

3.5A LOW DROPOUT VOLTAGE REGULATOR [Low Quiescent Current Type]

The KIA378R × × × 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

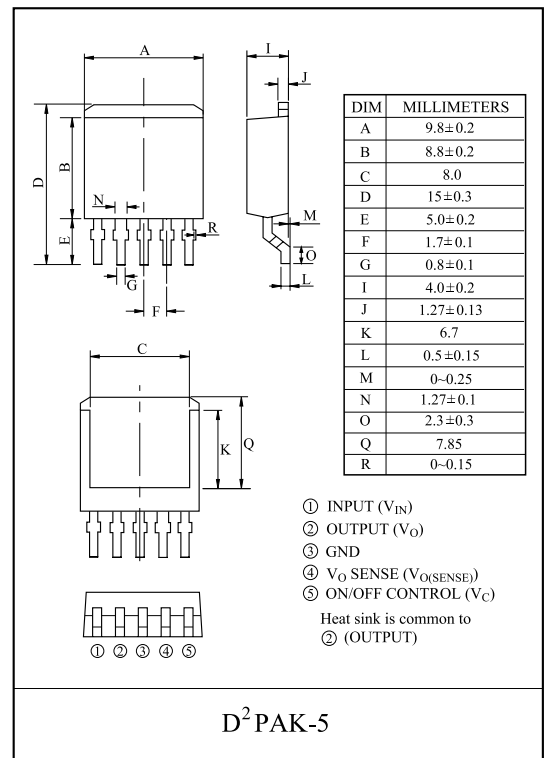
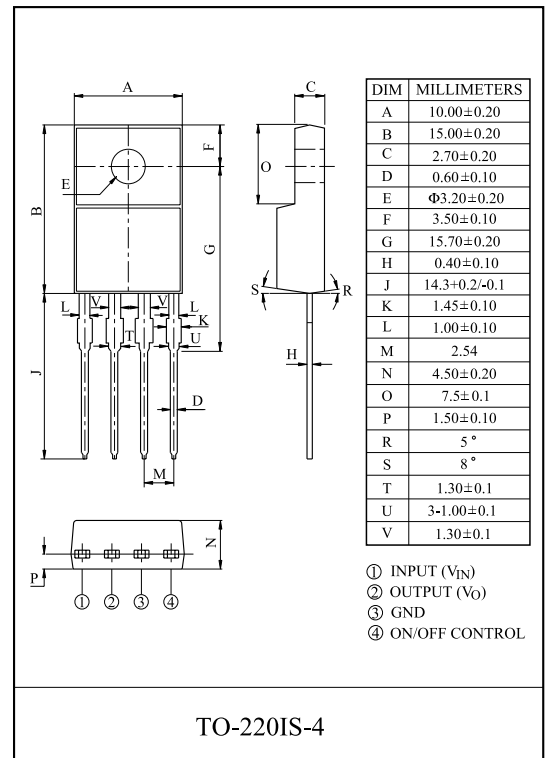
- 3.5A Output Low Dropout Voltage Regulator.
- Very Low Dropout Voltage : 0.5V/Max. ($I_{OUT}=3.5A$)
- Built in ON/OFF Control Terminal. (Active High)
- Built in Over Current Over Heat Protection, ASO Protection Functions.
- Low Quiescent Current (Output OFF Mode) : 0.5 μ A(Typ.)

LINE UP

ITEM	OUTPUT VOLTAGE (Typ.)	PACKAGE
KIA378R015FP/PI	1.5	FP : D ² PAK-5 PI : TO-220IS-4
KIA378R018FP/PI	1.8	
KIA378R020FP/PI	2.0	
KIA378R025FP/PI	2.5	
KIA378R030FP/PI	3.0	
KIA378R033FP/PI	3.3	
KIA378R050FP/PI	5.0	

MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage		V_{IN}	7	V
ON/OFF Control Voltage		V_C	7	V
Output Current		I_{OUT}	3.5	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}	-30 ~ 150	°C



KIA378R015FP/PI~KIA378R050FP/PI

KIA378R015FP~KIA378R050FP (D³PAK-5)

