

## 2A LOW DROPOUT VOLTAGE REGULATOR [Low Quiescent Current Type]

### FEATURES

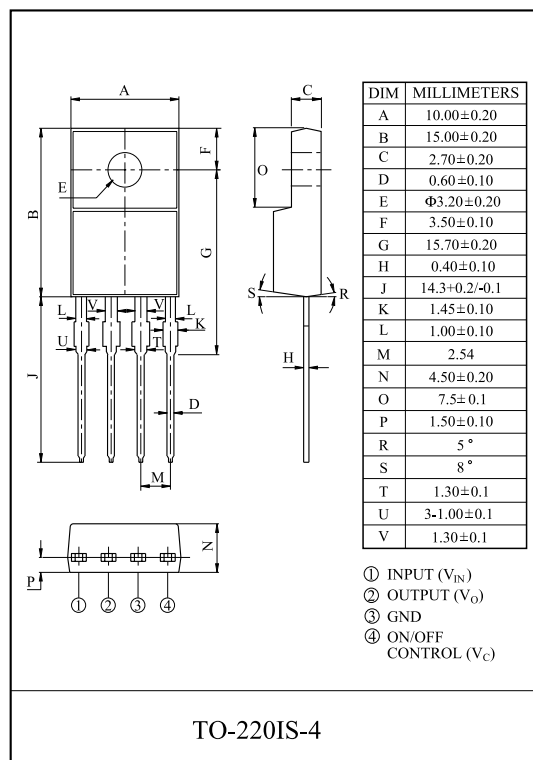
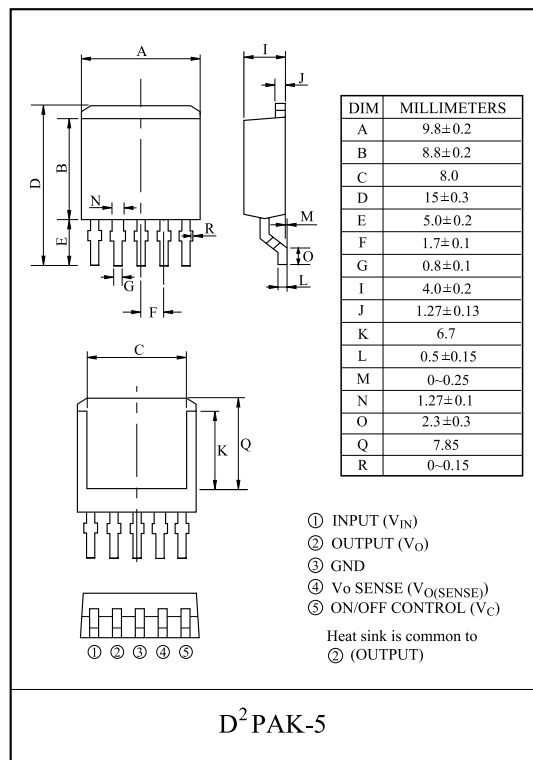
- 2.0A Output Low Dropout Voltage Regulator.
- Very Low Dropout Voltage : 0.5V/Max ( $I_{OUT}=2.0A$ )
- Built-in ON/OFF Control terminal. : Active High
- Built in Over Current, Over Heat Protection ASO Protection Functions.
- Low Quiescent Current (Output OFF Mode) : 0.5 $\mu$ A(Typ.)
- Low Voltage Operation :  $V_{OPR(MIN)}=2.35V$ .

### LINE UP

ITEM	OUTPUT VOLTAGE (Typ.)	PACKAGE
KIA278R015FP/PI	1.5	FP : D <sup>2</sup> PAK-5 PI : TO-220IS-4
KIA278R018FP/PI	1.8	
KIA278R020FP/PI	2.0	
KIA278R025FP/PI	2.5	
KIA278R030FP/PI	3.0	
KIA278R033FP/PI	3.3	
KIA278R050FP/PI	5.0	

### MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage		$V_{IN}$	15	V
ON/OFF Control Voltage		$V_C$	15	V
Output Current		$I_{OUT}$	2.0	A
Power Dissipation-1 (No Heatsink)	FP	$P_{D1}$	2.0	W
	PI		1.5	
Power Dissipation-2 (Infinite Heatsink)	FP	$P_{D2}$	35	W
	PI		15	
Junction Temperature		$T_j$	150	°C
Operating Junction Temperature		$T_{opr}$	-20 ~ 80	°C
Storage Temperature		$T_{stg}$	-30 ~ 150	°C



