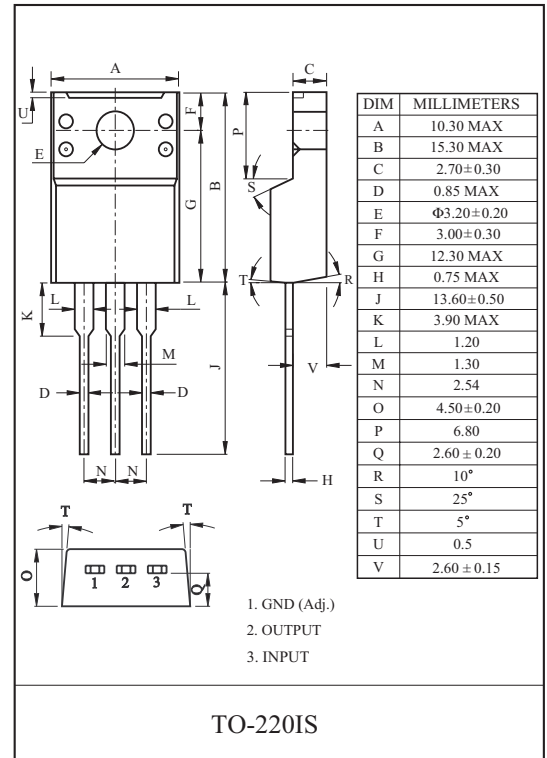


### LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATOR

The KIA1117API × × is a Low Drop Voltage Regulator able to provide up to 1A of output current, available even in adjustable version ( $V_{ref}=1.25V$ )

#### FEATURES

- Low Dropout Voltage : 1.1V/Typ. ( $I_{out}=1.0A$ )
- Very Low Quiescent Current : 2.5mA/Typ.
- Output Current up to 1A
- Fixed Output Voltage of 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Adjustable Version Availability :  $V_{ref}=1.25V$
- Internal Current and Thermal Limit
- A Minimum of  $10\mu F$  for stability
- Available in  $\pm 2\%$  (at 25 °C)
- High Ripple Rejection : 80dB/Typ
- Temperature Range : -30 °C ~ 125 °C



#### LINE UP

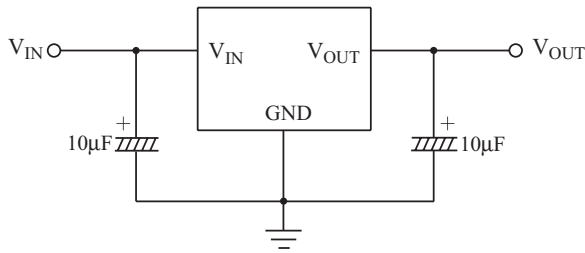
ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA1117API00	Adjustable (1.25~10V)	API : TO-220IS
KIA1117API15	1.5	
KIA1117API18	1.8	
KIA1117API25	2.5	
KIA1117API28	2.85	
KIA1117API33	3.3	
KIA1117API50	5.0	

#### MAXIMUM RATINGS ( $T_a=25\text{ °C}$ )

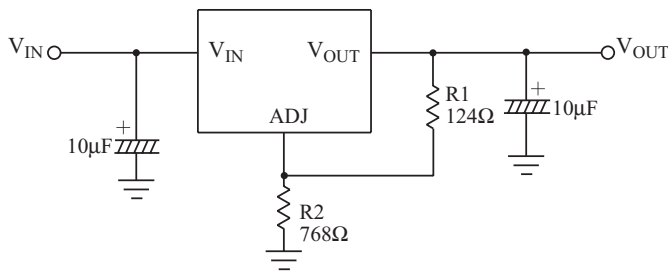
CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Voltage	$V_{IN}$	10	V
Output Current	$I_{OUT}$	1.0	A
Power Dissipation 1 (No Heatsink)	$P_{D1}$	2.0	W
Power Dissipation 2 (Infinite Heatsink)	$P_{D2}$	20.8	W
Operating Temperature	$T_{opr}$	-30~125	°C
Storage Temperature	$T_{stg}$	-55~150	°C

