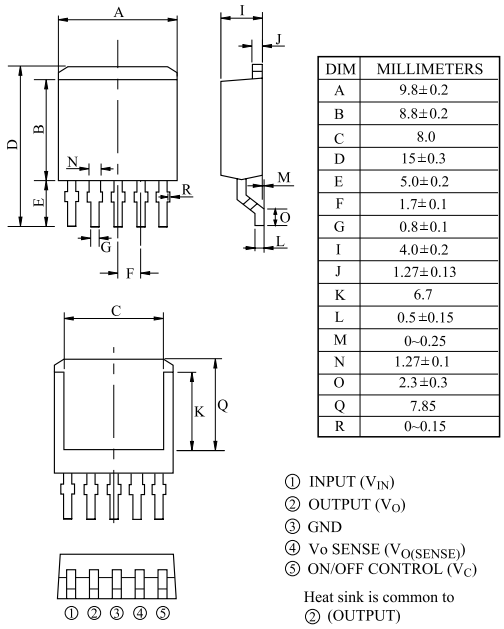
KIA278R015FP/PI~ KIA278R050FP/PI

BIPOLAR LINEAR INTEGRATED CIRCUIT

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) : 0.5μA(Typ.)
- Low Voltage Operation : $V_{OPR(MIN)}$=2.35V.



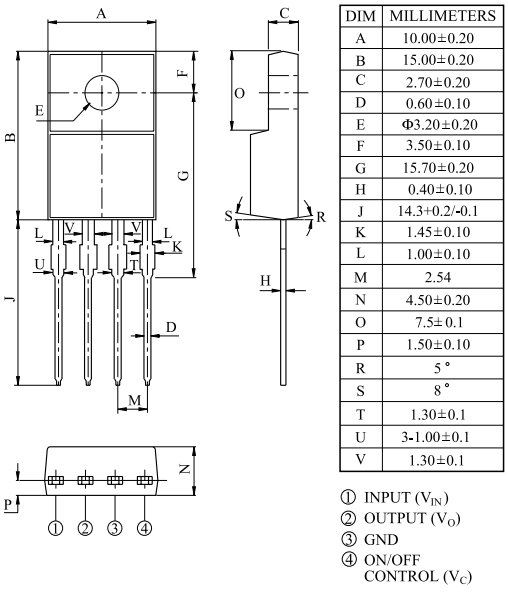
DIM	MILLIMETERS
A	9.8±0.2
B	8.8±0.2
C	8.0
D	15±0.3
E	5.0±0.2
F	1.7±0.1
G	0.8±0.1
I	4.0±0.2
J	1.27±0.13
K	6.7
L	0.5±0.15
M	0~0.25
N	1.27±0.1
O	2.3±0.3
Q	7.85
R	0~0.15

① INPUT (V_{IN})
② OUTPUT (V_O)
③ GND
④ Vo SENSE ($V_{O(SENSE)}$)
⑤ ON/OFF CONTROL (V_C)
Heat sink is common to ② (OUTPUT)

D^{2}PAK-5

LINE UP

ITEM	OUTPUT VOLTAGE (Typ.)	PACKAGE
KIA278R015FP/PI	1.5	FP : D^{2}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	



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)

TO-220IS-4

MAXIMUM RATINGS (Ta=25℃)

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	℃
Operating Junction Temperature		T_{opr}	-20～80	℃
Storage Temperature		T_{stg}	-30～150	℃

KIA278R015FP~KIA278R050FP (D²PAK-5)

