TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

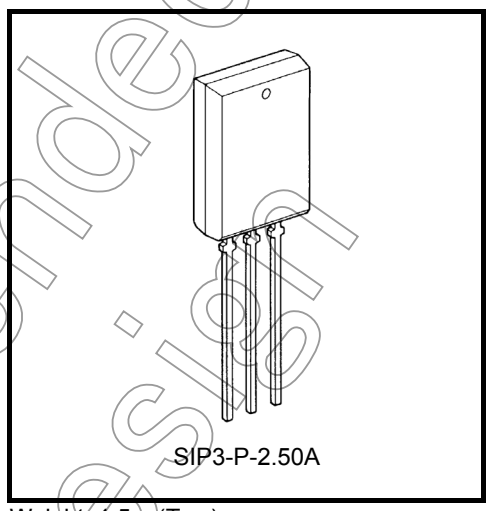
TA7805SB, TA78057SB, TA7806SB, TA7807SB, TA7808SB, TA7809SB, TA7810SB, TA7812SB, TA7815SB, TA7818SB, TA7820SB, TA7824SB

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

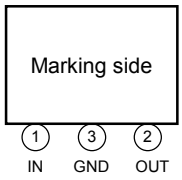
Features

- Suitable for CMOS, TTL and the power supply of other digital ICs
- Internal thermal shutdown protection
- Internal overcurrent protection
- Maximum output current of 1 A
- Package in the plastic case TPL (P_D: 1.8 W)

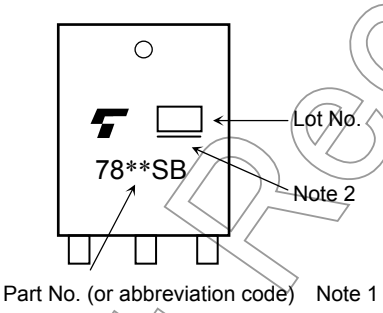


Weight: 1.5 g (Typ.)

Pin Assignment



Marking



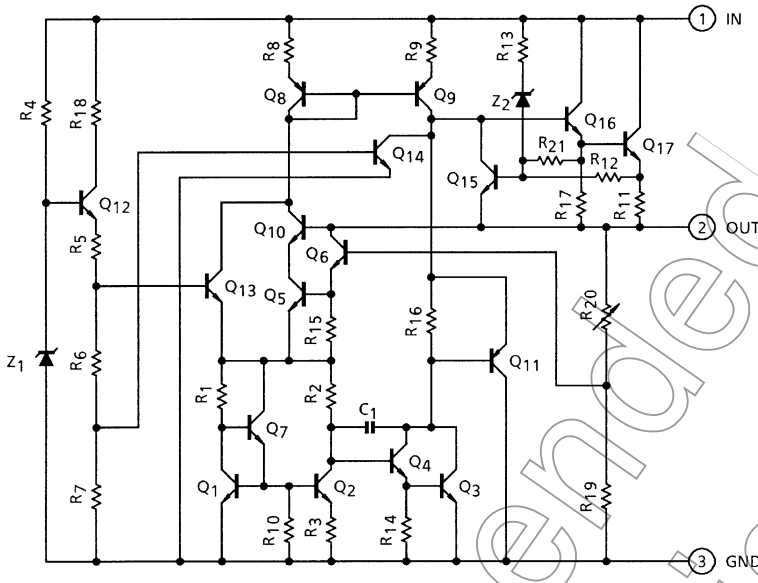
Note 1: The "**" in the each product number is replaces with the output voltage of each product.

Note 2: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The product(s) in this document ("Product") contain functions intended to protect the Product from temporary small overloads such as minor short-term overcurrent or overheating. The protective functions do not necessarily protect Product under all circumstances. When incorporating Product into your system, please design the system (1) to avoid such overloads upon the Product, and (2) to shut down or otherwise relieve the Product of such overload conditions immediately upon occurrence. For details, please refer to the notes appearing below in this document and other documents referenced in this document.

Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Input voltage	TA7805SB	V_{IN}	35	V
	TA78057SB			
	TA7806SB			
	TA7807SB			
	TA7808SB			
	TA7809SB			
	TA7810SB			
	TA7812SB			
	TA7815SB			
	TA7818SB		40	
	TA7820SB			
	TA7824SB			
Output current		I_{OUT}	1	A
Power dissipation	(Ta = 25°C)	P_D	1.8	W
Operating temperature		T_{opr}	−30 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C
Junction temperature		T_j	150	°C
Thermal resistance	junction to ambient	$R_{th\ (j-a)}$	69.4	°C/W

Note 3: 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).

TA7805SB
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 10 V, I_{OUT} = 500 mA, 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, 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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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)

Characteristics	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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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)

Characteristics	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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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)

Characteristics	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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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)

Characteristics	Symbol	Test Circuit	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} ≤ 1.0 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

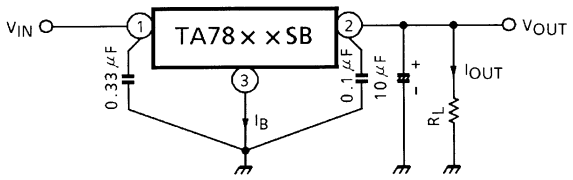
TA7820SB
Electrical Characteristics
(Unless otherwise specified, V_{IN} = 29 V, I_{OUT} = 500 mA, 0°C ≤ T_j ≤ 125°C)

Characteristics	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} ≤ 1.0 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)

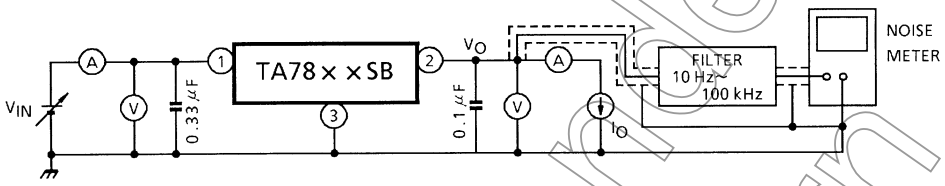
Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C, I_{OUT} = 100 mA		23.0	24.0	25.0	V
Line regulation	Reg·line	1	T_j = 25°C	27 V ≤ V_{IN} ≤ 38 V	—	18	480	mV
				30 V ≤ V_{IN} ≤ 36 V	—	6	240	
Load regulation	Reg·load	1	T_j = 25°C	5 mA ≤ I_{OUT} ≤ 1.0 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



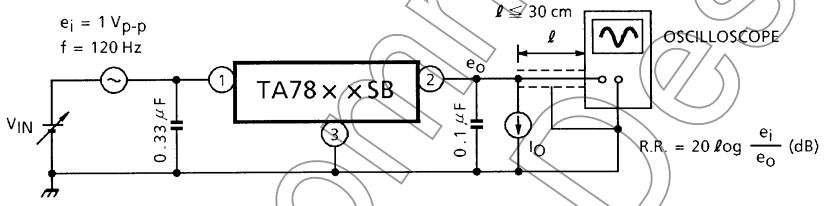
Test Circuit 2

V_{NO}



Test Circuit 3

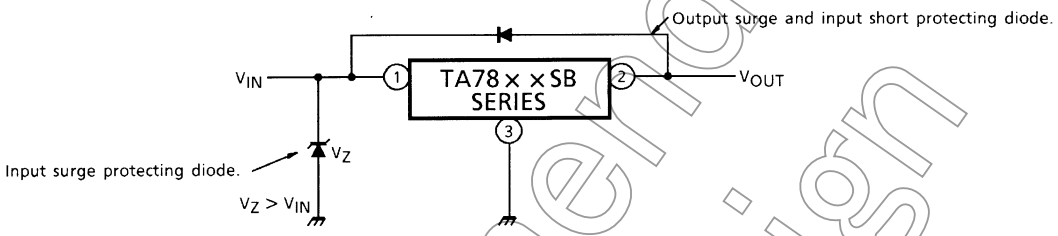
R.R.



