TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

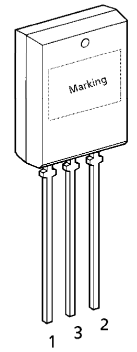
TA7805SB, TA78057SB, TA7806SB, TA7807SB, TA7808SB, TA7809SB TA7810SB, TA7812SB, TA7815SB, TA7818SB, TA7820SB, TA7824SB

THREE TERMINAL POSITIVE VOLTAGE REGULATORS

5 V, 5.7 V, 6 V, 7 V, 8 V, 9 V, 10 V, 12 V, 15 V, 18 V, 20 V, 24 V

FEATURES

- Suitable for CMOS, TTL, the other digital IC's power supply
- Internal thermal overload protection
- Internal short circuit current limiting
- Output current in excess of 1 A
- Package in the plastic case TPL (P_D : 1.8 W)

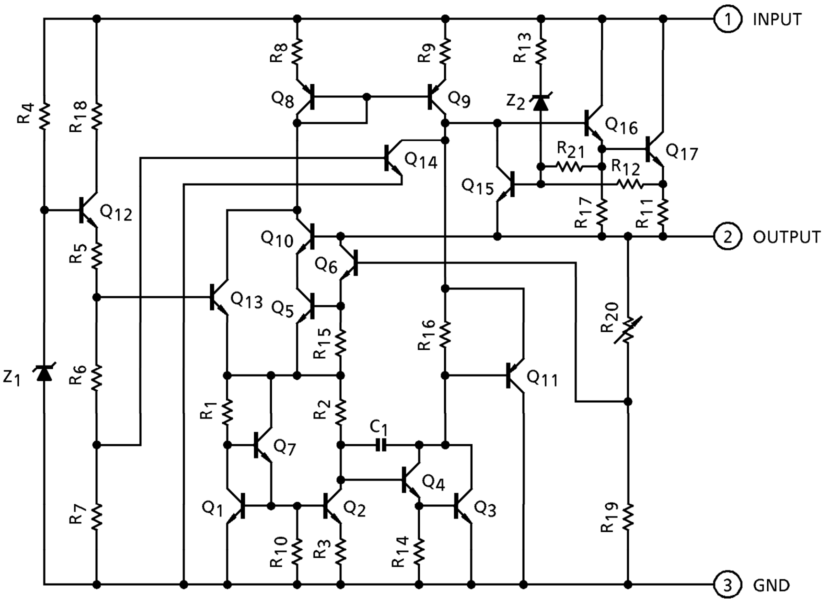


1. INPUT
2. OUTPUT
3. COMMON

P-SIP3-2.50A

Weight : 1.5 g (Typ.)

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage	TA7805SB	V_{IN}	35	V
	TA78057SB			
	TA7806SB			
	TA7807SB			
	TA7808SB			
	TA7809SB			
	TA7810SB			
	TA7812SB			
	TA7815SB			
	TA7818SB		40	
	TA7820SB			
	TA7824SB			
Power Dissipation	(Ta = 25°C)	P_D	1.8	W
Operating Temperature		T_{opr}	−30~85	°C
Storage Temperature		T_{stg}	−55~150	°C
Junction Temperature		T_j	150	°C
Thermal Resistance		$R_{th\ (j\text{-}a)}$	69.4	°C / W

TA7805SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 10 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		4.8	5.0	5.2	V
Line Regulation	Reg·line	1	T_j = 25°C	7.0 V ≦ V_{IN} ≦ 25 V	—	3	100	mV
				8.0 V ≦ V_{IN} ≦ 12 V	—	1	50	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	15	100	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	5	50	
Output Voltage	V_{OUT}	1	T_j = 25°C	7.0 V ≦ V_{IN} ≦ 20 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	4.75	—	5.25	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.2	8.0	mA
Quiescent Current Change	ΔI_B	1	7.0 V ≦ V_{IN} ≦ 25 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.3	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	50	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 8.0 V ≦ V_{IN} ≦ 18 V I_{OUT} = 50 mA, T_j = 25°C		62	78	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.6	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.6	—	mV / °C

TA78057SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 10.7 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		5.47	5.7	5.93	V
Line Regulation	Reg·line	1	T_j = 25°C	7.7 V ≦ V_{IN} ≦ 25 V	—	4	110	mV
				8.7 V ≦ V_{IN} ≦ 12.7 V	—	2	55	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	15	110	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	5	55	
Output Voltage	V_{OUT}	1	T_j = 25°C	7.7 V ≦ V_{IN} ≦ 20.7 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	5.42	—	5.98	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	7.7 V ≦ V_{IN} ≦ 25 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.3	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	55	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 8.8 V ≦ V_{IN} ≦ 18.8 V I_{OUT} = 50 mA, T_j = 25°C		62	77	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.5	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.7	—	mV / °C

