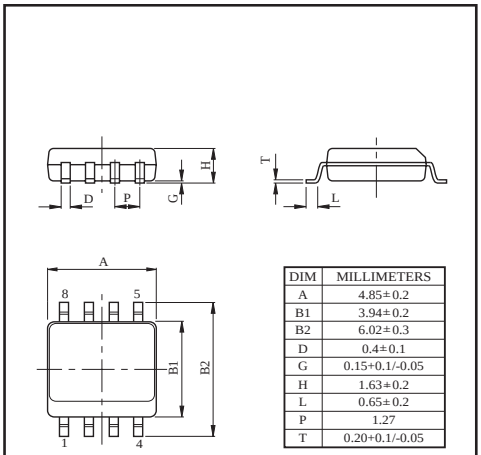
THREE TERMINAL POSITIVE VOLTAGE REGULATORS
5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 24V.

FEATURES

· Best Suited to Power Supply for TTL, C^2-MOS.
· No External Part Needed.
· Built-in Thermal Protective Circuit.
· Max. Output Current 100mA (T_j=25℃).



DIM	MILLIMETERS
A	4.85±0.2
B1	3.94±0.2
B2	6.02±0.3
D	0.4±0.1
G	0.15+0.1/-0.05
H	1.63±0.2
L	0.65±0.2
P	1.27
T	0.20+0.1/-0.05

1. OUTPUT
2. COMMON
3. COMMON
4. NC
8. INPUT
7. COMMON
6. COMMON
5. NC

SOP-8

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage	5V ~ 10V	V_{IN}	30	V
	12V ~ 18V		35	
	18V ~ 24V		40	
Power Dissipation		P_D	500	mW
Operating Junction Temperature		T_j	-30 ~ 150	℃
Storage Temperature		T_{stg}	-55 ~ 150	℃

ELECTRICAL CHARACTERISTICS

FR78L05SOP

(Unless otherwise specified, V_{IN}=10V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		4.75	5.0	5.25	V
			7.0V≤ V_{IN}≤20V, 1.0mA≤ I_{OUT}≤40mA		4.75	-	5.25	V
			1.0mA≤ I_{OUT}≤70mA		4.75	-	5.25	
Line Regulation	Reg line	1	T_j=25℃	7.0V≤ V_{IN}≤20V	-	32	150	mV
				8.0V≤ V_{IN}≤20V	-	26	100	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤100mA	-	15	60	mV
				1.0mA≤ I_{OUT}≤40mA	-	8	30	
Quiescent Current	I_B	1	T_j=25℃		-	3.1	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_B	1	9.0V≤ V_{IN}≤20V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	42	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 8.0V≤ V_{IN}≤20V, T_j=25℃		41	49	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L06SOP

(Unless otherwise specified, V_{IN}=12V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		5.75	6.0	6.25	V
			8V≤ V_{IN}≤ 20V, 1.0mA≤ I_{OUT}≤ 40mA		5.7	6.0	6.3	
			1.0mA≤ I_{OUT}≤70mA		5.7	6.0	6.3	
Line Regulation	Reg line	1	T_j=25℃	8.1V≤ V_{IN}≤ 20V	-	35	175	mV
				9.0V≤ V_{IN}≤ 20V	-	29	125	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤100mA	-	16	80	mV
				1.0mA≤ I_{OUT}≤40mA	-	9	40	
Quiescent Current	I_B	1	T_j=25℃		-	3.9	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_B	1	9.0V≤ V_{IN}≤ 20V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	46	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 9.0V≤ V_{IN}≤ 19V, T_j=25℃		40	48	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L08SOP

(Unless otherwise specified, V_{IN}=14V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		7.7	8.0	8.3	V
			10.5V≤ V_{IN} ≤23V, 1.0mA≤ I_{OUT} ≤40mA		7.6	-	8.4	
			1.0mA≤ I_{OUT} ≤70mA		7.6	-	8.4	
Line Regulation	Reg line	1	T_j=25℃	10.5V≤ V_{IN} ≤ 23V	-	42	175	mV
				11V≤ V_{IN} ≤ 23V	-	36	125	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT} ≤100mA	-	18	80	mV
				1.0mA≤ I_{OUT} ≤40mA	-	10	40	
Quiescent Current	I_B	1	T_j=25℃		-	4	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_B	1	11V≤ V_{IN} ≤ 23V		-	-	1.5	mA
			1.0mA≤ I_{OUT} ≤40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	54	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 12V≤ V_{IN} ≤ 23V, T_j=25℃		37	46	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L09SOP

