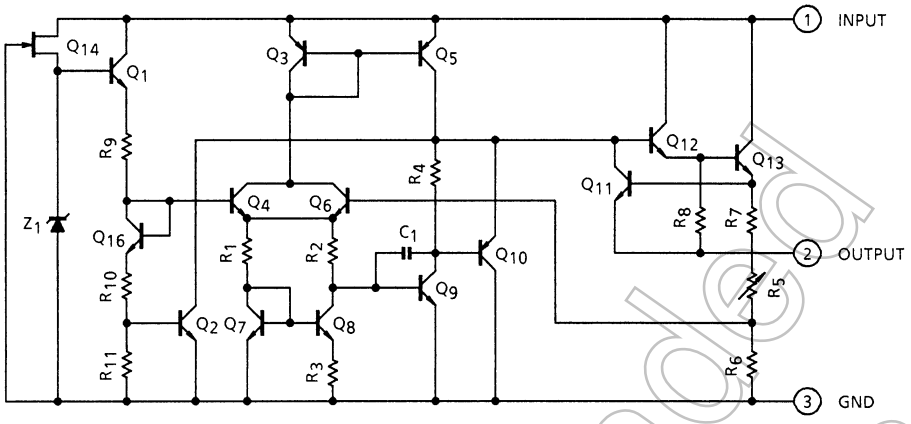
Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Input voltage	TA78L005AP	V_{IN}	35	V
	TA78L006AP			
	TA78L007AP			
	TA78L075AP			
	TA78L008AP			
	TA78L009AP			
	TA78L010AP			
	TA78L012AP			
	TA78L132AP			
	TA78L015AP			
	TA78L018AP		40	
	TA78L020AP			
	TA78L024AP			
Output current		I_{OUT}	0.15	A
Power dissipation	(Ta = 25°C)	P_D	800	mW
Operating temperature		T_{opr}	−30 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C
Junction temperature		T_j	150	°C
Thermal resistance		$R_{th\ (j-a)}$	156	°C/W

Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

TA78L005AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 10 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		4.8	5.0	5.2	V
Line regulation	Reg·line	1	T_j = 25°C	7.0 V ≤ V_{IN} ≤ 20 V	—	55	150	mV
				8.0 V ≤ V_{IN} ≤ 20 V	—	45	100	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	11	60	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	5.0	30	
Output voltage	V_{OUT}	1	T_j = 25°C	7.0 V ≤ V_{IN} ≤ 20 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	4.75	—	5.25	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	4.75	—	5.25	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.0	mA
			T_j = 125°C		—	—	5.5	
Quiescent current change	ΔI_B	1	T_j = 25°C	8.0 V ≤ V_{IN} ≤ 20 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	40	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	12	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 8.0 V ≤ V_{IN} ≤ 18 V, T_j = 25°C		41	49	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.6	—	mV/°C

TA78L006AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 11 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		5.76	6.0	6.24	V
Line regulation	Reg·line	1	T_j = 25°C	8.1 V ≤ V_{IN} ≤ 21 V	—	50	150	mV
				9.0 V ≤ V_{IN} ≤ 21 V	—	45	110	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	12	70	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	5.5	35	
Output voltage	V_{OUT}	1	T_j = 25°C	8.1 V ≤ V_{IN} ≤ 21 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	5.7	—	6.3	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	5.7	—	6.3	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.0	mA
			T_j = 125°C		—	—	5.5	
Quiescent current change	ΔI_B	1	T_j = 25°C	9.0 V ≤ V_{IN} ≤ 20 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	40	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	14	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 9.0 V ≤ V_{IN} ≤ 19 V, T_j = 25°C		39	47	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.7	—	mV/°C

