Line Regulation	Reg Line	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=3.8V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=3.8V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	75	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$2.8V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $2.8V \leq V_{IN} \leq 12V$	-	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

KIA78R015FP~KIA78R050FP

ELECTRICAL CHARACTERISTICS

KIA78R020FP (Unless otherwise specified, $V_{IN}=4V$, $T_j=25^\circ C$)

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
		$3.0V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	1.93	2.0	2.07	
Line Regulation	Reg Line	$3.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=4V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$3.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$3.0V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=4V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	80	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$3.0V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $3.0V \leq V_{IN} \leq 12V$	-	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

KIA78R025FP (Unless otherwise specified, $V_{IN}=4.5V$, $T_j=25^\circ C$)

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
		$3.5V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	2.412	2.5	2.588	
Line Regulation	Reg Line	$3.5V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=4.5V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$3.5V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$3.5V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=4.5V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	95	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$3.5V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $3.5V \leq V_{IN} \leq 12V$	-	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

KIA78R015FP~KIA78R050FP

ELECTRICAL CHARACTERISTICS

KIA78R030FP (Unless otherwise specified, $V_{IN}=5V$, $T_j=25^\circ C$)

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
		$4.0V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	2.895	3.0	3.105	
Line Regulation	Reg Line	$4.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=5.0V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$4.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$4.0V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=5.0V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	110	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$4.0V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $4.0V \leq V_{IN} \leq 12V$	-	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

KIA78R033FP (Unless otherwise specified, $V_{IN}=5.3V$, $T_j=25^\circ C$)

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
		$4.3V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	3.184	3.3	3.416	
Line Regulation	Reg Line	$4.3V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=5.3V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$4.3V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$4.3V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=5.3V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	115	-	μV_{rms}
Ripple Rejection	$R \cdot R$	$4.3V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $4.3V \leq V_{IN} \leq 12V$	-	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

KIA78R015FP~KIA78R050FP

ELECTRICAL CHARACTERISTICS

KIA78R050FP (Unless otherwise specified, $V_{IN}=7V$, $T_j=25^\circ C$)

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
		$6.0V \leq V_{IN} \leq 12V$, $5mA \leq I_{OUT} \leq 1A$, $0^\circ C \leq T_j \leq 125^\circ C$	4.83	5.0	5.17	
Line Regulation	Reg Line	$6.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0.5A$	-	5	20	mV
Load Regulation	Reg Load	$V_{IN}=7.0V$, $5mA \leq I_{OUT} \leq 1A$	-	5	20	mV
Quiescent Current	I_Q	$6.0V \leq V_{IN} \leq 12V$, $I_{OUT}=0A$	-	0.8	1.8	mA
		$6.0V \leq V_{IN} \leq 12V$, $I_{OUT}=1A$	-	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}	$V_{IN}=7.0V$, $I_{OUT}=50mA$, $10Hz \leq f \leq 100kHz$	-	150	-	μV_{rms}
Ripple Rejection	R · R	$6.0V \leq V_{IN} \leq 12V$, $I_{OUT}=50mA$, $f=120Hz$	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)	$I_{Q(OFF)}$	$V_C=0.4V$, $6.0V \leq V_{IN} \leq 12V$	-	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