# KIA1117API00~KIA1117API50

**Fig.1 Application Circuit-1 (Fixed-Type)**

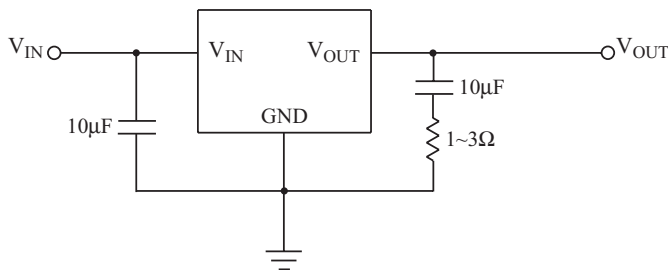


**Fig.2 Application Circuit-2 (Adjustable-Type)**



$$V_{OUT} = V_{REF} (1 + R2/R1) + I_{ADJ} \cdot R2$$

**Fig.3 Application Circuit-3 (With MLCC)**



- When using a ceramic capacitor, set an additional series resistor 1~3 for stability.

## ELECTRICAL CHARACTERISTICS

**KIA1117API00** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$ , $I_{OUT} = 10\text{mA}$	-	1	10	mV
Load Regulation	Reg Load	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{IN} = V_{OUT} + 2.0\text{V}$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	
Adjustable Pin Current	$I_{ADJ}$	$V_{IN} = V_{OUT} + 1.5\text{V}$	-	35	-	$\mu\text{A}$
Minimum Load Current	$I_{MIN}$	$V_{IN} = V_{OUT} + 1.5\text{V}$	10	-	-	mA
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 40\text{mA}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	-	100	-	$\mu\text{V}_{rms}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0\text{V}$	1.1	-	-	A
Ripple Rejection	$R \cdot R$	$I_{OUT} = 40\text{mA}$ , $f = 120\text{Hz}$ , $V_{ripple} = 1\text{V}_{p-p}$ $V_{IN} = V_{OUT} + 3\text{V}$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1\text{A}$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$	-	0.5	-	%

# KIA1117API00~KIA1117API50

## ELECTRICAL CHARACTERISTICS

**KIA1117API15** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT} + 1.5V \leq V_{IN} \leq 10V$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5V \leq V_{IN} \leq 10V$ , $I_{OUT} = 10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$ , $V_{IN} = V_{OUT} + 2.0V$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 0A$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10V$ , $I_{OUT} = 0A$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 40mA$ , $10Hz \leq f \leq 10kHz$	-	100	-	$\mu V_{rms}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40mA$ , $f = 120Hz$ , $V_{ripple} = 1V_{p-p}$ $V_{IN} = V_{OUT} + 3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1A$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117API18** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT} + 1.5V \leq V_{IN} \leq 10V$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5V \leq V_{IN} \leq 10V$ , $I_{OUT} = 10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$ , $V_{IN} = V_{OUT} + 2.0V$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 0A$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10V$ , $I_{OUT} = 0A$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 40mA$ , $10Hz \leq f \leq 10kHz$	-	100	-	$\mu V_{rms}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40mA$ , $f = 120Hz$ , $V_{ripple} = 1V_{p-p}$ $V_{IN} = V_{OUT} + 3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1A$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$	-	0.5	-	%

# KIA1117API00~KIA1117API50

## ELECTRICAL CHARACTERISTICS

**KIA1117API25** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$ , $I_{OUT} = 10\text{mA}$	-	1	10	mV
Load Regulation	Reg Load	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{IN} = V_{OUT} + 2.0\text{V}$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 40\text{mA}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	-	100	-	$\mu\text{V}_{\text{rms}}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0\text{V}$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40\text{mA}$ , $f = 120\text{Hz}$ , $V_{\text{ripple}} = 1\text{V}_{\text{p-p}}$ $V_{IN} = V_{OUT} + 3\text{V}$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1\text{A}$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117API28** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$ , $I_{OUT} = 10\text{mA}$	-	1	10	mV
Load Regulation	Reg Load	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$ , $V_{IN} = V_{OUT} + 2.0\text{V}$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10\text{V}$ , $I_{OUT} = 0\text{A}$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25\text{V}$ , $I_{OUT} = 40\text{mA}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	-	100	-	$\mu\text{V}_{\text{rms}}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0\text{V}$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40\text{mA}$ , $f = 120\text{Hz}$ , $V_{\text{ripple}} = 1\text{V}_{\text{p-p}}$ $V_{IN} = V_{OUT} + 3\text{V}$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1\text{A}$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5\text{V}$ , $I_{OUT} = 10\text{mA}$	-	0.5	-	%

