

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA7805F, TA78057F, TA7806F, TA7807F, TA7808F, TA7809F, TA7810F, TA7812F, TA7815F, TA7818F, TA7820F, TA7824F

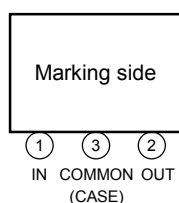
Three Terminal Positive Voltage Regulators

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

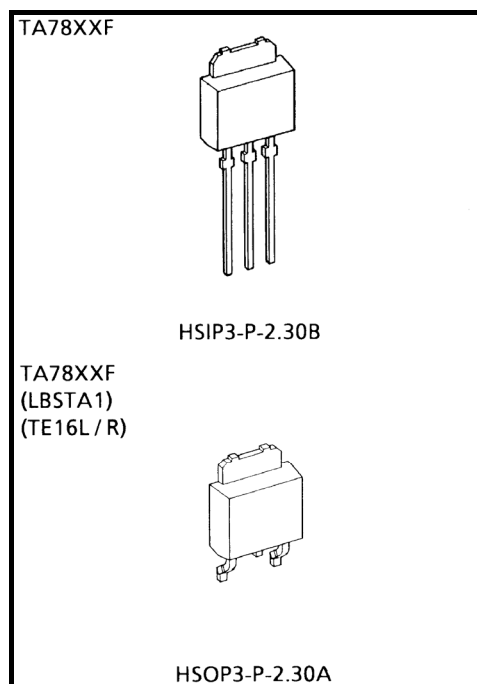
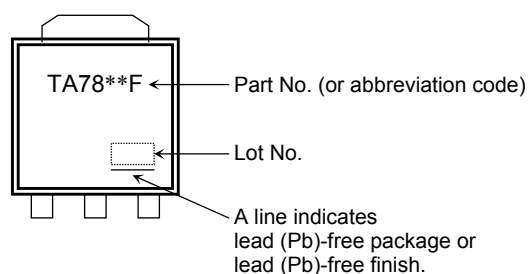
Features

- Suitable for CMOS, TTL, the power supply of the digital ICs
- Internal thermal overload protection.
- Internal short circuit current limiting.
- Maximum output current of 1 A.
- Packaged in POWER MOLD.

Pin Assignment



Marking

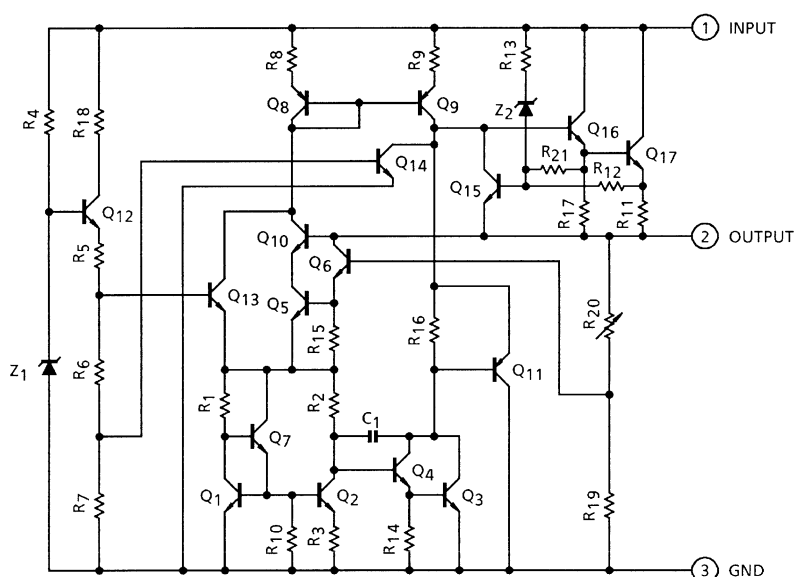


Weight

HSIP3-P-2.30B: 0.36 g (typ.)

HSOP3-P-2.30A: 0.36 g (typ.)

Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Input voltage	TA7805F	V _{IN}	35	V
	TA78057F			
	TA7806F			
	TA7807F			
	TA7808F			
	TA7809F			
	TA7810F			
	TA7812F			
	TA7815F			
	TA7818F			
	TA7820F		40	
	TA7824F			
Power dissipation	(Ta = 25°C)	P _D	1	W
	(Tc = 25°C)		10	
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-c)}	12.5	°C/W
		R _{th (j-a)}	125	

Note: 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).

