

5A LOW DROPOUT VOLTAGE REGULATOR [Low Quiescent Current Type]

The KIA578R × × Series are Low Dropout Voltage Regulator suitable for various electronic equipments. The Regulator has multi-function such as over current protection, overheat heat protection.

FEATURES

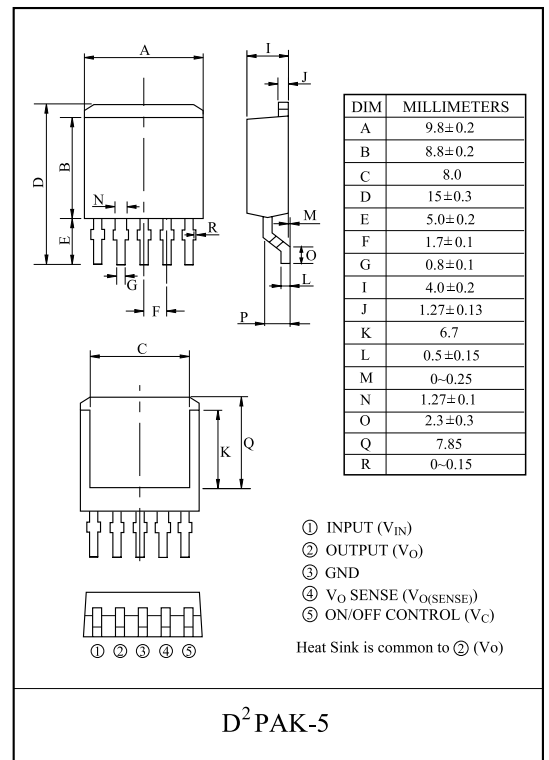
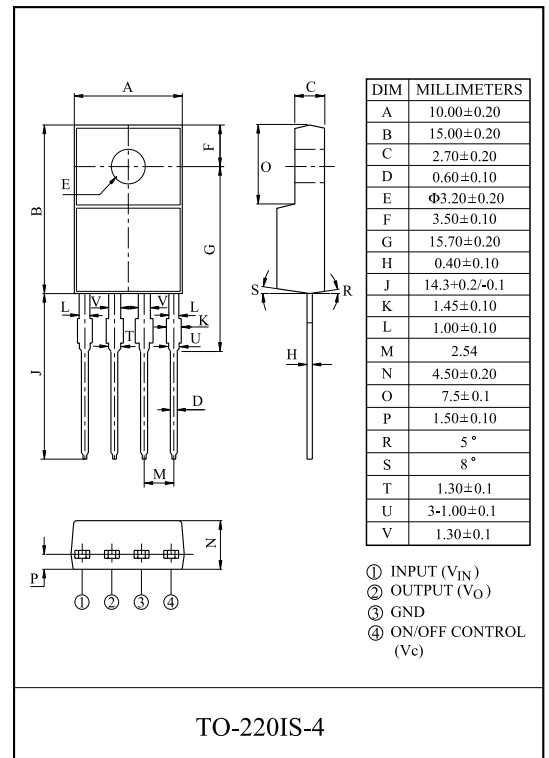
- 5.0A Output Low Dropout Voltage Regulator.
- Very Low Dropout Voltage : 0.5V/Max. ($I_{OUT}=5.0A$)
- Built in ON/OFF Control Terminal. (Active High)
- Built in Over Current Over Heat Protection, ASO Protection Functions.
- Low Quiescent Current (Output OFF Mode) : 0.5 μ A(Typ.)