TA78L007AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 12 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		6.72	7.0	7.28	V
Line regulation	Reg·line	1	T_j = 25°C	9.2 V ≤ V_{IN} ≤ 22 V	—	50	160	mV
				10 V ≤ V_{IN} ≤ 22 V	—	45	115	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	13	75	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	6.0	40	
Output voltage	V_{OUT}	1	T_j = 25°C	9.2 V ≤ V_{IN} ≤ 22 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	6.65	—	7.35	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	6.65	—	7.35	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	10 V ≤ V_{IN} ≤ 22 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	50	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	17	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 10 V ≤ V_{IN} ≤ 20 V, T_j = 25°C		37	46	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.75	—	mV/°C

TA78L075AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 13 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		7.21	7.5	7.79	V
Line regulation	Reg·line	1	T_j = 25°C	9.8 V ≤ V_{IN} ≤ 23 V	—	40	170	mV
				10.5 V ≤ V_{IN} ≤ 23 V	—	40	120	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	14	80	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	6.5	40	
Output voltage	V_{OUT}	1	T_j = 25°C	9.8 V ≤ V_{IN} ≤ 23 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	7.125	—	7.875	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	7.125	—	7.875	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	10.5 V ≤ V_{IN} ≤ 23 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	60	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	19	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 11 V ≤ V_{IN} ≤ 21 V, T_j = 25°C		37	45	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.75	—	mV/°C

TA78L008AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 14 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		7.7	8.0	8.3	V
Line regulation	Reg·line	1	T_j = 25°C	10.5 V ≤ V_{IN} ≤ 23 V	—	20	175	mV
				11 V ≤ V_{IN} ≤ 23 V	—	12	125	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	15	80	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	7.0	40	
Output voltage	V_{OUT}	1	T_j = 25°C	10.5 V ≤ V_{IN} ≤ 23 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	7.6	—	8.4	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	7.6	—	8.4	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	11 V ≤ V_{IN} ≤ 23 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	60	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	20	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 12 V ≤ V_{IN} ≤ 23 V, T_j = 25°C		37	45	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.8	—	mV/°C

TA78L009AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 15 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		8.64	9.0	9.36	V
Line regulation	Reg·line	1	T_j = 25°C	11.4 V ≤ V_{IN} ≤ 24 V	—	80	200	mV
				12 V ≤ V_{IN} ≤ 24 V	—	20	160	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	17	90	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	8.0	45	
Output voltage	V_{OUT}	1	T_j = 25°C	11.4 V ≤ V_{IN} ≤ 24 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	8.55	—	9.45	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	8.55	—	9.45	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	12 V ≤ V_{IN} ≤ 24 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	65	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	21	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 12 V ≤ V_{IN} ≤ 24 V, T_j = 25°C		36	44	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.85	—	mV/°C

TA78L010AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 16 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		9.6	10	10.4	V
Line regulation	Reg·line	1	T_j = 25°C	12.5 V ≤ V_{IN} ≤ 25 V	—	80	230	mV
				13 V ≤ V_{IN} ≤ 25 V	—	30	170	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	18	90	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	8.5	45	
Output voltage	V_{OUT}	1	T_j = 25°C	12.5 V ≤ V_{IN} ≤ 25 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	9.5	—	10.5	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	9.5	—	10.5	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	13 V ≤ V_{IN} ≤ 25 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	70	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	22	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 13 V ≤ V_{IN} ≤ 24 V, T_j = 25°C		36	43	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.9	—	mV/°C

TA78L012AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 19 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		11.5	12	12.5	V
Line regulation	Reg·line	1	T_j = 25°C	14.5 V ≤ V_{IN} ≤ 27 V	—	120	250	mV
				16 V ≤ V_{IN} ≤ 27 V	—	100	200	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	20	100	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	10	50	
Output voltage	V_{OUT}	1	T_j = 25°C	14.5 V ≤ V_{IN} ≤ 27 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	11.4	—	12.6	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	11.4	—	12.6	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	16 V ≤ V_{IN} ≤ 27 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	80	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	24	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 15 V ≤ V_{IN} ≤ 25 V, T_j = 25°C		36	41	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−1.0	—	mV/°C