TA7805F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 10\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	4.8	5.0	5.2	V
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$7.0\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	3	mV
				$8.0\text{ V} \leq V_{IN} \leq 12\text{ V}$	—	1	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	15	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	5	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$ $7.0\text{ V} \leq V_{IN} \leq 20\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	4.75	—	5.25	V
Quiescent current	I_B	1	$T_j = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.2	8.0	mA
Quiescent current change	ΔI_B	1	$7.0\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_j = 25^\circ\text{C}$	—	—	1.3	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	50	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $10\text{ V} \leq V_{IN} \leq 18\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_j = 25^\circ\text{C}$	57	73	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_j = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_j = 25^\circ\text{C}$	—	1.6	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-0.6	—	$\text{mV}/^\circ\text{C}$

TA78057F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 10.7\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	5.47	5.7	5.93	V
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$7.7\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	4	mV
				$8.7\text{ V} \leq V_{IN} \leq 12.7\text{ V}$	—	2	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	15	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	5	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$ $7.7\text{ V} \leq V_{IN} \leq 20.7\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	5.42	—	5.98	V
Quiescent current	I_B	1	$T_j = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$7.7\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_j = 25^\circ\text{C}$	—	—	1.3	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	55	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $8.8\text{ V} \leq V_{IN} \leq 18.8\text{ V}$, $I_{OUT} = 50\text{ mA}$, $T_j = 25^\circ\text{C}$	56	72	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_j = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_j = 25^\circ\text{C}$	—	1.5	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-0.7	—	$\text{mV}/^\circ\text{C}$

TA7806F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 11\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	5.75	6.0	6.25	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	$8.0\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	4	mV
				$9\text{ V} \leq V_{IN} \leq 13\text{ V}$	—	2	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	15	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	5	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $8\text{ V} \leq V_{IN} \leq 21\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	5.7	—	6.3	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$8.0\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.3	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	55	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $11\text{ V} \leq V_{IN} \leq 19\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	56	72	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	1.5	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-0.7	—	$\text{mV}/^\circ\text{C}$

TA7807F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 12\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	6.72	7.0	7.28	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	$9\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	5	mV
				$10\text{ V} \leq V_{IN} \leq 14\text{ V}$	—	2	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	15	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	5	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $9\text{ V} \leq V_{IN} \leq 22\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	6.65	—	7.35	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$9\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.3	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	60	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $12\text{ V} \leq V_{IN} \leq 20\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	54	70	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	1.3	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-0.8	—	$\text{mV}/^\circ\text{C}$

TA7808F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 14\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	7.7	8.0	8.3	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	—	6	160	mV
			$10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	2	80	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	—	12	160	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	80	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $10.5\text{ V} \leq V_{IN} \leq 23\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	7.6	—	8.4	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	70	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $14\text{ V} \leq V_{IN} \leq 21.5\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	53	69	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	1.1	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-1.0	—	$\text{mV}/^\circ\text{C}$

TA7809F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 15\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	8.64	9.0	9.36	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	—	7.0	180	mV
			$11.5\text{ V} \leq V_{IN} \leq 26\text{ V}$	—	2.5	90	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	—	12	180	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	90	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $11.5\text{ V} \leq V_{IN} \leq 24\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	8.55	—	9.45	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$11.5\text{ V} \leq V_{IN} \leq 26\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	75	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $15\text{ V} \leq V_{IN} \leq 22.5\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	51	67	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	1.0	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-1.1	—	$\text{mV}/^\circ\text{C}$

TA7810F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 16\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	9.6	10.0	10.4	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	—	8	200	mV
			$12.5\text{ V} \leq V_{IN} \leq 27\text{ V}$	—	2.5	100	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	—	12	200	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	100	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$	9.5	—	10.5	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$12.5\text{ V} \leq V_{IN} \leq 27\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	80	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $16\text{ V} \leq V_{IN} \leq 23.5\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	50	66	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.9	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-1.3	—	$\text{mV}/^\circ\text{C}$

TA7812F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 19\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	11.5	12.0	12.5	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	—	10	240	mV
			$14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$	—	3	120	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	—	12	240	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	120	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$	11.4	—	12.6	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.3	8.0	mA
Quiescent current change	ΔI_B	1	$14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	90	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $19\text{ V} \leq V_{IN} \leq 25\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	50	66	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.7	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-1.6	—	$\text{mV}/^\circ\text{C}$