LINE UP

ITEM	OUTPUT VOLTAGE (Typ.)	PACKAGE
KIA578R015FP/PI	1.5	FP:D ² PAK-5 PI:TO-220IS-4
KIA578R018FP/PI	1.8	
KIA578R020FP/PI	2.0	
KIA578R025FP/PI	2.5	
KIA578R030FP/PI	3.0	
KIA578R033FP/PI	3.3	
KIA578R050FP/PI	5.0	

MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage		V_{IN}	16	V
ON/OFF Control Voltage		V_C	16	V
Output Current		I_{OUT}	5	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}	-55 ~ 150	°C



KIA578R015FP/PI~KIA578R050FP/PI

[D²PAK-5]

Fig. 1 Test Circuit

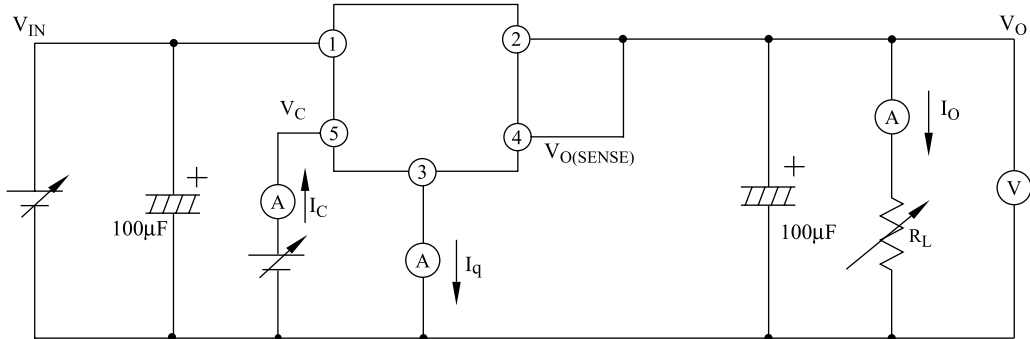
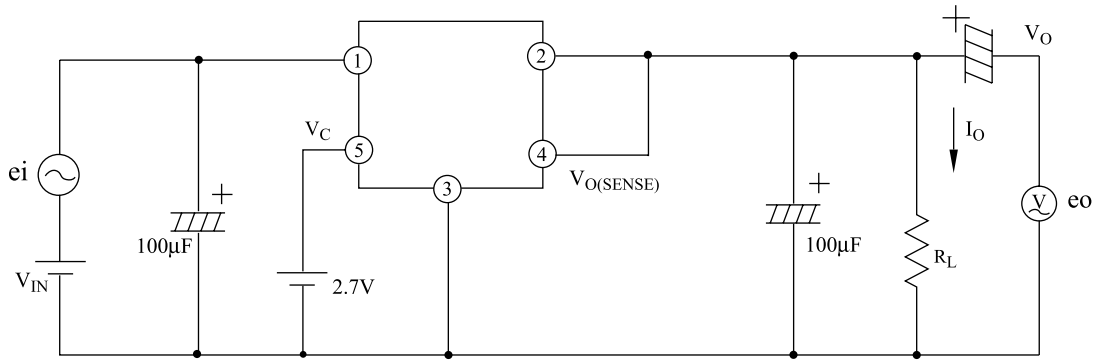
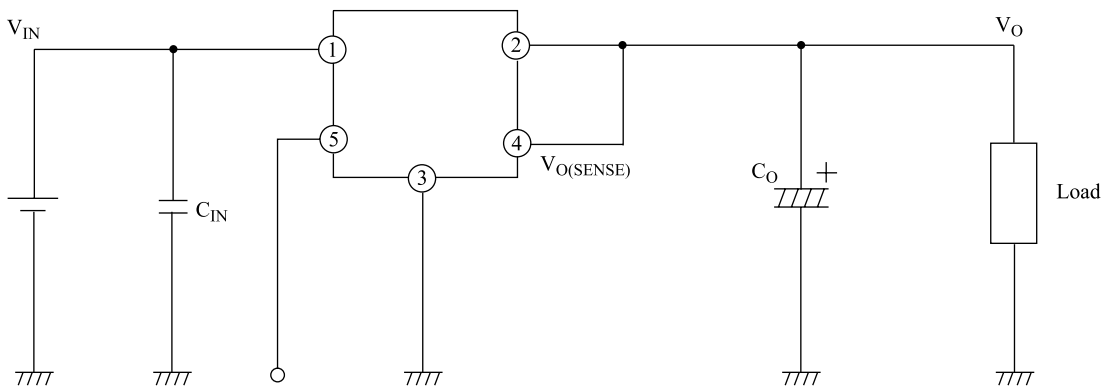