TA7806SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 11 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C,)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		5.75	6.0	6.25	V
Line Regulation	Reg·line	1	T_j = 25°C	8.0 V ≦ V_{IN} ≦ 25 V	—	4	120	mV
				9 V ≦ V_{IN} ≦ 13 V	—	2	60	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	15	120	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	5	60	
Output Voltage	V_{OUT}	1	T_j = 25°C	8 V ≦ V_{IN} ≦ 21 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	5.7	—	6.3	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	8.0 V ≦ V_{IN} ≦ 25 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.3	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	55	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 9 V ≦ V_{IN} ≦ 19 V I_{OUT} = 50 mA, T_j = 25°C		61	77	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.5	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.7	—	mV / °C

TA7807SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 12 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		6.72	7.0	7.28	V
Line Regulation	Reg·line	1	T_j = 25°C	9 V ≦ V_{IN} ≦ 25 V	—	5	140	mV
				10 V ≦ V_{IN} ≦ 14 V	—	2	70	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	15	140	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	5	70	
Output Voltage	V_{OUT}	1	T_j = 25°C	9 V ≦ V_{IN} ≦ 22 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	6.65	—	7.35	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	9 V ≦ V_{IN} ≦ 25 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.3	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	60	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 10 V ≦ V_{IN} ≦ 20 V I_{OUT} = 50 mA, T_j = 25°C		59	75	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.3	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−0.8	—	mV / °C

TA7808SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 14 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		7.7	8.0	8.3	V
Line Regulation	Reg·line	1	T_j = 25°C	10.5 V ≦ V_{IN} ≦ 25 V	—	6	160	mV
				11 V ≦ V_{IN} ≦ 17 V	—	2	80	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	160	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	80	
Output Voltage	V_{OUT}	1	T_j = 25°C	10.5 V ≦ V_{IN} ≦ 23 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	7.6	—	8.4	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	10.5 V ≦ V_{IN} ≦ 25 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	70	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 11.5 V ≦ V_{IN} ≦ 21.5 V I_{OUT} = 50 mA, T_j = 25°C		58	74	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.1	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	– 1.0	—	mV / °C

TA7809SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 15 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		8.64	9.0	9.36	V
Line Regulation	Reg·line	1	T_j = 25°C	11.5 V ≦ V_{IN} ≦ 26 V	—	7	180	mV
				13 V ≦ V_{IN} ≦ 19 V	—	2.5	90	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	180	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	90	
Output Voltage	V_{OUT}	1	T_j = 25°C	11.5 V ≦ V_{IN} ≦ 24 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	8.55	—	9.45	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	11.5 V ≦ V_{IN} ≦ 26 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	75	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 12.5 V ≦ V_{IN} ≦ 22.5 V I_{OUT} = 50 mA, T_j = 25°C		56	72	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	1.0	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	− 1.1	—	mV / °C

TA7810SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 16 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		9.6	10.0	10.4	V
Line Regulation	Reg·line	1	T_j = 25°C	12.5 V ≦ V_{IN} ≦ 27 V	—	8	200	mV
				14 V ≦ V_{IN} ≦ 20 V	—	2.5	100	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	200	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	100	
Output Voltage	V_{OUT}	1	T_j = 25°C	12.5 V ≦ V_{IN} ≦ 25 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	9.5	—	10.5	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	12.5 V ≦ V_{IN} ≦ 27 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	80	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 13.5 V ≦ V_{IN} ≦ 23.5 V I_{OUT} = 50 mA, T_j = 25°C		55	72	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.9	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	− 1.3	—	mV / °C

TA7812SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 19 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		11.5	12.0	12.5	V
Line Regulation	Reg·line	1	T_j = 25°C	14.5 V ≦ V_{IN} ≦ 30 V	—	10	240	mV
				16 V ≦ V_{IN} = 22 V	—	3	120	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	240	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	120	
Output Voltage	V_{OUT}	1	T_j = 25°C	14.5 V ≦ V_{IN} ≦ 27 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	11.4	—	12.6	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.3	8.0	mA
Quiescent Current Change	ΔI_B	1	14.5 V ≦ V_{IN} ≦ 30 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	90	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 15 V ≦ V_{IN} ≦ 25 V I_{OUT} = 50 mA, T_j = 25°C		55	71	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.7	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	– 1.6	—	mV / °C

