TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA79L05F,TA79L06F,TA79L08F,TA79L09F,TA79L10F, TA79L12F,TA79L15F,TA79L18F,TA79L20F,TA79L24F

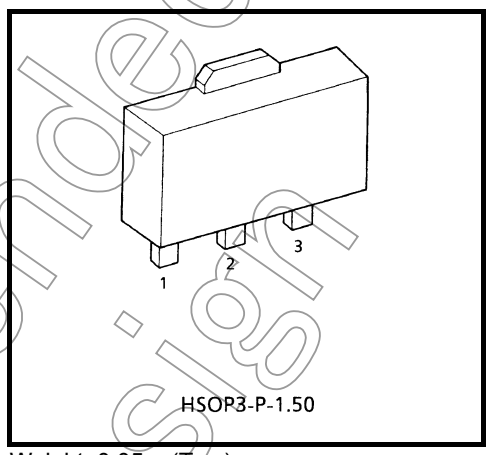
Three-Terminal Negative Voltage Regulators

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

Features

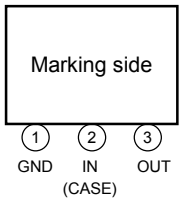
Best suited to a power supply for TTL and C^2MOS.

- Built-in overcurrent protection.
- Built-in overheating protection.
- Maximum output current of 150 mA (T_j = 25°C).
- Packaged in Power Mini. (SOT-89).

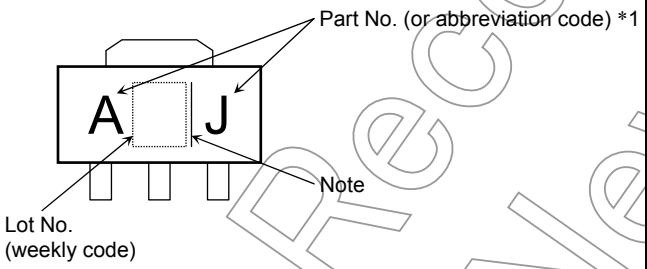


Weight: 0.05 g (Typ.)

Pin Assignment



Marking



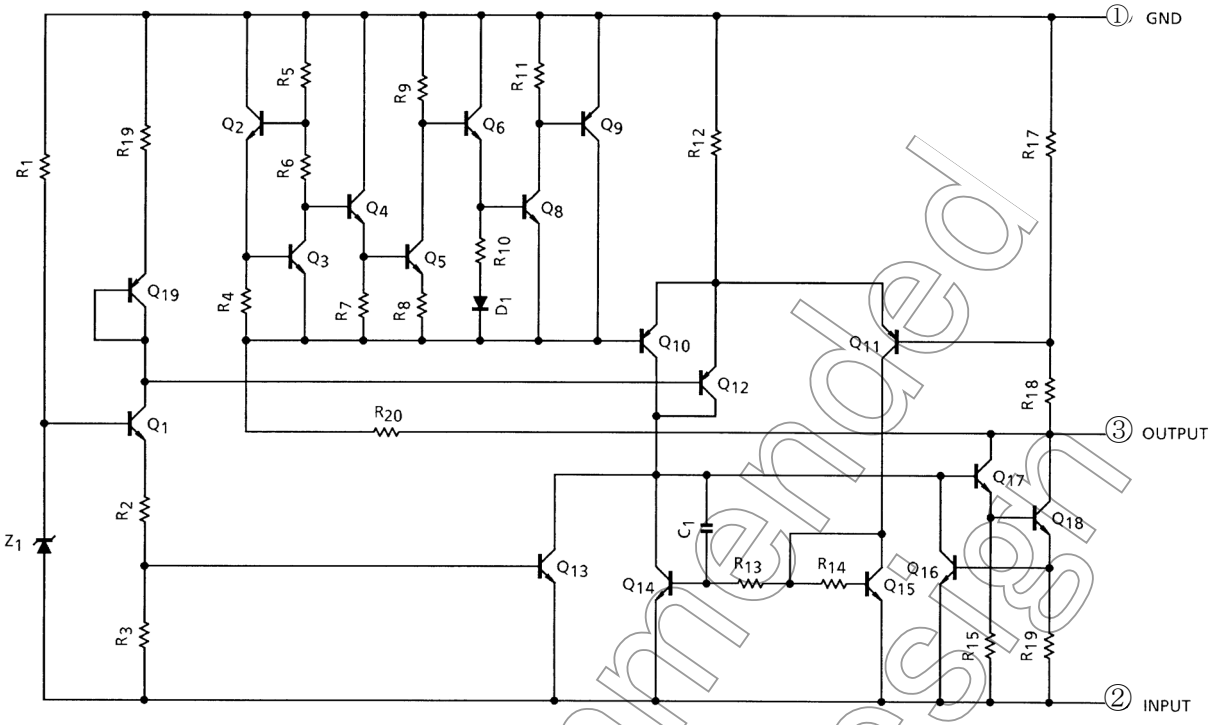
	Part No. (or abbreviation code)	Part No.
*1	AJ	TA79L05F
	BJ	TA79L06F
	CJ	TA79L08F
	DJ	TA79L09F
	EJ	TA79L10F
	FJ	TA79L12F
	GJ	TA79L15F
	HJ	TA79L18F
	IJ	TA79L20F
	JJ	TA79L24F

