

## THREE TERMINAL POSITIVE LOW DROPOUT VOLTAGE REGULATOR (5V, 6V, 8V, 9V, 10V, 12V, 15V)

The KIA78DL series are three-terminal regulators with maximum output current 250mA, consuming low standby current, best suited as backup power supply for memory, etc. and power supply for medium size circuits. This series is further provided with various protective functions.

### FEATURES

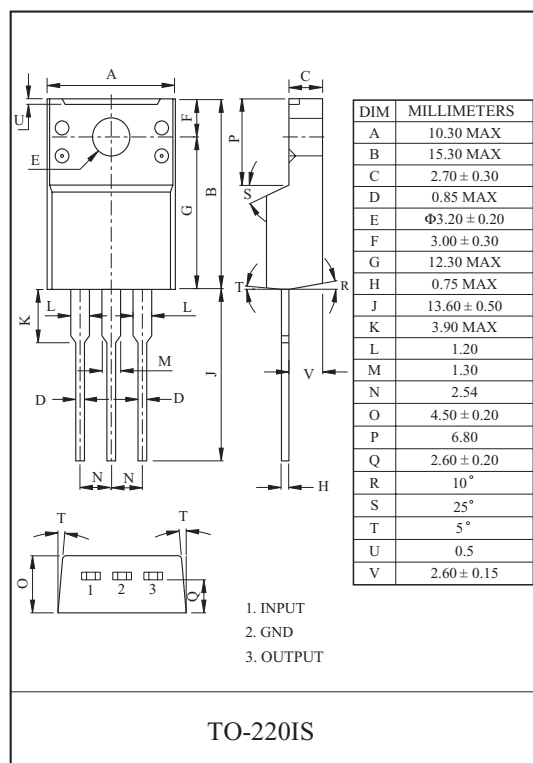
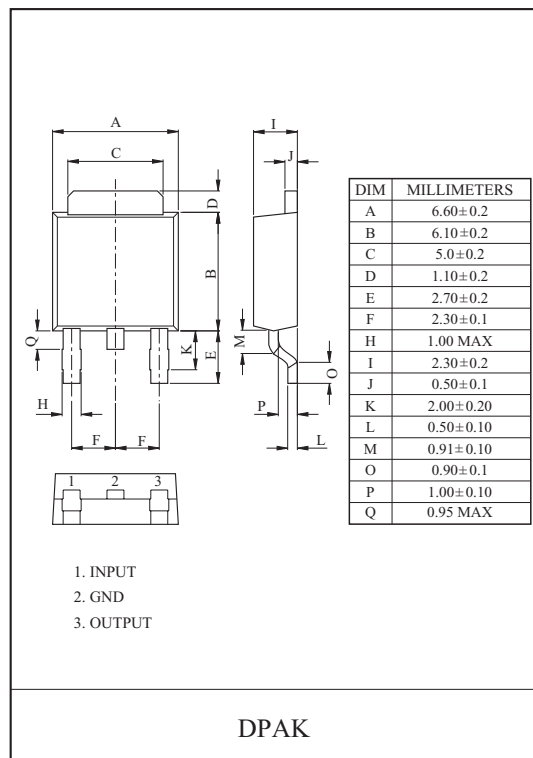
- Low Standby Current Consumption : 500 $\mu$ A (Typ.).
- Maximum Output Current : 250mA (Max.).
- Less I/O Voltage Difference : 0.6V (Max.).
- Multiple Protections : Power Reverse Connection/60V Load Dump/  
Thermal Protection/Short-Circuit Protection.