# KIA278R015FP/PI~KIA278R050FP/PI

## KIA278R015FP~KIA278R050FP (D<sup>2</sup>PAK-5)

Fig. 1 Test Circuit

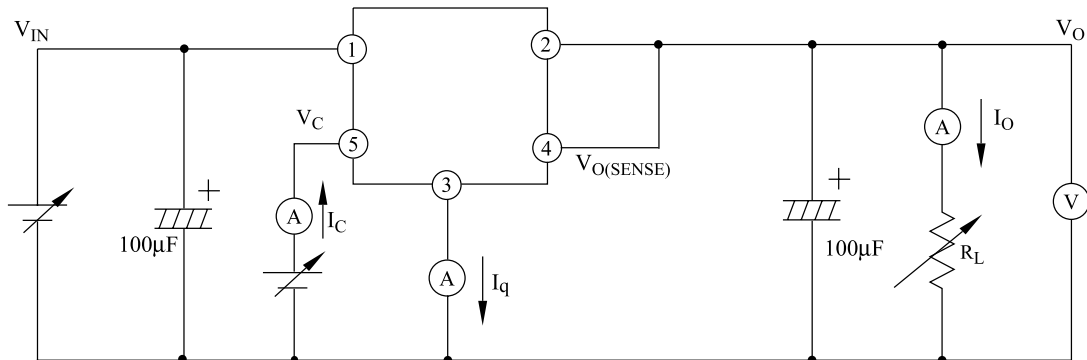
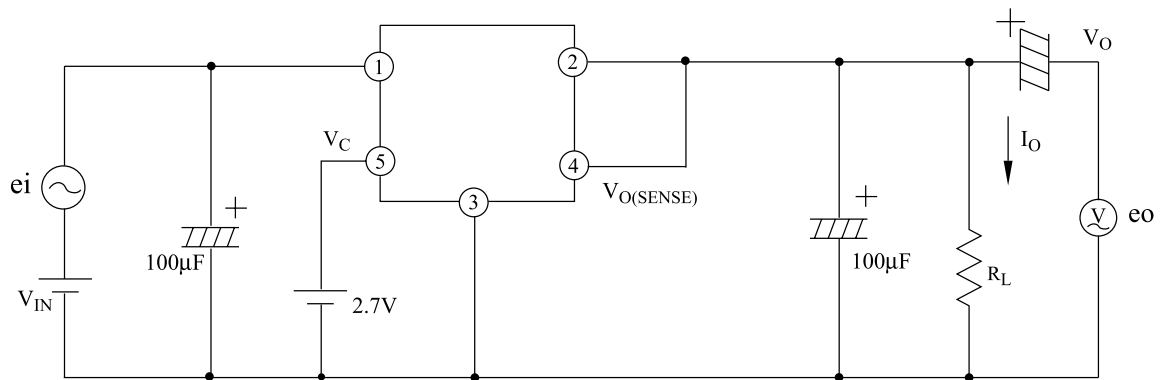
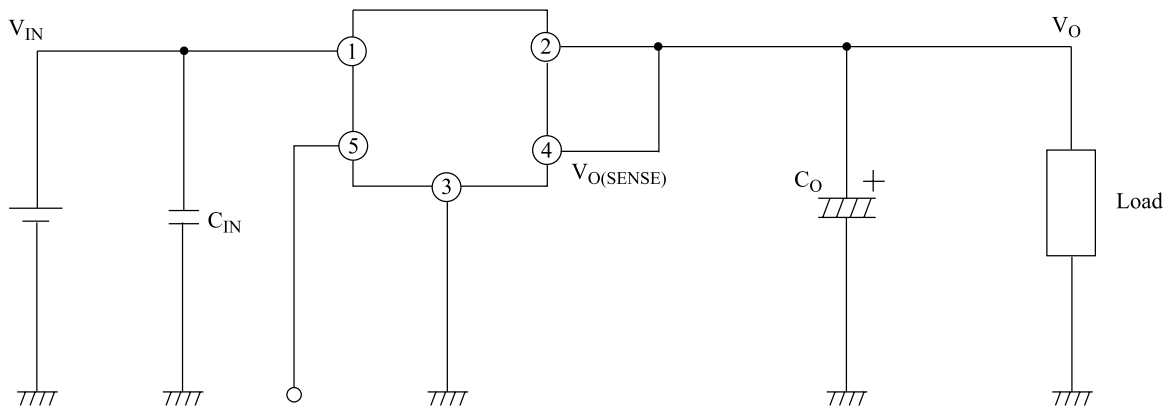