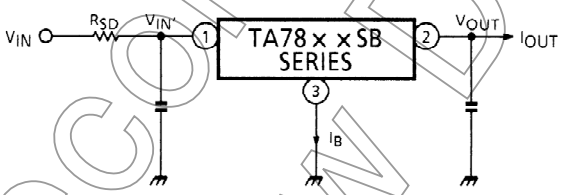
Usage Precautions

(1) In regard to GND, be careful not to apply a negative voltage to the input/output terminal.

(2) If a surge voltage exceeding the absolute maximum rating is applied to the input terminal or if a voltage in excess of the input terminal voltage is applied to the output terminal, the circuit may be destroyed.
Particular care is necessary in the case of the latter.
Circuit destruction may also occur if the input terminal shorts to GND in a state of normal operation, causing the output terminal voltage to exceed the input voltage (GND potential) and the electrical charge of the chemical capacitor connected to the output terminal to flow into the input side.
Where these risks exist, take steps such as connecting zener and general silicon diodes to the circuit, as shown in the figure below.



(3) When the input voltage is too high, the power dissipation of the three-terminal regulator, which is a series regulator, increases, causing the junction temperature to rise. In such a case, it is recommended to reduce the power dissipation, and hence the junction temperature, by inserting a power-limiting resistor R_{SD} in the input terminal.



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

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

Reducing $V_{IN'}$ below the lowest voltage necessary for the IC will cause ripple, deterioration in output regulation and, in certain circumstances, parasitic oscillation.
To determine the resistance value of R_{SD}, design with a margin, referring to the following equation.

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

(4) Be sure to connect a capacitor near the input terminal and output terminal between both terminals and GND. The capacitances should be determined experimentally because they depend on PCB patterns. In particular, adequate investigation should be made to ensure there is no problem even in high or low temperatures

- 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.

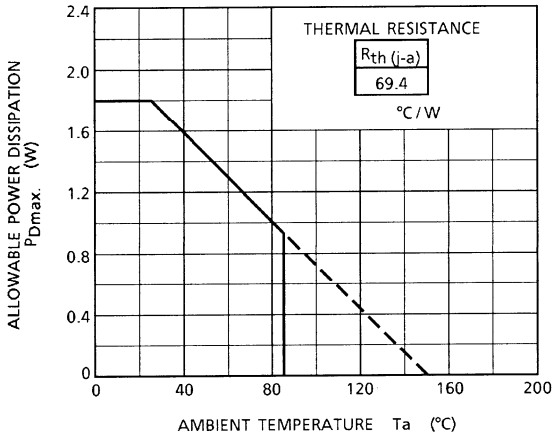
- Overcurrent Protection

  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.

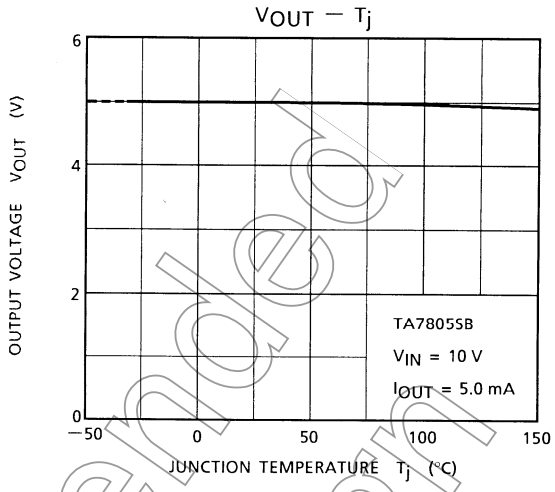
- Thermal shutdown Protection

  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.

