

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

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

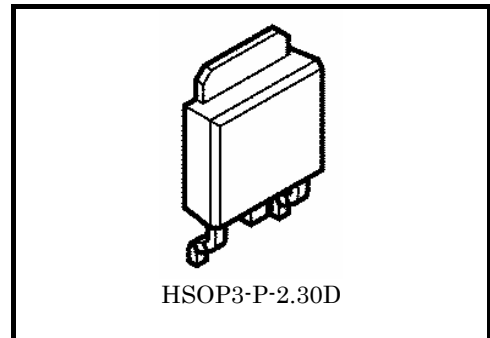
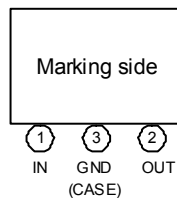
Output Current of 1A, Three Terminal Positive Voltage Regulators

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

- Internal overcurrent protection.
- Internal overheating protection.
- Maximum output current of 1 A.
- Packaged in New PW-Mold (Surface-mount type).

Pin Assignment

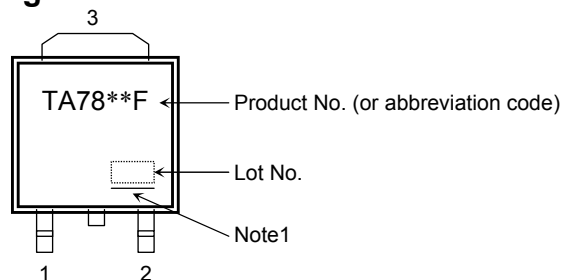


HSOP3-P-2.30D

Weight

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

Marking



Note: The “**” part of each product number varies according to the output voltage of the product.

Note1: A line under a Lot No. identifies the indication of product Labels.

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.

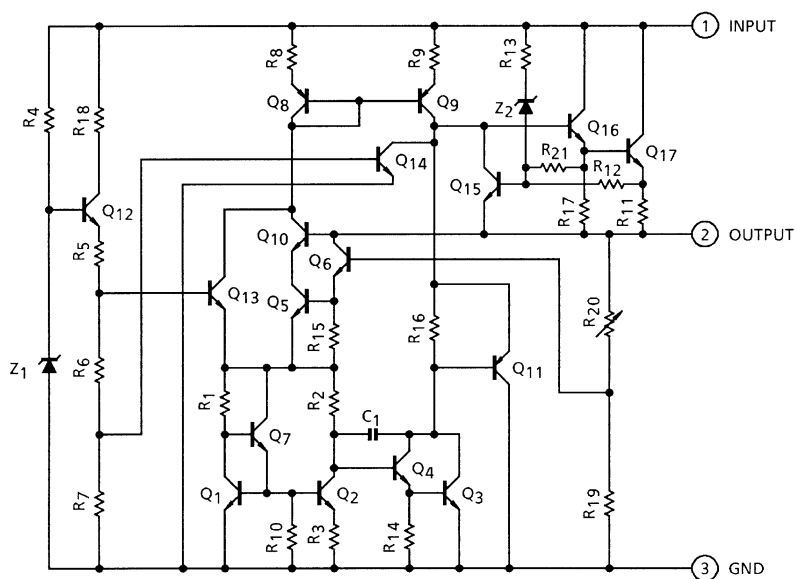
Ordering Method

Product Name	Package (Lead Type)	Packing Form
TA78**F (TE16L1, NQ)	New PW-Mold: Surface-mount	Tape (2000 pcs / reel)

Note: The “**” in each pro-forma product name is replaced with the output voltage of each product.

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	V_{IN}	35	V
		40	
Output current	I_{OUT}	1	A
Power dissipation	P_D	1	W
		10	
Operating junction temperature	T_{jopr}	-30 to 150	°C
Storage temperature	T_{stg}	-55 to 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	$T_j = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_j = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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
				$9.0\text{ V} \leq V_{IN} \leq 13\text{ V}$	—	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$	$9.0\text{ V} \leq V_{IN} \leq 25\text{ V}$	—	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	$T_J = 25^\circ\text{C}$ $9.0\text{ V} \leq V_{IN} \leq 22\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	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	$9.0\text{ V} \leq V_{IN} \leq 25\text{ V}$, $I_{OUT} = 5\text{ mA}$, $T_J = 25^\circ\text{C}$	—	—	1.3	mA
Output noise voltage	V_{NO}	2	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$ $12.5\text{ V} \leq V_{IN} \leq 25\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$ $14.5\text{ V} \leq V_{IN} \leq 27\text{ V}$ $5.0\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$	—	11	300	mV
			$17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ $20\text{ V} \leq V_{IN} \leq 26\text{ V}$	—	3	150	
Load regulation	Reg·load	1	$T_J = 25^\circ\text{C}$	—	12	300	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$ $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	4	150	
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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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	$T_J = 25^\circ\text{C}$	—	13	360	mV
			$21\text{ V} \leq V_{IN} \leq 33\text{ V}$ $24\text{ V} \leq V_{IN} \leq 30\text{ V}$	—	4	180	
Load regulation	Reg·load	1	$T_J = 25^\circ\text{C}$	—	12	360	mV
			$5\text{ mA} \leq I_{OUT} \leq 1.4\text{ A}$ $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$	—	4	180	
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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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, $V_{IN} = 29\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