TA7815SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 23 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		14.4	15.0	15.6	V
Line Regulation	Reg·line	1	T_j = 25°C	17.5 V ≦ V_{IN} ≦ 30 V	—	11	300	mV
				20 V ≦ V_{IN} ≦ 26 V	—	3	150	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	300	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	150	
Output Voltage	V_{OUT}	1	T_j = 25°C	17.5 V ≦ V_{IN} ≦ 30 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	14.25	—	15.75	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.4	8.0	mA
Quiescent Current Change	ΔI_B	1	17.5 V ≦ V_{IN} ≦ 30 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	110	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 18.5 V ≦ V_{IN} ≦ 28.5 V I_{OUT} = 50 mA, T_j = 25°C		54	70	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.5	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	− 2.0	—	mV / °C

TA7818SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 27 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		17.3	18.0	18.7	V
Line Regulation	Reg·line	1	T_j = 25°C	21 V ≦ V_{IN} ≦ 33 V	—	13	360	mV
				24 V ≦ V_{IN} ≦ 30 V	—	4	180	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	360	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	180	
Output Voltage	V_{OUT}	1	T_j = 25°C	21 V ≦ V_{IN} ≦ 33 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	17.1	—	18.9	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.5	8.0	mA
Quiescent Current Change	ΔI_B	1	21 V ≦ V_{IN} ≦ 33 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	125	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 22 V ≦ V_{IN} ≦ 32 V I_{OUT} = 50 mA, T_j = 25°C		52	68	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.4	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	− 2.5	—	mV / °C

TA7820SB

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{IN} = 29 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		19.2	20.0	20.8	V
Line Regulation	Reg·line	1	T_j = 25°C	23 V ≦ V_{IN} ≦ 35 V	—	15	400	mV
				26 V ≦ V_{IN} ≦ 32 V	—	5	200	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	400	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	200	
Output Voltage	V_{OUT}	1	T_j = 25°C	23 V ≦ V_{IN} ≦ 35 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	19.0	—	21.0	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.6	8.0	mA
Quiescent Current Change	ΔI_B	1	23 V ≦ V_{IN} ≦ 35 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	135	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 24 V ≦ V_{IN} ≦ 34 V I_{OUT} = 50 mA, T_j = 25°C		50	66	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.4	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	− 3.0	—	mV / °C

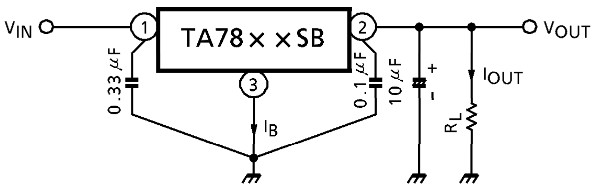
TA7824SB

ELECTRICAL CHARACTERISTICS

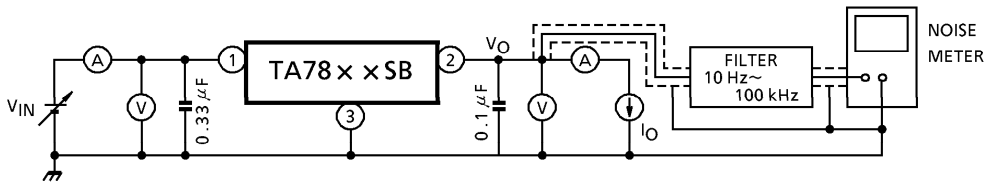
(Unless otherwise specified, V_{IN} = 33 V, I_{OUT} = 500 mA, 0°C ≦ T_j ≦ 125°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		23.0	24.0	25.0	V
Line Regulation	Reg·line	1	T_j = 25°C	27 V ≦ V_{IN} ≦ 38 V	—	18	480	mV
				30 V ≦ V_{IN} ≦ 36 V	—	6	240	
Load Regulation	Reg·load	1	T_j = 25°C	5 mA ≦ I_{OUT} ≦ 1.4 A	—	12	480	mV
				250 mA ≦ I_{OUT} ≦ 750 mA	—	4	240	
Output Voltage	V_{OUT}	1	T_j = 25°C	27 V ≦ V_{IN} ≦ 38 V 5.0 mA ≦ I_{OUT} ≦ 1.0 A	22.8	—	25.2	V
Quiescent Current	I_B	1	T_j = 25°C, I_{OUT} = 5 mA		—	4.6	8.0	mA
Quiescent Current Change	ΔI_B	1	27 V ≦ V_{IN} ≦ 38 V, I_{OUT} = 5 mA, T_j = 25°C		—	—	1.0	mA
Output Noise Voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≦ f ≦ 100 kHz I_{OUT} = 50 mA		—	150	—	μV_{rms}
Ripple Rejection	R.R.	3	f = 120 Hz, 28 V ≦ V_{IN} ≦ 38 V I_{OUT} = 50 mA, T_j = 25°C		50	66	—	dB
Dropout Voltage	V_D	1	I_{OUT} = 1.0 A, T_j = 25°C		—	2.0	—	V
Short Circuit Current Limit	I_{SC}	1	T_j = 25°C		—	0.3	—	A
Average Temperature Coefficient of Output Voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	−3.5	—	mV / °C