TA7815F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 23\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	14.4	15.0	15.6	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	$17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$	—	11	mV
				$20\text{ V} \leq V_{IN} \leq 26\text{ V}$	—	3	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	12	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	4	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	14.25	—	15.75	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.4	8.0	mA
Quiescent current change	ΔI_B	1	$17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	110	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $23\text{ V} \leq V_{IN} \leq 28.5\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	49	65	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.5	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-2.0	—	$\text{mV}/^\circ\text{C}$

TA7818F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 27\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	17.3	18.0	18.7	V
Line regulation	Reg-line	1	$T_J = 25^\circ\text{C}$	$21\text{ V} \leq V_{IN} \leq 33\text{ V}$	—	13	mV
				$24\text{ V} \leq V_{IN} \leq 30\text{ V}$	—	4	
Load regulation	Reg-load	1	$T_J = 25^\circ\text{C}$	$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	12	mV
				$250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	4	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $21\text{ V} \leq V_{IN} \leq 33\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	17.1	—	18.9	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.5	8.0	mA
Quiescent current change	ΔI_B	1	$21\text{ V} \leq V_{IN} \leq 33\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	125	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $27\text{ V} \leq V_{IN} \leq 32\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	47	63	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.4	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-2.5	—	$\text{mV}/^\circ\text{C}$

TA7820F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 29\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

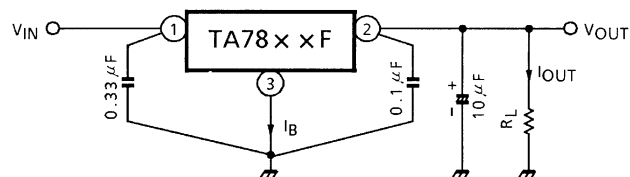
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	19.2	20.0	20.8	V
Line regulation	Reg·line	1	$T_J = 25^\circ\text{C}$	—	15	400	mV
			$23\text{ V} \leq V_{IN} \leq 35\text{ V}$	—	5	200	
Load regulation	Reg·load	1	$T_J = 25^\circ\text{C}$	—	12	400	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	200	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $23\text{ V} \leq V_{IN} \leq 35\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	19.0	—	21.0	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.6	8.0	mA
Quiescent current change	ΔI_B	1	$23\text{ V} \leq V_{IN} \leq 35\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	135	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $29\text{ V} \leq V_{IN} \leq 34\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	45	61	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.4	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-3.0	—	$\text{mV}/^\circ\text{C}$

TA7824F
Electrical Characteristics

 (Unless otherwise specified, $V_{IN} = 33\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

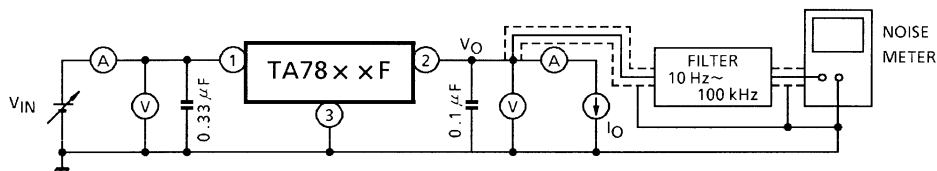
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	23.0	24.0	25.0	V
Line regulation	Reg·line	1	$T_J = 25^\circ\text{C}$	—	18	480	mV
			$27\text{ V} \leq V_{IN} \leq 38\text{ V}$	—	6	240	
Load regulation	Reg·load	1	$T_J = 25^\circ\text{C}$	—	12	480	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$	—	4	240	
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$ $27\text{ V} \leq V_{IN} \leq 38\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	22.8	—	25.2	V
Quiescent current	I_B	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 5\text{ mA}$	—	4.6	8.0	mA
Quiescent current change	ΔI_B	1	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.0	mA
Output noise voltage	V_{NO}	2	$T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	150	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, $33\text{ V} \leq V_{IN} \leq 38\text{ V}$ $I_{OUT} = 50\text{ mA}$, $T_J = 25^\circ\text{C}$	45	61	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0\text{ A}$, $T_J = 25^\circ\text{C}$	—	2.0	—	V
Short circuit current limit	I_{SC}	1	$T_J = 25^\circ\text{C}$	—	0.3	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5\text{ mA}$	—	-3.5	—	$\text{mV}/^\circ\text{C}$