### LINE-UP

ITEM	OUTPUT VOLTAGE (Typ.)	UNIT
KIA78DL05F/PI	5	F : DPAK PI : TO-220IS
KIA78DL06F/PI	6	
KIA78DL08F/PI	8	
KIA78DL09F/PI	9	
KIA78DL10F/PI	10	
KIA78DL12F/PI	12	
KIA78DL15F/PI	15	

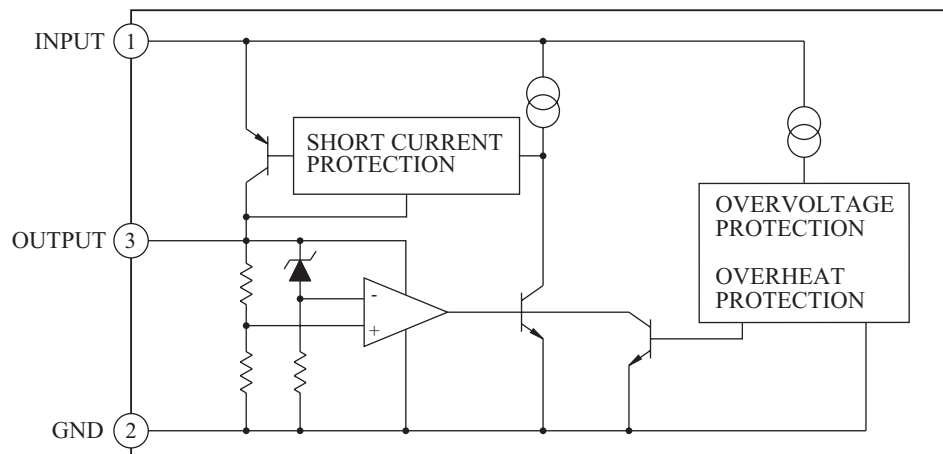
### MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Operating Input Voltage	$V_{IN}$	29	V
Input Voltage of Surge	$V_{IN}$	60	V
Power Dissipation-1 (No Heatsink)	F	1.3	W
	PI	2.0	
Power Dissipation-2 (Infinite Heatsink)	F	12.0	W
	PI	20.8	
Junction Temperature	$T_j$	-40 ~ 150	°C
Operating Temperature	$T_{opr}$	-40 ~ 85	°C
Storage Temperature	$T_{stg}$	-55 ~ 150	°C
Lead Temperature Time	$T_{sol}$	260 (10sec)	°C



# KIA78DL05F/PI~78DL15F/PI

## BLOCK DIAGRAM



### KIA78DL05F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=14V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$5.35V \leq V_{IN} \leq 26V$ , $T_a=-40 \sim 85^\circ C$	4.5	5	5.5	V
Line Regulation	$\Delta V_{OUT(1)}$	$9V \leq V_{IN} \leq 16V$	-	2	10	mV
		$6V \leq V_{IN} \leq 26V$	-	4	30	
Load Regulation	$\Delta V_{OUT(2)}$	$10mA \leq I_{OUT} \leq 200mA$	-	14	50	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $6V \leq V_{IN} \leq 26V$	-	0.5	1	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$		29	33	-	V

### KIA78DL06F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=14V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$6.35V \leq V_{IN} \leq 26V$ , $T_a=-40 \sim 85^\circ C$	5.4	6	6.6	V
Line Regulation	$\Delta V_{OUT(1)}$	$10V \leq V_{IN} \leq 17V$	-	2	12	mV
		$7V \leq V_{IN} \leq 26V$	-	5	36	
Load Regulation	$\Delta V_{OUT(2)}$	$10mA \leq I_{OUT} \leq 200mA$	-	17	60	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $7V \leq V_{IN} \leq 26V$	-	0.55	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$		29	33	-	V

# KIA78DL05F/PI~78DL15F/PI

## KIA78DL08F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=16V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$8.35V \leq V_{IN} \leq 26V$ , $-40^\circ C \leq Ta \leq 85^\circ C$	7.2	8	8.8	V
Line Regulation	$\Delta V_{OUT}(1)$	$12V \leq V_{IN} \leq 19V$	-	3	16	mV
		$9V \leq V_{IN} \leq 26V$	-	6	45	
Load Regulation	$\Delta V_{OUT}(2)$	$10mA \leq I_{OUT} \leq 200mA$	-	22	80	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $9V \leq V_{IN} \leq 26V$	-	0.6	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$	-	29	33	-	V