Fig. 2 Ripple Rejection Test Circuit



* 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]

KIA578R015FP/PI~KIA578R050FP/PI

[TO-220IS-4]

Fig. 1 Test Circuit

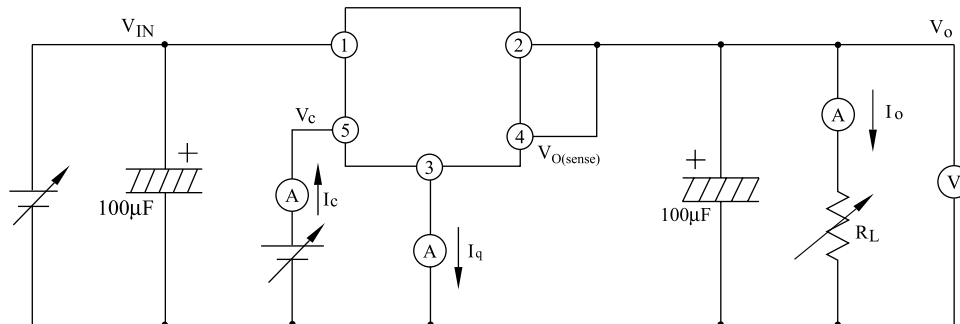


Fig. 2 Ripple Rejection Test Circuit

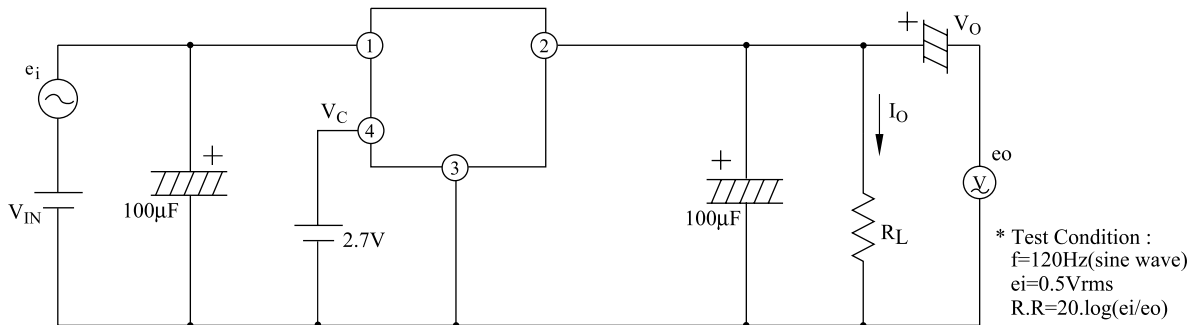
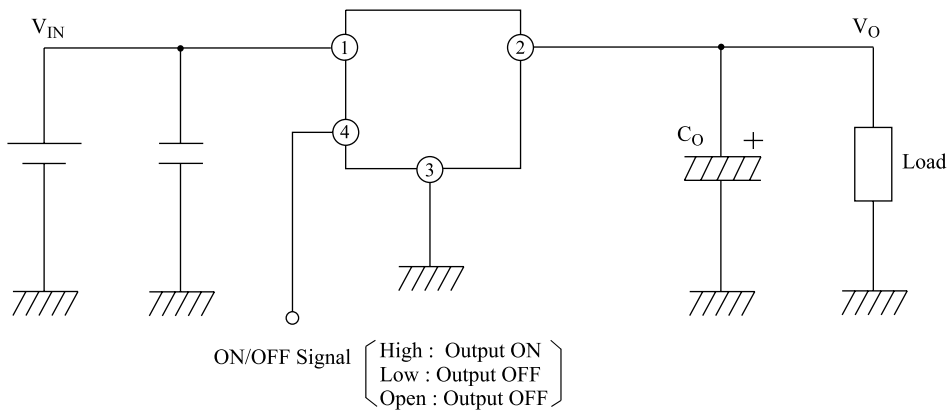