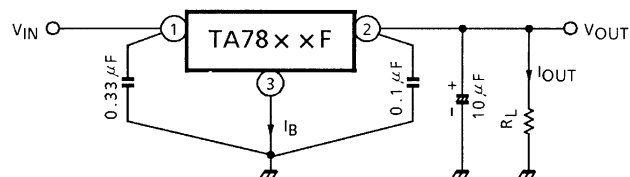
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	19.2	20.0	20.8	V
Line regulation	Reg·line	1	$T_J = 25^\circ\text{C}$	—	15	400	mV
			$23\text{ V} \leq V_{IN} \leq 35\text{ V}$	—	5	200	
Load regulation	Reg·load	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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, $V_{IN} = 33\text{ V}$, $I_{OUT} = 500\text{ mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$)

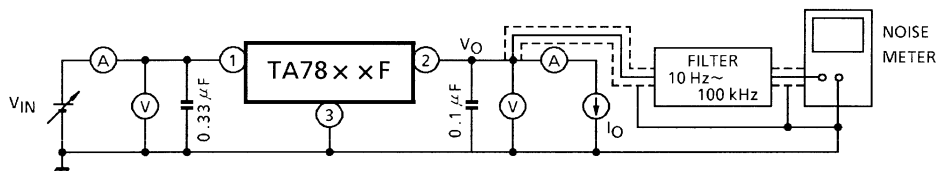
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_J = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$	23.0	24.0	25.0	V
Line regulation	Reg·line	1	$T_J = 25^\circ\text{C}$	—	18	480	mV
			$27\text{ V} \leq V_{IN} \leq 38\text{ V}$	—	6	240	
Load regulation	Reg·load	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	$T_J = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$ $I_{OUT} = 50\text{ mA}$	—	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