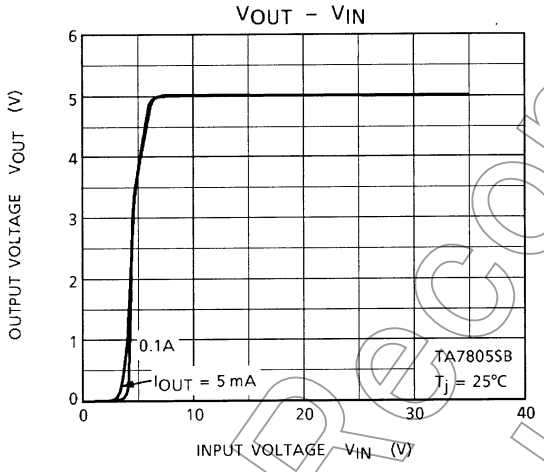
$P_{Dmax.}$ – Ta



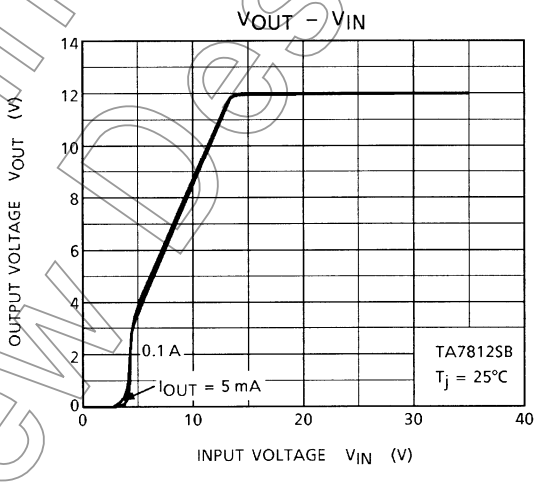
V_{OUT} – T_j



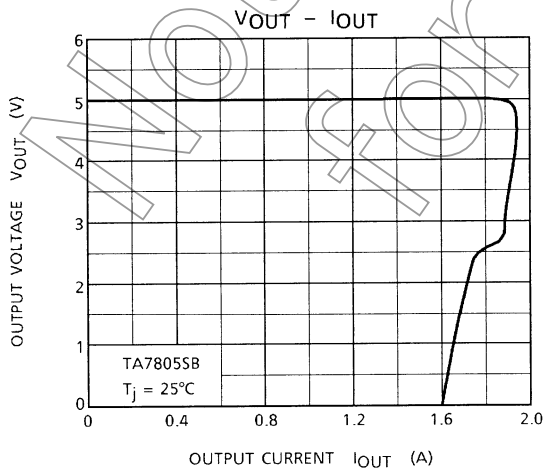
V_{OUT} – V_{IN}



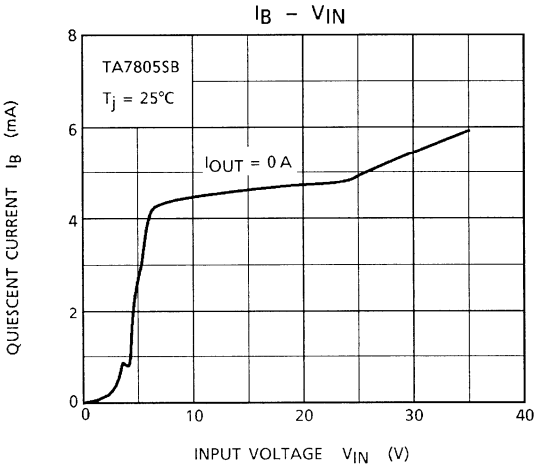
V_{OUT} – V_{IN}



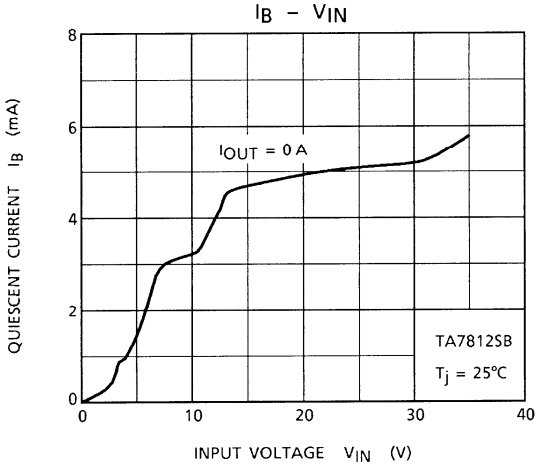