(Unless otherwise specified, V_{IN}=14V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		8.6	9.0	9.4	V
			12V≤ V_{IN}≤ 24V, 1.0mA≤ I_{OUT}≤ 40mA		8.55	-	9.45	
			1.0mA≤ I_{OUT}≤ 70mA		8.55	-	9.45	
Line Regulation	Reg line	1	T_j=25℃	12V≤ V_{IN}≤ 24V	-	45	175	mV
				13V≤ V_{IN}≤ 24V	-	40	125	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤ 100mA	-	19	90	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	11	45	
Quiescent Current	I_B	1	T_j=25℃		-	4.1	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_B	1	13V≤ V_{IN}≤ 24V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	58	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 13V≤ V_{IN}≤ 24V, T_j=25℃		38	45	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L10SOP

(Unless otherwise specified, V_{IN}=16V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		9.6	10	10.4	V
			13V≤ V_{IN}≤ 25V, 1.0mA≤ I_{OUT}≤ 40mA		9.5	-	10.5	
			1.0mA≤ I_{OUT}≤ 70mA		9.5	-	10.5	
Line Regulation	Reg line	1	T_j=25℃	13V≤ V_{IN}≤ 25V	-	51	175	mV
				14V≤ V_{IN}≤ 25V	-	42	125	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤ 100mA	-	20	90	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	11	40	
Quiescent Current	I_B	1	T_j=25℃		-	4.2	6.0	mA
			T_j=125℃		-	-	5.5	
Quiescent Current Change	ΔI_B	1	14V≤ V_{IN}≤ 25V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	62	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 15V≤ V_{IN}≤ 24V, T_j=25℃		37	44	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L12SOP

(Unless otherwise specified, V_{IN}=17V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		11.5	12	12.5	V
			14.5V≤ V_{IN}≤ 27V, 1.0mA≤ I_{OUT}≤ 40mA		11.4	-	12.6	
			1.0mA≤ I_{OUT}≤ 70mA		11.4	-	12.6	
Line Regulation	Reg line	1	T_j=25℃	14.5V≤ V_{IN}≤ 27V	-	55	250	mV
				16V≤ V_{IN}≤ 27V	-	49	200	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤ 100mA	-	22	100	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	13	50	
Quiescent Current	I_B	1	T_j=25℃		-	4.3	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	1	16V≤ V_{IN}≤ 27V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	70	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 15V≤ V_{IN}≤ 25V, T_j=25℃		37	42	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L15SOP

(Unless otherwise specified, V_{IN}=19V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		14.4	15	15.6	V
			17.5V≤ V_{IN}≤ 30V, 1.0mA≤ I_{OUT}≤ 40mA		14.25	-	15.75	
			1.0mA≤ I_{OUT}≤ 70mA		14.25	-	15.75	
Line Regulation	Reg line	1	T_j=25℃	17.5V≤ V_{IN}≤ 30V	-	65	300	mV
				19V≤ V_{IN}≤ 30V	-	58	250	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤ 100mA	-	25	150	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	12	75	
Quiescent Current	I_B	1	T_j=25℃		-	4.2	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	1	19V≤ V_{IN}≤ 30V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	82	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 18.5V≤ V_{IN}≤ 28.5V, T_j=25℃		34	40	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

ELECTRICAL CHARACTERISTICS

FR78L18SOP

(Unless otherwise specified, V_{IN}=23V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		17.3	18	18.7	V
			21.5V≤ V_{IN}≤ 33V, 1.0mA≤ I_{OUT}≤ 40mA		17.1	-	18.9	
			1.0mA≤ I_{OUT}≤ 70mA		17.1	-	18.9	
Line Regulation	Reg line	1	T_j=25℃	20.5V≤ V_{IN}≤ 33V	-	70	360	mV
				22V≤ V_{IN}≤ 33V	-	64	300	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT}≤ 100mA	-	27	180	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	19	90	
Quiescent Current	I_B	1	T_j=25℃		-	4.7	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	1	22V≤ V_{IN}≤ 33V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	150	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 21.5V≤ V_{IN}≤ 31.5V, T_j=25℃		32	36	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