TA78L132AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 21 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		12.67	13.2	13.73	V
Line regulation	Reg·line	1	T_j = 25°C	16 V ≤ V_{IN} ≤ 28 V	—	125	270	mV
				17 V ≤ V_{IN} ≤ 28 V	—	105	225	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	22	120	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	11	60	
Output voltage	V_{OUT}	1	T_j = 25°C	16 V ≤ V_{IN} ≤ 28 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	12.54	—	13.86	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	12.54	—	13.86	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	17 V ≤ V_{IN} ≤ 28 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	90	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	28	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 17 V ≤ V_{IN} ≤ 27 V, T_j = 25°C		34	41	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−1.2	—	mV/°C

TA78L015AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 23 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		14.4	15	15.6	V
Line regulation	Reg·line	1	T_j = 25°C	17.5 V ≤ V_{IN} ≤ 30 V	—	130	300	mV
				20 V ≤ V_{IN} ≤ 30 V	—	110	250	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	25	150	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	12	75	
Output voltage	V_{OUT}	1	T_j = 25°C	17.5 V ≤ V_{IN} ≤ 30 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	14.25	—	15.75	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	14.25	—	15.75	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	20 V ≤ V_{IN} ≤ 30 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	90	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	30	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 18.5 V ≤ V_{IN} ≤ 28.5 V, T_j = 25°C		34	40	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−1.3	—	mV/°C

TA78L018AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 27 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		17.3	18	18.7	V
Line regulation	Reg·line	1	T_j = 25°C	21.4 V ≤ V_{IN} ≤ 33 V	—	32	325	mV
				22 V ≤ V_{IN} ≤ 33 V	—	27	275	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	30	170	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	15	75	
Output voltage	V_{OUT}	1	T_j = 25°C	21.4 V ≤ V_{IN} ≤ 33 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	17.1	—	18.9	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	17.1	—	18.9	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	22 V ≤ V_{IN} ≤ 33 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	150	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	45	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 23 V ≤ V_{IN} ≤ 33 V, T_j = 25°C		32	38	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−1.5	—	mV/°C

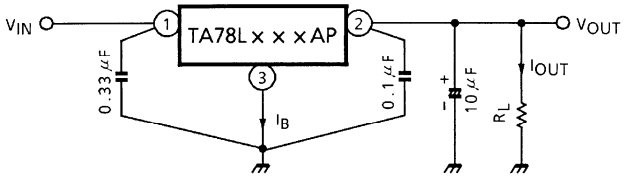
TA78L020AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 29 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		19.2	20	20.8	V
Line regulation	Reg·line	1	T_j = 25°C	23.5 V ≤ V_{IN} ≤ 35 V	—	33	330	mV
				24 V ≤ V_{IN} ≤ 35 V	—	28	285	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	33	180	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	17	90	
Output voltage	V_{OUT}	1	T_j = 25°C	23.5 V ≤ V_{IN} ≤ 35 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	19.0	—	21.0	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	19.0	—	21.0	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	24 V ≤ V_{IN} ≤ 35 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	170	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	49	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 25 V ≤ V_{IN} ≤ 35 V, T_j = 25°C		31	37	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−1.7	—	mV/°C

TA78L024AP
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 33 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

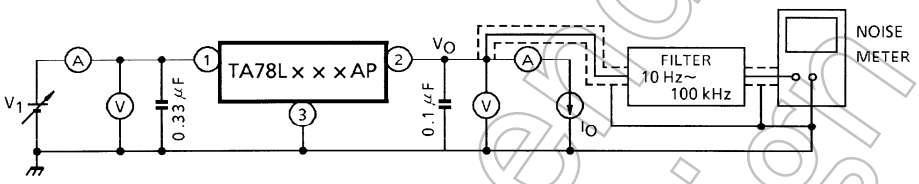
Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		23	24	25	V
Line regulation	Reg·line	1	T_j = 25°C	27.5 V ≤ V_{IN} ≤ 38 V	—	35	350	mV
				28 V ≤ V_{IN} ≤ 38 V	—	30	300	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	40	200	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	20	100	
Output voltage	V_{OUT}	1	T_j = 25°C	27.5 V ≤ V_{IN} ≤ 38 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	22.8	—	25.2	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	22.8	—	25.2	
Quiescent current	I_B	1	T_j = 25°C		—	3.5	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_B	1	T_j = 25°C	28 V ≤ V_{IN} ≤ 38 V	—	—	1.5	mA
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	200	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	56	—	mV/kh
Ripple rejection	R.R.	3	f = 120 Hz, 29 V ≤ V_{IN} ≤ 39 V, T_j = 25°C		31	35	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−2.0	—	mV/°C