Fig. 2 Ripple Rejection Test Circuit



\* 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 ]

# KIA278R015FP/PI~KIA278R050FP/PI

## KIA278R015PI~KIA278R050PI (TO-220IS-4)

Fig. 1 Test Circuit

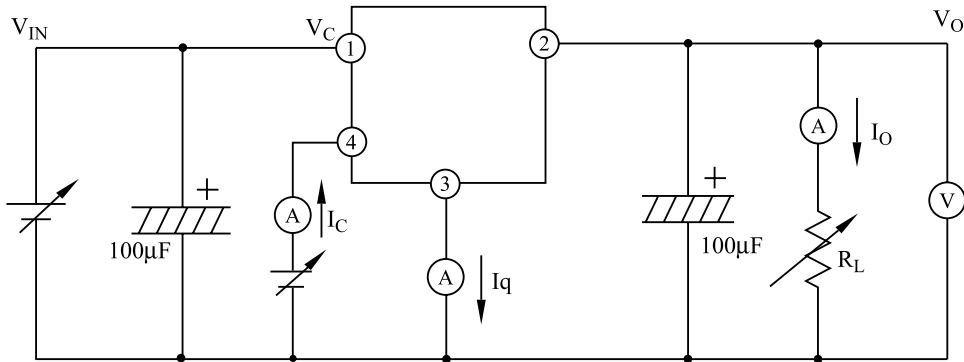
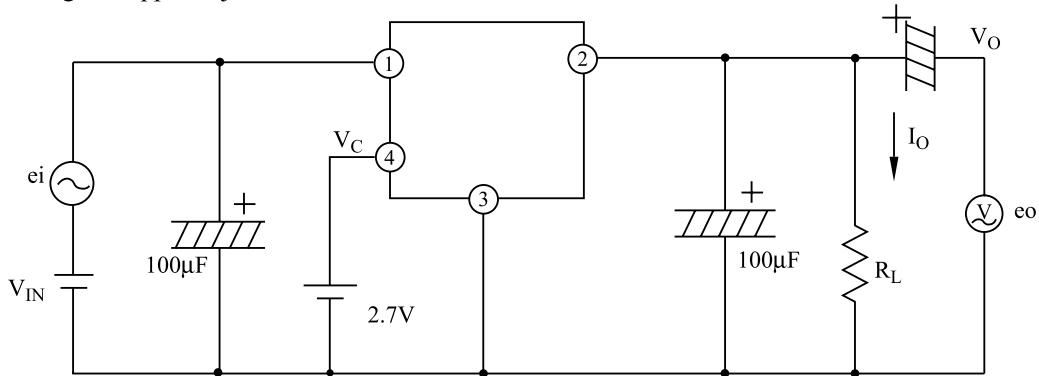
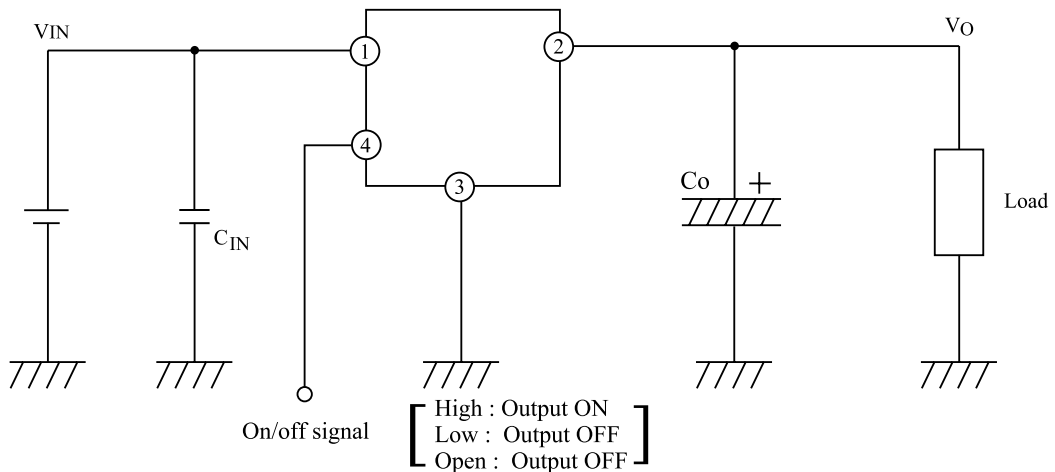


