

## LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATOR

The KIA1117BS/BF × × Series are 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 1.2V, 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
- Suitable for MLCC, Tantalum and Low ESR Electrolytic Capacitors
- ESR Range for stability :  $1m\Omega \sim 200\Omega$
- Available in  $\pm 2\%$ (at 25 °C)
- High Ripple Rejection : 80dB/Typ
- Temperature Range : -40 °C ~ 150 °C

### LINE UP

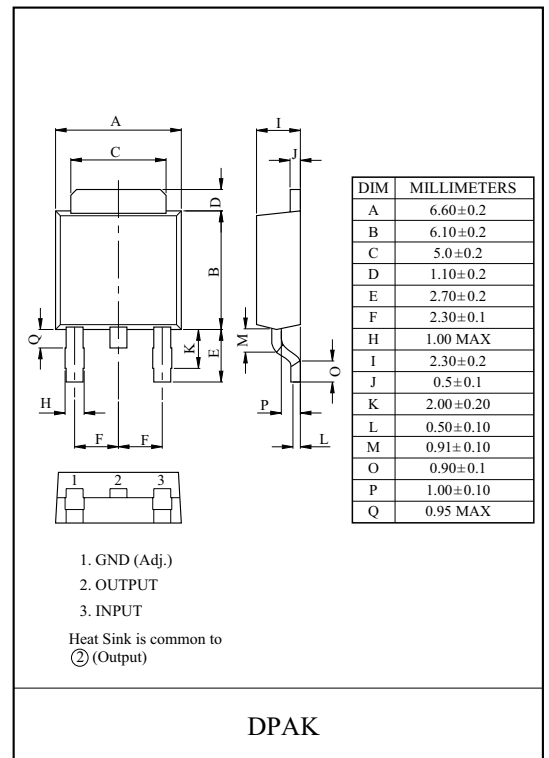
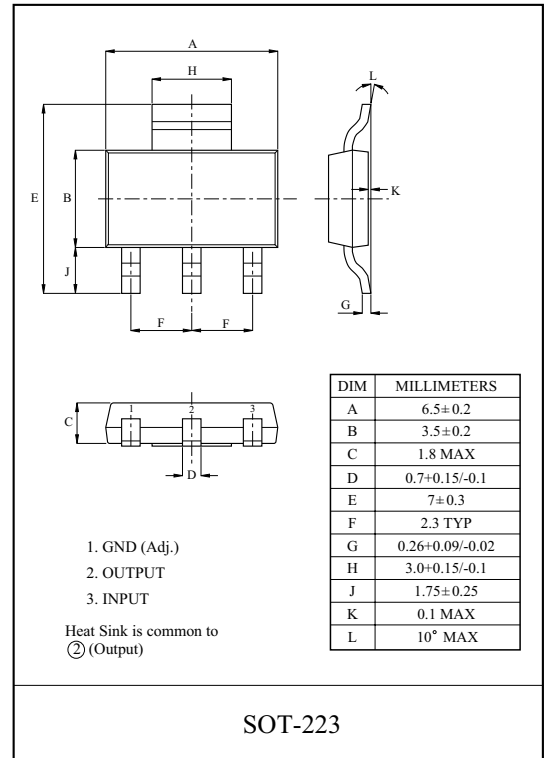
ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA1117BS/BF00	Adjustable (1.25~8V)	S : SOT-223 F : DPAK
KIA1117BS/BF12	1.2	
KIA1117BS/BF15	1.5	
KIA1117BS/BF18	1.8	
KIA1117BS/BF25	2.5	
KIA1117BS/BF28	2.85	
KIA1117BS/BF33	3.3	
KIA1117BS/BF50	5.0	

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Voltage	$V_{IN}$	10	V
Output Current	$I_{OUT}$	1.0	A
Power Dissipation 1 (No Heatsink)	S (Note)	1.0	W
	F	1.3	
Power Dissipation 2 (Infinite Heatsink)	S	8.3	W
	F	13	
Maximum Junction Temperature	$T_{j(max)}$	150	°C
Operating Junction Temperature	$T_{opr}$	-40 ~ 150	°C
Storage Temperature	$T_{stg}$	-55 ~ 150	°C

Note) Package Mounted on FR-4 PCB  $36 \times 18 \times 1.5$ mm.