Test Circuit 1/Standard Application Circuit



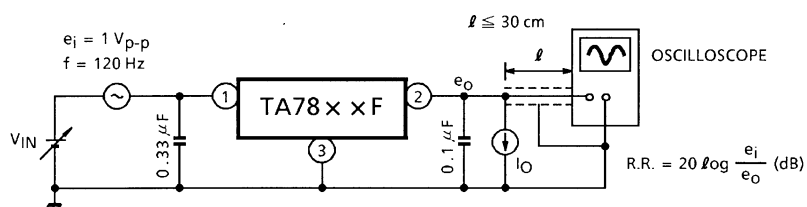
Test Circuit 2

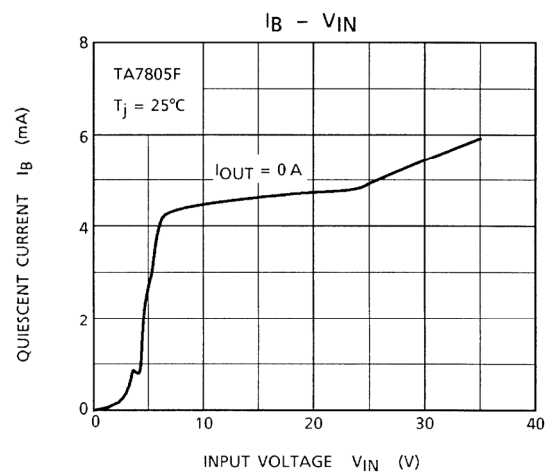
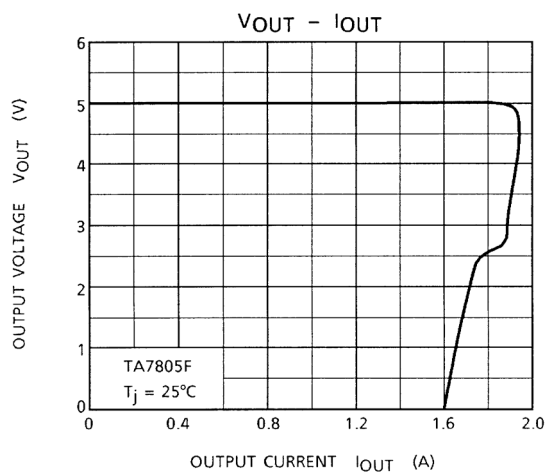
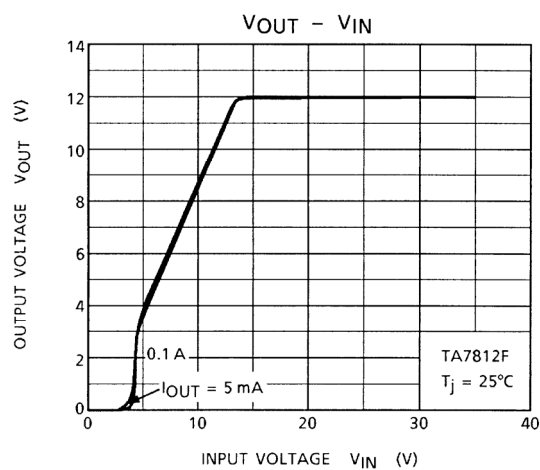
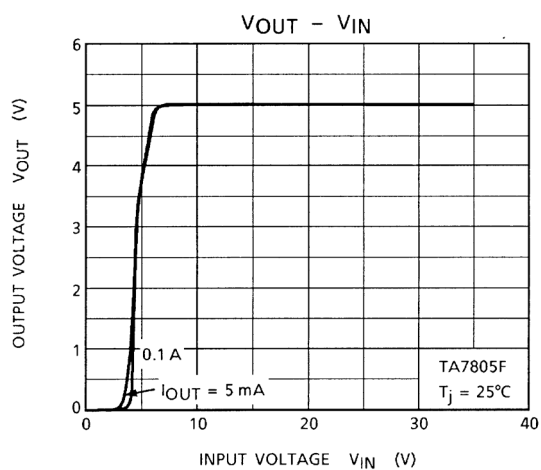
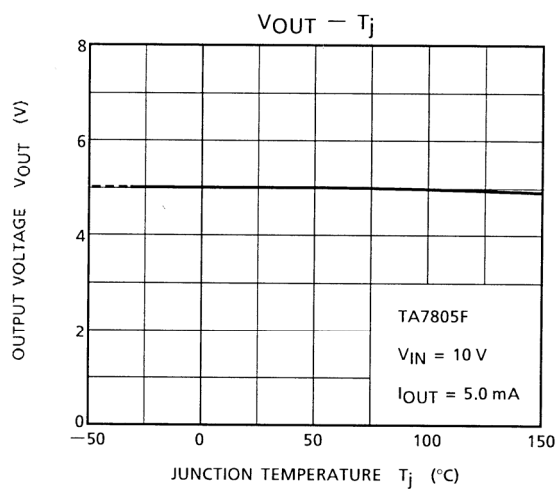
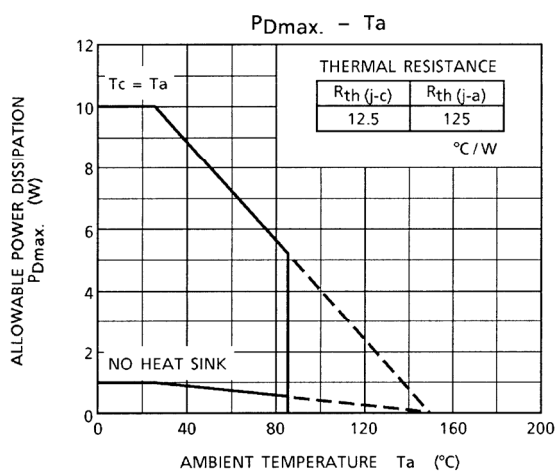
V_{NO}