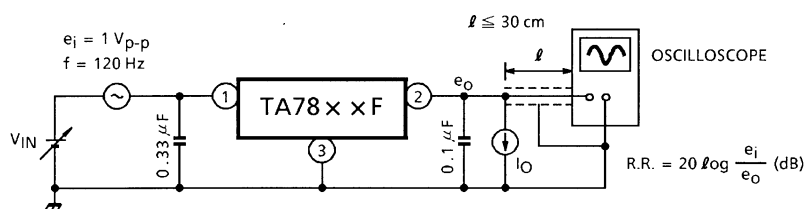
Test Circuit 2

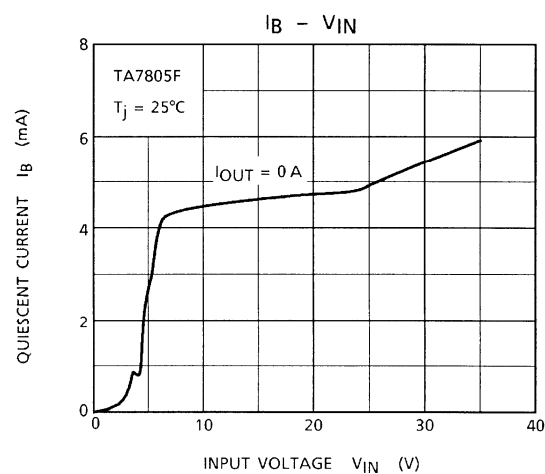
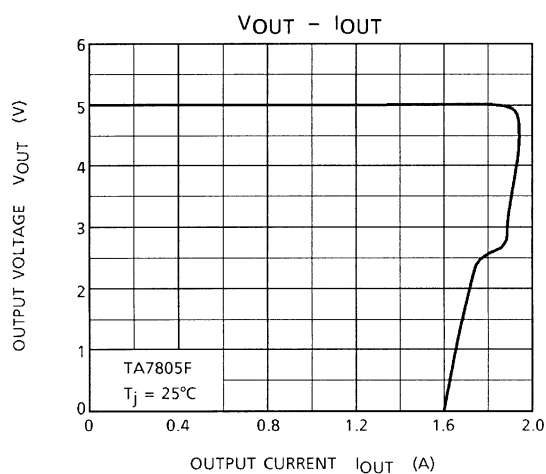
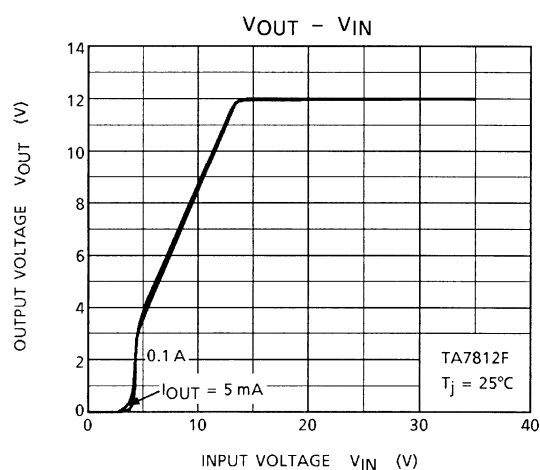
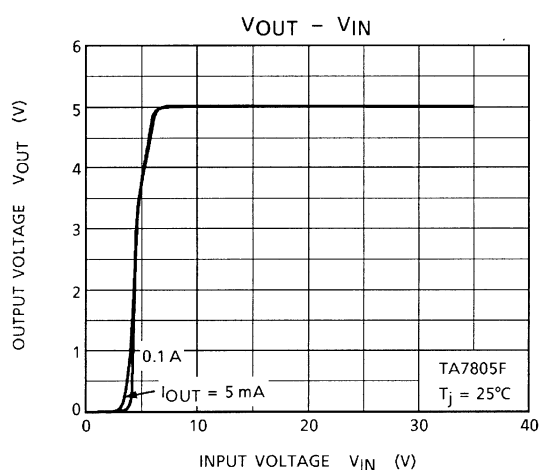
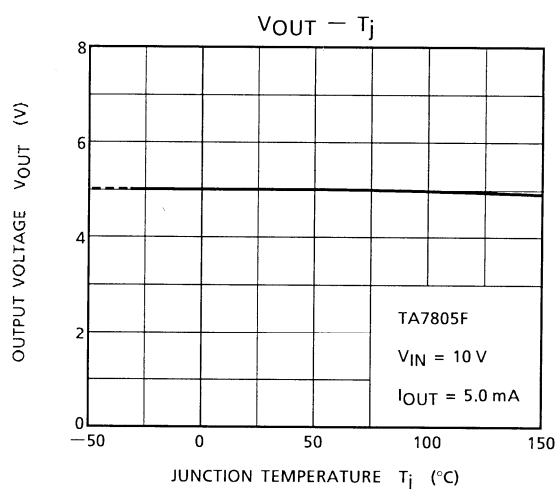
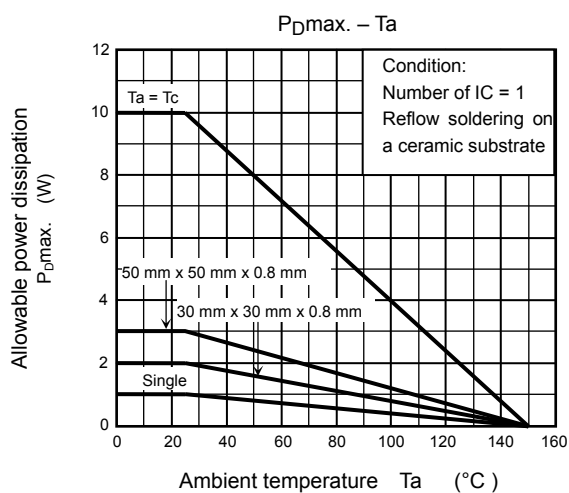
V_{NO}