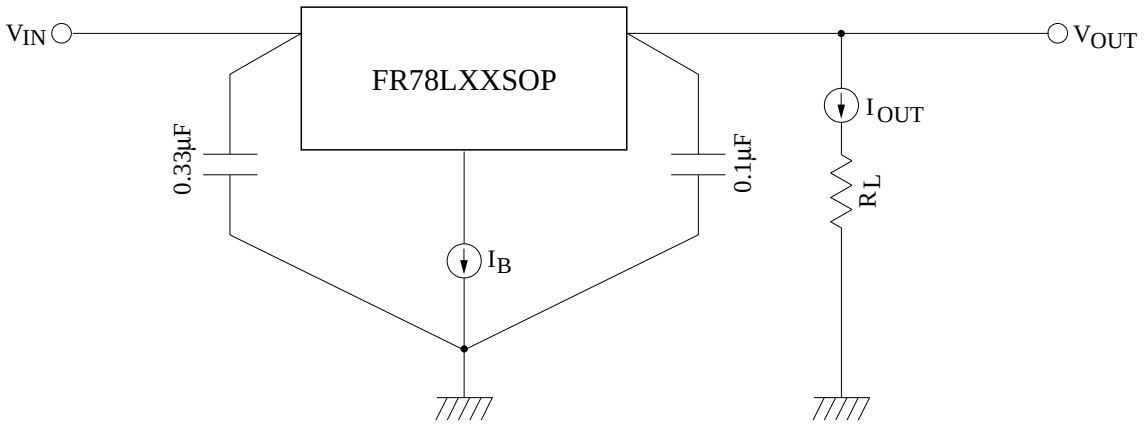
ELECTRICAL CHARACTERISTICS

FR78L24SOP

(Unless otherwise specified, V_{IN}=26V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0℃≤T_j≤125℃)

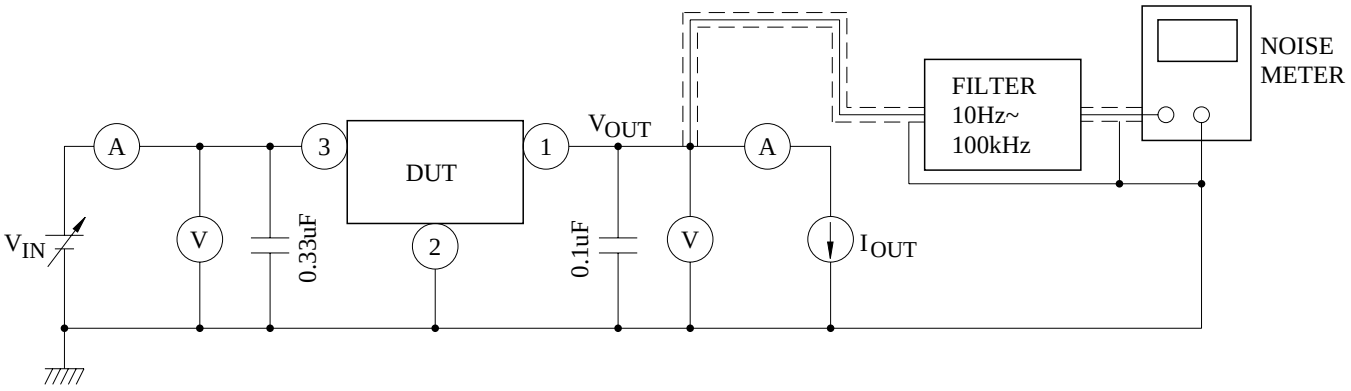
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃		23	24	25	V
			26.5V≤ V_{IN}≤ 39V, 1.0mA≤ I_{OUT}≤ 40mA		22.8	-	25.2	
			1.0mA≤ I_{OUT} ≤70mA		22.8	-	25.2	
Line Regulation	Reg line	1	T_j=25℃	27.5V≤ V_{IN}≤ 38V	-	35	350	mV
				28V≤ V_{IN}≤ 38V	-	30	300	
Load Regulation	Reg load	1	T_j=25℃	1.0mA≤ I_{OUT} ≤100mA	-	40	200	mV
				1.0mA≤ I_{OUT}≤ 40mA	-	20	100	
Quiescent Current	I_B	1	T_j=25℃		-	4.8	6.5	mA
			T_j=125℃		-	-	6.0	
Quiescent Current Change	ΔI_B	1	28V≤ V_{IN}≤ 39V		-	-	1.5	mA
			1.0mA≤ I_{OUT}≤ 40mA		-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≤ f ≤100kHz		-	82	-	μV_{rms}
Ripple Rejection Ratio	RR	2	f=120Hz, 27.5V≤ V_{IN}≤ 37.5V, T_j=25℃		30	33	-	dB
Dropout Voltage	V_D	1	T_j=25℃		-	1.7	-	V

TEST CIRCUIT / STANDARD APPLICATION CIRCUIT



TEST CIRCUIT

1. V_{OUT} , Reg · line , Reg · load , V_{OUT} , I_B , $\triangle I_B$, V_{NO} , $\triangle V_{OUT}$ $/\triangle t$, $|V_{IN} - V_{OUT}|$, TC_{VO}



2. RR

e_i = 1V p-p
f = 120Hz
ℓ ≦ 30cm