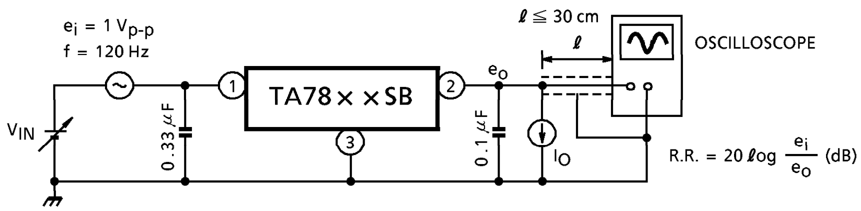
TEST CIRCUIT 1 / STANDARD APPLICATION CIRCUIT

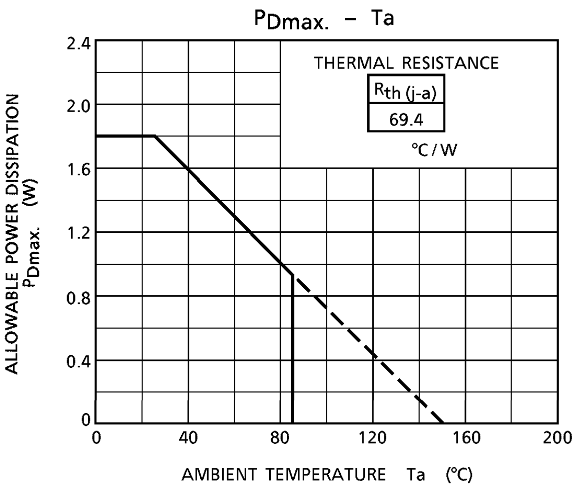


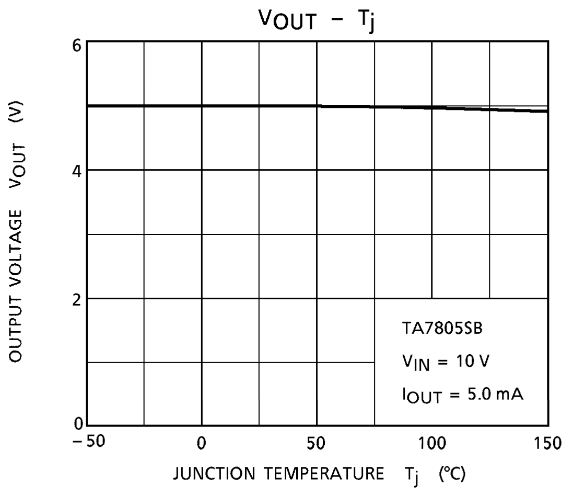
TEST CIRCUIT 2 V_{NO}

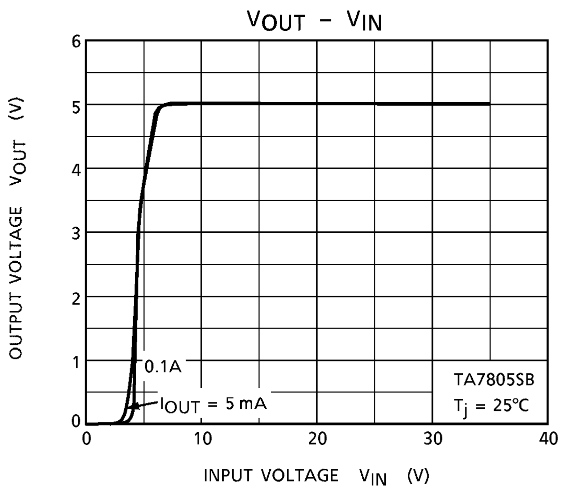


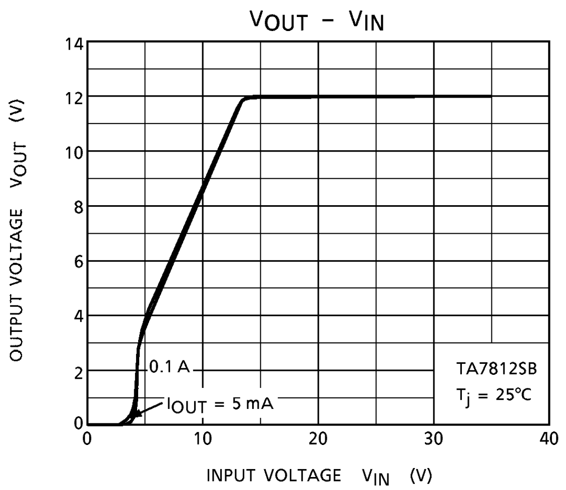
TEST CIRCUIT 3 R.R.

