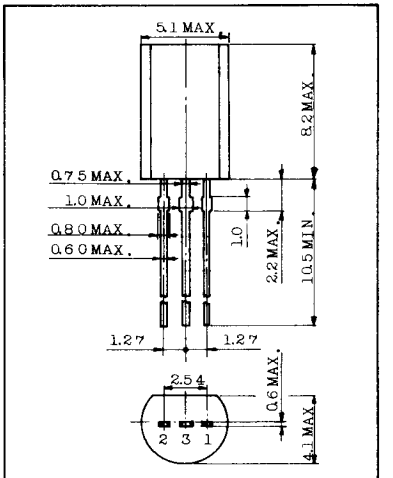
THREE TERMINAL POSITIVE REGULATORS

5V, 6V, 7V, 7.5V, 8V, 9V, 10V, 12V,
13.2V, 15V, 18V, 20V, 24V.

- Suitable for TTL, DTL, HTL, C-MOS Power Supply
- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- Maximum Output Current of 150mA (T_j=25°C)
- Available in the Plastic TO-92MOD Package

Unit in mm

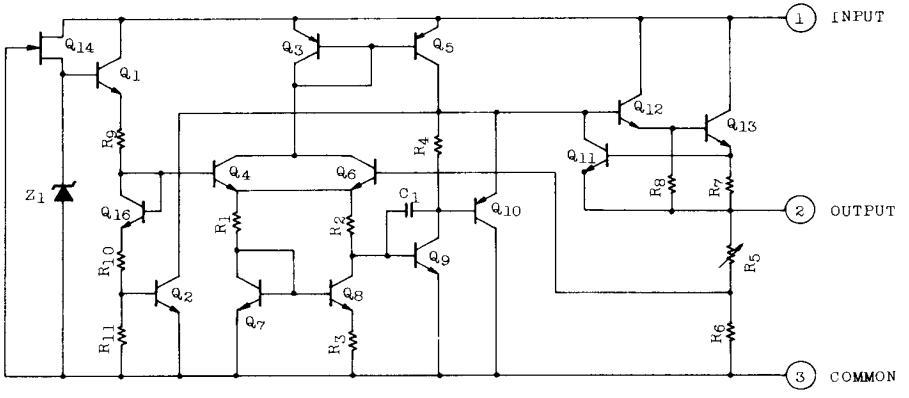


JEDEC	TO-92MOD
EIAJ	–
TOSHIBA	5-5

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage	(5V ~ 15V)	V_{IN}	35	V
	(18V ~ 24V)		40	
Power Dissipation		P_D	800	mW
Operating Temperature		T_{opr}	-30 ~ 75	°C
Storage Temperature		T_{stg}	-55 ~ 150	°C

EQUIVALENT CIRCUIT



TA78L005P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=10V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, $0^{o}C < T_j < 125^{o}C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L005P			TA78L005AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	4.68	5.0	5.32	4.8	5.0	5.2	V
Input Regulation	Reg.line	1	T_j=25°C, 7.0 ≤ V_{IN} ≤ 20V	-	55	200	-	55	150	mV
			8.0 ≤ V_{IN} ≤ 20V	-	45	150	-	45	100	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 100mA	-	11	60	-	11	60	mV
			1.0mA ≤ I_{OUT} ≤ 40mA	-	5.0	30	-	5.0	30	
Output Voltage	V_{OUT}	1	7.0V ≤ V_{IN} ≤ 20V, 1.0mA ≤ I_{OUT} ≤ 40mA	4.6	-	5.4	4.75	-	5.25	V
			V_{IN}=10V, 1.0mA ≤ I_{OUT} ≤ 70mA	4.6	-	5.4	4.75	-	5.25	
Quiescent Current	I_B	1	T_j=25°C	-	3.1	6.0	-	3.1	6.0	mA
			T_j=125°C	-	-	5.5	-	-	5.5	
Quiescent Current Change	ΔI_B	1	8.0V ≤ V_{IN} ≤ 20V	-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz	-	40	-	-	40	-	μV
Long Term Stability	$\frac{\Delta V_{OUT}}{\Delta t}$	1		-	12	-	-	12	-	$\frac{mV}{1.0\ KHrs}$
Ripple Rejection	RR	2	f=120Hz, 8.0V ≤ V_{IN} ≤ 18V, T_j=25°C	40	49	-	41	49	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-0.6	-	-	-0.6	-	$mV/^{o}C$