Fig. 3 Application Circuit for Standard



KIA578R015FP/PI~KIA578R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA578R015)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	-	2.35	-	16	V
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	1.45	1.50	1.55	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=3.3V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

ELECTRICAL CHARACTERISTICS (KIA578R018)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	-	2.35	-	16	V
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	1.75	1.8	1.85	V
Load Regulation	Reg Load	$I_O=5mA \sim 3.5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=3.3V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

KIA578R015FP/PI~KIA578R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA578R020)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	V_{IN}	-	2.35	-	16	V
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	1.95	2.0	2.05	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=3.3V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

ELECTRICAL CHARACTERISTICS (KIA578R025)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	2.438	2.50	2.562	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6.5V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=3.3V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

KIA578R015FP/PI~KIA578R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA578R030)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	2.925	3.0	3.075	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=3.5V \sim 7V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	R · R	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=5V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

ELECTRICAL CHARACTERISTICS (KIA578R033)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^\circ C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	3.218	3.30	3.382	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=3.8V \sim 7V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^\circ C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^\circ C$
Ripple Rejection	R · R	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=5V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

KIA578R015FP/PI~KIA578R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA578R050)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=2.5A$, connects $V_{O(SENSE)}$ terminal to V_O terminal, $T_a=25^{\circ}C$.)

CHARACTERISTIC	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O	Contacts $V_{O(SENSE)}$ terminal to V_O terminal	4.88	5.0	5.12	V
Load Regulation	Reg Load	$I_O=5mA \sim 5A$	-	0.2	2	%
Line Regulation	Reg Line	$V_{IN}=5.5V \sim 7V$, $I_O=5mA$	-	0.1	1	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_j=0 \sim 125^{\circ}C$, $I_O=5mA$	-	± 0.02	± 0.05	%/ $^{\circ}C$
Ripple Rejection	$R \cdot R$	$I_{OUT}=0.5A$, $f=120Hz$, $V_{ripple}=0.5V_{rms}$, $V_{IN}=5V$	60	70	-	dB
Output ON state for control Voltage	$V_{C(ON)}$	-	2.0	-	-	V
Output ON state for control Current	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA
Output OFF state for control Voltage	$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA
Quiescent Current	I_Q	$I_O=0$	-	1	2	mA
Quiescent Current (OFF Mode)	$I_{Q(OFF)}$	$V_C=0.4V$	-	0.1	5	μA

KIA578R015FP/PI~KIA578R050FP/PI

Fig.4 $I_O - V_O$

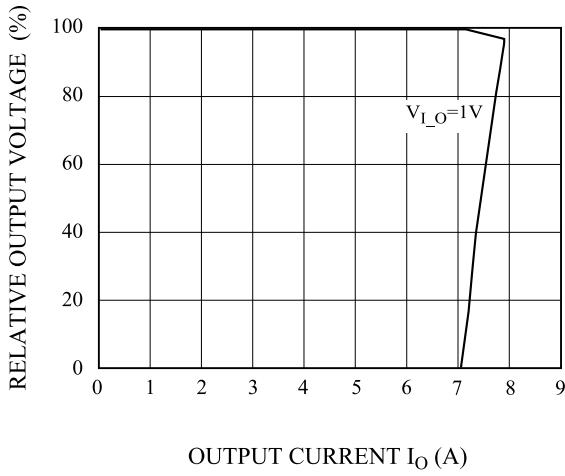


Fig.5 $T_a - \Delta V_O$ (KIA578R025)