Fig. 2 Ripple Rejection Test Circuit



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

Fig. 3 Application Circuit for Standard



# KIA278R015FP/PI~KIA278R050FP/PI

## ELECTRICAL CHARACTERISTICS (KIA278R015)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	$V_{IN}$	-	2.35	-	7	V
Output Voltage	$V_O$	-	1.45	1.50	1.55	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

## ELECTRICAL CHARACTERISTICS (KIA278R018)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	$V_{IN}$	-	2.35	-	7	V
Output Voltage	$V_O$	-	1.75	1.8	1.85	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

# KIA278R015FP/PI~KIA278R050FP/PI

## ELECTRICAL CHARACTERISTICS (KIA278R020)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	-	1.95	2.0	2.05	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Dropout Voltage	$V_D$	$I_O=2A$	-	-	0.5	V
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

## ELECTRICAL CHARACTERISTICS (KIA278R025)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	-	2.438	2.50	2.562	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6.5V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Dropout Voltage	$V_D$	$I_O=2A$	-	-	0.5	V
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

# KIA278R015FP/PI~KIA278R050FP/PI

## ELECTRICAL CHARACTERISTICS (KIA278R030)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	-	2.925	3.0	3.075	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=3.5V \sim 7V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Dropout Voltage	$V_D$	$I_O=2A$	-	-	0.5	V
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

## ELECTRICAL CHARACTERISTICS (KIA278R033)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	-	3.218	3.30	3.382	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=3.8V \sim 7V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Dropout Voltage	$V_D$	$I_O=2A$	-	-	0.5	V
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

# KIA278R015FP/PI~KIA278R050FP/PI

## ELECTRICAL CHARACTERISTICS (KIA278R050)

(Unless otherwise specified,  $V_{IN}=V_O+1V$ ,  $I_O=1A$ ,  $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	-	4.88	5.0	5.12	V
Load Regulation	Reg Load	$I_O=5mA \sim 2.0A$	-	0.2	2.0	%
Line Regulation	Reg Line	$V_{IN}=5.5V \sim 7V$ , $I_O=5mA$	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$ , $I_O=5mA$	-	$\pm 0.02$	$\pm 0.05$	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$ , $f=120Hz$ , $V_{ripple}=0.5V_{rms}$	45	60	-	dB
Dropout Voltage	$V_D$	$I_O=2A$	-	-	0.5	V
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2.0	$\mu A$
Quiescent Current	$I_Q$	$I_O=0A$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$ , $I_O=0A$	-	0.5	5	$\mu A$

# KIA278R015FP/PI~KIA278R050FP/PI

Fig. 4  $I_O - V_O$  (KIA278R015)

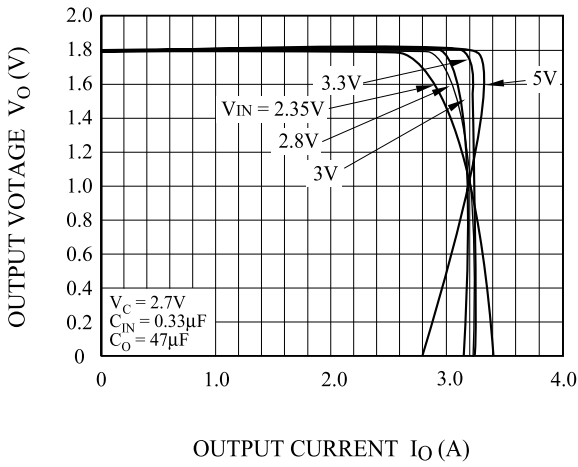


Fig. 5  $I_O - V_O$  (KIA278R018)