TA78L006P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=11V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0°C < T_j < 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		TA78L006P			TA78L006AP			UNIT
					MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C		5.61	6.0	6.39	5.76	6.0	6.24	V
Input Regulation	Reg.line	1	T_j=25°C	8.1V ≤ V_{IN} ≤ 21V	-	50	200	-	50	150	mV
				9.0V ≤ V_{IN} ≤ 21V	-	45	150	-	45	110	
Load Regulation	Reg.load	1	T_j=25°C	1.0mA ≤ I_{OUT} ≤ 100mA	-	12	70	-	12	70	mV
				1.0mA ≤ I_{OUT} ≤ 40mA	-	5.5	35	-	5.5	35	
Output Voltage	V_{OUT}	1	8.1V ≤ V_{IN} ≤ 21V 1.0mA ≤ I_{OUT} ≤ 40mA		5.52	-	6.48	5.7	-	6.3	V
			V_{IN}=11V, 1.0mA ≤ I_{OUT} ≤ 70mA		5.52	-	6.48	5.7	-	6.3	
Quiescent Current	I_B	1	T_j=25°C		-	3.1	6.0	-	3.1	6.0	mA
			T_j=125°C		-	-	5.5	-	-	5.5	
Quiescent Current Change	ΔI_B	1	9.0V ≤ V_{IN} ≤ 20V		-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA		-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz		-	40	-	-	40	-	μV
Long Term Stability	$\Delta V_{OUT} / \Delta t$	1			-	14	-	-	14	-	mV / 1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 9.0V ≤ V_{IN} ≤ 19V, T_j=25°C		38	47	-	39	47	-	dB
Dropout Voltage	$\|V_{IN} - V_{OUT}\|$	1	T_j=25°C		-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-0.7	-	-	-0.7	-	mV/°C

TA78L007P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=12V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, $0^{\circ}C < T_j < 125^{\circ}C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L007P			TA78L007AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	6.55	7.0	7.45	6.72	7.0	7.28	V
Input Regulation	Reg.line	1	T_j=25°C, 9.2V≦V_{IN}≦22V	-	50	200	-	50	160	mV
			T_j=25°C, 10V≦V_{IN}≦22V	-	45	150	-	45	115	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA≦I_{OUT}≦100mA	-	13	75	-	13	75	mV
			T_j=25°C, 1.0mA≦I_{OUT}≦40mA	-	6.0	40	-	6.0	40	
Output Voltage	V_{OUT}	1	9.2V≦V_{IN}≦22V, 1.0mA≦I_{OUT}≦40mA	6.44	-	7.56	6.65	-	7.35	V
			V_{IN}=12V, 1.0mA≦I_{OUT}≦70mA	6.44	-	7.56	6.65	-	7.35	
Quiescent Current	I_B	1	T_j=25°C	-	3.1	6.5	-	3.1	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	10V≦V_{IN}≦22V	-	-	1.5	-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz≦f≦100kHz	-	50	-	-	50	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	17	-	-	17	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 10V≦V_{IN}≦20V, T_j=25°C	36	46	-	37	46	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-0.75	-	-	-0.75	-	mV/°C

TA78L07 P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=13V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0°C < T_j < 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L075P			TA78L075AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	7.02	7.5	7.98	7.21	7.5	7.79	V
Input Regulation	Reg.line	1	T_j=25°C, 9.8V ≤ V_{IN} ≤ 23V	-	40	200	-	40	170	mV
			T_j=25°C, 10.5V ≤ V_{IN} ≤ 23V	-	40	150	-	40	120	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 100mA	-	14	80	-	14	80	mV
			T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 40mA	-	6.5	40	-	6.5	40	
Output Voltage	V_{OUT}	1	9.8V ≤ V_{IN} ≤ 23V, 1.0mA ≤ I_{OUT} ≤ 40mA	6.9	-	8.1	7.125	-	7.875	V
			V_{IN}=13V, 1.0mA ≤ I_{OUT} ≤ 70mA	6.9	-	8.1	7.125	-	7.875	
Quiescent Current	I_B	1	T_j=25°C	-	3.1	6.5	-	3.1	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	10.5V ≤ V_{IN} ≤ 23V	-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz	-	60	-	-	60	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	19	-	-	19	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 11V ≤ V_{IN} ≤ 21V, T_j=25°C	36	45	-	37	45	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-0.75	-	-	-0.75	-	mV/°C