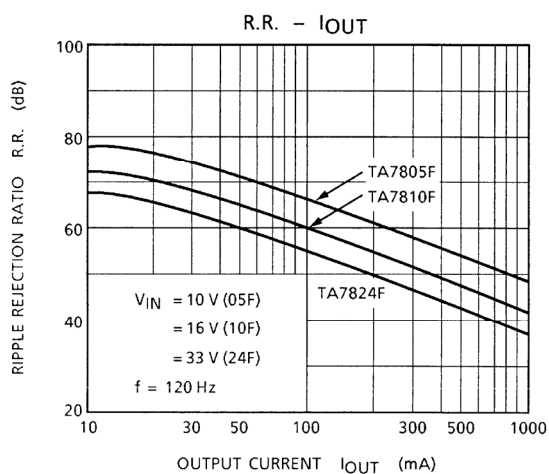
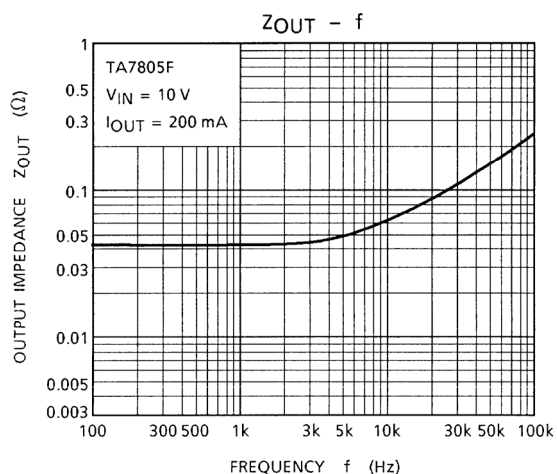
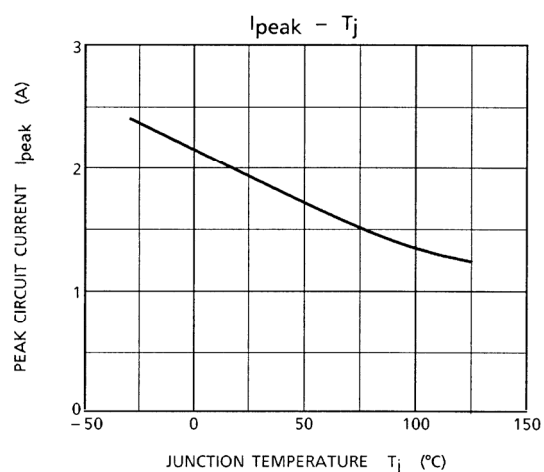
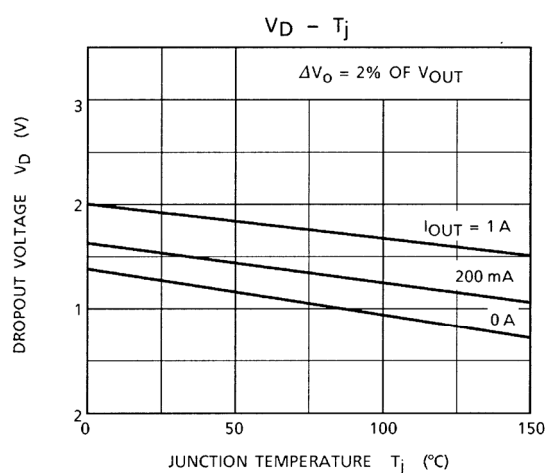
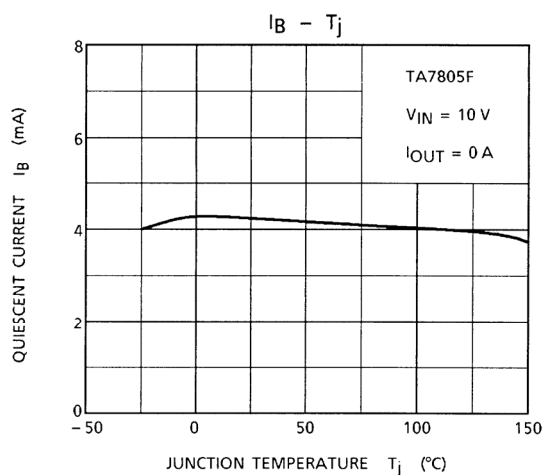
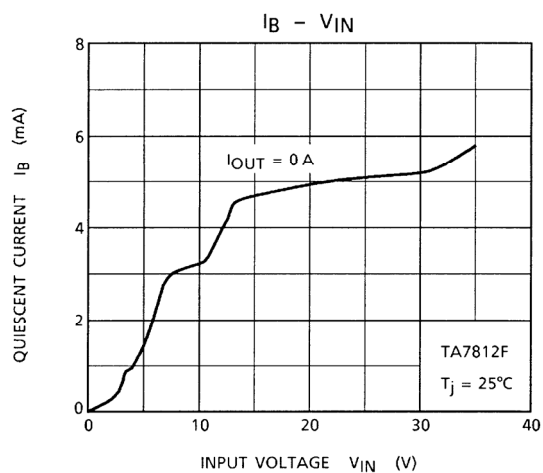