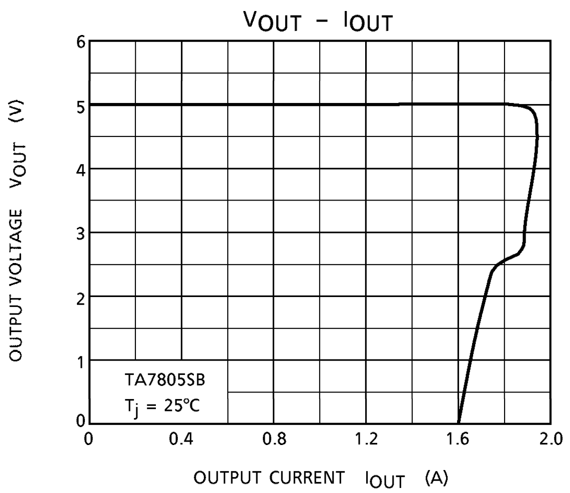


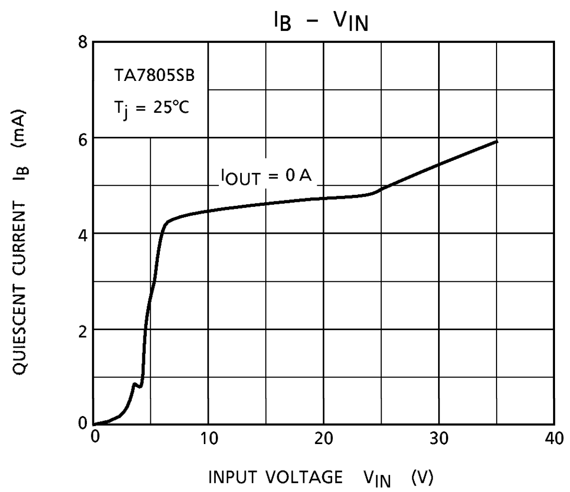

PDmax. – Ta
THERMAL RESISTANCE
Rth (j-a)
69.4
°C / W
ALLOWABLE POWER DISSIPATION PDmax. (W)
AMBIENT TEMPERATURE Ta (°C)


VOUT – Tj
TA7805SB
VIN = 10 V
IOUT = 5.0 mA
OUTPUT VOLTAGE VOUT (V)
JUNCTION TEMPERATURE Tj (°C)

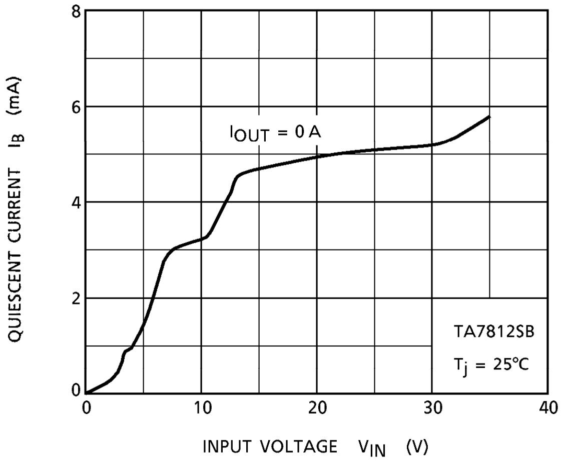

VOUT – VIN
0.1A
IOUT = 5 mA
TA7805SB
Tj = 25°C
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)


VOUT – VIN
0.1 A
IOUT = 5 mA
TA7812SB
Tj = 25°C
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)

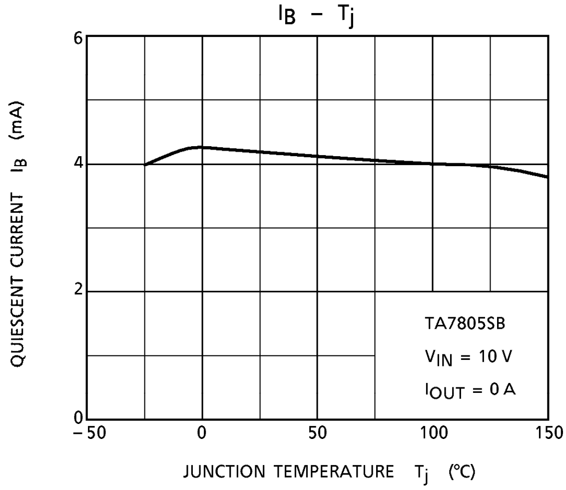

VOUT – IOUT
TA7805SB
Tj = 25°C
OUTPUT VOLTAGE VOUT (V)
OUTPUT CURRENT IOUT (A)