Test Circuit 1/Standard Application



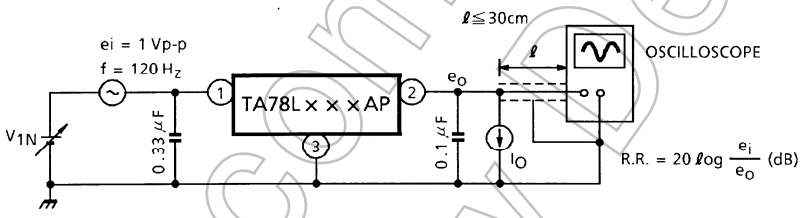
Test Circuit 2

V_{NO}

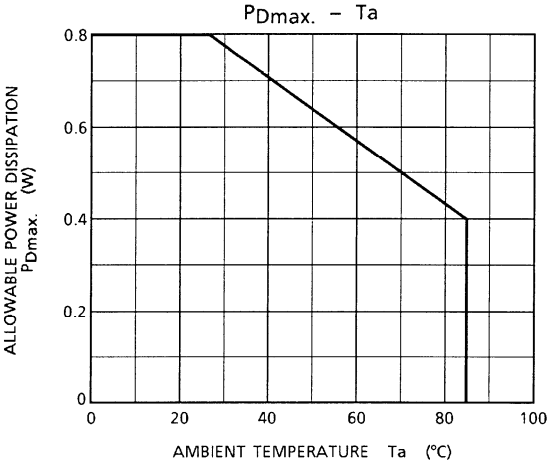


Test Circuit 3

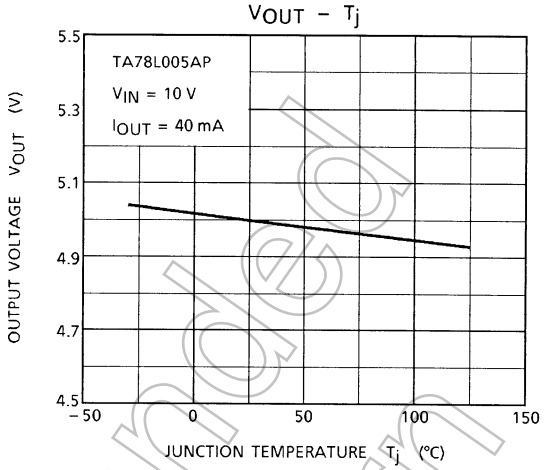
R.R.