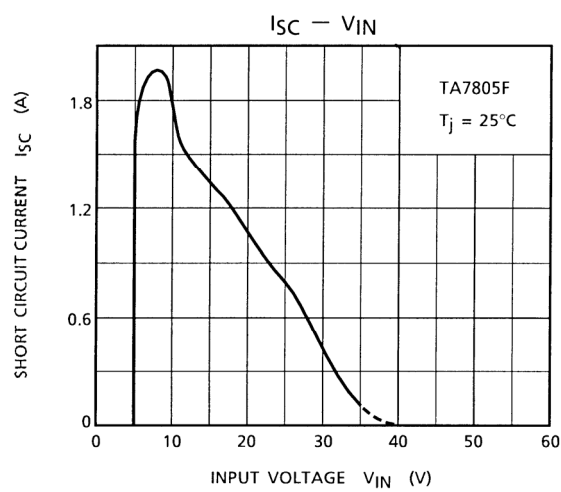
Test Circuit 3

R.R.









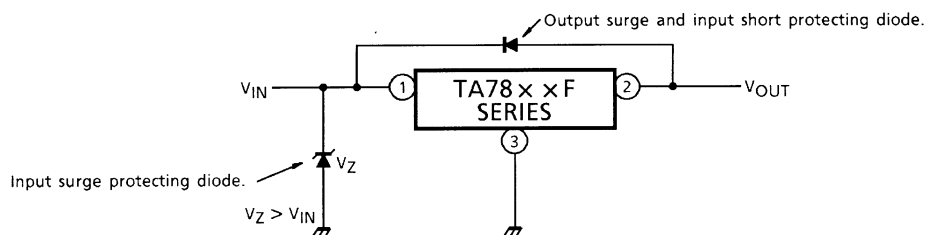
Precautions on Application

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

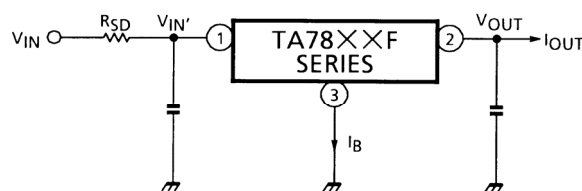
Particular care is necessary in the case of the latter.

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 RSD in the input terminal.



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

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

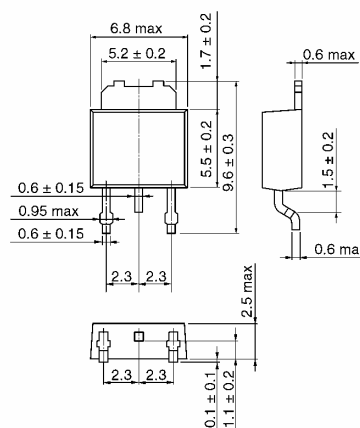
Reducing VIN' below the lowest voltage necessary for the IC will cause ripple, deterioration in output regulation and, in certain circumstances, parasitic oscillation.