Fig. 1 Test Circuit

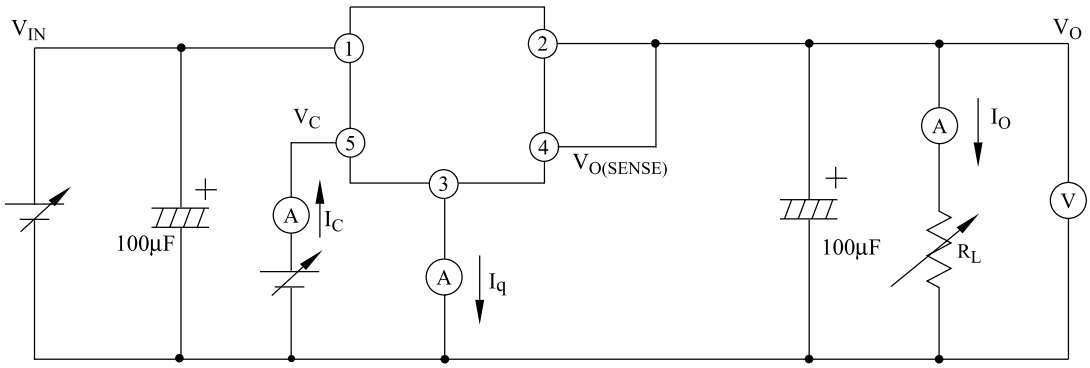
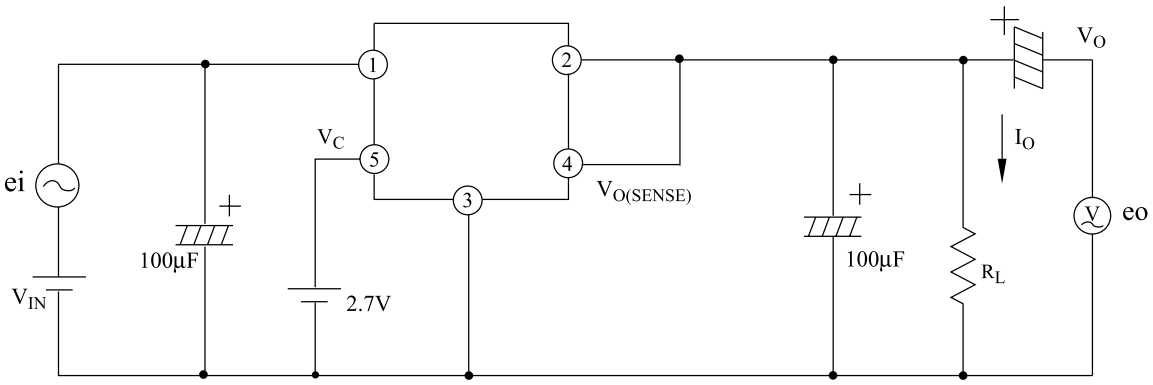
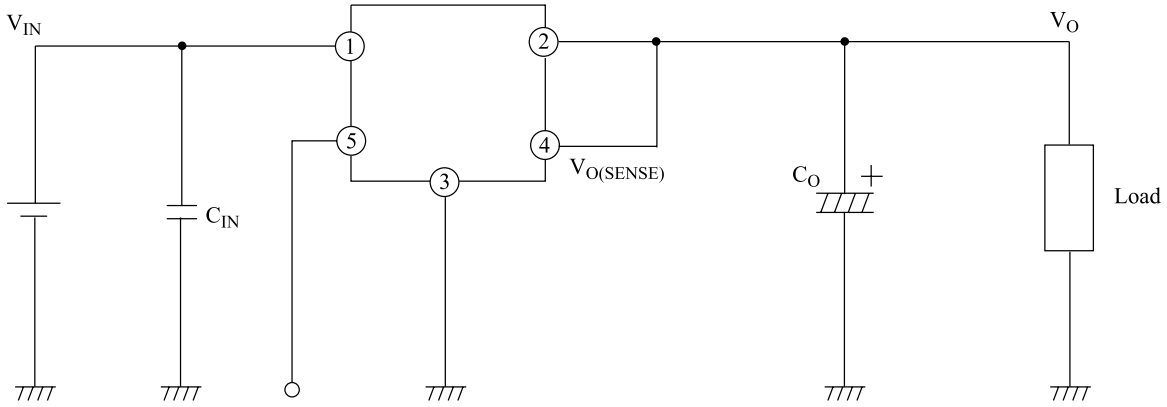


Fig. 2 Ripple Rejection Test Circuit



* Test Condition : f=120Hz, ei = 0.5Vrms, R.R=20.log(ei/eo)

Fig. 3 Application Circuit for Standard



On/off signal [High : Output ON
Low : Output OFF
Open : Output OFF]

KIA278R015PI~KIA278R050PI (TO-220IS-4)