: mounting pad for the GND Lead min.  $6cm^2$



# KIA1117BS/BF00 ~ KIA1117BS/BF50

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF00** (Unless otherwise specified,  $T_j=25\text{ }^\circ\text{C}$ )

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	
Adjustable Pin Current	$I_{ADJ}$	$V_{IN}=V_{OUT}+1.5V$	-	35	-	$\mu\text{A}$
Minimum Load Current	$I_{MIN}$	$V_{IN}=V_{OUT}+1.5V$	10	-	-	mA
Output Noise Voltage	$V_{NO}$	$V_{IN}=V_{OUT}+1.25V, I_{OUT}=40mA,$ $10Hz \leq f \leq 10kHz$	-	100	-	$\mu\text{V}_{rms}$
Short Circuit Current Limit	$I_{SC}$	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40mA, f=120Hz, V_{ripple}=1Vp-p$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT}=1A$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=-40\sim 150\text{ }^\circ\text{C}$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF15** (Unless otherwise specified,  $T_j=25\text{ }^\circ\text{C}$ )

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	-	$\mu\text{V}_{rms}$
Short Circuit Current Limit	$I_{SC}$	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40mA, f=120Hz, V_{ripple}=1Vp-p$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT}=1A$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=-40\sim 150\text{ }^\circ\text{C}$	-	0.5	-	%

# KIA1117BS/BF00 ~ KIA1117BS/BF50

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF18** (Unless otherwise specified,  $T_j=25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=25^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	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	-	$\mu\text{V}_{rms}$
Short 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	$V_D$	$I_{OUT}=1A$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=-40\sim 150^\circ\text{C}$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF25** (Unless otherwise specified,  $T_j=25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=25^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	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	-	$\mu\text{V}_{rms}$
Short 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	$V_D$	$I_{OUT}=1A$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_j=-40\sim 150^\circ\text{C}$	-	0.5	-	%

# KIA1117BS/BF00 ~ KIA1117BS/BF50

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF28** (Unless otherwise specified,  $T_j=25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=25^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	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	-	$\mu\text{V}_{\text{rms}}$
Short Circuit Current Limit	$I_{SC}$	$V_{IN}=V_{OUT}+2.0\text{V}$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40\text{mA}$ , $f=120\text{Hz}$ , $V_{\text{ripple}}=1\text{Vp-p}$ $V_{IN}=V_{OUT}+3\text{V}$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT}=1\text{A}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=-40\sim 150^\circ\text{C}$	-	0.5	-	%

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF33** (Unless otherwise specified,  $T_j=25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=25^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	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	-	$\mu\text{V}_{\text{rms}}$
Short Circuit Current Limit	$I_{SC}$	$V_{IN}=V_{OUT}+2.0\text{V}$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40\text{mA}$ , $f=120\text{Hz}$ , $V_{\text{ripple}}=1\text{Vp-p}$ $V_{IN}=V_{OUT}+3\text{V}$	60	80	-	dB
Dropout Voltage	$V_D$	$I_{OUT}=1\text{A}$	-	1.1	1.4	V
Temperature Stability	$TCV_O$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=-40\sim 150^\circ\text{C}$	-	0.5	-	%

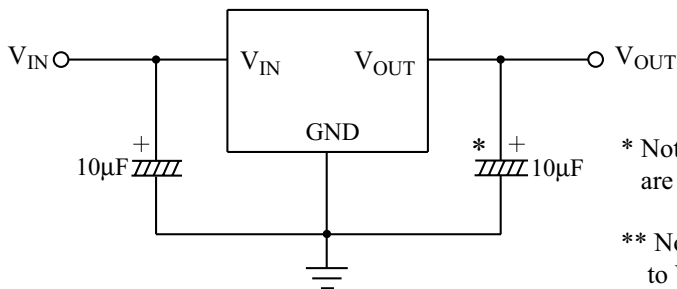
# KIA1117BS/BF00 ~ KIA1117BS/BF50

## ELECTRICAL CHARACTERISTICS

**KIA1117BS/BF50** (Unless otherwise specified,  $T_j=25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT1}$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=25^\circ\text{C}$	$V_{OUT} \times 0.98$	$V_{OUT}$	$V_{OUT} \times 1.02$	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	-	$\mu\text{V}_{\text{rms}}$
Short 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	$V_D$	$I_{OUT}=1\text{A}$	-	1.1	1.4	V
Temperature Stability	$\text{TCV}_O$	$V_{IN}=V_{OUT}+1.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_j=-40\sim 150^\circ\text{C}$	-	0.5	-	%