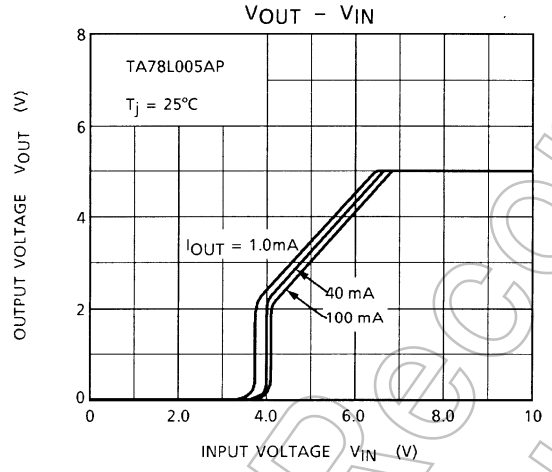
$P_{Dmax.}$ – Ta



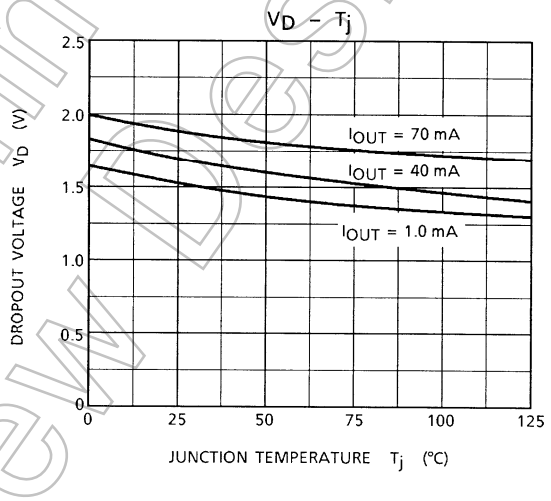
V_{OUT} – T_j



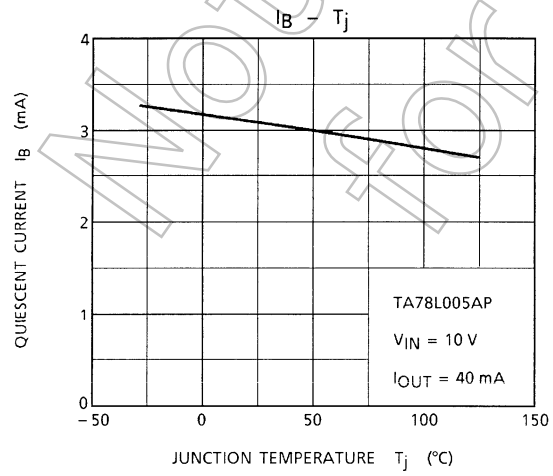
V_{OUT} – V_{IN}



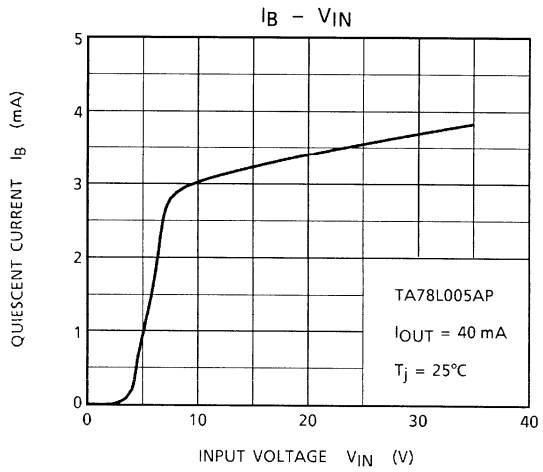
V_D – T_j

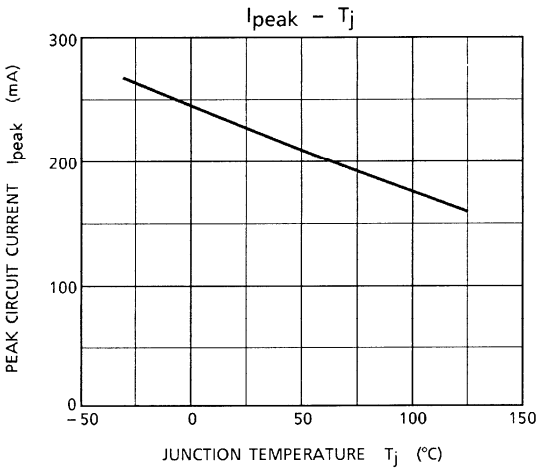


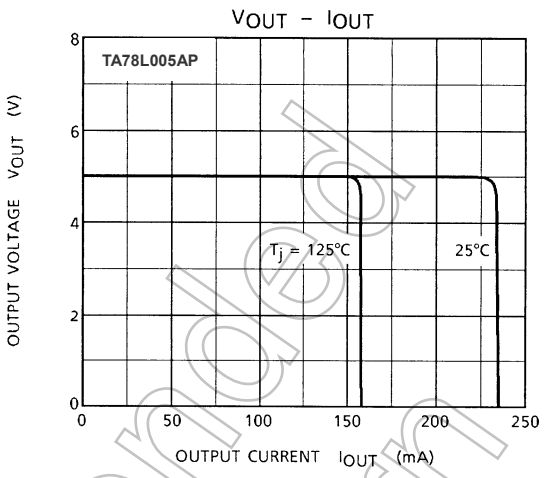
I_B – T_j



I_B – V_{IN}

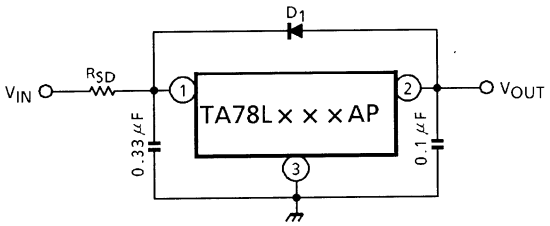






Usage Precautions

Destruction of the IC may occur if high voltage in excess of the IC output voltage (typ. value) is applied to the IC output terminal. In this case, connect a Zener diode between the output terminal and GND to prevent any application of excessive voltage.



D_1 : IC protective diode
When surge voltage is applied to IC output terminal or $V_{IN} < V_{OUT}$ at the time of power ON / OFF, always connect the high speed switching diode D_1.

R_{SD} : Power limiting resistor
If V_{IN} is too high, always connect R_{SD} in order to reduce power consumption of IC.

- Low voltage

  Do not apply voltage to the Product that is lower than the minimum operating voltage, or the Product's protective functions will not operate properly and the Product may be permanently damaged.