TA78L008P/AP ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L008P			TA78L008AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	7.48	8.0	8.52	7.7	8.0	8.3	V
Input Regulation	Reg.line	1	T_j=25°C, 10.5V ≤ V_{IN} ≤ 23V	-	20	200	-	20	175	mV
			T_j=25°C, 11V ≤ V_{IN} ≤ 23V	-	12	150	-	12	125	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 100mA	-	15	80	-	15	80	mV
			T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 40mA	-	7.0	40	-	7.0	40	
Output Voltage	V_{OUT}	1	10.5V ≤ V_{IN} ≤ 23V, 1.0mA ≤ I_{OUT} ≤ 40mA	7.36	-	8.64	7.6	-	8.4	V
			V_{IN}=14V, 1.0mA ≤ I_{OUT} ≤ 70mA	7.36	-	8.64	7.6	-	8.4	
Quiescent Current	I_B	1	T_j=25°C	-	3.1	6.5	-	3.1	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	11V ≤ V_{IN} ≤ 23V	-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz	-	60	-	-	60	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	20	-	-	20	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 12V ≤ V_{IN} ≤ 23V, T_j=25°C	36	45	-	37	45	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-0.8	-	-	-0.8	-	mV/°C

TA78L009P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=15V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, $0^{\circ}C < T_j < 125^{\circ}C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L009P			TA78L009AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	8.42	9.0	9.58	8.64	9.0	9.36	V
Input Regulation	Reg.line	1	T_j=25°C, 11.4V ≤ V_{IN} ≤ 24V	-	80	230	-	80	200	mV
			12V ≤ V_{IN} ≤ 24V	-	20	160	-	20	160	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 100mA	-	17	90	-	17	90	mV
			1.0mA ≤ I_{OUT} ≤ 40mA	-	8.0	45	-	8.0	45	
Output Voltage	V_{OUT}	1	11.4V ≤ V_{IN} ≤ 24V, 1.0mA ≤ I_{OUT} ≤ 40mA	8.28	-	9.72	8.55	-	9.45	V
			V_{IN}=15V, 1.0mA ≤ I_{OUT} ≤ 70mA	8.28	-	9.72	8.55	-	9.45	
Quiescent Current	I_B	1	T_j=25°C	-	3.2	6.5	-	3.2	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	11.5V ≤ V_{IN} ≤ 26V	-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz	-	65	-	-	65	-	μV
Long Term Stability	$\Delta V_{OUT} / \Delta t$	1		-	21	-	-	21	-	mV / 1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 12V ≤ V_{IN} ≤ 24V, T_j=25°C	36	44	-	36	44	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	±0.85	-	-	±0.85	-	mV/°C

TA78L010P/AP ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L010P			TA78L010AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	9.35	10	10.65	9.6	10	10.4	V
Input Regulation	Reg.Line	1	T_j=25°C, 12.5V ≤ V_{IN} ≤ 25V	-	80	230	-	80	230	mV
			T_j=25°C, 13V ≤ V_{IN} ≤ 25V	-	30	170	-	30	170	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 100mA	-	18	90	-	18	90	mV
			T_j=25°C, 1.0mA ≤ I_{OUT} ≤ 40mA	-	8.5	45	-	8.5	45	
Output Voltage	V_{OUT}	1	12.5V ≤ V_{IN} ≤ 25V, 1.0mA ≤ I_{OUT} ≤ 40mA	9.2	-	10.8	9.5	-	10.5	V
			V_{IN}=16V, 1.0mA ≤ I_{OUT} ≤ 70mA	9.2	-	1.08	9.5	-	1.05	
Quiescent Current	I_B	1	T_j=25°C	-	3.2	6.5	-	3.2	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	13V ≤ V_{IN} ≤ 25V	-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz	-	70	-	-	70	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	22	-	-	22	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 13V ≤ V_{IN} ≤ 24V, T_j=25°C	36	43	-	36	43	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-0.9	-	-	-0.9	-	mV/°C