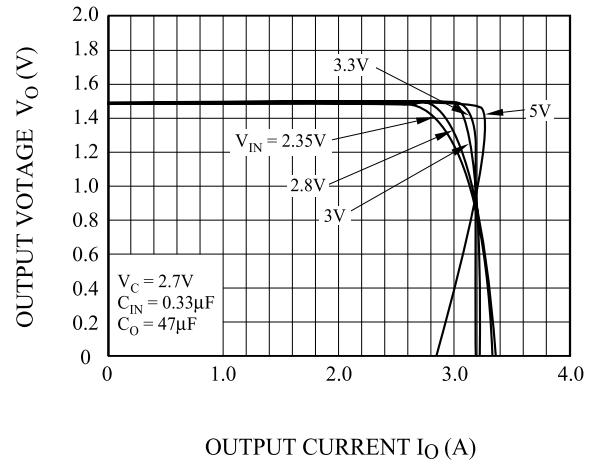


Fig. 6  $I_O - V_O$  (KIA278R025)

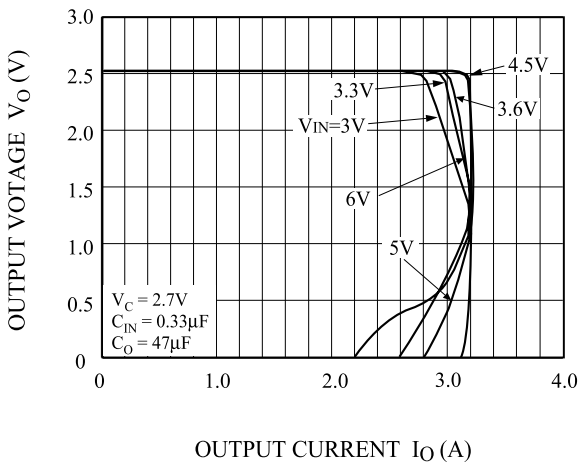


Fig. 7  $T_j - \Delta V_O$  (KIA278R015)

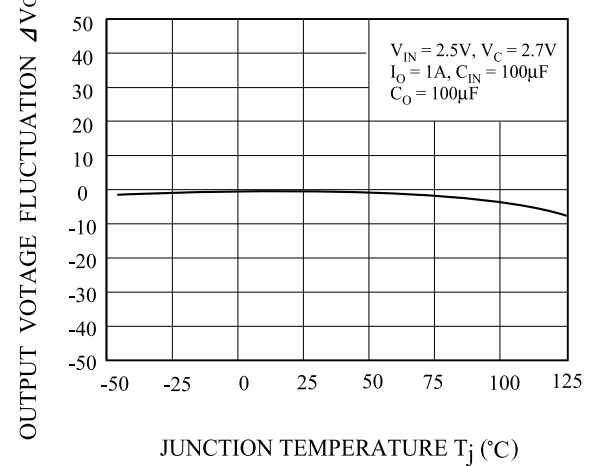


Fig. 8  $T_j - \Delta V_O$  (KIA278R018)

