

LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATOR

The KIA78Q × × S/F 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 : 4.2mA/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
- Only 10 μF for stability
- Available in $\pm 2\%$ (at 25 °C) and 4% in full Temperature range
- High Ripple Rejection : 80dB/Typ
- Temperature Range : 0 °C ~ 125 °C

LINE UP

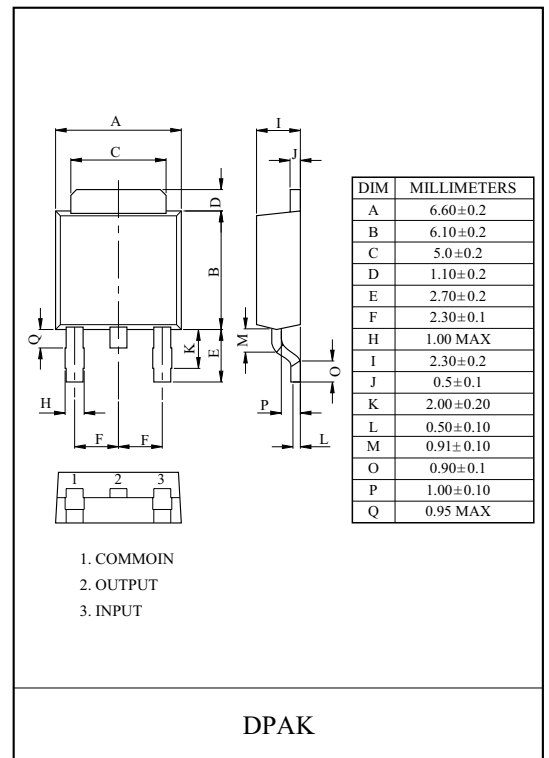
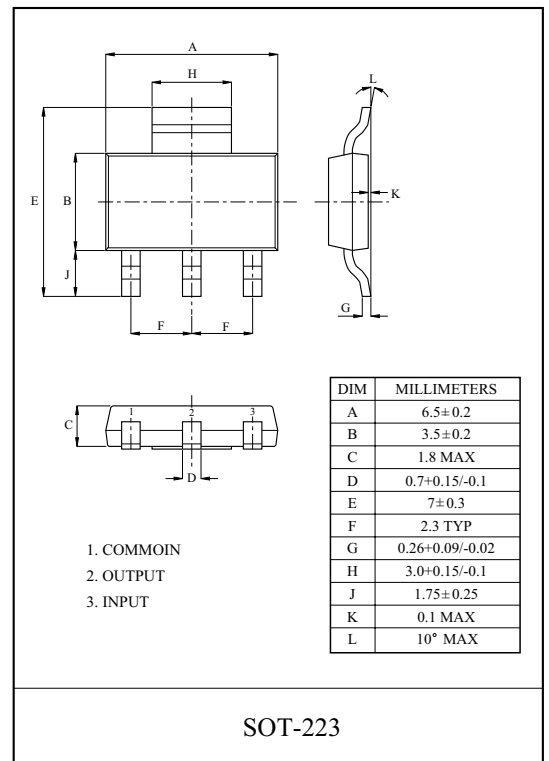
ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA78Q000S/F	Adjustable (1.25~10V)	S : SOT-223 F : DPAK
KIA78Q015S/F	1.5	
KIA78Q018S/F	1.8	
KIA78Q025S/F	2.5	
KIA78Q028S/F	2.85	
KIA78Q033S/F	3.3	
KIA78Q050S/F	5.0	

MAXIMUM RATINGS ($T_a=25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Voltage	V_{IN}	10	V
Output Current	S/F 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	
Operating Temperature	T_{opr}	0 ~ 125	°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. $6cm^2$