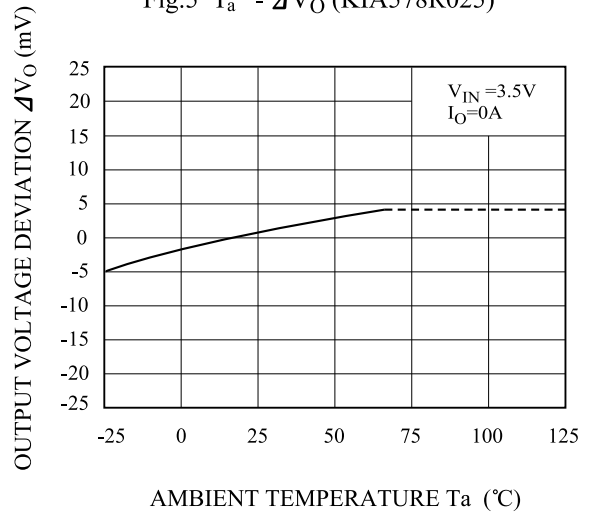


Fig.6 $V_{IN} - V_O$ (KIA578R015)

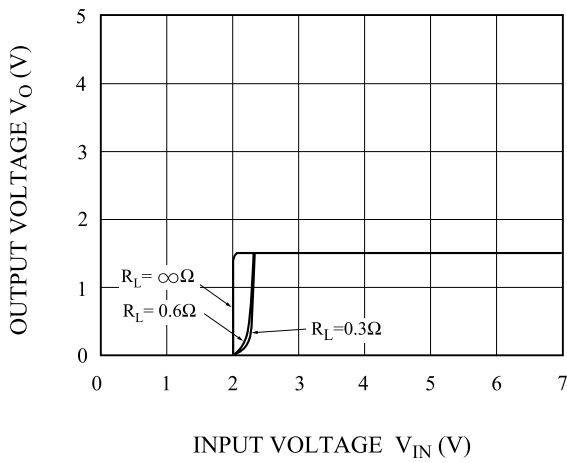


Fig.7 $V_{IN} - V_O$ (KIA578R025)

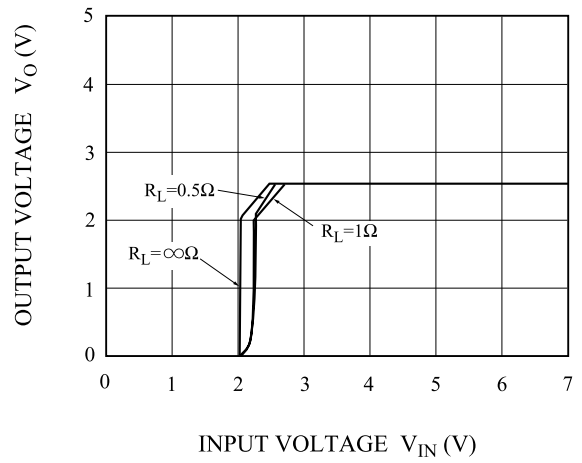


Fig.8 $V_{IN} - I_{BIAS}$ (KIA578R015)

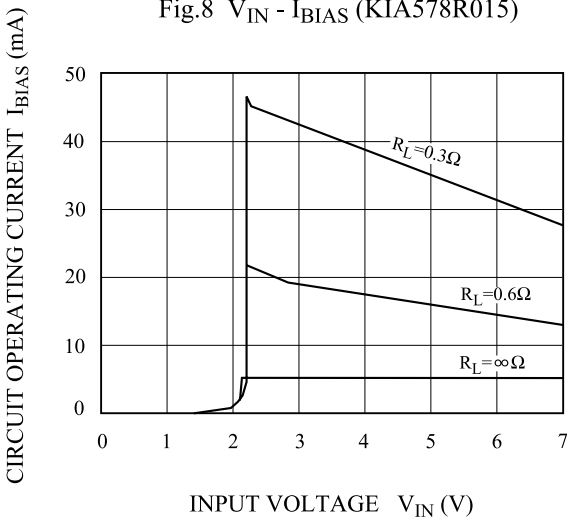
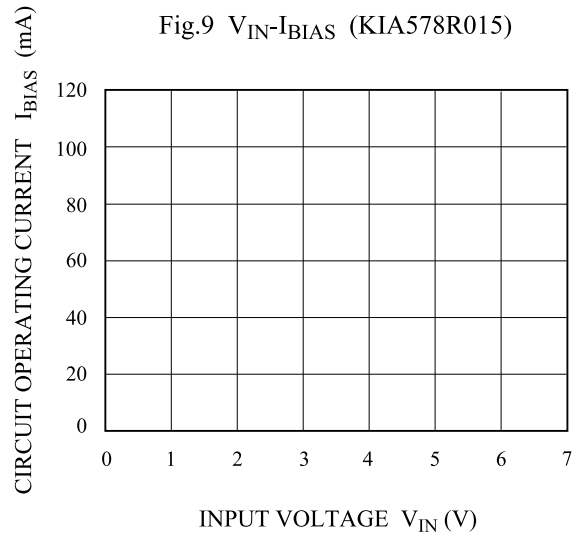