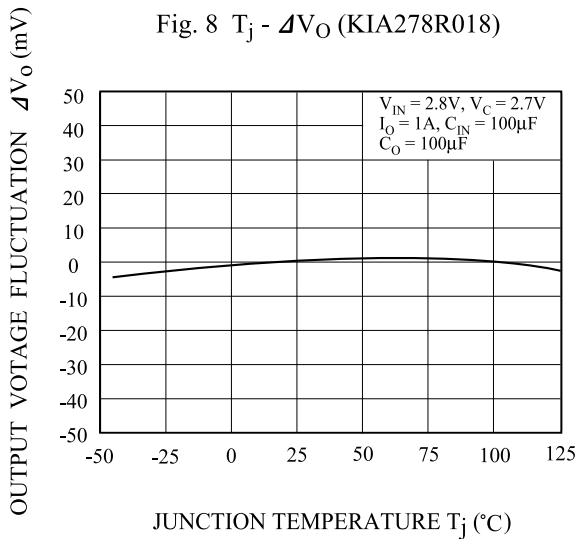
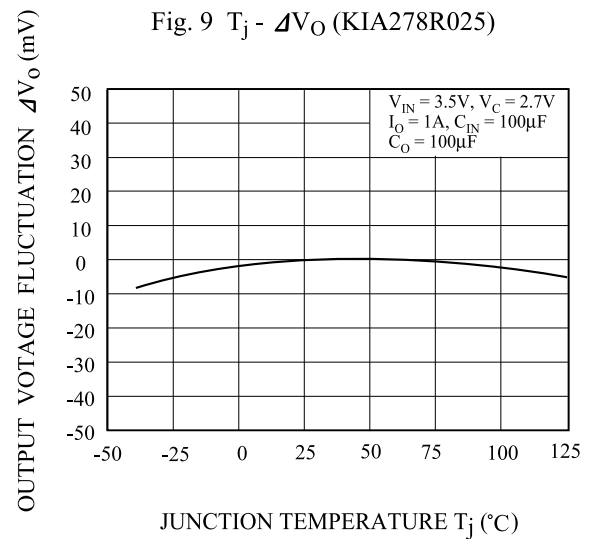


Fig. 9  $T_j - \Delta V_O$  (KIA278R025)





# KIA278R015FP/PI~KIA278R050FP/PI

Fig. 10  $V_{IN} - V_{OUT}$  (KIA278R015)

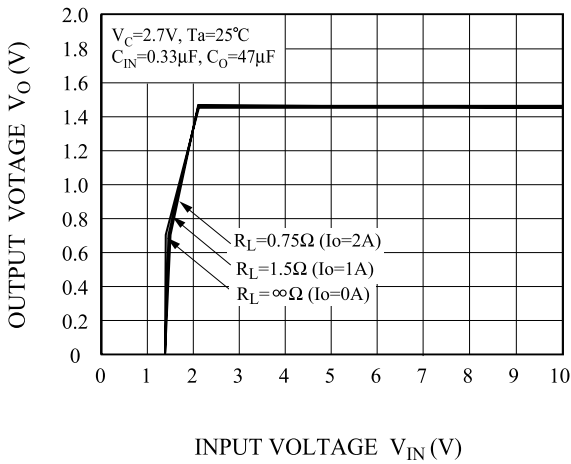


Fig. 11  $V_{IN} - V_{OUT}$  (KIA278R018)

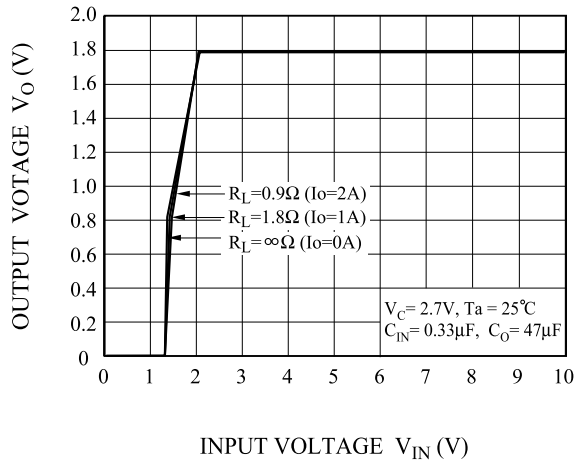


Fig. 12  $V_{IN} - V_{OUT}$  (KIA278R025)

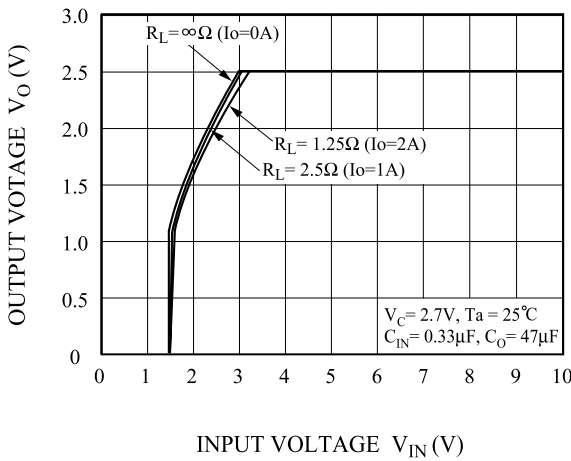


Fig. 13  $V_{IN} - I_{BIAS}$  (KIA278R015)