Fig. 1 Test Circuit

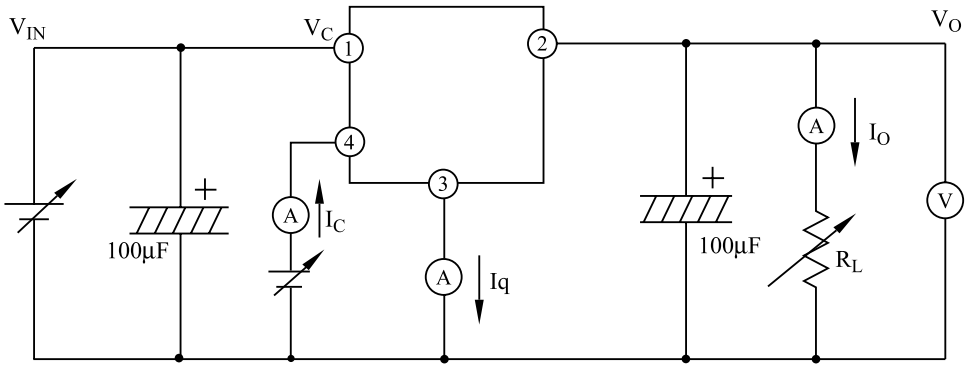
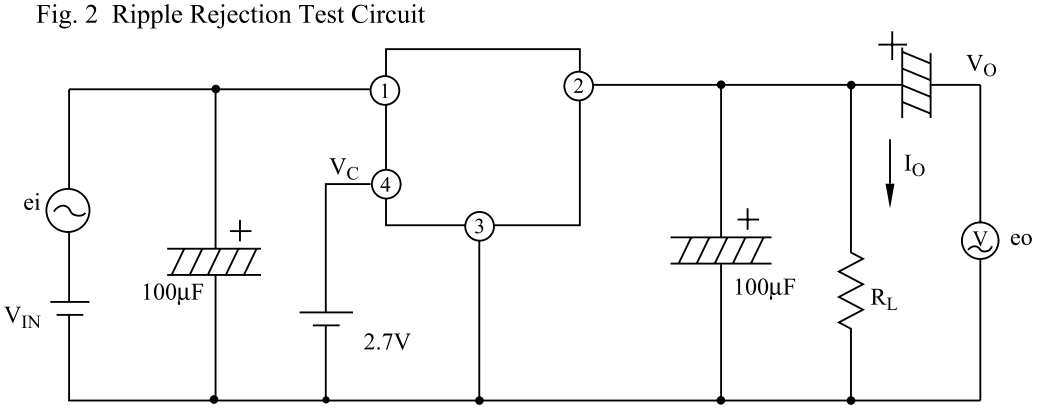
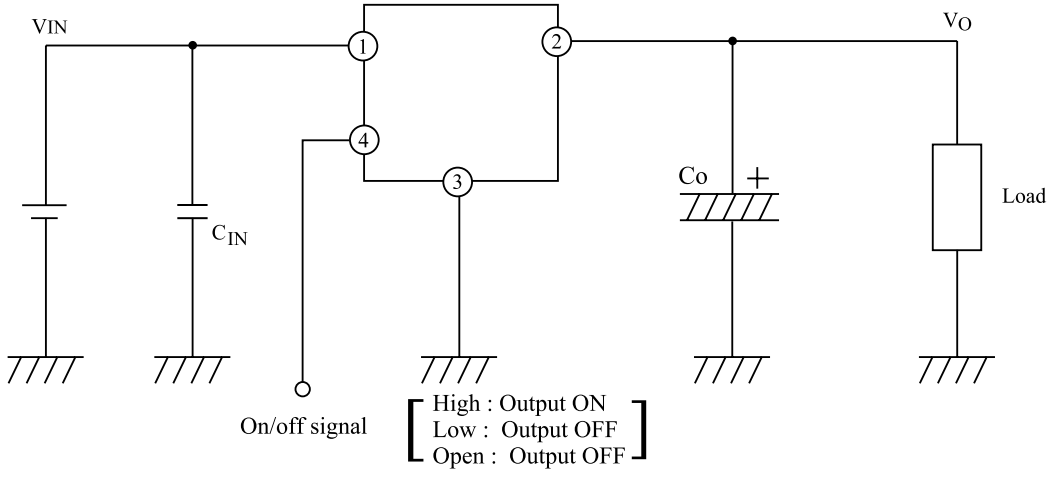


Fig. 2 Ripple Rejection Test Circuit



* Test Condition : f=120Hz, ei = 0.5Vrms, R.R=20.log(ei/eo)

Fig. 3 Application Circuit for Standard



ELECTRICAL CHARACTERISTICS (KIA278R015)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=2.5V~5.5V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R018)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=2.5V~5.5V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R020)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=3V~6V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R025)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=3V~6.5V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R030)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=3.5V~7V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R033)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=3.8V~7V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