Fig.9 $V_{IN} - I_{BIAS}$ (KIA578R015)



KIA578R015FP/PI~KIA578R050FP/PI

Fig. 10 f_{in} - RR

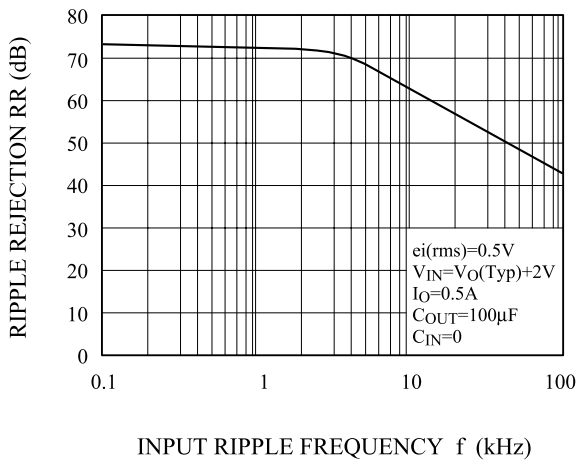


Fig.11 P_D - T_a

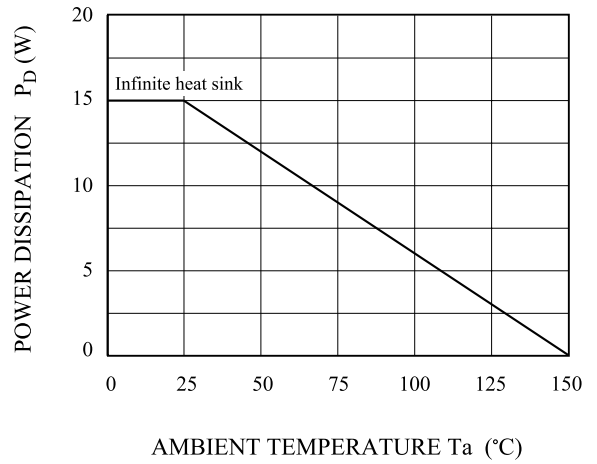


Fig. 12 P_D - T_a (D²PAK-5)

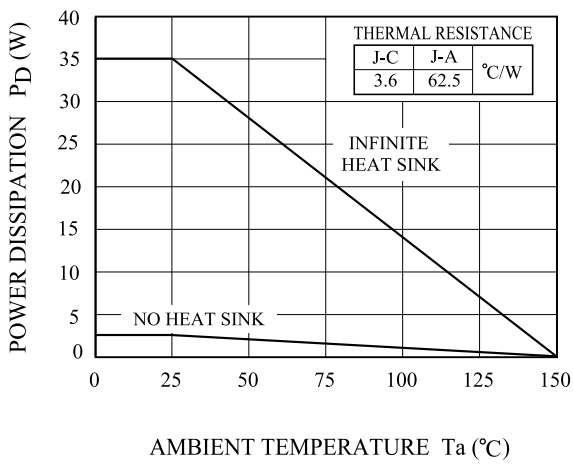


Fig. 13 P_D - T_a (TO-220IS-4)