# KIA1117API00~KIA1117API50

## ELECTRICAL CHARACTERISTICS

**KIA1117API33** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT} + 1.5V \leq V_{IN} \leq 10V$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5V \leq V_{IN} \leq 10V$ , $I_{OUT} = 10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$ , $V_{IN} = V_{OUT} + 2.0V$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 0A$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10V$ , $I_{OUT} = 0A$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 40mA$ , $10Hz \leq f \leq 10kHz$	-	100	-	$\mu V_{rms}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40mA$ , $f = 120Hz$ , $V_{ripple} = 1V_{p-p}$ $V_{IN} = V_{OUT} + 3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1A$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117API50** (Unless otherwise specified,  $T_j = -30 \sim 125 \text{ }^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$ , $T_j = 25 \text{ }^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	V
	$V_{OUT2}$	$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT} + 1.5V \leq V_{IN} \leq 10V$	$V_{OUT} \times 0.97$	$V_{OUT}$	$V_{OUT} \times 1.03$	
Line Regulation	Reg Line	$V_{OUT} + 1.5V \leq V_{IN} \leq 10V$ , $I_{OUT} = 10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$ , $V_{IN} = V_{OUT} + 2.0V$	-	0.5	1	%
Quiescent Current	$I_{B1}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 0A$	-	2.5	5	mA
	$I_{B2}$	$V_{IN} = 10V$ , $I_{OUT} = 0A$	-	2.5	5	
Output Noise Voltage	$V_{NO}$	$V_{IN} = V_{OUT} + 1.25V$ , $I_{OUT} = 40mA$ , $10Hz \leq f \leq 10kHz$	-	100	-	$\mu V_{rms}$
Sort Circuit Current Limit	$I_{SC}$	$V_{IN} = V_{OUT} + 2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT} = 40mA$ , $f = 120Hz$ , $V_{ripple} = 1V_{p-p}$ $V_{IN} = V_{OUT} + 3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT} = 1A$ , $V_{IN} = 0.95V_{OUT}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN} = V_{OUT} + 1.5V$ , $I_{OUT} = 10mA$	-	0.5	-	%

