

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

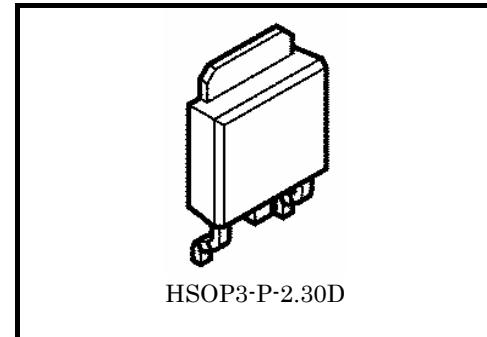
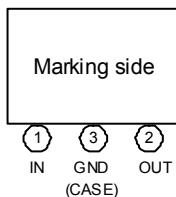
**TA7805F,TA78057F,TA7806F,TA7807F,TA7808F,TA7809F
TA7810F,TA7812F,TA7815F,TA7818F,TA7820F,TA7824F**

Output Current of 1A, Three Terminal Positive Voltage Regulators

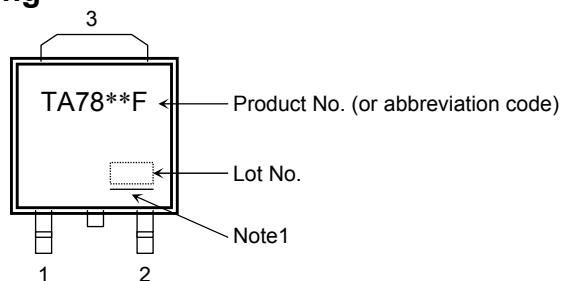
5 V, 5.7 V, 6 V, 7 V, 8 V, 9 V, 10 V, 12 V, 15 V, 18 V, 20 V, 24 V

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.

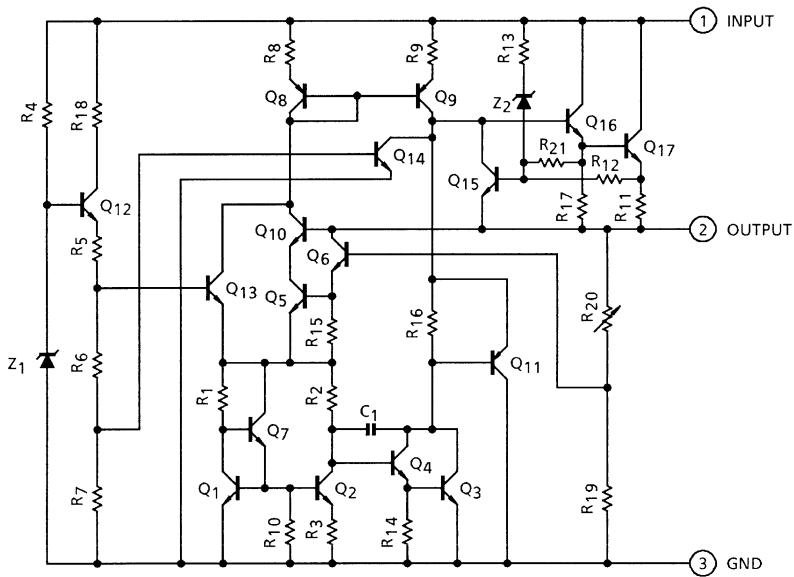
Ordering Method

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	TA7805F	V _{IN}	35	V
	TA78057F			
	TA7806F			
	TA7807F			
	TA7808F			
	TA7809F			
	TA7810F			
	TA7812F			
	TA7815F			
	TA7818F			
	TA7820F			
Output current	I _{OUT}	I _{OUT}	1	A
	(Ta = 25°C)		1	W
Power dissipation	(Tc = 25°C)	P _D	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, $V_{IN} = 10$ V, $I_{OUT} = 500$ mA, $0^\circ C \leq T_j \leq 125^\circ C$)