TA78L012P/AP ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L012P			TA78L012AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	11.22	12	12.78	11.5	12	12.5	V
Input Regulation	Reg.line	1	T_j=25°C, 14.5V≤V_{IN}≤27V	-	120	250	-	120	250	mV
			T_j=25°C, 16V≤V_{IN}≤27V	-	100	200	-	100	200	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA≤I_{OUT}≤100mA	-	20	100	-	20	100	mV
			T_j=25°C, 1.0mA≤I_{OUT}≤40mA	-	10	50	-	10	50	
Output Voltage	V_{OUT}	1	14.5V≤V_{IN}≤27V, 1.0mA≤I_{OUT}≤40mA	11.04	-	12.96	11.4	-	12.6	V
			V_{IN}=19V, 1.0mA≤I_{OUT}≤70mA	11.04	-	12.96	11.4	-	12.6	
Quiescent Current	I_B	1	T_j=25°C	-	3.2	6.5	-	3.2	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	16V≤V_{IN}≤27V	-	-	1.5	-	-	1.5	mA
			1.0mA≤I_{OUT}≤40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz≤f≤100kHz	-	80	-	-	80	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	24	-	-	24	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 15V≤V_{IN}≤25V, T_j=25°C	36	41	-	36	41	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-1.0	-	-	-1.0	-	mV/°C

TA78L132P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=21V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, $0^{\circ}C < T_j < 125^{\circ}C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L132P			TA78L132AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	12.34	13.2	14.06	12.67	13.2	13.73	V
Input Regulation	Reg.line	1	T_j=25°C, 16V≦V_{IN}≦28V	-	125	270	-	125	270	mV
			T_j=25°C, 17V≦V_{IN}≦28V	-	105	225	-	105	225	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA≦I_{OUT}≦100mA	-	22	120	-	22	120	mV
			T_j=25°C, 1.0mA≦I_{OUT}≦40mA	-	11	60	-	11	60	
Output Voltage	V_{OUT}	1	16V≦V_{IN}≦28V, 1.0mA≦I_{OUT}≦40mA	12.14	-	14.26	12.54	-	13.86	V
			V_{IN}=21V, 1.0mA≦I_{OUT}≦70mA	12.14	-	14.26	12.54	-	13.86	
Quiescent Current	I_B	1	T_j=25°C	-	3.2	6.5	-	3.2	6.5	mA
			T_j=125°C	-	3.2	6.0	-	3.2	6.0	
Quiescent Current Change	ΔI_B	1	17V≦V_{IN}≦28V	-	-	1.5	-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz≦f≦100kHz	-	90	-	-	90	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	28	-	-	28	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=100Hz, 17V≦V_{IN}≦27V, T_j=25°C	34	41	-	34	41	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-1.2	-	-	-1.2	-	mV/°C