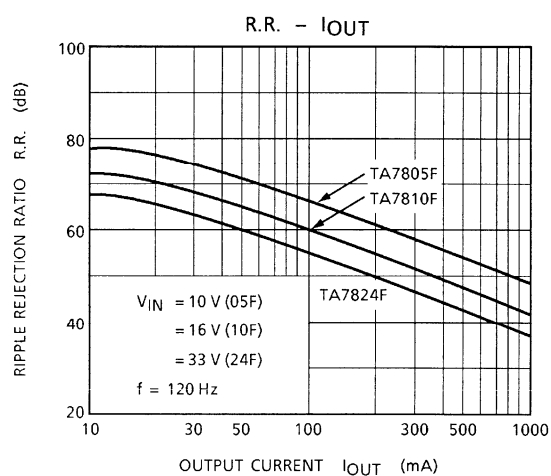
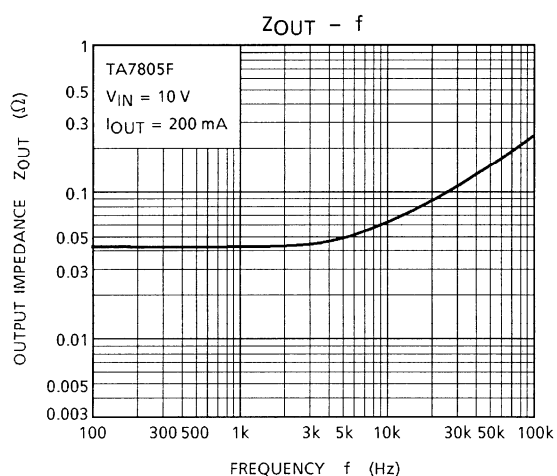
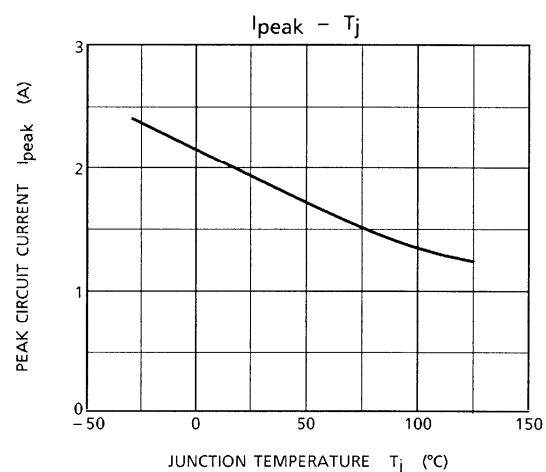
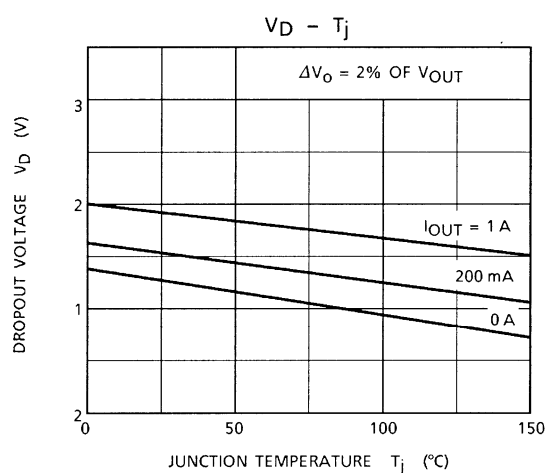
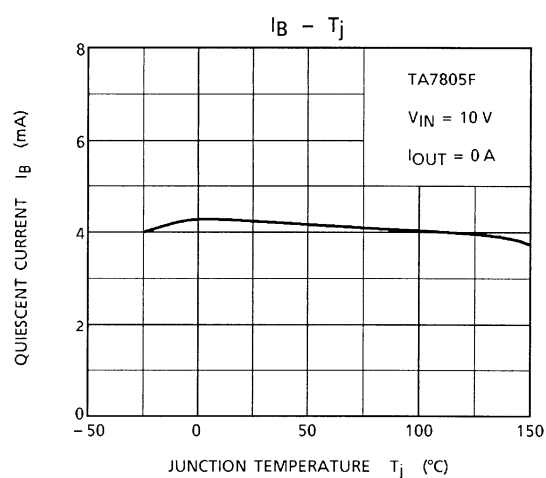
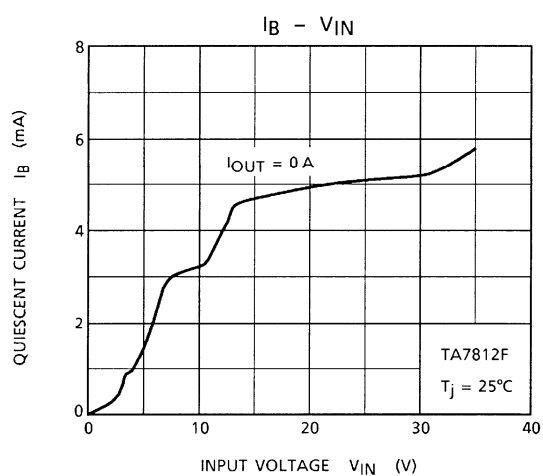