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

TA78057F

Electrical Characteristics

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

Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_j = 25^\circ C, I_{OUT} = 100$ mA		5.47	5.7	5.93	V
Line regulation	Reg-line	1	$T_j = 25^\circ C$	7.7 V $\leq V_{IN} \leq 25$ V	—	4	110	mV
				8.7 V $\leq V_{IN} \leq 12.7$ V	—	2	55	
Load regulation	Reg-load	1	$T_j = 25^\circ C$	5 mA $\leq I_{OUT} \leq 1.4$ A	—	15	110	mV
				250 mA $\leq I_{OUT} \leq 750$ mA	—	5	55	
Output voltage	V_{OUT}	1	$T_j = 25^\circ C$	7.7 V $\leq V_{IN} \leq 20.7$ V 5.0 mA $\leq I_{OUT} \leq 1.0$ A	5.42	—	5.98	V
Quiescent current	I_B	1	$T_j = 25^\circ C, I_{OUT} = 5$ mA	—	4.3	8.0	—	mA
Quiescent current change	ΔI_B	1	7.7 V $\leq V_{IN} \leq 25$ V, $I_{OUT} = 5$ mA, $T_j = 25^\circ C$	—	—	1.3	—	mA
Output noise voltage	V_{NO}	2	$T_j = 25^\circ C, 10$ Hz $\leq f \leq 100$ kHz $I_{OUT} = 50$ mA		—	55	—	μV_{rms}
Ripple rejection	R.R.	3	f = 120 Hz, 8.8 V $\leq V_{IN} \leq 18.8$ V, $I_{OUT} = 50$ mA, $T_j = 25^\circ C$	56	72	—	—	dB
Dropout voltage	V_D	1	$I_{OUT} = 1.0$ A, $T_j = 25^\circ C$	—	2.0	—	—	V
Short circuit current limit	I_{SC}	1	$T_j = 25^\circ C$	—	1.5	—	—	A
Average temperature coefficient of output voltage	T_{CVO}	1	$I_{OUT} = 5$ mA	—	-0.7	—	—	$mV/^\circ C$