Fig. 1 Test Circuit

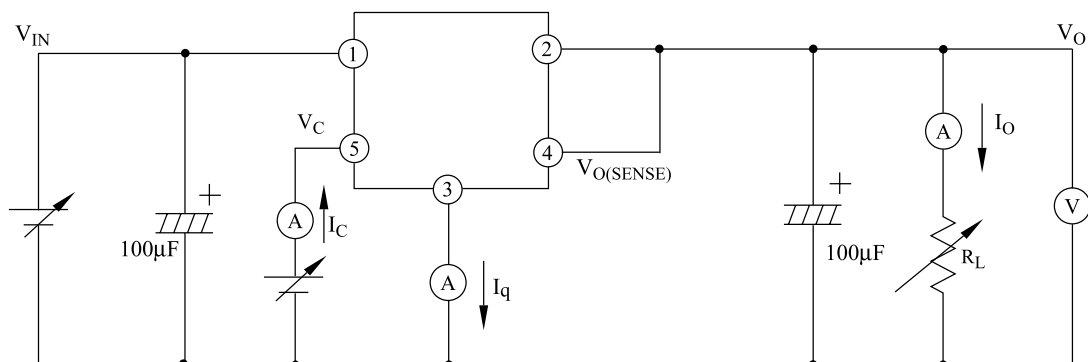
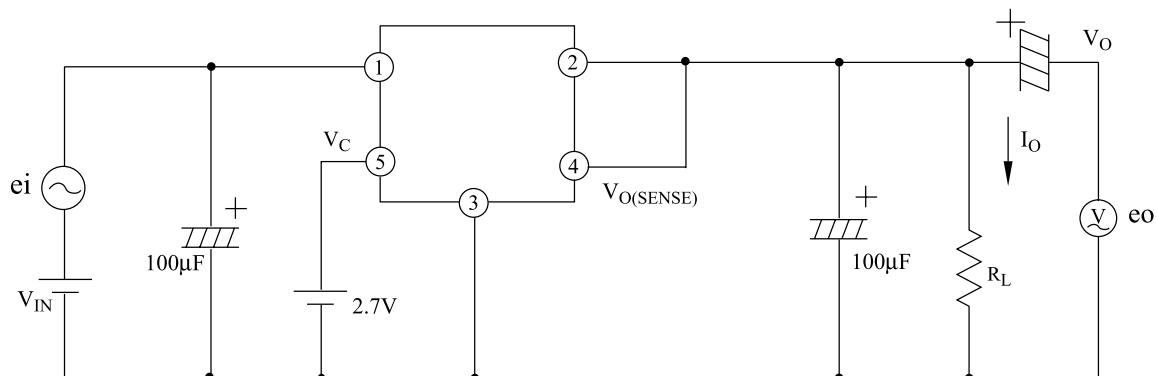
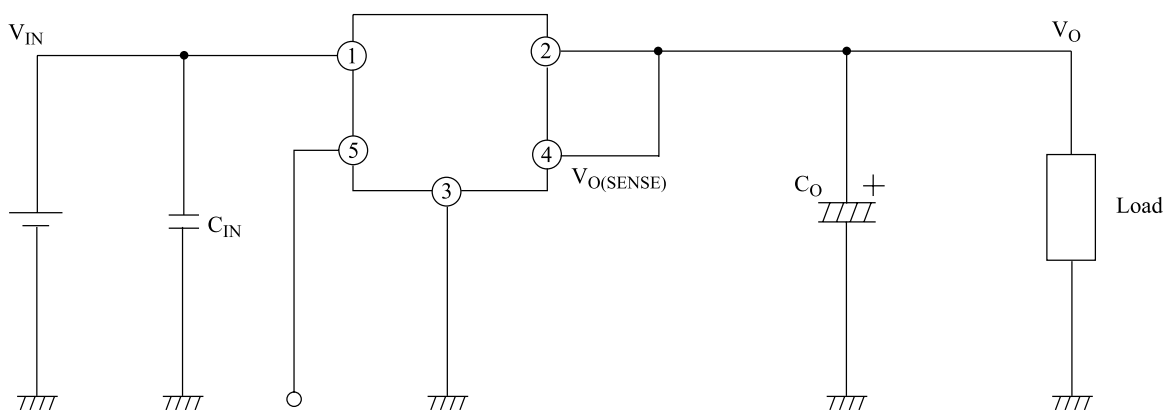


Fig. 2 Ripple Rejection Test Circuit



* 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]

KIA378R015FP/PI~KIA378R050FP/PI

KIA378R015PI~KIA378R050PI (TO-220IS-4)