IB – VIN
TA7805SB
Tj = 25°C
IOUT = 0 A
QUIESCENT CURRENT IB (mA)
INPUT VOLTAGE VIN (V)

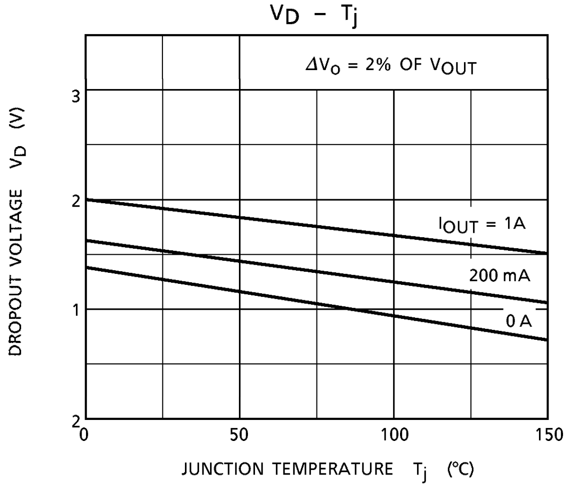
I_B – V_{IN}



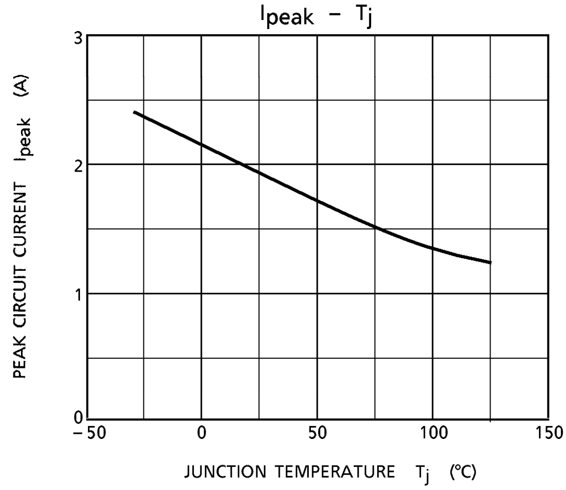
I_B – T_j



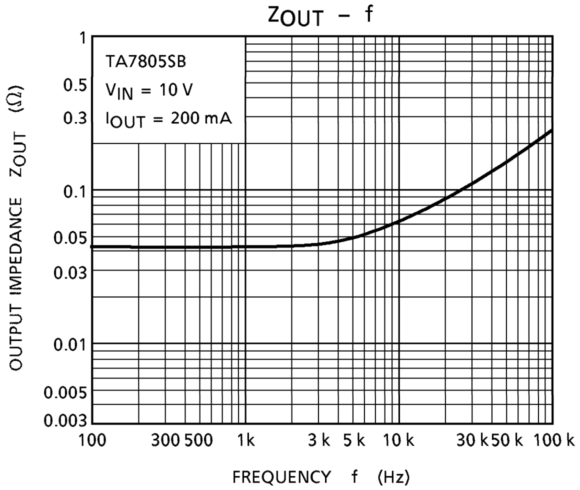
V_D – T_j



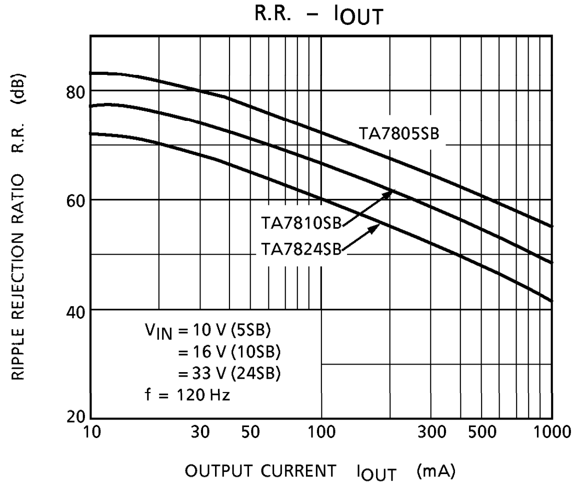
I_{peak} – T_j

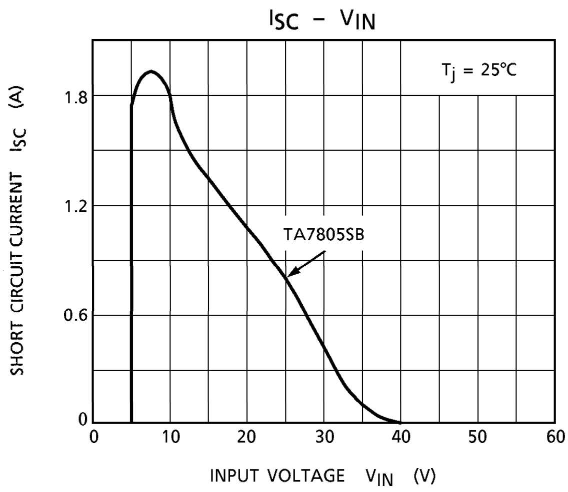


Z_{OUT} – f



R.R. – I_{OUT}

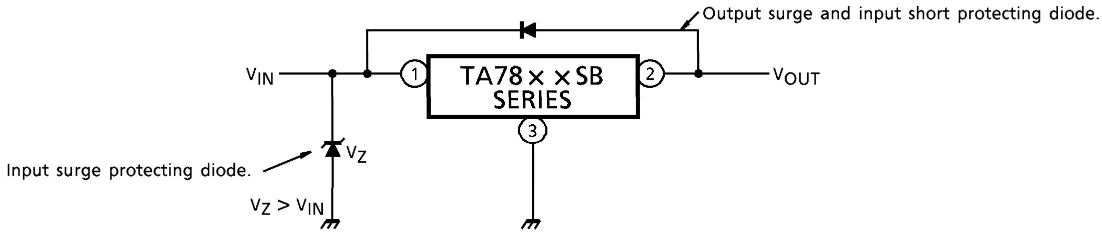



I_{SC} – V_{IN}
T_j = 25°C
TA7805SB
SHORT CIRCUIT CURRENT I_{SC} (A)
1.8
1.2
0.6
0
0
10
20
30
40
50
60
INPUT VOLTAGE V_{IN} (V)

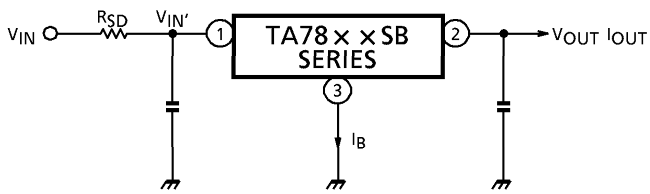
PRECAUTIONS ON APPLICATION

(1) In regard to GND, be careful not to apply a negative voltage to the input / output terminal. Further, special care is necessary in case of a voltage boost application.

(2) When a surge voltage exceeding maximum rating is applied to the input terminal or when a voltage in excess of the input terminal voltage is applied to the output terminal, the circuit may be destroyed.
Specially, in the latter case, great care is necessary.
Further, if the input terminal shorts to GND in a state of normal operation, the output terminal voltage becomes higher than the input voltage (GND potential), and the electric charge of a chemical capacitor connected to the output terminal flows into the input side, which may cause the destruction of circuit.