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 V $\leq V_{IN} \leq 25\text{ V}$	—	4	120	mV
				9.0 V $\leq V_{IN} \leq 13\text{ V}$	—	2	60	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	15	120	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	5	60	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	8 V $\leq V_{IN} \leq 21\text{ V}$ 5.0 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 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 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 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 V $\leq V_{IN} \leq 25\text{ V}$	—	5	140	mV
				10 V $\leq V_{IN} \leq 14\text{ V}$	—	2	70	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	15	140	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	5	70	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	9.0 V $\leq V_{IN} \leq 22\text{ V}$ 5.0 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 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 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 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	$T_j = 25^\circ\text{C}$	10.5 V $\leq V_{IN} \leq 25\text{ V}$	—	6	160	mV
				11 V $\leq V_{IN} \leq 17\text{ V}$	—	2	80	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	160	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	80	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	10.5 V $\leq V_{IN} \leq 23\text{ V}$ 5.0 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_{BI}	1	10.5 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 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 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	$T_j = 25^\circ\text{C}$	11.5 V $\leq V_{IN} \leq 26\text{ V}$	—	7.0	180	mV
				13 V $\leq V_{IN} \leq 19\text{ V}$	—	2.5	90	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	180	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	90	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	11.5 V $\leq V_{IN} \leq 24\text{ V}$ 5.0 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_{BI}	1	11.5 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 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 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	$T_j = 25^\circ\text{C}$	12.5 V $\leq V_{IN} \leq$ 27 V	—	8	200	mV
				14 V $\leq V_{IN} \leq$ 20 V	—	2.5	100	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq$ 1.4 A	—	12	200	mV
				250 mA $\leq I_{OUT} \leq$ 750 mA	—	4	100	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	12.5 V $\leq V_{IN} \leq$ 25 V 5.0 mA $\leq I_{OUT} \leq$ 1.0 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_{BI}	1	12.5 V $\leq V_{IN} \leq$ 27 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 Hz $\leq f \leq$ 100 kHz $I_{OUT} = 50\text{ mA}$	—	80	—	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, 16 V $\leq V_{IN} \leq$ 23.5 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	$T_j = 25^\circ\text{C}$	14.5 V $\leq V_{IN} \leq$ 30 V	—	10	240	mV
				16 V $\leq V_{IN} \leq$ 22 V	—	3	120	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq$ 1.4 A	—	12	240	mV
				250 mA $\leq I_{OUT} \leq$ 750 mA	—	4	120	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	14.5 V $\leq V_{IN} \leq$ 27 V 5.0 mA $\leq I_{OUT} \leq$ 1.0 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_{BI}	1	14.5 V $\leq V_{IN} \leq$ 30 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 Hz $\leq f \leq$ 100 kHz $I_{OUT} = 50\text{ mA}$	—	90	—	—	μV_{rms}
Ripple rejection	R.R.	3	$f = 120\text{ Hz}$, 19 V $\leq V_{IN} \leq$ 25 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 V $\leq V_{IN} \leq 30\text{ V}$	—	11	300	mV
				20 V $\leq V_{IN} \leq 26\text{ V}$	—	3	150	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	300	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	150	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	17.5 V $\leq V_{IN} \leq 30\text{ V}$ 5.0 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 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 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 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 V $\leq V_{IN} \leq 33\text{ V}$	—	13	360	mV
				24 V $\leq V_{IN} \leq 30\text{ V}$	—	4	180	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	360	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	180	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	21 V $\leq V_{IN} \leq 33\text{ V}$ 5.0 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 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 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 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	$T_j = 25^\circ\text{C}$	23 V $\leq V_{IN} \leq 35\text{ V}$	—	15	400	mV
				26 V $\leq V_{IN} \leq 32\text{ V}$	—	5	200	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	400	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	200	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	23 V $\leq V_{IN} \leq 35\text{ V}$ 5.0 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 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 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 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	—	$\text{mV/}^\circ\text{C}$

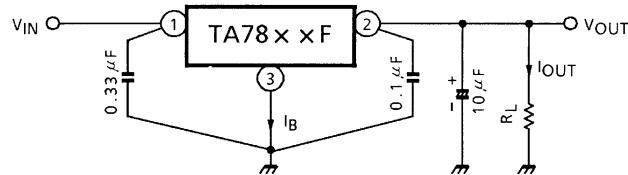
TA7824F

Electrical Characteristics

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

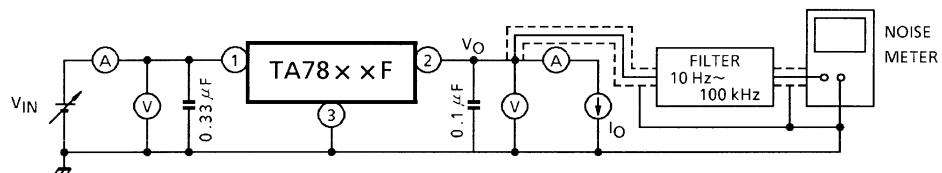
Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$, $I_{OUT} = 100\text{ mA}$		23.0	24.0	25.0	V
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	27 V $\leq V_{IN} \leq 38\text{ V}$	—	18	480	mV
				30 V $\leq V_{IN} \leq 36\text{ V}$	—	6	240	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	5 mA $\leq I_{OUT} \leq 1.4\text{ A}$	—	12	480	mV
				250 mA $\leq I_{OUT} \leq 750\text{ mA}$	—	4	240	
Output voltage	V_{OUT}	1	$T_j = 25^\circ\text{C}$	27 V $\leq V_{IN} \leq 38\text{ V}$ 5.0 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 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 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 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