To determine the resistance value of RSD, 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.

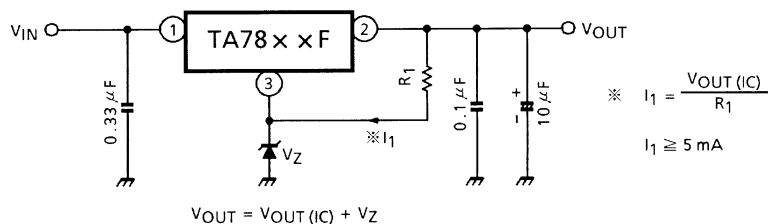
- (5) The molded plastic portion of this unit, measuring 5.5 mm (L) by 6.8 mm (W) by 2.5 mm (T), is more compact compared to its equivalent TO-220.
- The GND fin extends directly out of the main body, and can be soldered directly to the ceramic circuit board for significant increase in power dissipation.
- To obtain high reliability in the heat sink design of the regulator IC, it is generally required to derate more than 20% of maximum junction temperature (T_j max).
- Further, full consideration should be given to the installation of IC on a heat sink.



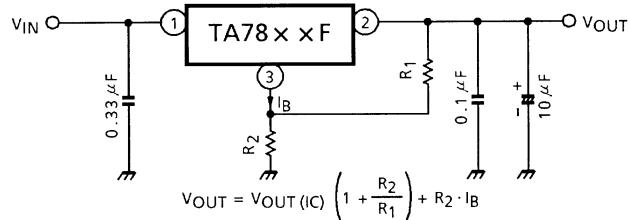
Application Circuits

(1) Voltage boost regulator

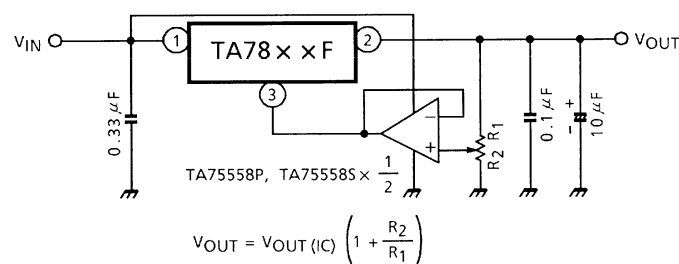
- (a) Voltage boost by use of zener diode



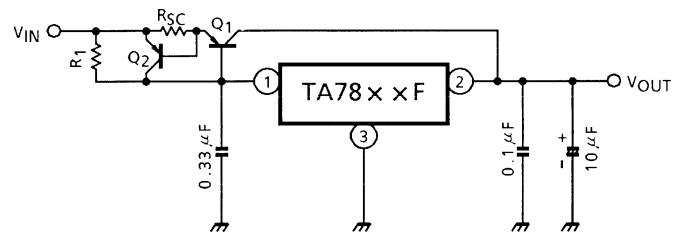
- (b) Voltage boost by use of resistor



- (c) Adjustable output regulator



(2) Current boost regulator



Heat sink is needed for Q_1 .

$$R_1 \cong \frac{V_{BE1}}{I_{B \text{ MAX}}}$$

where,

V_{BE1} : V_{BE} of external transistor Q_1 .