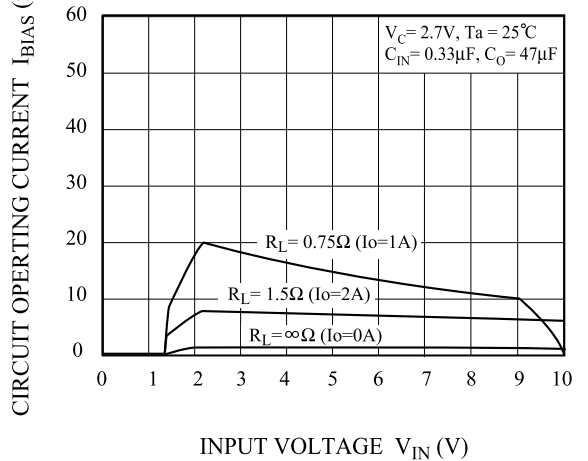


Fig. 14  $V_{IN} - I_{BIAS}$  (KIA278R018)

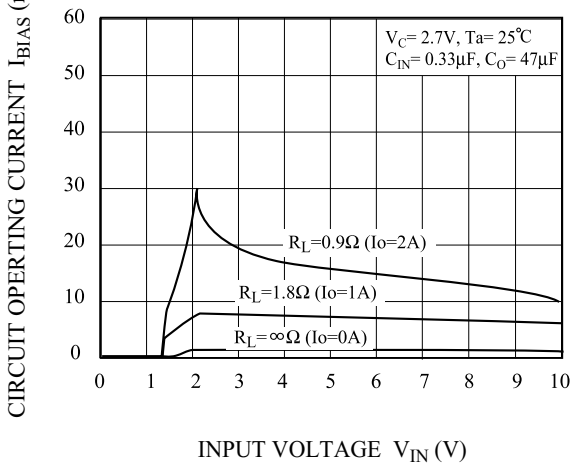
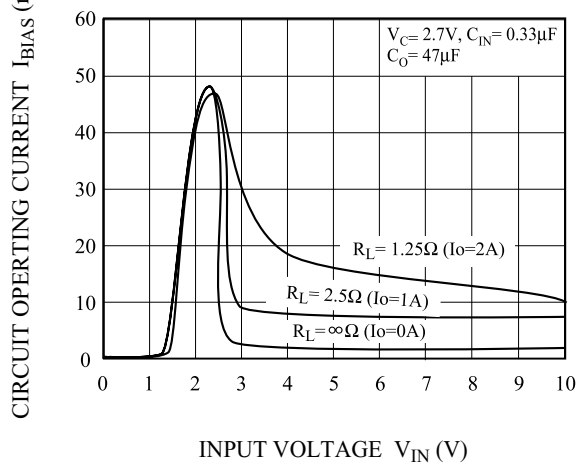


Fig. 15  $V_{IN} - I_{BIAS}$  (KIA278R025)



# KIA278R015FP/PI~KIA278R050FP/PI

Fig. 16  $T_j - I_q$

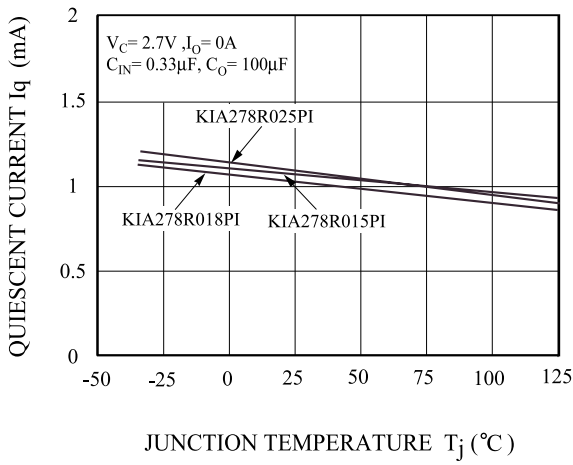


Fig. 17  $T_j - V_C$  (ON/OFF)