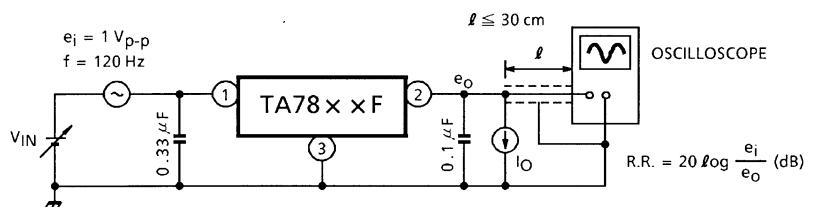
Test Circuit 2

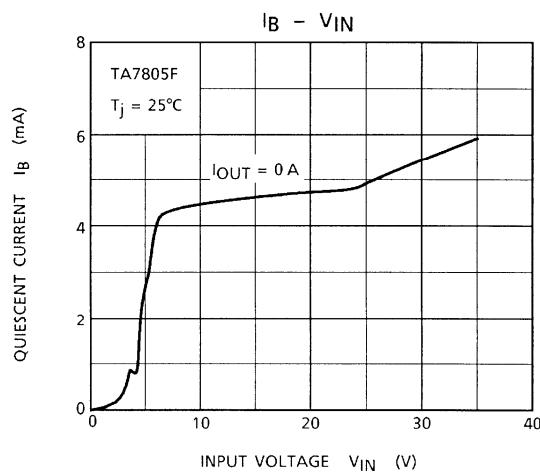
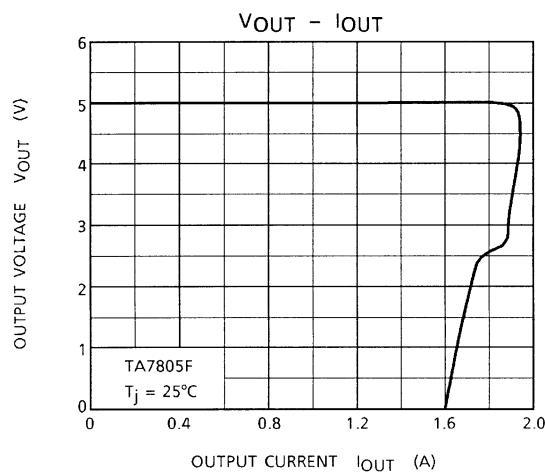