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

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

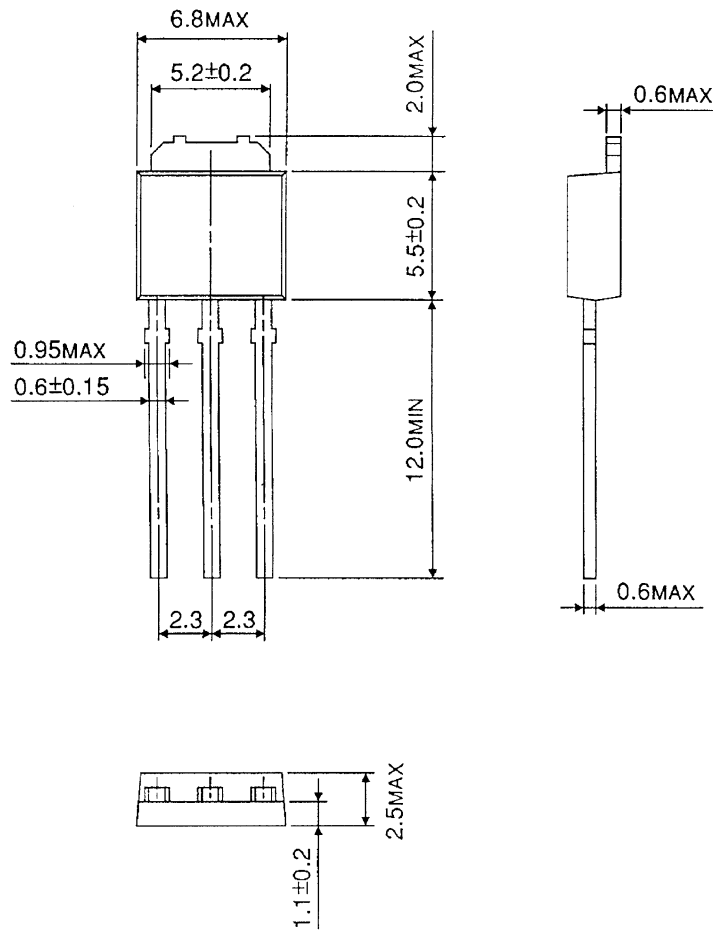
where,

I_{SC} : Short-circuit current.

Package Dimensions

HSIP3-P-2.30B

Unit : mm

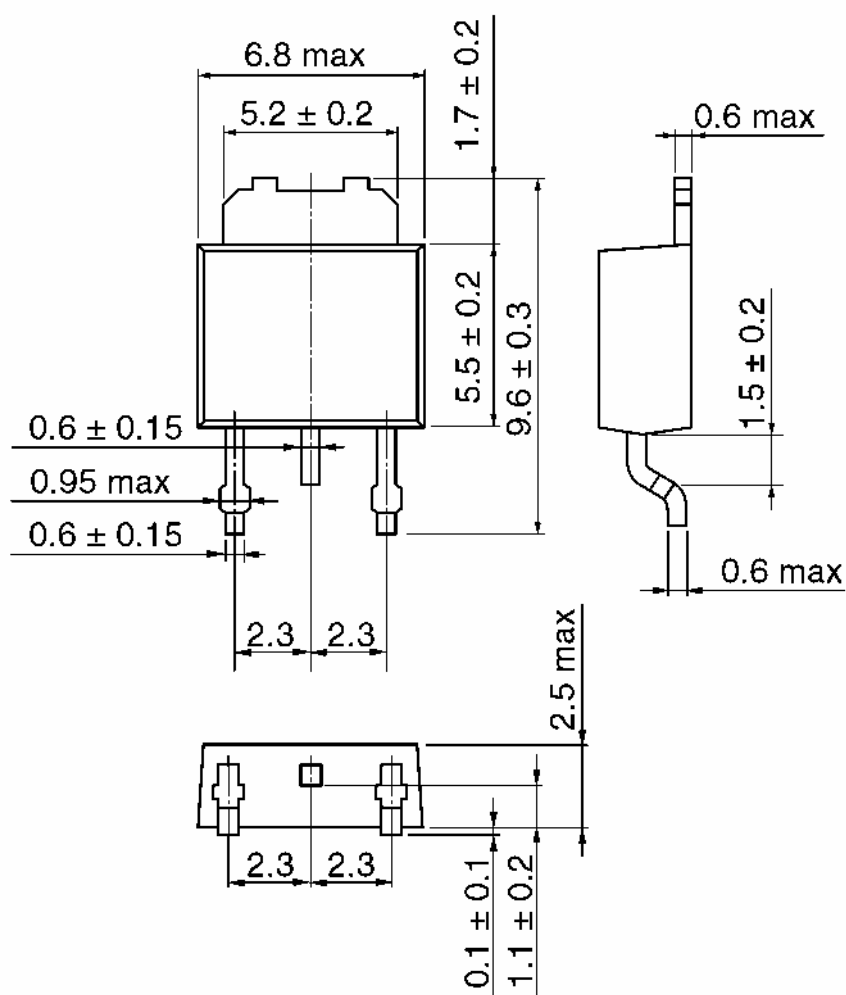


Weight : 0.36 g (Typ.)

Package Dimensions

HSOP3-P-2.30A

Unit: mm



Weight: 0.36 g (typ.)

RESTRICTIONS ON PRODUCT USE

20070701-EN

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