# KIA1117API00~KIA1117API50

Fig. 3  $V_D - I_{OUT}$

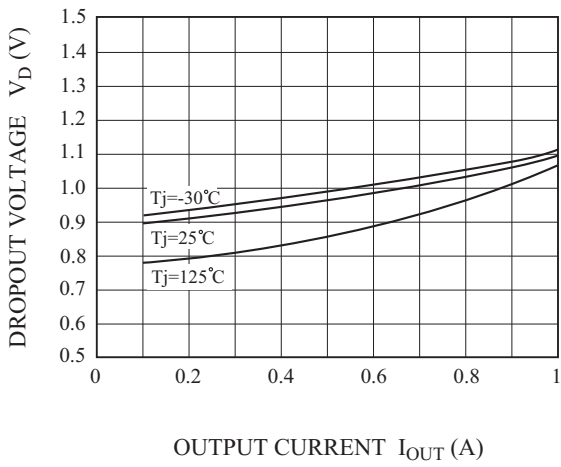


Fig. 4  $V_{OUT}(\text{CHANGE}) - T_j$

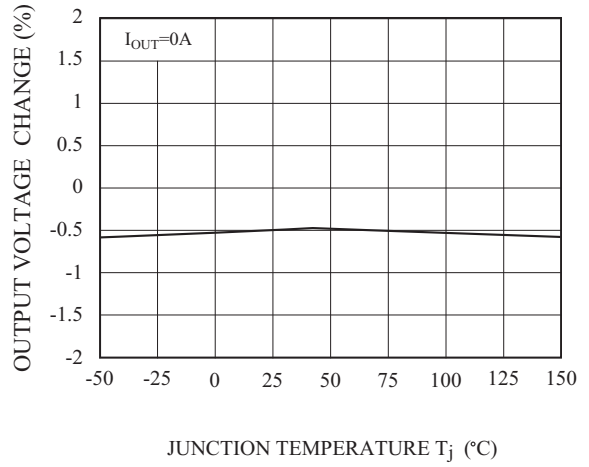


Fig. 5 LINE REGULATION

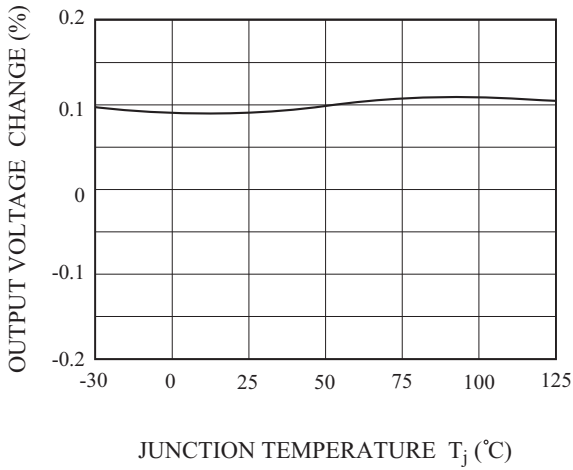


Fig. 4 LOAD REGULATION

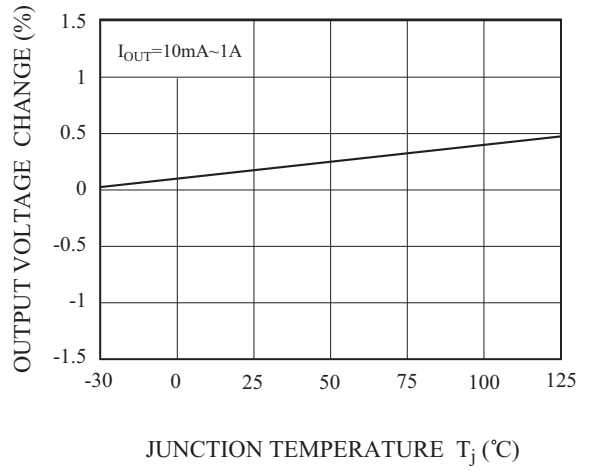


Fig.7  $I_Q - T_j$

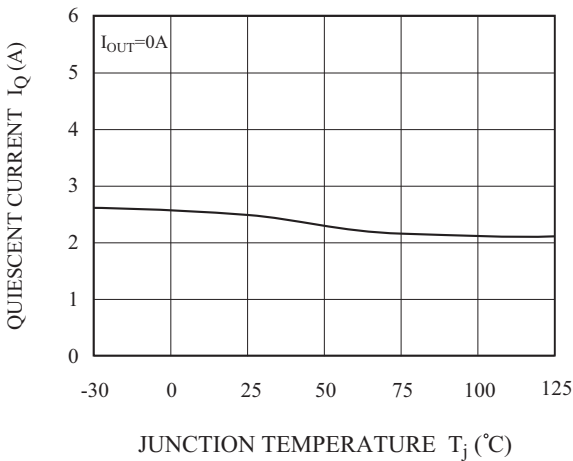
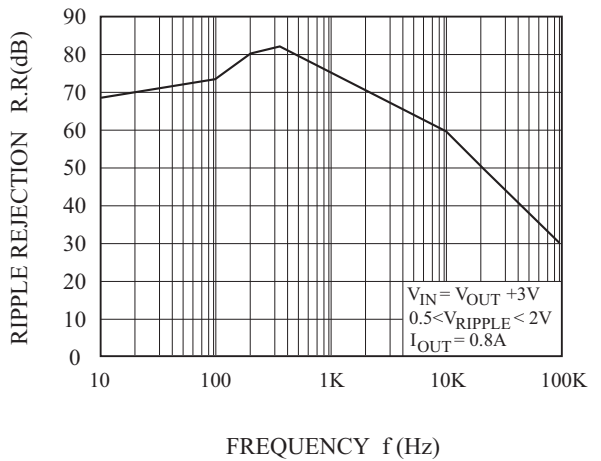


Fig.8 R.R - f



# KIA1117API00~KIA1117API50

Fig.9  $P_D - T_a$  (API-Type : TO-220IS)