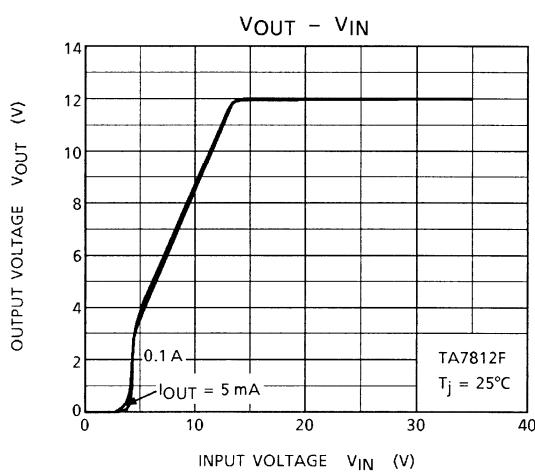
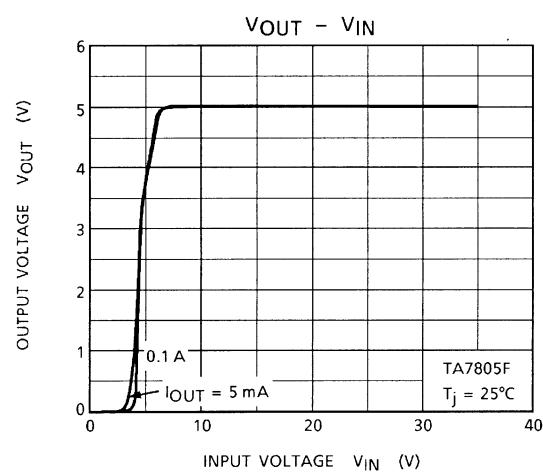
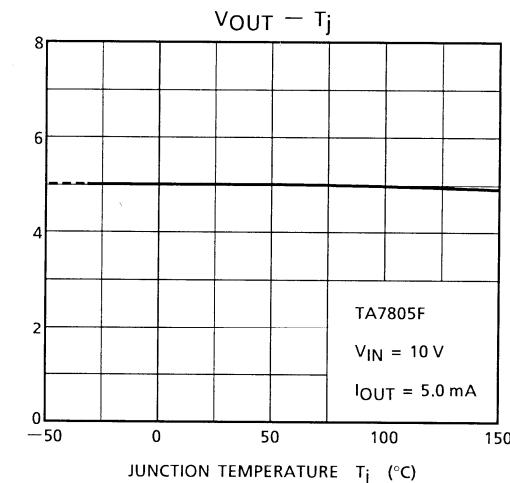
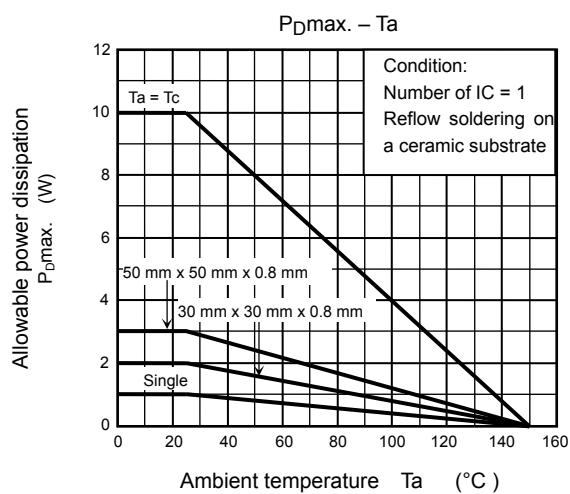
VNO