## KIA78DL09F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=16V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$9.35V \leq V_{IN} \leq 26V$ , $-40^\circ C \leq Ta \leq 85^\circ C$	8.1	9	9.9	V
Line Regulation	$\Delta V_{OUT}(1)$	$13V \leq V_{IN} \leq 20V$	-	3	18	mV
		$10V \leq V_{IN} \leq 26V$	-	7	50	
Load Regulation	$\Delta V_{OUT}(2)$	$10mA \leq I_{OUT} \leq 200mA$	-	25	90	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $10V \leq V_{IN} \leq 26V$	-	0.65	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$	-	29	33	-	V

## KIA78DL10F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=16V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$10.35V \leq V_{IN} \leq 26V$ , $-40^\circ C \leq Ta \leq 85^\circ C$	9	10	11	V
Line Regulation	$\Delta V_{OUT}(1)$	$14V \leq V_{IN} \leq 21V$	-	4	20	mV
		$11V \leq V_{IN} \leq 26V$	-	8	60	
Load Regulation	$\Delta V_{OUT}(2)$	$10mA \leq I_{OUT} \leq 200mA$	-	28	100	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $11V \leq V_{IN} \leq 26V$	-	0.7	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$	-	29	33	-	V

# KIA78DL05F/PI~78DL15F/PI

KIA78DL12F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=18V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

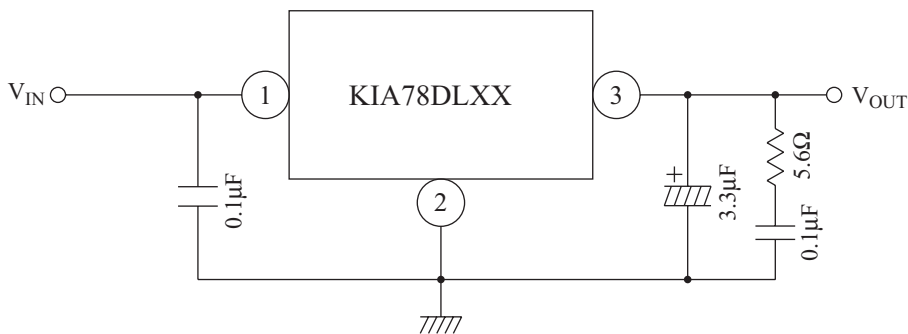
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$12.35V \leq V_{IN} \leq 26V$ , $-40^\circ C \leq T_a \leq 85^\circ C$	10.8	12	13.2	V
Line Regulation	$\Delta V_{OUT(1)}$	$16V \leq V_{IN} \leq 23V$	-	5	24	mV
		$13V \leq V_{IN} \leq 26V$	-	10	70	
Load Regulation	$\Delta V_{OUT(2)}$	$10mA \leq I_{OUT} \leq 200mA$	-	33	120	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $13V \leq V_{IN} \leq 26V$	-	0.8	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$	-	29	33	-	V

KIA78DL15F/PI

ELECTRICAL CHARACTERISTICS ( $V_{IN}=20V$ ,  $I_{OUT}=10mA$ ,  $T_j=25^\circ C$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$15.35V \leq V_{IN} \leq 26V$ , $-40^\circ C \leq T_a \leq 85^\circ C$	13.5	15	16.5	V
Line Regulation	$\Delta V_{OUT(1)}$	$19V \leq V_{IN} \leq 26V$	-	6	30	mV
		$16V \leq V_{IN} \leq 26V$	-	12	80	
Load Regulation	$\Delta V_{OUT(2)}$	$10mA \leq I_{OUT} \leq 200mA$	-	40	150	mV
Quiescent Current	$I_{CC}$	$I_{OUT} \leq 10mA$ , $16V \leq V_{IN} \leq 26V$	-	0.9	-	mA
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$	-	0.15	0.3	V
		$I_{OUT}=200mA$	-	0.4	0.6	
Max. Operating Input Voltage	$V_{IN}$	-	29	33	-	V