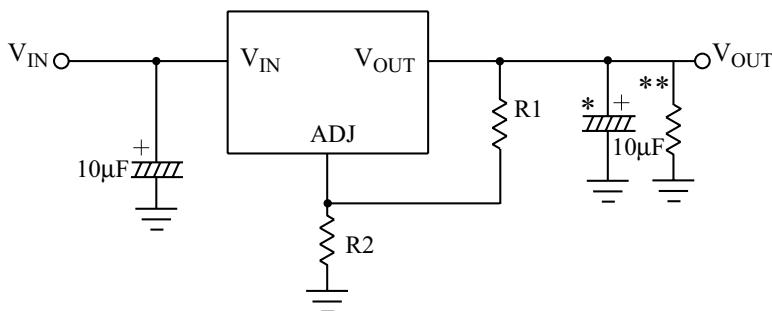
**Fig.1 Application Circuit-1 (Fixed-Type)**



\* Note 1) MLCC, Tantalum, Low ESR Electrolytic Capacitors are suitable in ESR range for stability (1m~200  $\Omega$ )

\*\* Note 2) When R1 is much larger than 124  $\Omega$ , apply 8~10mA to  $V_{out}$ -GND by setting an additional dummy resistor for stability of  $V_{out}$  under no load condition

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



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

# KIA1117BS/BF00 ~ KIA1117BS/BF50

Fig. 3  $V_D - I_{OUT}$