KIA78Q000S/F~KIA78Q050S/F

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

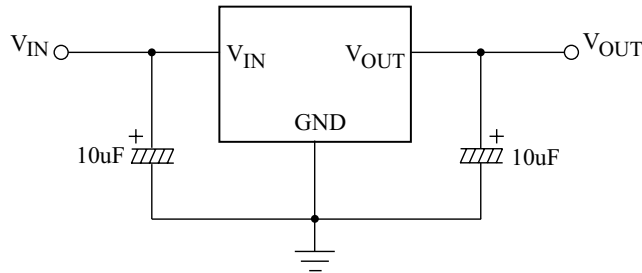
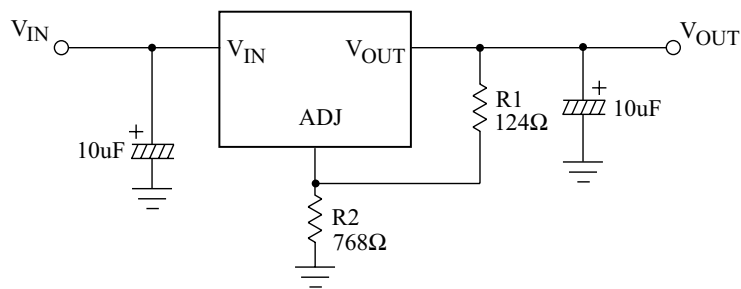


Fig.2 Application Circuit-2 (Adjustable-Type)



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

ELECTRICAL CHARACTERISTICS

KIA78Q000S/F (Unless otherwise specified, $T_j = 0 \sim 125^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN} = V_{OUT} + 1.5\text{V}$, $I_{OUT} = 10\text{mA}$, $T_j = 25^\circ\text{C}$	1.225	1.25	1.275	V
	V_{OUT2}	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$, $V_{OUT} + 1.5\text{V} \leq V_{IN} \leq 10\text{V}$	1.20	1.25	1.30	
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	$10\text{mA} \leq I_{OUT} \leq 1\text{A}$, $V_{IN} = V_{OUT} + 2.0\text{V}$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN} = V_{OUT} + 1.25\text{V}$, $I_{OUT} = 0\text{A}$	-	4.2	10	mA
	I_{B2}	$V_{IN} = 10\text{V}$, $I_{OUT} = 0\text{A}$	-	4.2	10	
Adjustable Pin Current	I_{ADJ}	$V_{IN} = V_{OUT} + 1.5\text{V}$	-	35	-	μA
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	-	μV_{rms}
Short 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	1.2	V
Temperature Stability	TCV_O	$V_{IN} = V_{OUT} + 1.5\text{V}$, $I_{OUT} = 10\text{mA}$	-	0.5	-	%

KIA78Q000S/F~KIA78Q050S/F

ELECTRICAL CHARACTERISTICS

KIA78Q015S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	1.47	1.5	1.53	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	1.44	1.5	1.56	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μV_{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	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

ELECTRICAL CHARACTERISTICS

KIA78Q018S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	1.764	1.8	1.836	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	1.728	1.8	1.872	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μV_{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	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

KIA78Q000S/F~KIA78Q050S/F

ELECTRICAL CHARACTERISTICS

KIA78Q025S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	2.45	2.5	2.55	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	2.4	2.5	2.6	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μV_{rms}
Sort Circuit Current Limit	I_{SC}	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	$R \cdot R$	$I_{OUT}=40mA$, $f=120Hz$, $V_{ripple}=1V_{p-p}$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	V_D	$I_{OUT}=1A$, $V_{IN}=0.95V_{OUT}$	-	1.1	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

ELECTRICAL CHARACTERISTICS

KIA78Q028S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	2.793	2.85	2.907	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	2.736	2.85	2.964	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μV_{rms}
Sort Circuit Current Limit	I_{SC}	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	$R \cdot R$	$I_{OUT}=40mA$, $f=120Hz$, $V_{ripple}=1V_{p-p}$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	V_D	$I_{OUT}=1A$, $V_{IN}=0.95V_{OUT}$	-	1.1	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

KIA78Q000S/F~KIA78Q050S/F

ELECTRICAL CHARACTERISTICS

KIA78Q033S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	3.234	3.3	3.366	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	3.168	3.3	3.432	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μVrms
Sort Circuit Current Limit	I_{SC}	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40mA$, $f=120Hz$, $V_{ripple}=1Vp-p$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	V_D	$I_{OUT}=1A$, $V_{IN}=0.95V_{OUT}$	-	1.1	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