ELECTRICAL CHARACTERISTICS (KIA278R050)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1A$, Ta=25℃)

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～2.0A	-	0.2	2.0	%
Line Regulation	Reg Line	V_{IN}=5.5V~7V, I_O=5mA	-	0.05	1.0	%
Temperature Coefficient of Output Voltage	T_CV_O	Tj=0～125℃, I_O=5mA	-	±0.02	±0.05	%/℃
Ripple Rejection	R · R	I_{OUT}=0.5A, f=120Hz, V_{ripple}=0.5Vrms	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	μA
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	μA
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	μA

Fig. 4 I_O - V_O (KIA278R015)

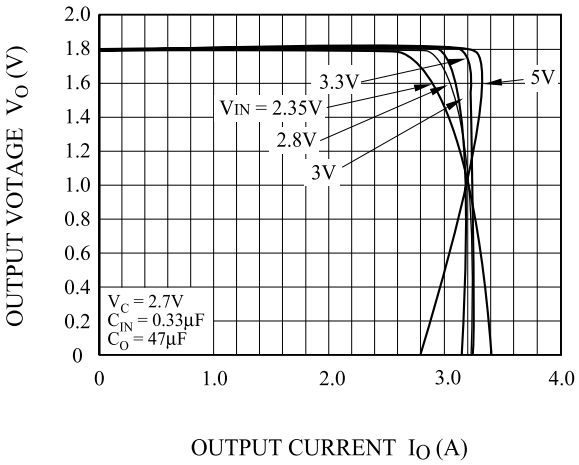


Fig. 5 I_O - V_O (KIA278R018)

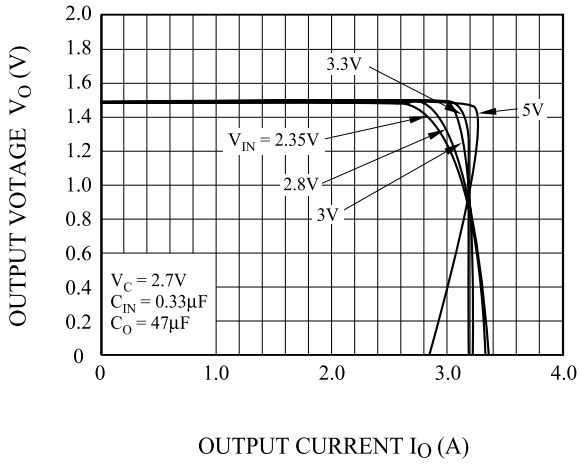


Fig. 6 I_O - V_O (KIA278R025)

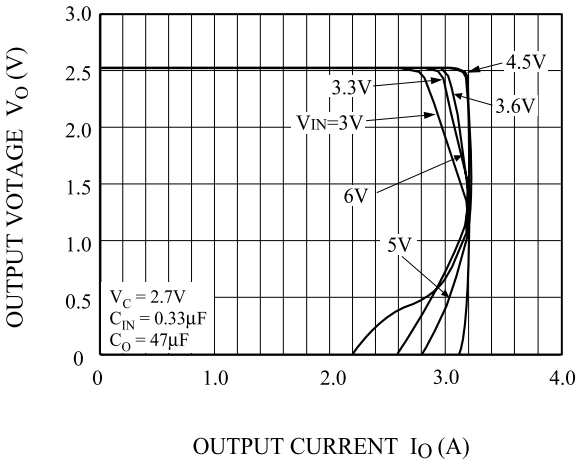


Fig. 7 T_j - ΔV_O (KIA278R015)

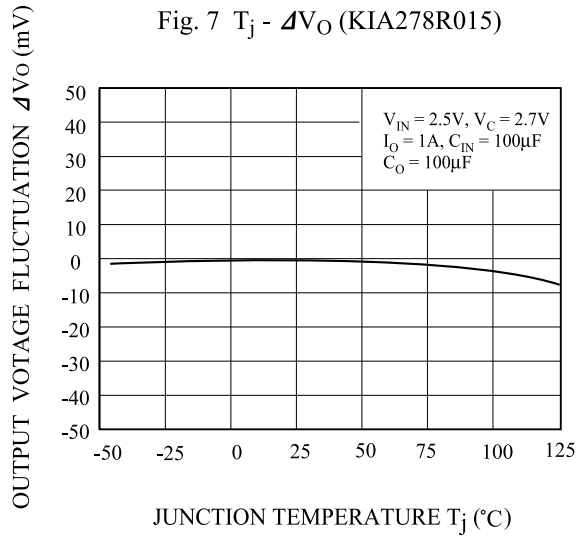


Fig. 8 T_j - ΔV_O (KIA278R018)