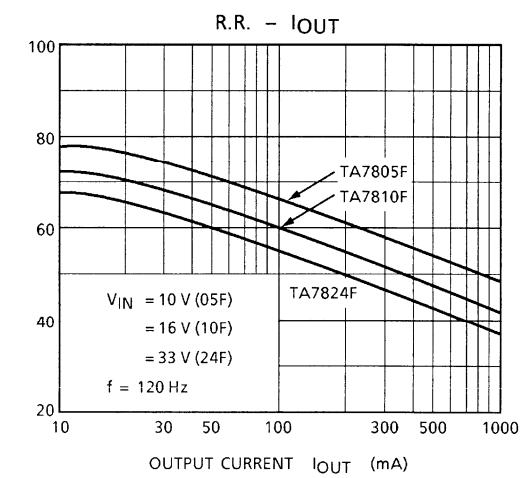
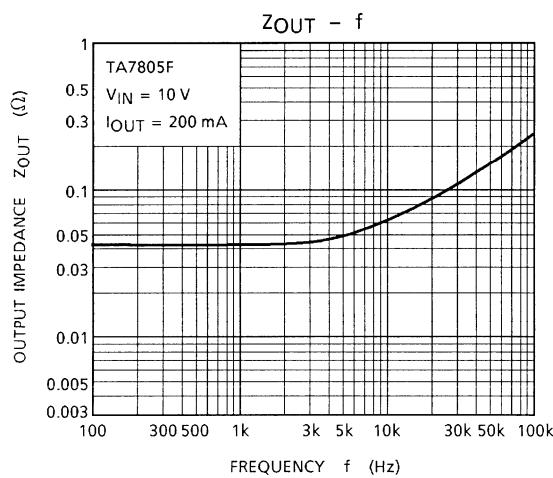
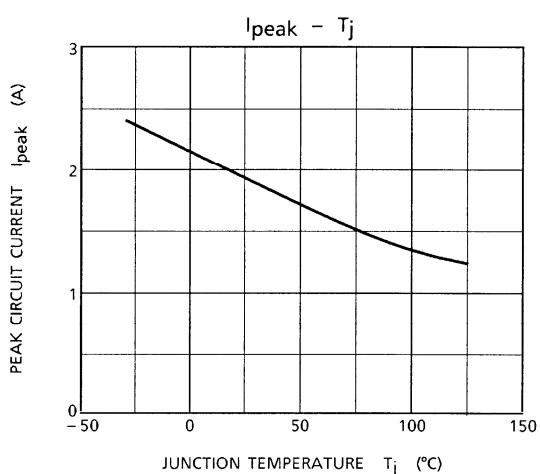
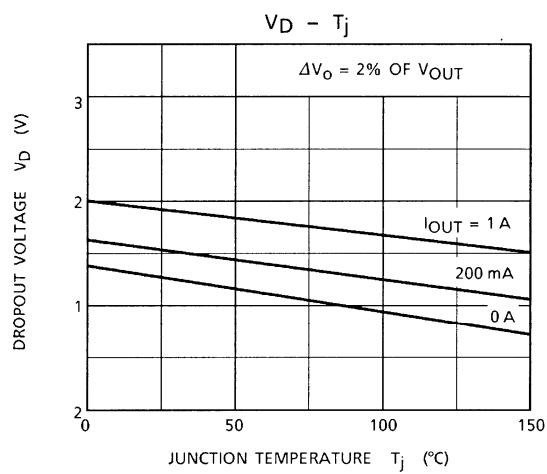
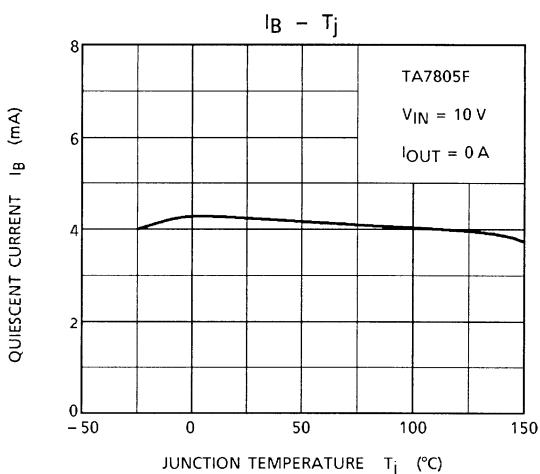
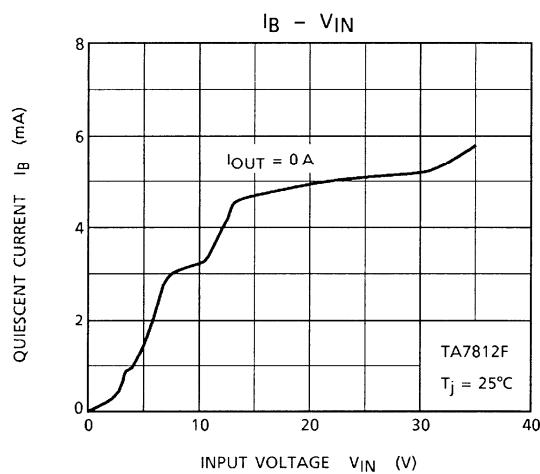