V_{OUT} – I_{OUT}



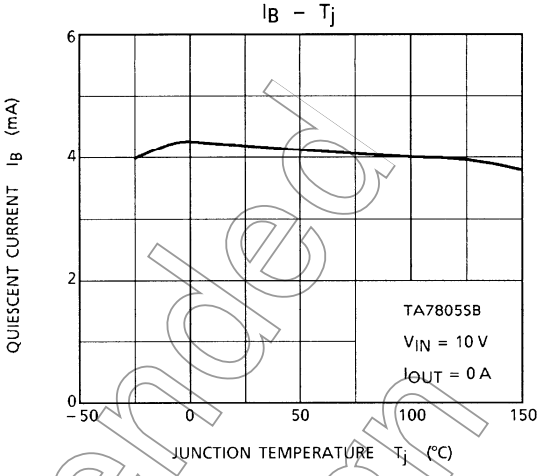
I_B – V_{IN}



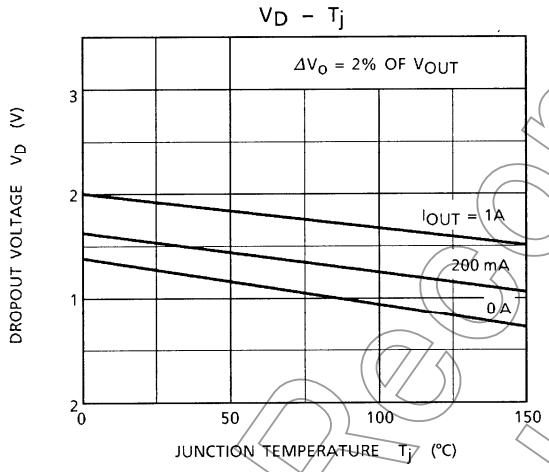
I_B – V_{IN}



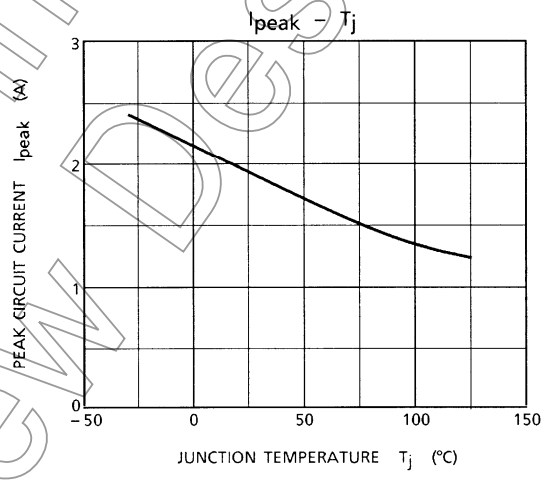
I_B – T_j



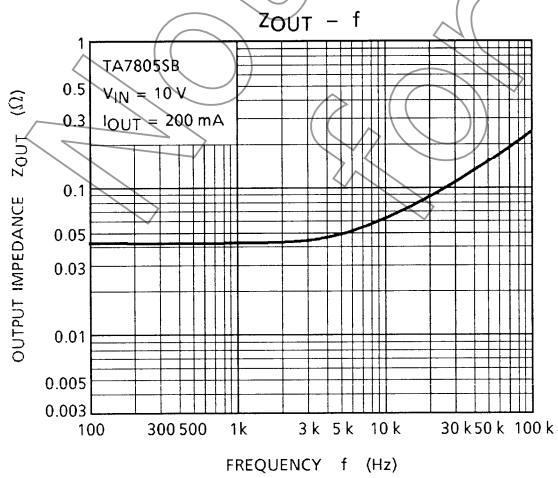
V_D – T_j



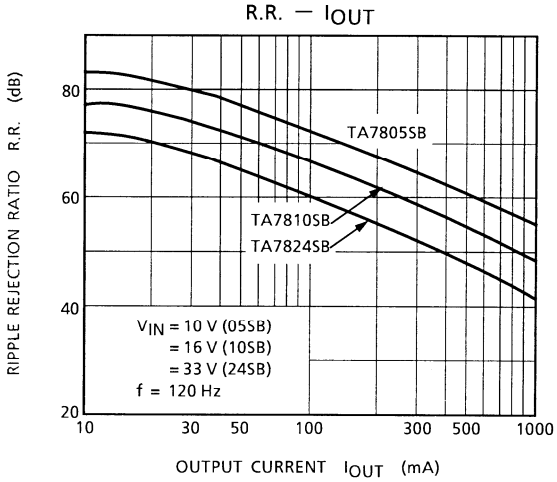