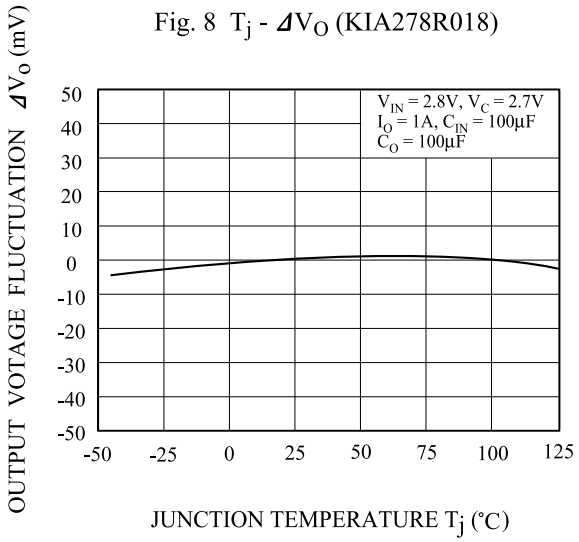


Fig. 9 T_j - ΔV_O (KIA278R025)

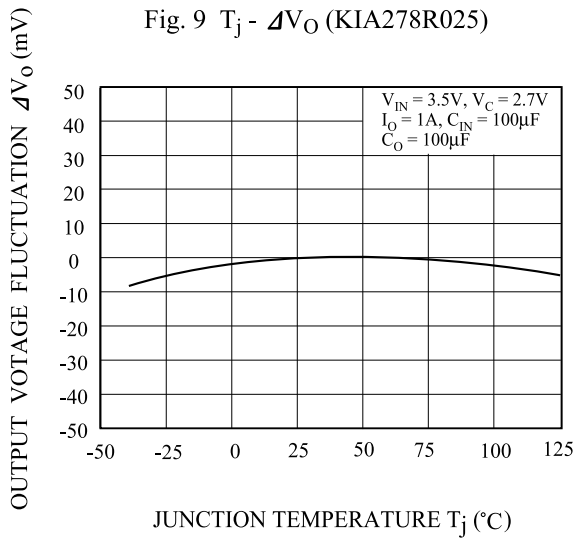


Fig. 10 V_{IN} - V_{OUT} (KIA278R015)

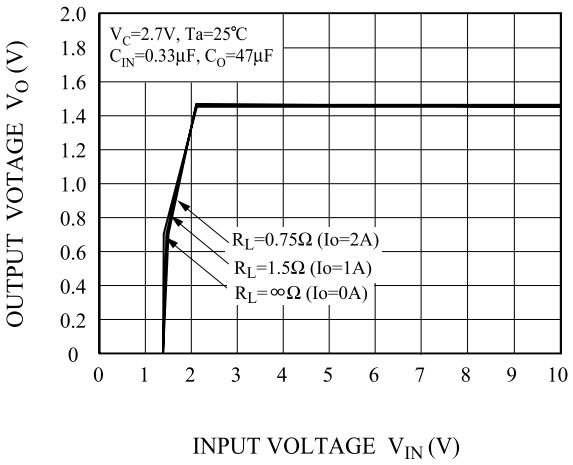


Fig. 11 V_{IN} - V_{OUT} (KIA278R018)

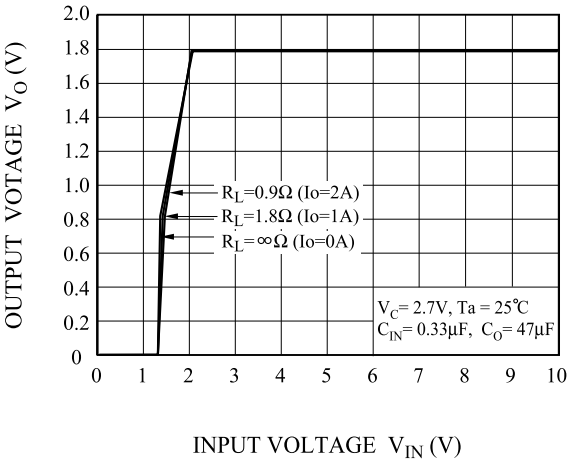


Fig. 12 V_{IN} - V_{OUT} (KIA278R025)