TA78L015P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=23V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, $0^{\circ}C < T_j < 125^{\circ}C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L015P			TA78L015AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	$T_j=25^{\circ}C$	14.03	15	15.97	14.4	15	15.6	V
Input Regulation	Reg.line	1	$T_j=25^{\circ}C$, $17.5V \leq V_{IN} \leq 30V$	-	130	300	-	130	300	mV
			$T_j=25^{\circ}C$, $20V \leq V_{IN} \leq 30V$	-	110	250	-	110	250	
Load Regulation	Reg.load	1	$T_j=25^{\circ}C$, $1.0mA \leq I_{OUT} \leq 100mA$	-	25	150	-	25	150	mV
			$T_j=25^{\circ}C$, $1.0mA \leq I_{OUT} \leq 40mA$	-	12	75	-	12	75	
Output Voltage	V_{OUT}	1	$17.5V \leq V_{IN} \leq 30V$, $1.0mA \leq I_{OUT} \leq 40mA$	13.8	-	16.2	14.25	-	15.75	V
			V_{IN}=23V, $1.0mA \leq I_{OUT} \leq 70mA$	13.8	-	16.2	14.25	-	15.75	
Quiescent Current	I_B	1	$T_j=25^{\circ}C$	-	3.3	6.5	-	3.3	6.5	mA
			$T_j=125^{\circ}C$	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	$20V \leq V_{IN} \leq 30V$	-	-	1.5	-	-	1.5	mA
			$1.0mA \leq I_{OUT} \leq 40mA$	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	$Ta=25^{\circ}C$, $10Hz \leq f \leq 100kHz$	-	90	-	-	90	-	μV
Long Term Stability	$\Delta V_{OUT} / \Delta t$	1		-	30	-	-	30	-	mV / 1.0 KHrs
Ripple Rejection	RR	2	$f=120Hz$, $18.5V \leq V_{IN} \leq 28.5V$, $T_j=25^{\circ}C$	33	40	-	34	40	-	dB
Dropout Voltage	$\lvert V_{IN} - V_{OUT} \rvert$	1	$T_j=25^{\circ}C$	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-1.3	-	-	-1.3	-	mV/°C

TA78L018P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=27V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0°C<T_j<125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	TA78L018P			TA78L018AP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C	16.83	18	19.17	17.3	18	18.7	V
Input Regulation	Reg.line	1	T_j=25°C, 21.4V≤V_{IN}≤33V	-	32	325	-	32	325	mV
			T_j=25°C, 22V≤V_{IN}≤33V	-	27	275	-	27	275	
Load Regulation	Reg.load	1	T_j=25°C, 1.0mA≤I_{OUT}≤100mA	-	30	170	-	30	170	mV
			T_j=25°C, 1.0mA≤I_{OUT}≤40mA	-	15	75	-	15	75	
Output Voltage	V_{OUT}	1	21.4V≤V_{IN}≤33V, 1.0mA≤I_{OUT}≤40mA	16.56	-	19.44	17.1	-	18.9	V
			V_{IN}=27V, 1.0mA≤I_{OUT}≤70mA	16.56	-	19.44	17.1	-	18.9	
Quiescent Current	I_B	1	T_j=25°C	-	3.3	6.5	-	3.3	6.5	mA
			T_j=125°C	-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	22V≤V_{IN}≤33V	-	-	1.5	-	-	1.5	mA
			1.0mA≤I_{OUT}≤40mA	-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz≤f≤100kHz	-	150	-	-	150	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1		-	45	-	-	45	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 23V≤V_{IN}≤33V, T_j=25°C	32	38	-	32	38	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25°C	-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA	-	-1.5	-	-	-1.5	-	mV/°C

TA78L020P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=29V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0°C<T_j<125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		TA78L020P			TA78L020AP			UNIT
					MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C		18.7	20	21.3	19.2	20	20.8	V
Input Regulation	Reg.line	1	T_j=25°C	23.5V≦V_{IN}≦35V	-	33	330	-	33	330	mV
				24V≦V_{IN}≦35V	-	28	285	-	28	285	
Load Regulation	Reg.load	1	T_j=25°C	1.0mA≦I_{OUT}≦100mA	-	33	180	-	33	180	mV
				1.0mA≦I_{OUT}≦40mA	-	17	90	-	17	90	
Output Voltage	V_{OUT}	1	23.5V≦V_{IN}≦35V, 1.0mA≦I_{OUT}≦40mA		18.4	-	21.6	19.0	-	21.0	V
			V_{IN}=29V, 1.0mA≦I_{OUT}≦70mA		18.4	-	21.6	19.0	-	21.0	
Quiescent Current	I_B	1	T_j=25°C		-	3.3	6.5	-	3.3	6.5	mA
			T_j=125°C		-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	24V≦V_{IN}≦35V		-	-	1.5	-	-	1.5	mA
			1.0mA≦I_{OUT}≦40mA		-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz≦f≦100kHz		-	170	-	-	170	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	49	-	-	49	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 25V≦V_{IN}≦35V, T_j=25°C		31	37	-	31	37	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25°C		-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-1.7	-	-	-1.7	-	mV/°C