Fig.1 Standard Test Circuit & Application Circuit



# KIA78DL05F/PI~78DL15F/PI

Fig.2 |  $V_{OUT} - V_{IN}$  |

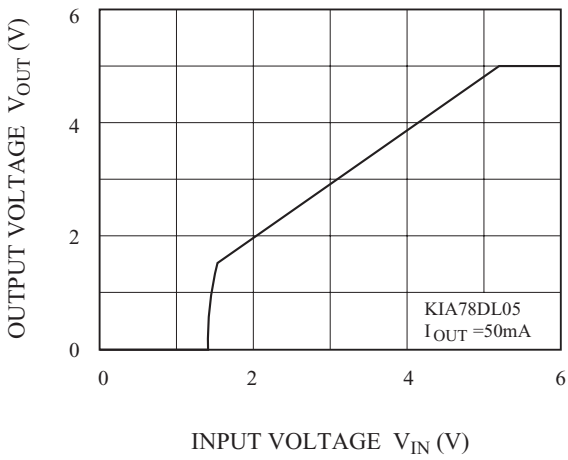


Fig.3 |  $V_{IN} - V_{OUT}$  | -  $I_{IN}$

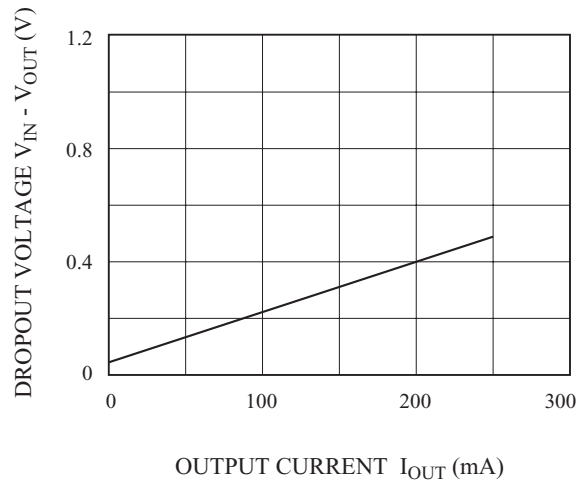


Fig.4  $I_{CC} - V_{IN}$

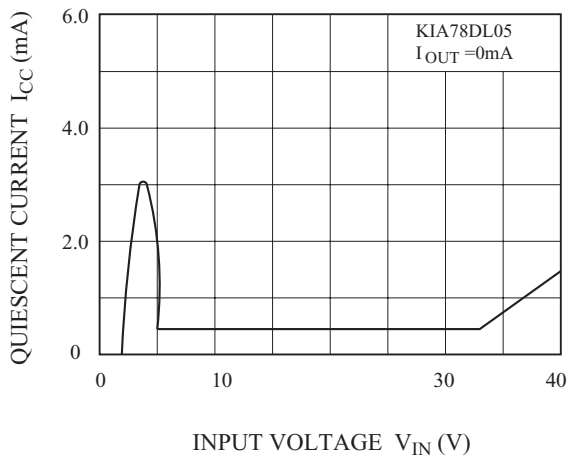


Fig.5  $P_D - T_a$  (F-Type : DPAK)

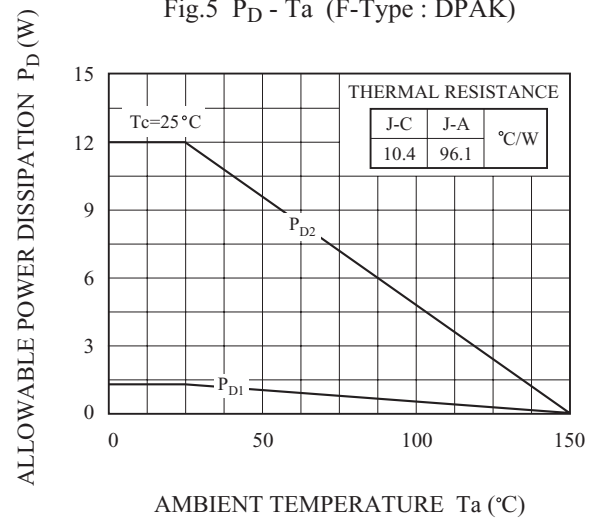


Fig.6  $P_D - T_a$  (PI-Type : TO-220IS)