KIA78R015FP~KIA78R050FP

Fig. 6 $V_{OUT} - T_j$

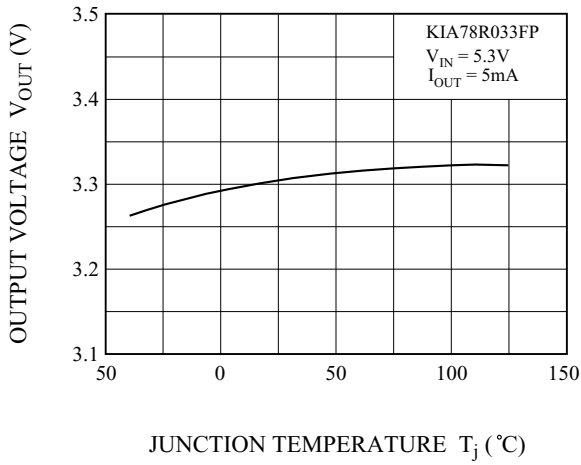


Fig. 7 $V_{OUT} - V_{IN}$

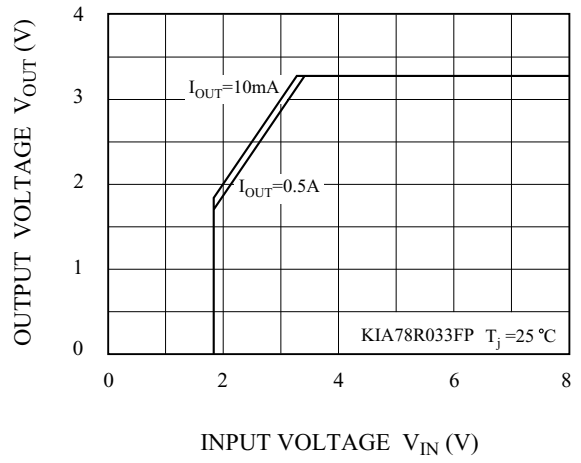


Fig. 8 $I_B - V_{IN}$

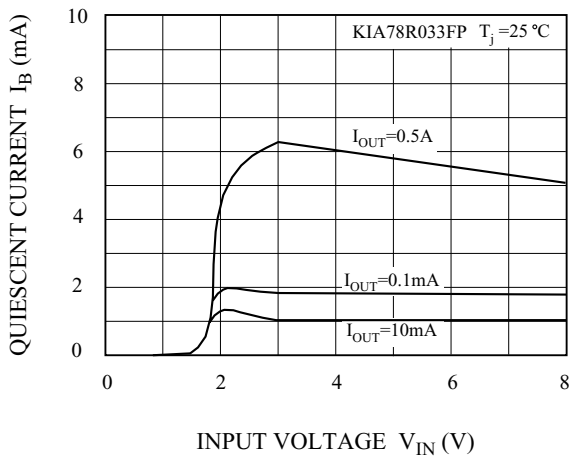


Fig. 9 $I_B - T_j$

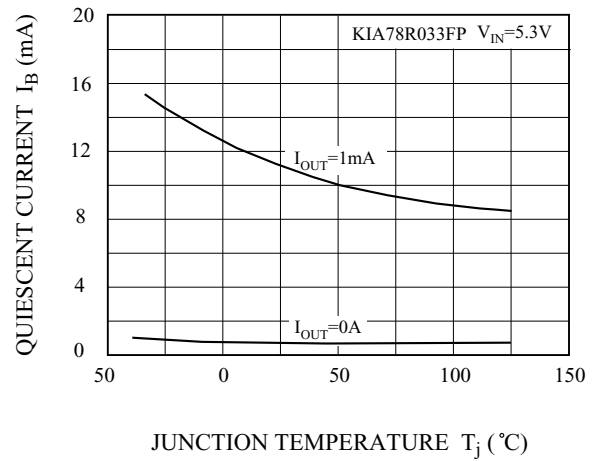


Fig. 10 $I_B - I_{OUT}$

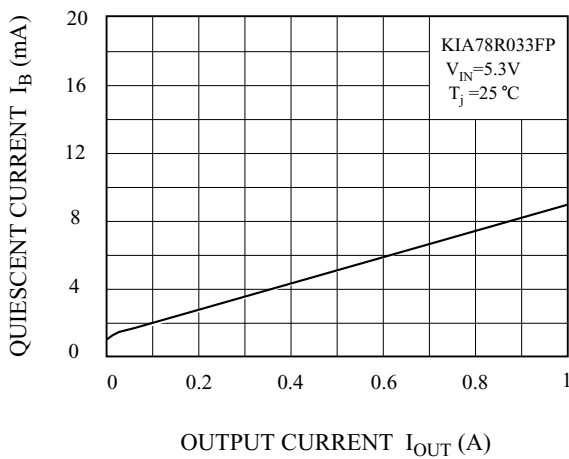
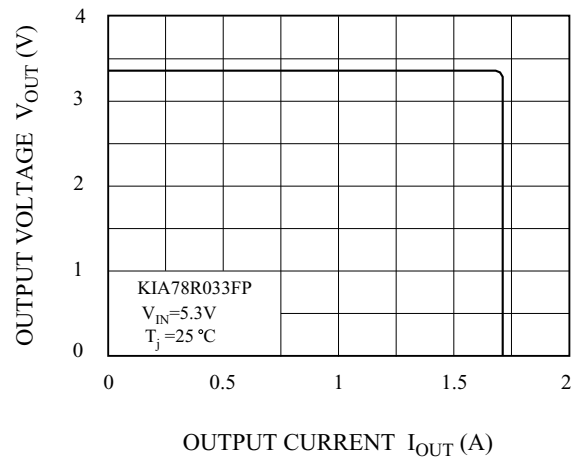


Fig. 11 $V_{OUT} - I_{OUT}$



KIA78R015FP~KIA78R050FP

Fig.12 $V_D - T_j$

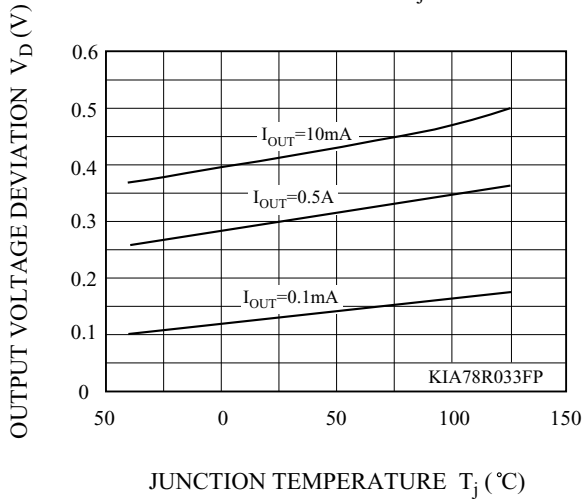


Fig.13 RR - f

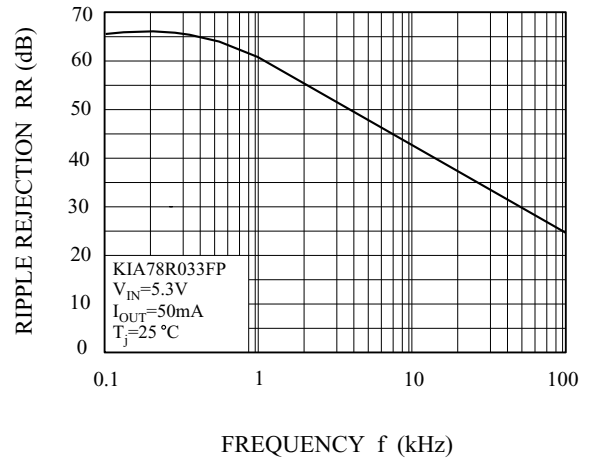


Fig. 14 $P_D - T_a$