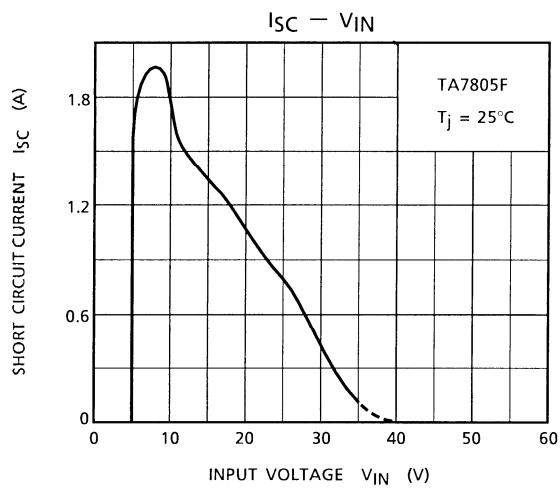
Test Circuit 3

R.R.







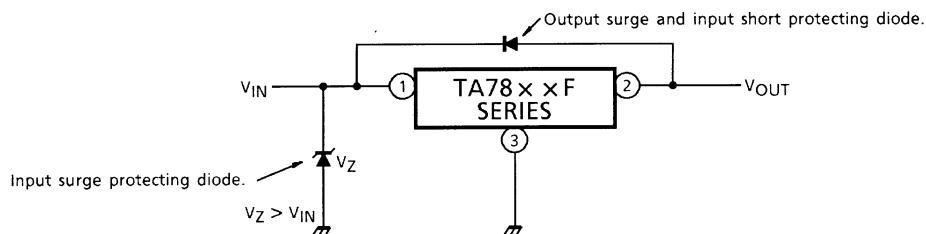


Usage Precautions

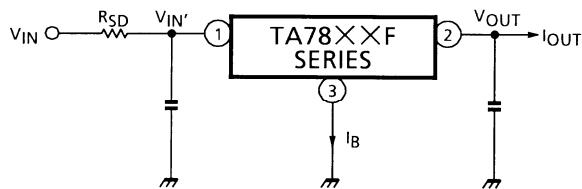
- (1) In regard to GND, be careful not to apply a negative voltage to the input/output terminal.
- (2) If a surge voltage exceeding the absolute maximum rating is applied to the input terminal or if a voltage in excess of the input terminal voltage is applied to the output terminal, the circuit may be 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 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.

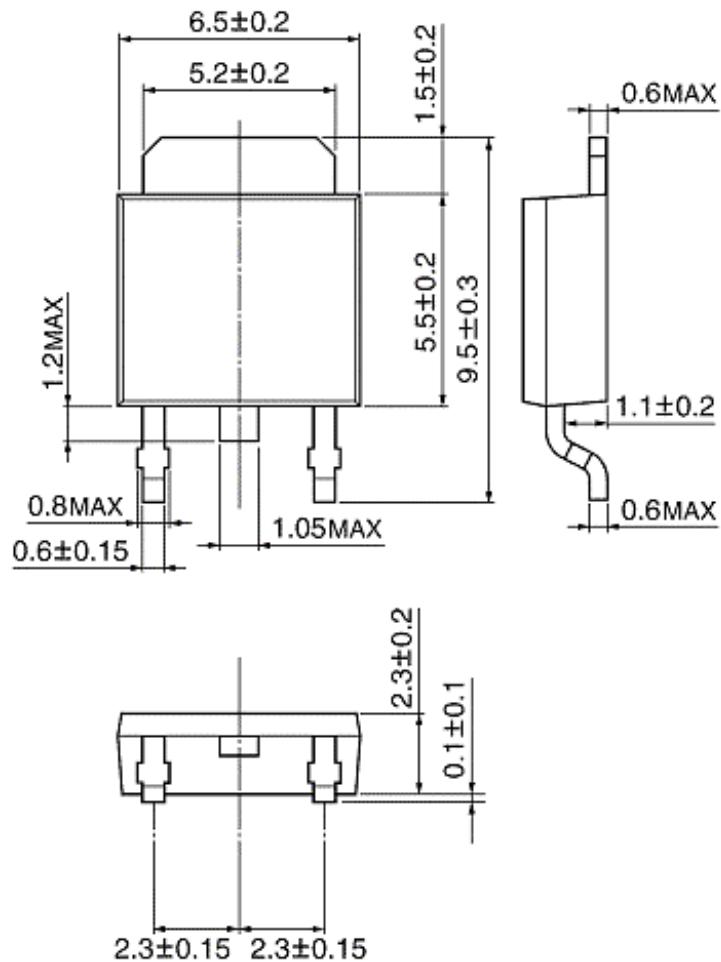
- **Overheating Protection**

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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