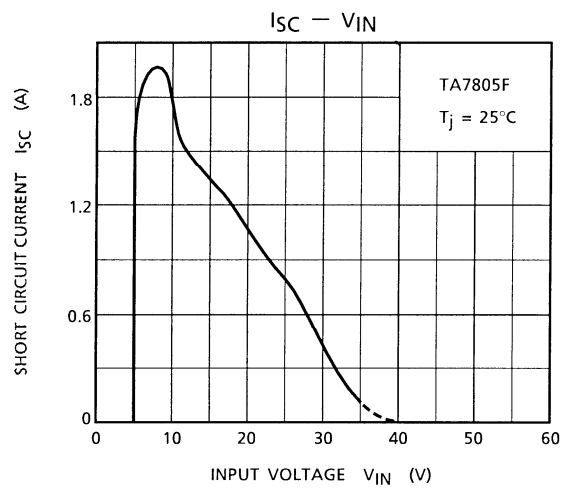
Test Circuit 3

R.R.









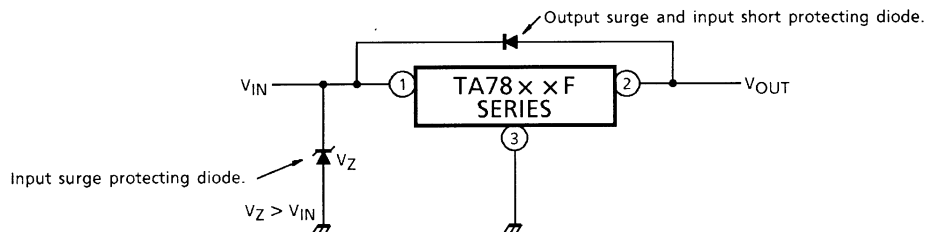
Usage Precautions

- (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.

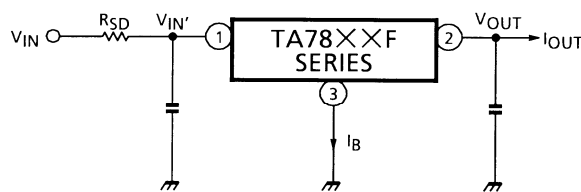
Particular care is necessary in the case of the latter.

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.

- (5) The molded plastic portion of this unit, measuring 5.5 mm (L) by 6.5 mm (W) by 2.3 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 ($T_{j \text{ max}}$).

Further, full consideration should be given to the installation of IC on a heat sink.

- 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.

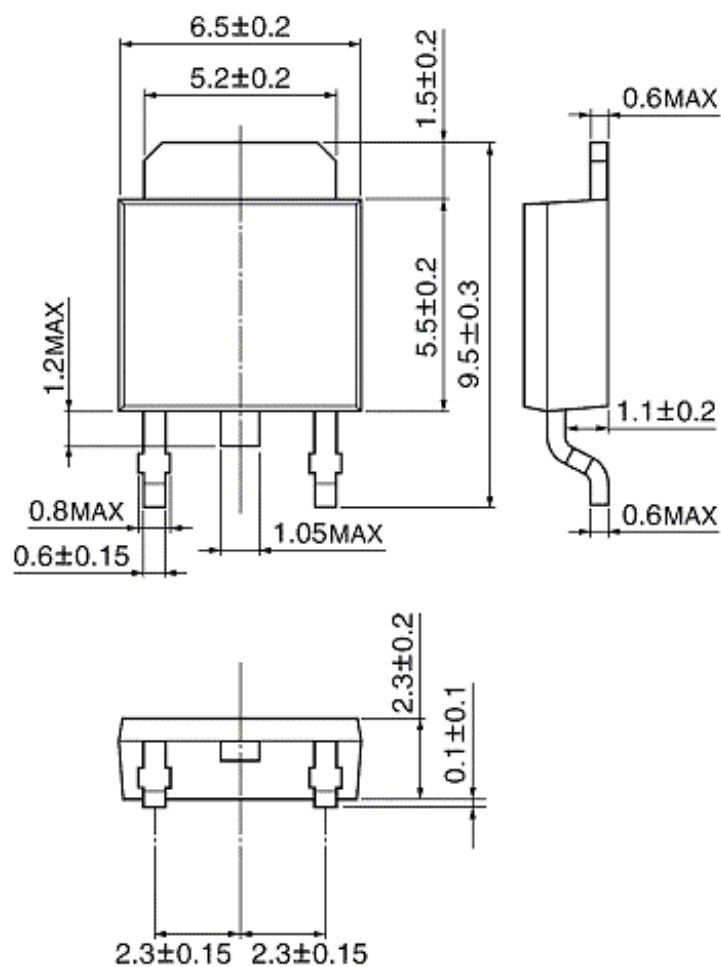
- Overheating Protection

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

HSOP3-P-2.30D

Unit: mm



Weight: 0.36 g (typ.)

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