ELECTRICAL CHARACTERISTICS

KIA78Q050S/F (Unless otherwise specified, $T_j=0\sim 125\text{ }^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT1}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_j=25\text{ }^\circ\text{C}$	4.9	5	5.1	V
	V_{OUT2}	$10mA \leq I_{OUT} \leq 1A$, $V_{OUT}+1.5V \leq V_{IN} \leq 10V$	4.8	5	5.2	
Line Regulation	Reg Line	$V_{OUT}+1.5V \leq V_{IN} \leq 10V$, $I_{OUT}=10mA$	-	1	10	mV
Load Regulation	Reg Load	$10mA \leq I_{OUT} \leq 1A$, $V_{IN}=V_{OUT}+2.0V$	-	15	30	mV
Quiescent Current	I_{B1}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=0A$	-	4.2	10	mA
	I_{B2}	$V_{IN}=10V$, $I_{OUT}=0A$	-	4.2	10	
Output Noise Voltage	V_{NO}	$V_{IN}=V_{OUT}+1.25V$, $I_{OUT}=40mA$, $10Hz \leq f \leq 10kHz$	-	100	-	μVrms
Sort Circuit Current Limit	I_{SC}	$V_{IN}=V_{OUT}+2.0V$	1.1	-	-	A
Ripple Rejection	R · R	$I_{OUT}=40mA$, $f=120Hz$, $V_{ripple}=1Vp-p$ $V_{IN}=V_{OUT}+3V$	60	80	-	dB
Dropout Voltage	V_D	$I_{OUT}=1A$, $V_{IN}=0.95V_{OUT}$	-	1.1	1.2	V
Temperature Stability	TCV_O	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$	-	0.5	-	%