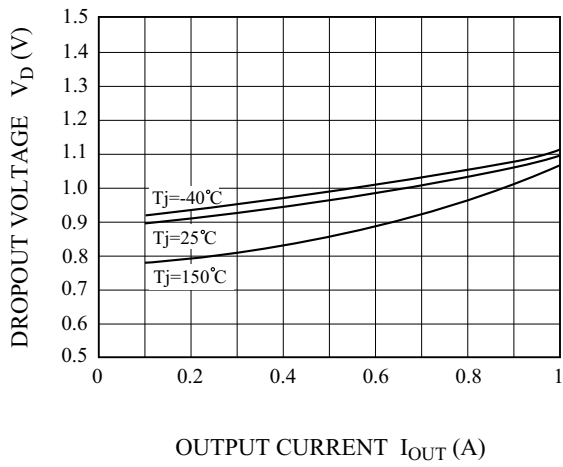


Fig. 4  $V_{OUT}(\text{CHANGE}) - T_j$

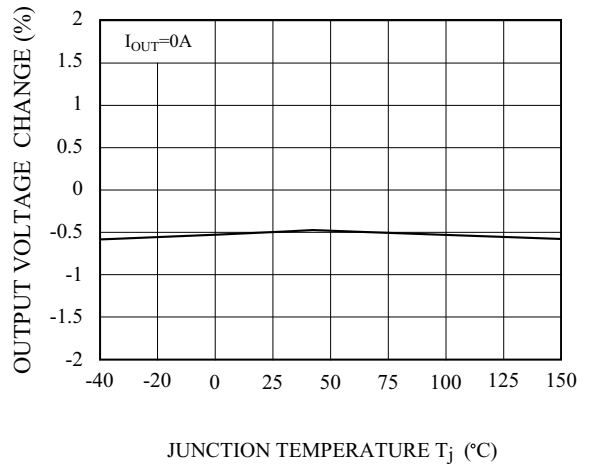


Fig. 5 LINE REGULATION

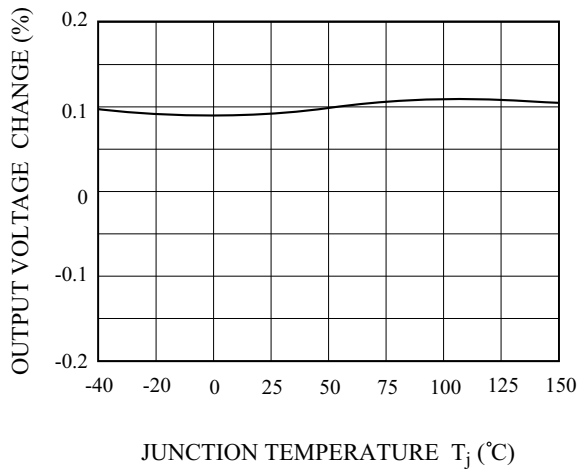


Fig. 6 LOAD REGULATION

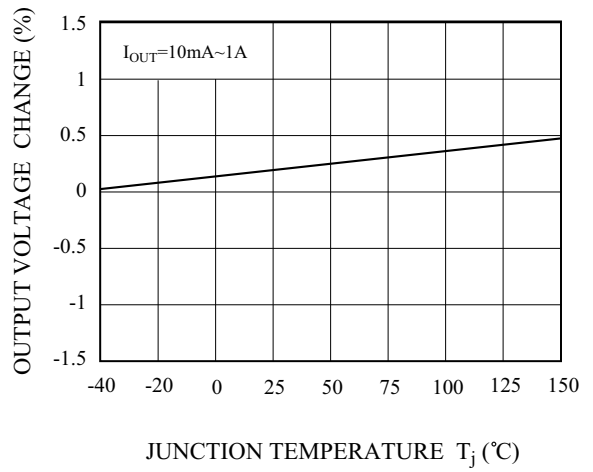


Fig.7  $I_Q - T_j$

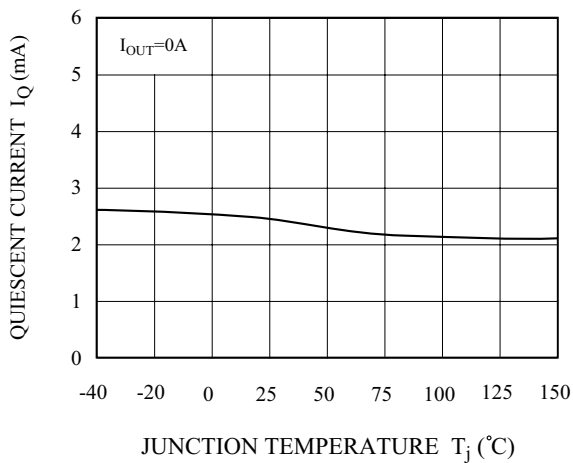
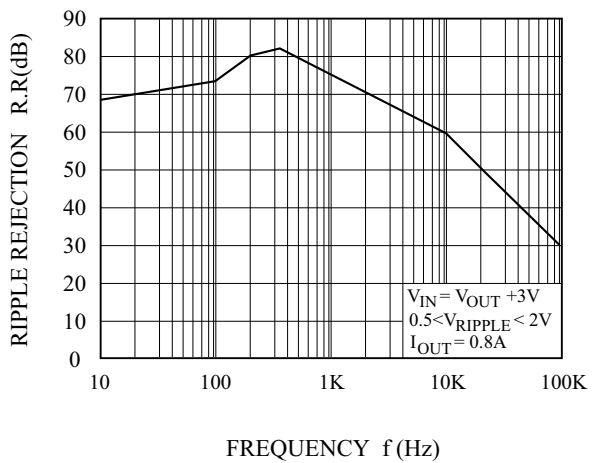


Fig.8 R.R - f



# KIA1117BS/BF00 ~ KIA1117BS/BF50

Fig.9 P<sub>D</sub> - Ta (S-Type : SOT-223)

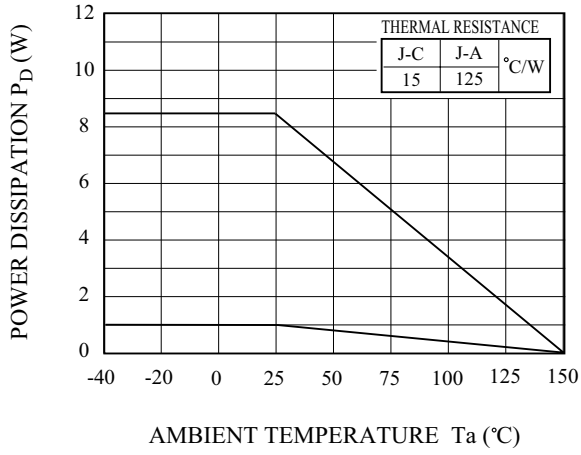


Fig.9 P<sub>D</sub> - Ta (F-Type : DPAK)