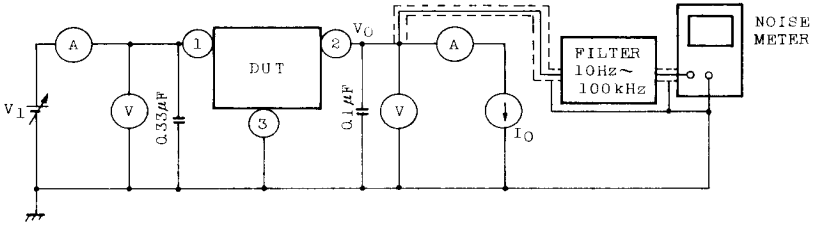
TA78L024P/AP ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN}=33V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, 0°C < T_j < 125°C)

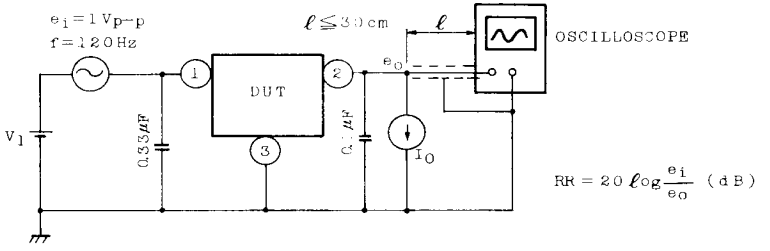
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		TA78L024P			TA78L024AP			UNIT
					MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Voltage	V_{OUT}	1	T_j=25°C		22.44	24	25.56	23	24	25	V
Input Regulation	Reg.line	1	T_j=25°C	27.5V ≤ V_{IN} ≤ 38V	-	35	350	-	35	350	mV
				28V ≤ V_{IN} ≤ 38V	-	30	300	-	30	300	
Load Regulation	Reg.load	1	T_j=25°C	1.0mA ≤ I_{OUT} ≤ 100mA	-	40	200	-	40	200	mV
				1.0mA ≤ I_{OUT} ≤ 40mA	-	20	100	-	20	100	
Output Voltage	V_{OUT}	1	27.5V ≤ V_{IN} ≤ 38V, 1.0mA ≤ I_{OUT} ≤ 40mA		22.08	-	25.92	22.8	-	25.2	V
			V_{IN}=33V, 1.0mA ≤ I_{OUT} ≤ 70mA		22.08	-	25.92	22.8	-	25.2	
Quiescent Current	I_B	1	T_j=25°C		-	3.5	6.5	-	3.5	6.5	mA
			T_j=125°C		-	-	6.0	-	-	6.0	
Quiescent Current Change	ΔI_B	1	28V ≤ V_{IN} ≤ 38V		-	-	1.5	-	-	1.5	mA
			1.0mA ≤ I_{OUT} ≤ 40mA		-	-	0.2	-	-	0.1	
Output Noise Voltage	V_{NO}	1	Ta=25°C, 10Hz ≤ f ≤ 100kHz		-	200	-	-	200	-	μV
Long Term Stability	$\Delta V_{OUT}/\Delta t$	1			-	56	-	-	56	-	mV/1.0 KHrs
Ripple Rejection	RR	2	f=120Hz, 29V ≤ V_{IN} ≤ 39V, T_j=25°C		30	35	-	31	35	-	dB
Dropout Voltage	$\lvert V_{IN}-V_{OUT}\rvert$	1	T_j=25°C		-	1.7	-	-	1.7	-	V
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA		-	-2.0	-	-	-2.0	-	mV/°C

TEST CIRCUIT

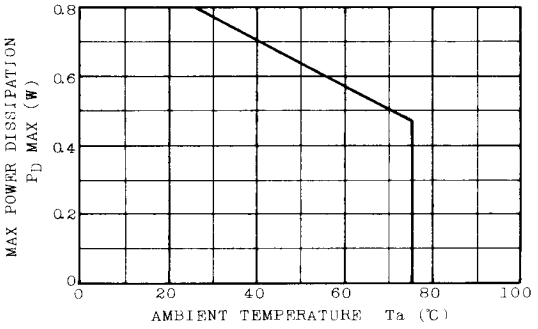
1. V_{OUT}, Reg.line, Reg.load, V_{OUT}, I_B, ΔI_B, V_{NO}, $\Delta V_{OUT}/\Delta t$, $|V_{IN}-V_{OUT}|$, TC_{VO}