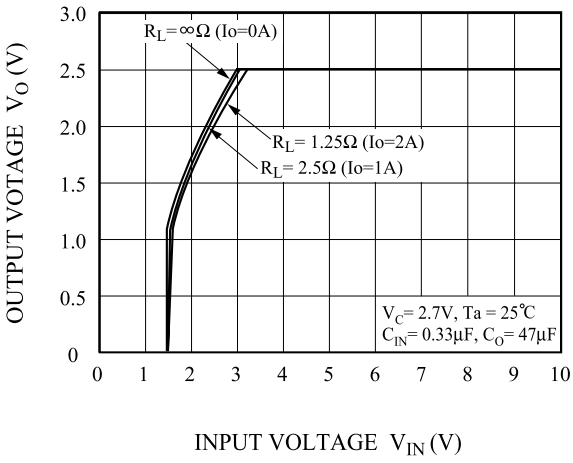


Fig. 13 V_{IN} - I_{BIAS} (KIA278R015)

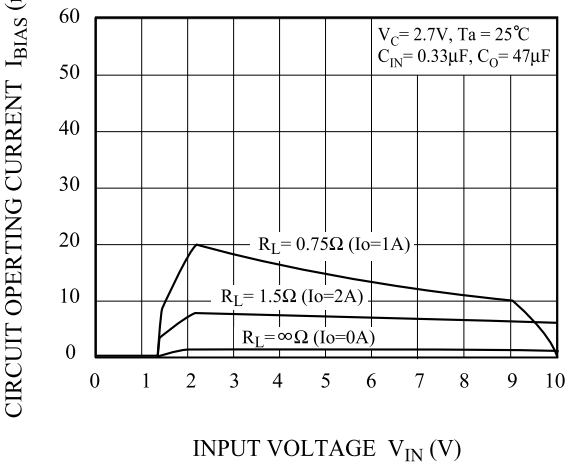


Fig. 14 V_{IN} - I_{BIAS} (KIA278R018)

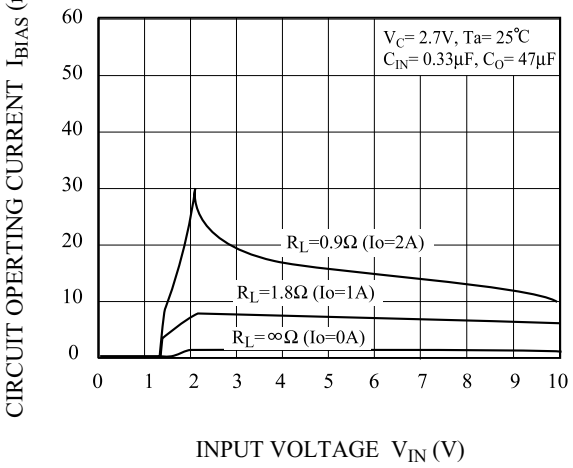


Fig. 15 V_{IN} - I_{BIAS} (KIA278R025)