- Overcurrent Protection

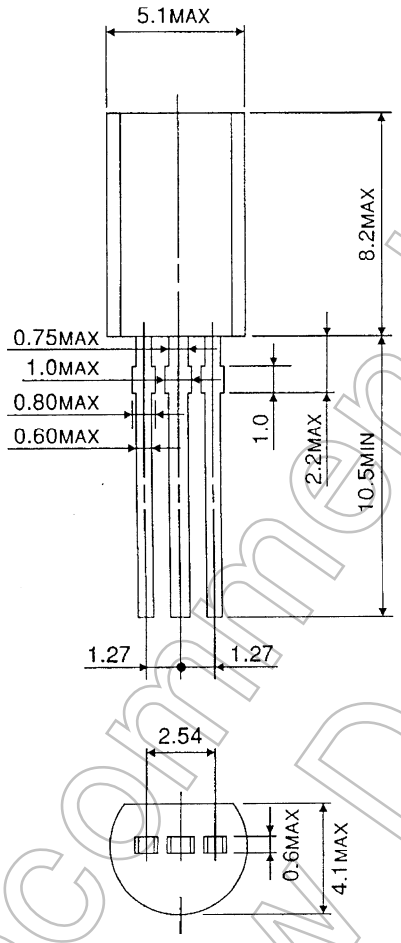
  The overcurrent protection circuits in the Product are designed to temporarily protect Product from minor overcurrent of brief duration. When the overcurrent protective function in the Product activates, immediately cease application of overcurrent to Product. Improper usage of Product, such as application of current to Product exceeding the absolute maximum ratings, could cause the overcurrent protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

- Overheating Protection

  The thermal shutdown circuits in the Product are designed to temporarily protect Product from minor overheating of brief duration. When the overheating protective function in the Product activates, immediately correct the overheating situation. Improper usage of Product, such as the application of heat to Product exceeding the absolute maximum ratings, could cause the overheating protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

Package Dimensions

SSIP3-P-1.27 Unit : mm



Weight : 0.36 g (Typ.)

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