Fig. 1 Test Circuit

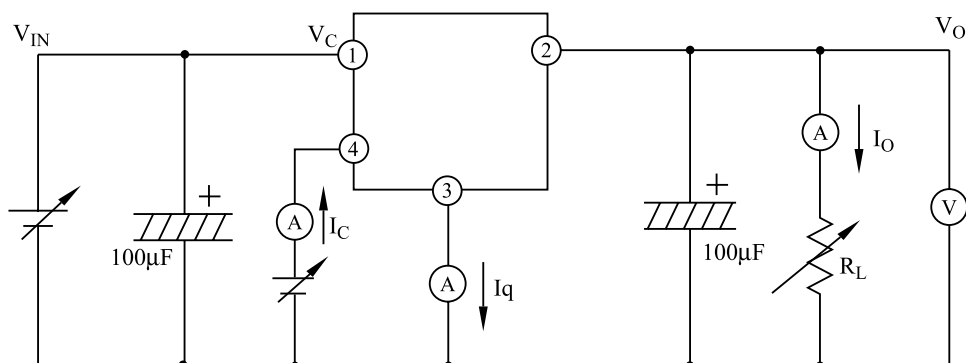
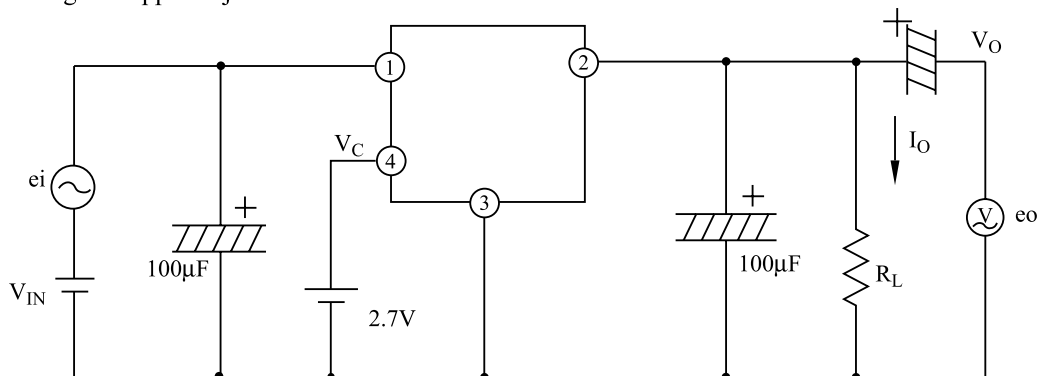
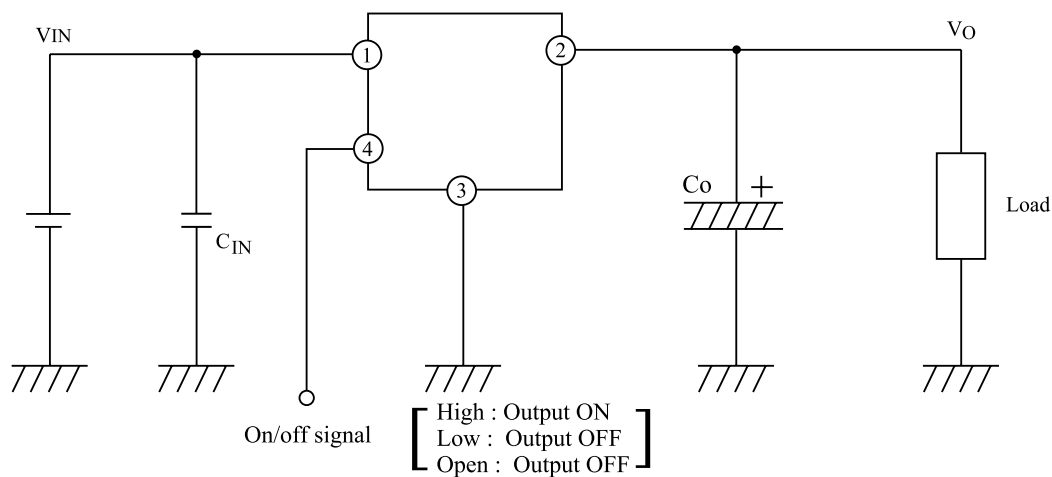