In these cases, take such steps as a zener diode and a general silicon diode are connected to the circuit, as shown in the following figure.



(3) When the input voltage is too high, the power dissipation of three terminal regulator increases because of series regulator, so that the junction temperature rises. In such a case, it is recommended to reduce the power dissipation by inserting the power limiting resistor R_{SD} in the input terminal, and to reduce the junction temperature as a result.



The power dissipation P_D of IC is expressed in the following equation.

$$P_D = (V_{IN}' - V_{OUT}) \cdot I_{OUT} + V_{IN}' \cdot I_B$$

If V_{IN}' is reduced below the lowest voltage necessary for the IC, the parasitic oscillation will be caused according to circumstances.
In determing the resistance value of R_{SD}, design with margin should be made by making reference to the following equation.

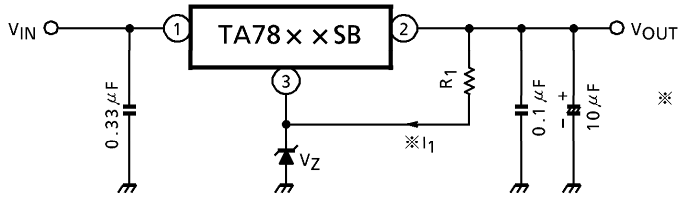
$$R_{SD} < \frac{V_{IN} - V_{IN}'}{I_{OUT} + I_B}$$

(4) Connect the input terminal and GND, and the output terminal and GND, by capacitor respectively. The capacitances should be determined experimentally because they depend on prented patterns. In particular, adequate investigation should be made so that there is no problem even at time of high or low temperature.