KIA78Q000S/F~KIA78Q050S/F

Fig. 3 $V_D - I_{OUT}$

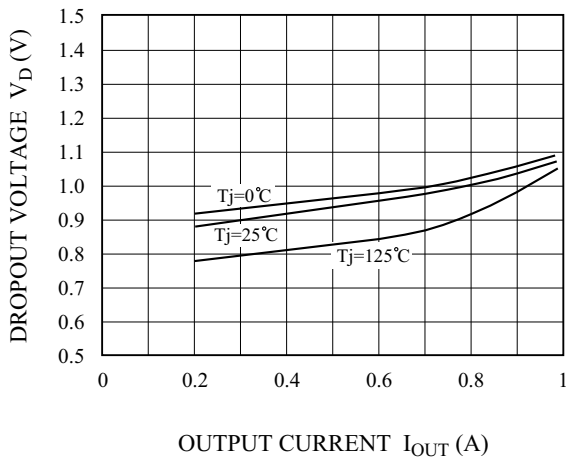


Fig. 4 $V_{REF} - T_j$

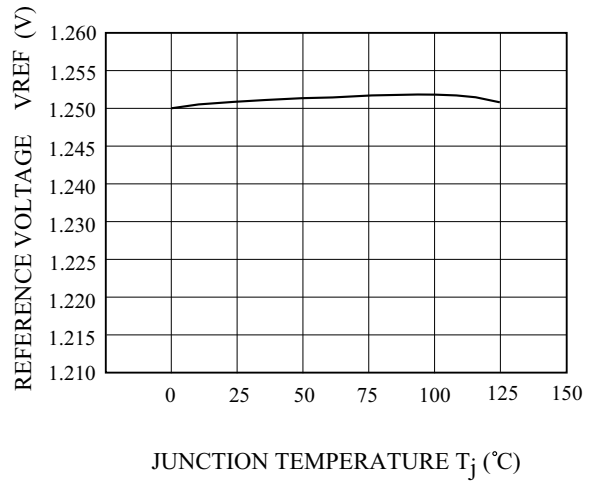


Fig. 5 $I_{OUT(MIN)} - T_j$

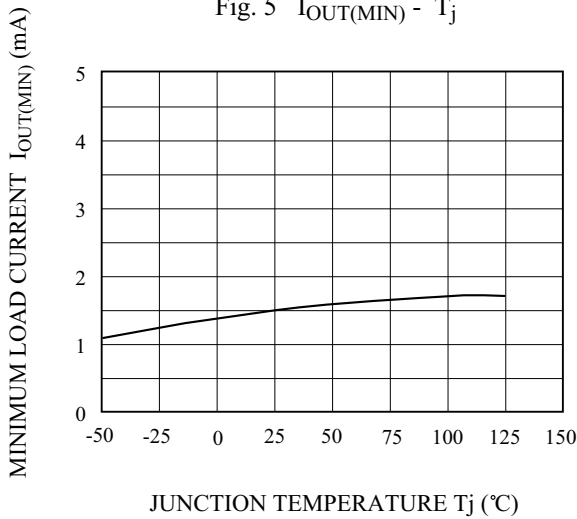


Fig. 6 $I_{ADJ} - T_j$

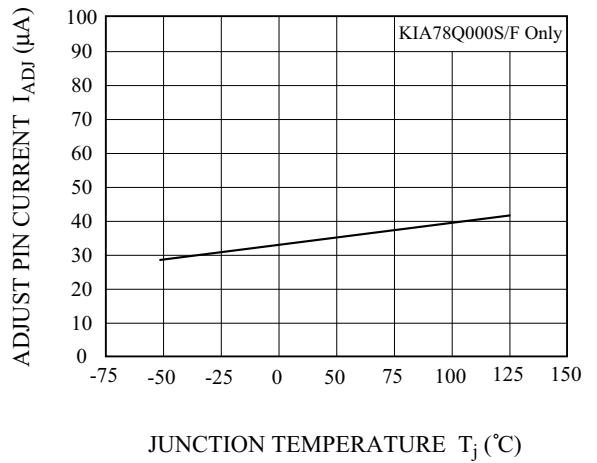


Fig. 7 $I_{SC} - T_j$

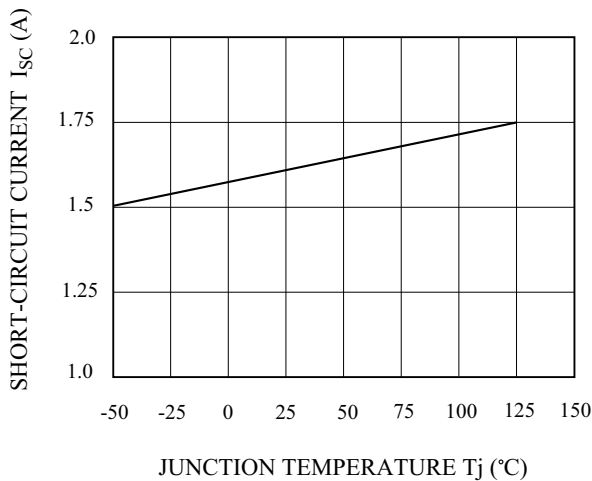
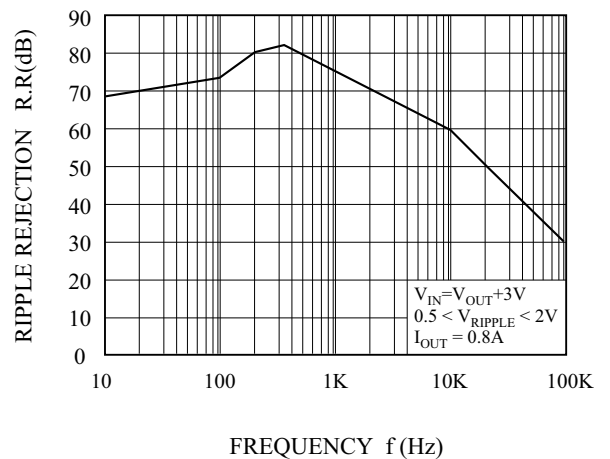


Fig. 8 R.R-f



KIA78Q000S/F~KIA78Q050S/F

Fig.9 P_D - T_a (S-Type : SOT-223)

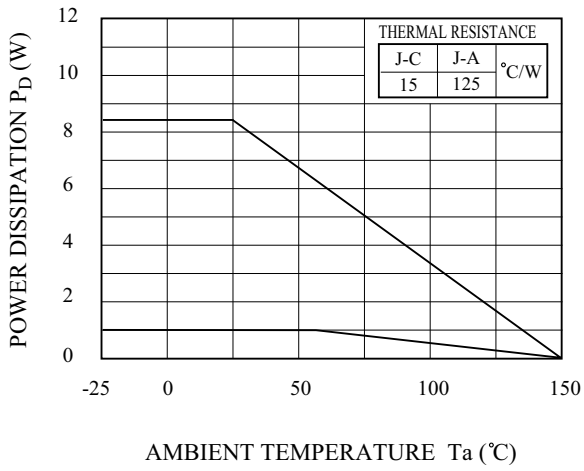


Fig.10 P_D - T_a (F-Type : DPAK)