Fig. 2 Ripple Rejection Test Circuit



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

Fig. 3 Application Circuit for Standard



KIA378R015FP/PI~KIA378R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA378R015)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=1.75A$, 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	-	7	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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$, $I_O=5mA$	-	0.05	0.1	%
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 (KIA378R018)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=1.75A$, 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	-	7	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	1	%
Line Regulation	Reg Line	$V_{IN}=2.5V \sim 5.5V$, $I_O=5mA$	-	0.05	0.1	%
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

KIA378R015FP/PI~KIA378R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA378R020)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=1.75A$, 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	-	7	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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6V$, $I_O=5mA$	-	0.05	0.1	%
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 (KIA378R025)

(Unless otherwise specified, $V_{IN}=5V$, $I_O=1.75A$, 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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=3V \sim 6.5V$, $I_O=5mA$	-	0.05	0.1	%
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

KIA378R015FP/PI~KIA378R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA378R030)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1.75A$, 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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=3.5V \sim 7V$, $I_O=5mA$	-	0.05	0.1	%
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

ELECTRICAL CHARACTERISTICS (KIA378R033)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1.75A$, 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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=3.8V \sim 7V$, $I_O=5mA$	-	0.05	0.1	%
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

KIA378R015FP/PI~KIA378R050FP/PI

ELECTRICAL CHARACTERISTICS (KIA378R050)

(Unless otherwise specified, $V_{IN}=V_O+1V$, $I_O=1.75A$, 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	$I_O=5mA \sim 3.5A$	-	0.2	1	%
Line Regulation	Reg Line	$V_{IN}=5.5V \sim 7V$, $I_O=5mA$	-	0.05	0.1	%
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

KIA378R015FP/PI~KIA378R050FP/PI

Fig.4 $I_O - V_O$

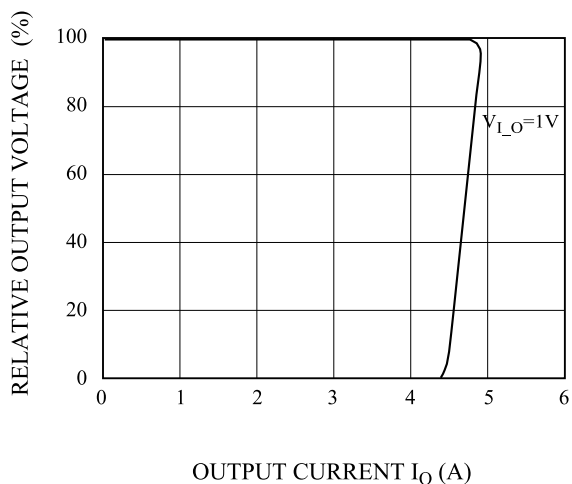


Fig.5 $T_a - \Delta V_O$ (KIA378R25)

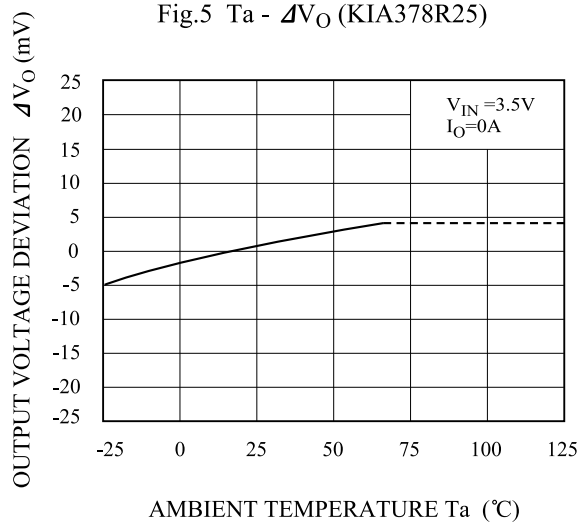


Fig.6 $V_{IN}-V_O$ (KIA378R015)

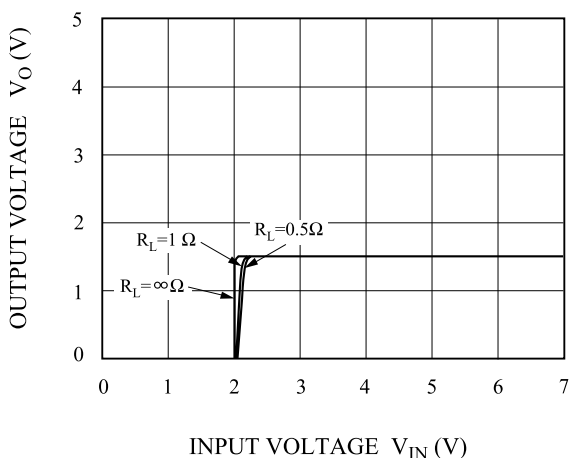


Fig.7 $V_{IN}-V_O$ (KIA378R025)