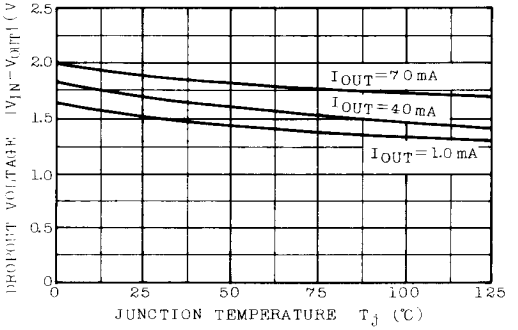
2. RR



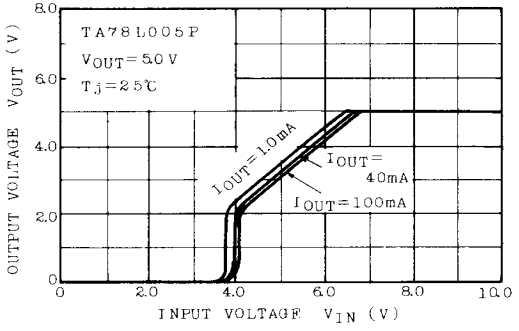
P_D MAX – Ta



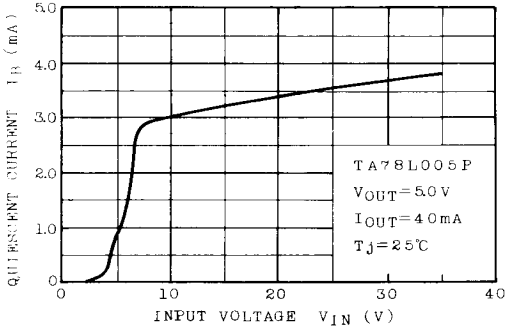
$|V_{IN} - V_{OUT}|$ – T_j



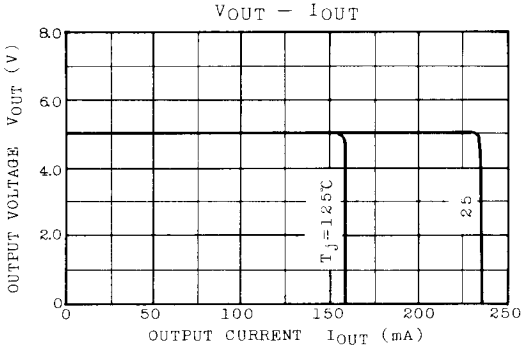
V_{OUT} – V_{IN}



I_B – V_{IN}

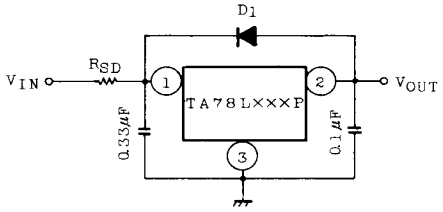


V_{OUT} – I_{OUT}



APPLICATION CIRCUIT

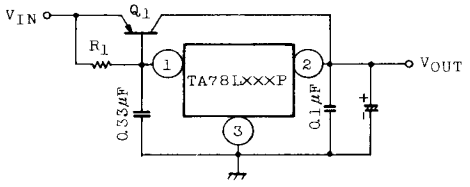
(1) STANDARD APPLICATION



D_1 : Protection Diode
High speed diode D_1 should be connected as shown in the figure if the condition $V_{IN} < V_{OUT}$ might occur by surge voltage or power supply ON/OFF.

R_{SD} : Power Limiting Resistor
For large V_{IN}, resistor R_{SD} is needed to limit IC power dissipation.