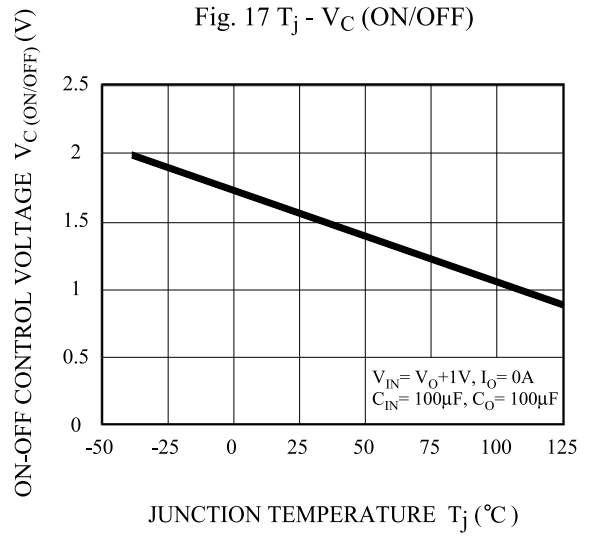


Fig.18  $f_{rip} - RR$

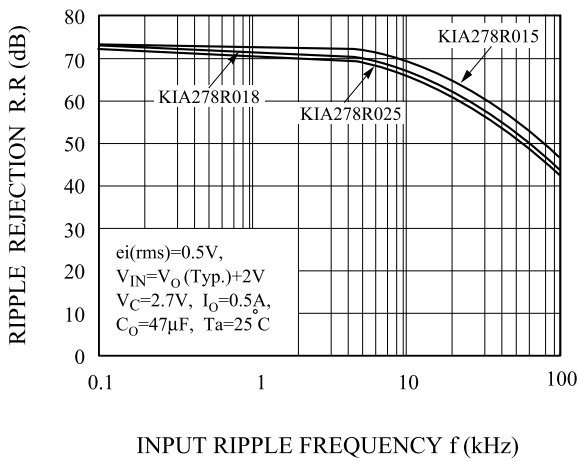


Fig. 19  $I_{OUT} - RR$

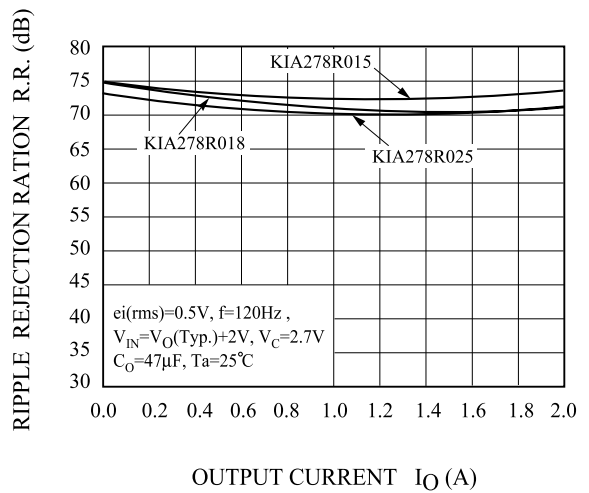


Fig. 21  $P_D - T_a$  (D<sup>2</sup>PAK-5)

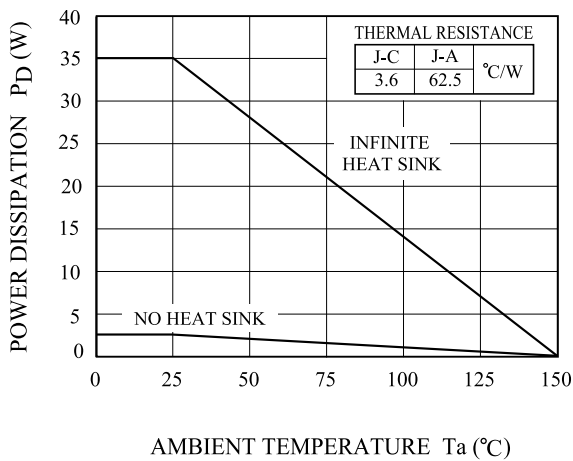


Fig. 20  $P_D - T_a$  (TO-220IS-4)