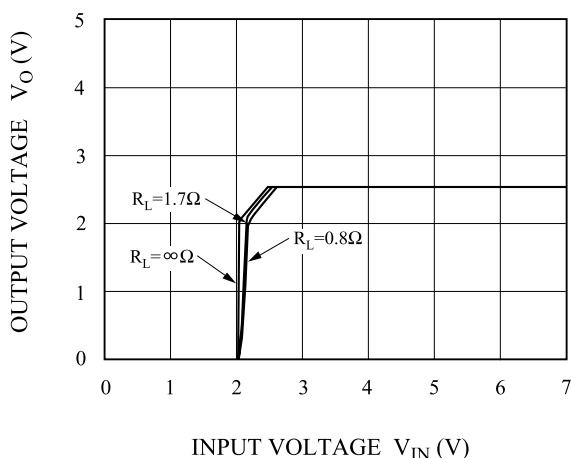


Fig.8 $V_{IN}-V_O$ (KIA378R033)

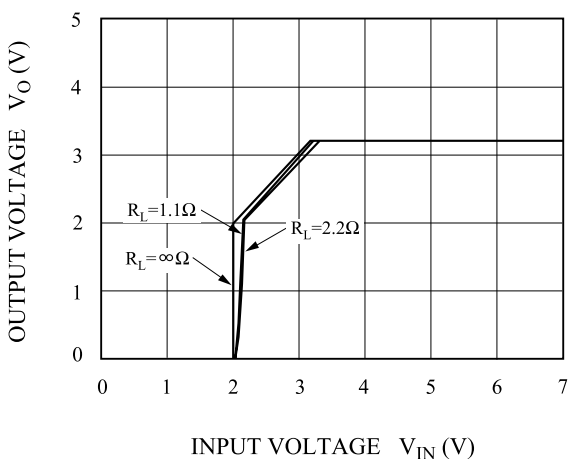
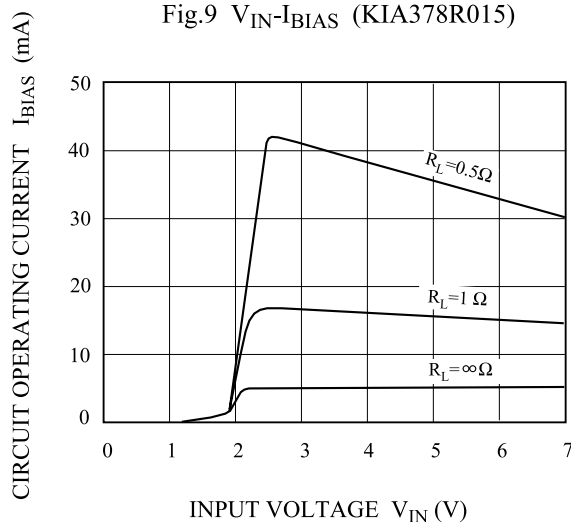


Fig.9 $V_{IN}-I_{BIAS}$ (KIA378R015)



KIA378R015FP/PI~KIA378R050FP/PI

Fig.10 $V_{IN} - I_{BIAS}$ (KIA378R025)

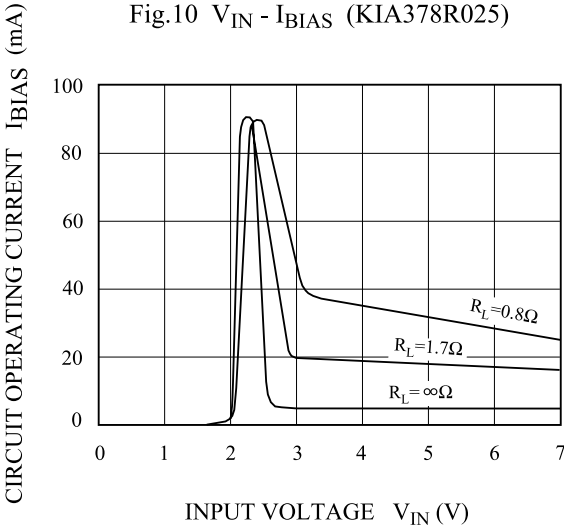


Fig.11 $V_{IN} - I_{BIAS}$ (KIA378R033)