(2) A. CURRENT BOOST VOLTAGE REGULATOR



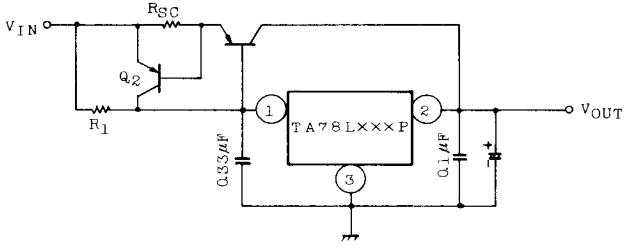
Heat sink is needed for Q_1

$$R_1 \leq \frac{V_{BE1}}{I_{B\ MAX}}$$

where, V_{BE1} : V_{BE} of external transistor Q_1

$I_{B\ MAX}$: Quiescent current of IC

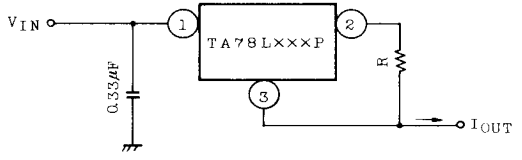
B. SHORT-CIRCUIT PROTECTION



$$R_{SC} = \frac{V_{BE2}}{I_{SC}}$$

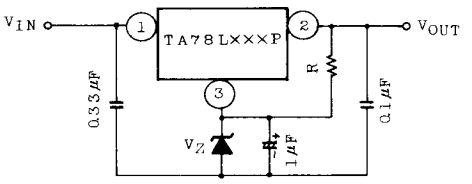
where, I_{SC} : Short-Circuit current

(3) CURRENT REGULATOR



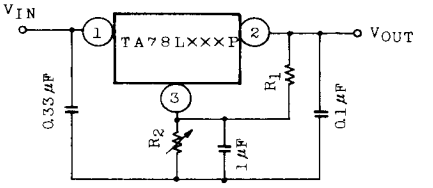
$$I_{OUT} = \frac{V_{OUT}}{R} + I_B$$

(4) VOLTAGE BOOST REGULATOR



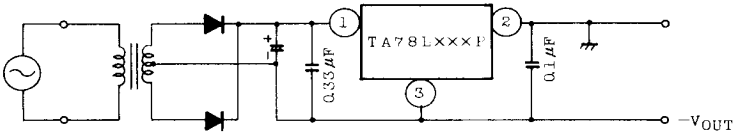
$V_{OUT}=V_Z+V_{OUT}$(of IC)

A little of current in resistor R is needed.

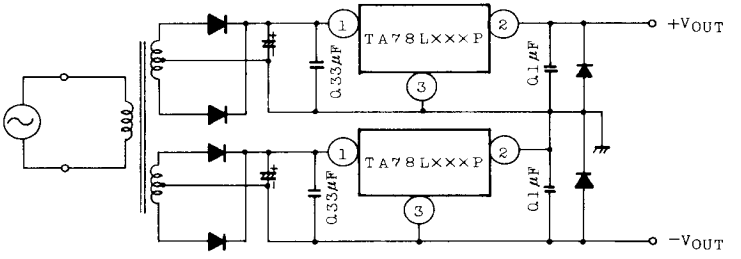


$V_{OUT}=R_2(I_B \cdot \frac{V_{OUT(of\ IC)}}{R_1}) + V_{OUT(of\ IC)}$

(5) NEGATIVE REGULATOR



(6) POSITIVE AND NEGATIVE REGULATOR



PRECAUTIONS FOR USE

When such a high voltage as exceeds 10V beyond the fixed output voltage (TYP Value) of IC is applied to the output terminal of IC, the IC may be destroyed. In such a case, it is advised to prevent an excessive voltage from being applied to the IC by connecting a zener diode between the output terminal and the GND. Especially, in the current boost circuit as shown in Example (2) of Application Circuits, an input voltage may be suddenly applied to the output terminal of IC in the form of steps, and that in case of light load, an excessive voltage may be transiently applied to the output terminal of IC: So that great care should be taken to this matter. In this case, in addition to the above, it may become necessary to consider such a countermeasure as the output capacitor in use is replaced with a capacitor of larger capacitance, or as R_1 (a resistor for IC bias current or bypass is replaced with a resistor of smaller resistance according to circumstances, or as the input voltage is gradually raised.