APPLICATION CIRCUITS

(1) Voltage boost regulator

(a) Voltage boost by use of zener diode

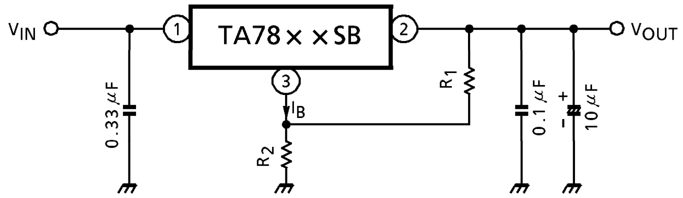


※ $I_1 = \frac{V_{OUT\,(IC)}}{R_1}$

$I_1 \geqq 5\text{mA}$

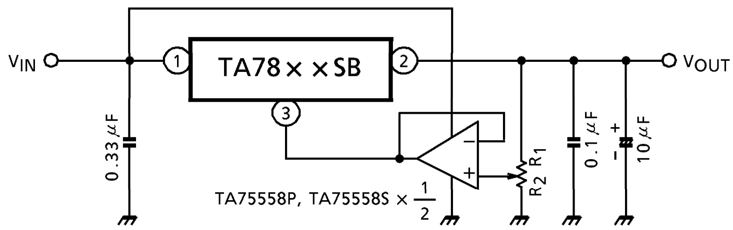
$$V_{OUT} = V_{OUT\,(IC)} + V_Z$$

(b) Voltage boost by use of resistor



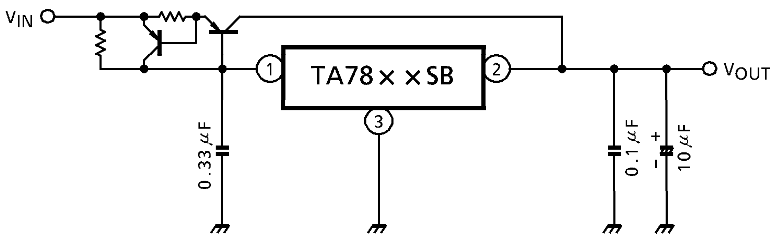
$$V_{OUT} = V_{OUT\,(IC)}\left(1 + \frac{R_2}{R_1}\right) + R_2 \cdot I_B$$

(c) Adjustable output regulator



$$V_{OUT} = V_{OUT\,(IC)}\left(1 + \frac{R_2}{R_1}\right)$$

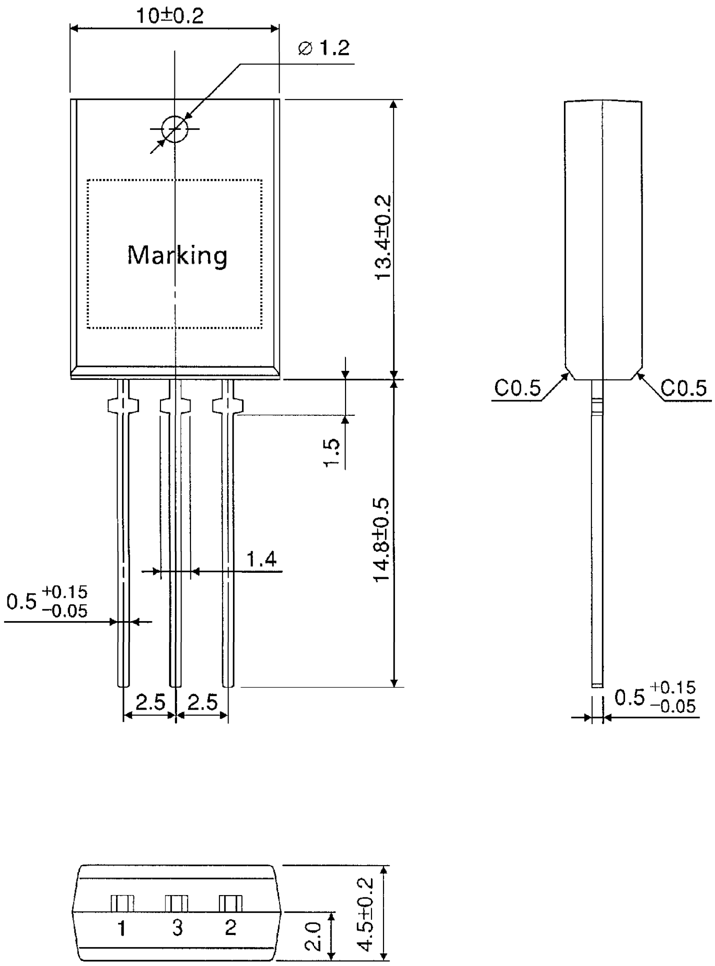
(2) Current boost regulator



PACKAGE DIMENSIONS

P-SIP3-2.50A

Unit : mm



Weight : 1.5 g (Typ.)