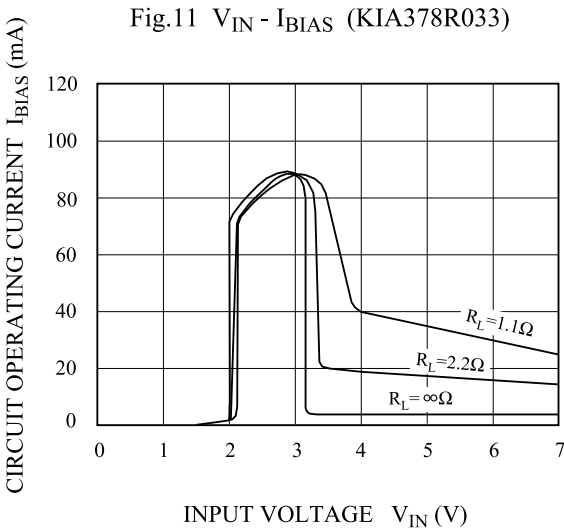


Fig. 12 $f_{in} - RR$

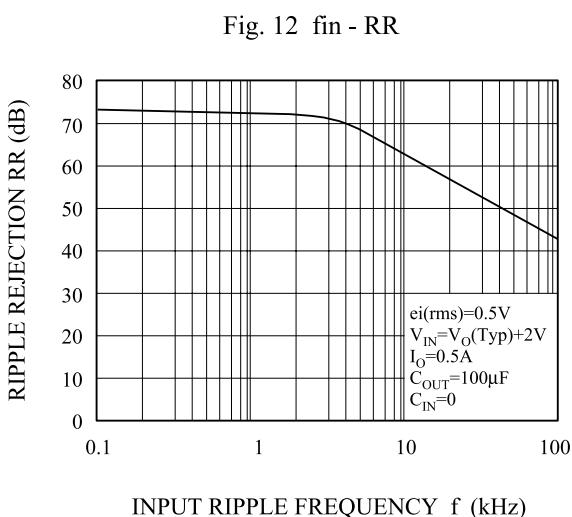


Fig.13 $P_D - T_a$ (D²PAK-5)

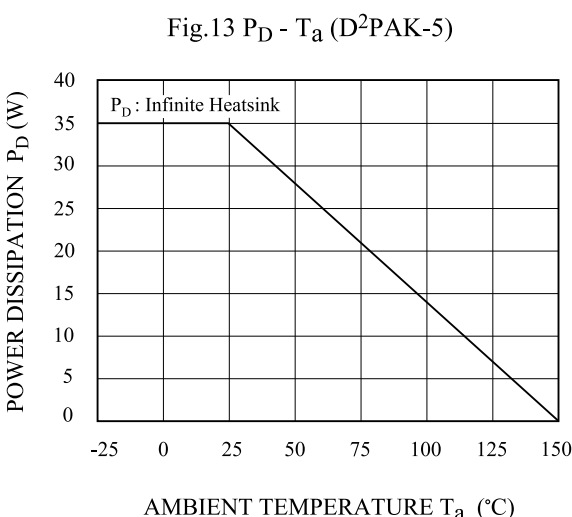


Fig. 14 $P_D - T_a$ (D²PAK-5)

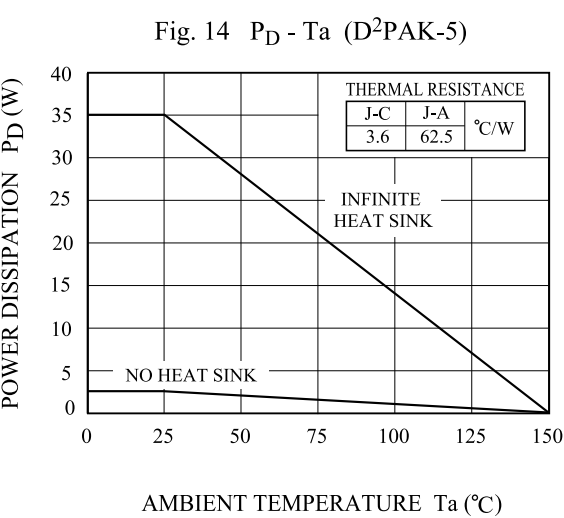


Fig. 15 $P_D - T_a$ (TO-220IS-4)