I_{peak} – T_j

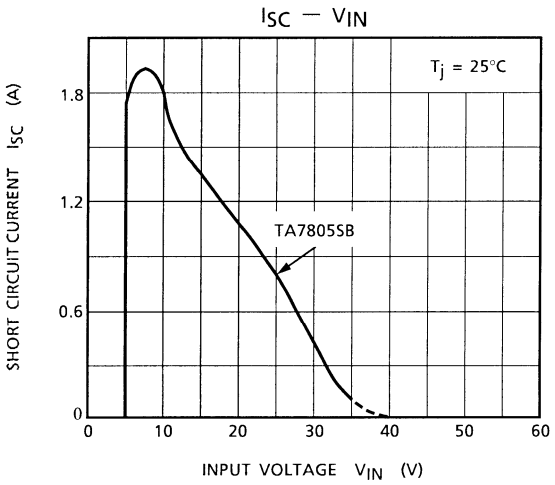


Z_{OUT} – f



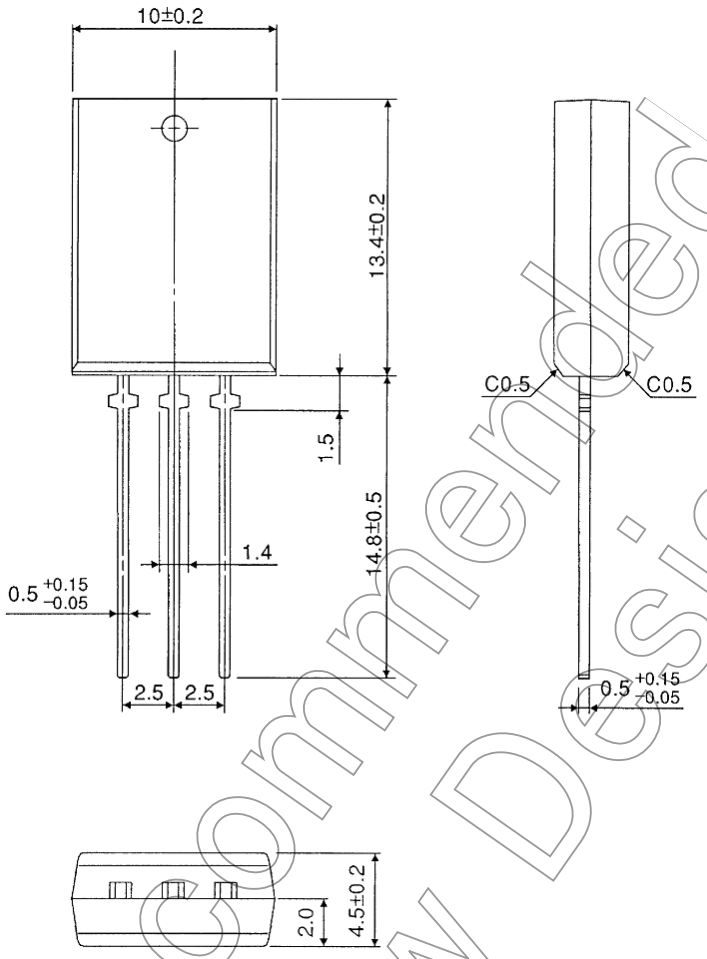
R.R. – I_{OUT}





Package Dimensions

SIP3-P-2.50A Unit: mm



Weight: 1.5 g (typ.)

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