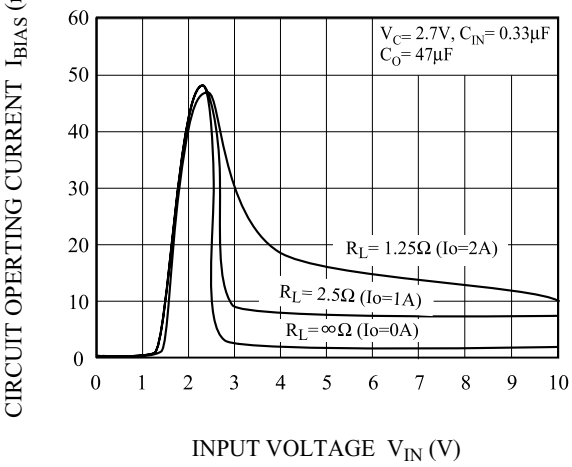


Fig. 16 T_j - Iq

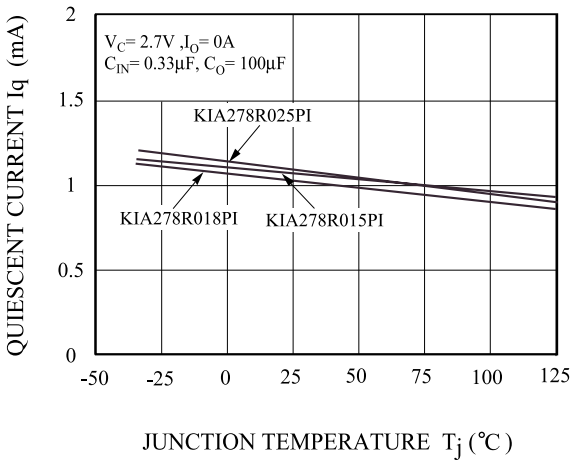


Fig. 17 T_j - V_C (ON/OFF)

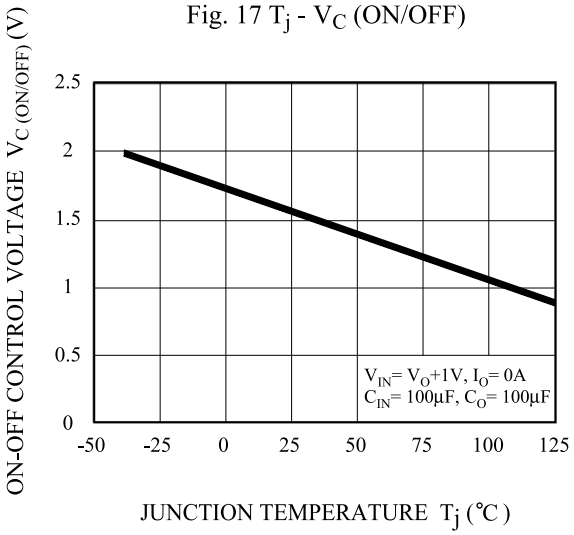


Fig.18 f_{rip} - RR

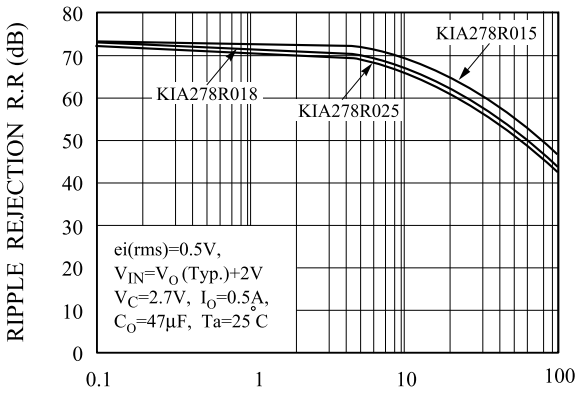


Fig. 19 I_{OUT} - RR

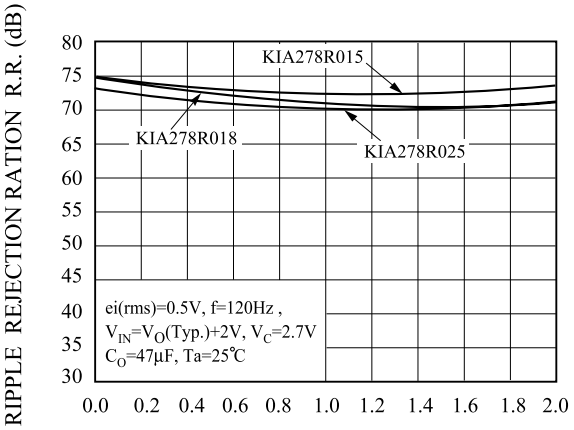


Fig. 21 P_D - Ta (D^2PAK-5)

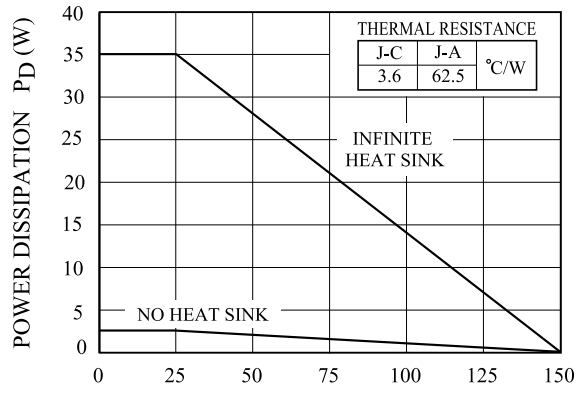


Fig. 20 P_D - Ta (TO-220IS-4)