Note: A line beside a Lot No. identifies the indication of product Labels.
Without a line: [[Pb]]/INCLUDES > MCV
With a line: [[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	TA79L05F	V_{IN}	−35	V
	TA79L06F			
	TA79L08F			
	TA79L09F			
	TA79L10F			
	TA79L12F			
	TA79L15F			
	TA79L18F		−40	
	TA79L20F			
	TA79L24F			
Output current		I_{OUT}	0.15	A
Power dissipation	(Ta = 25°C)	P_D	500	mW
Operating temperature		T_{opr}	−30 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C
Junction temperature		T_j	150	°C
Thermal resistance		$R_{th\ (j-a)}$	250	°C/W

Type No.	Marking
TA79L05F	AJ
TA79L06F	BJ
TA79L08F	CJ
TA79L09F	DJ
TA79L10F	EJ
TA79L12F	FJ
TA79L15F	GJ
TA79L18F	HJ
TA79L20F	IJ
TA79L24F	JJ

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).

TA79L05F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −10 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−5.2	−5.0	−4.8	V
Line regulation	Reg·line	1	T_j = 25°C	−20 V ≤ V_{IN} ≤ −7.0 V	—	55	150	mV
				−20 V ≤ V_{IN} ≤ −8.0 V	—	45	100	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	11	100	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	5.0	50	
Output voltage	V_{OUT}	1	T_j = 25°C	−20 V ≤ V_{IN} ≤ −7.0 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−5.25	—	−4.75	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−5.25	—	−4.75	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.0	mA
			T_j = 125°C		—	—	5.5	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−20 V ≤ V_{IN} ≤ −8.0 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	40	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	12	—	mV/kh
Ripple rejection ratio	R.R.	3	−18 V ≤ V_{IN} ≤ −8.0 V, T_j = 25°C, f = 120 Hz		41	49	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	0.6	—	mV/°C

TA79L06F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −11 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−6.24	−6.0	−5.76	V
Line regulation	Reg·line	1	T_j = 25°C	−21 V ≤ V_{IN} ≤ −8.1 V	—	50	150	mV
				−21 V ≤ V_{IN} ≤ −9.0 V	—	45	110	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	12	120	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	5.5	60	
Output voltage	V_{OUT}	1	T_j = 25°C	−21 V ≤ V_{IN} ≤ −8.1 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−6.3	—	−5.7	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−6.3	—	−5.7	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.0	mA
			T_j = 125°C		—	—	5.5	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−20 V ≤ V_{IN} ≤ −9.0 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	40	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	14	—	mV/kh
Ripple rejection ratio	R.R.	3	−19 V ≤ V_{IN} ≤ −9.0 V, T_j = 25°C, f = 120 Hz		39	47	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	0.7	—	mV/°C

TA79L08F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −14 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−8.3	−8.0	−7.7	V
Line regulation	Reg·line	1	T_j = 25°C	−23 V ≤ V_{IN} ≤ −10.5 V	—	20	175	mV
				−23 V ≤ V_{IN} ≤ −11 V	—	12	125	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	15	155	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	7.0	75	
Output voltage	V_{OUT}	1	T_j = 25°C	−23 V ≤ V_{IN} ≤ −10.5 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−8.4	—	−7.6	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−8.4	—	−7.6	
Quiescent current	I_B	1	T_j = 25°C		—	3.1	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−23 V ≤ V_{IN} ≤ −11 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	60	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	20	—	mV/kh
Ripple rejection ratio	R.R.	3	−23 V ≤ V_{IN} ≤ −12 V, T_j = 25°C, f = 120 Hz		37	45	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	0.8	—	mV/°C

TA79L09F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −15 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−9.36	−9.0	−8.64	V
Line regulation	Reg·line	1	T_j = 25°C	−24 V ≤ V_{IN} ≤ −11.4 V	—	80	200	mV
				−24 V ≤ V_{IN} ≤ −12 V	—	20	160	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	17	175	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	8.0	80	
Output voltage	V_{OUT}	1	T_j = 25°C	−24 V ≤ V_{IN} ≤ −11.4 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−9.45	—	−8.55	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−9.45	—	−8.55	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−24 V ≤ V_{IN} ≤ −12 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	65	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	21	—	mV/kh
Ripple rejection ratio	R.R.	3	−24 V ≤ V_{IN} ≤ −12 V, T_j = 25°C, f = 120 Hz		36	44	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	0.85	—	mV/°C

TA79L10F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −16 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−10.4	−10.0	−9.6	V
Line regulation	Reg·line	1	T_j = 25°C	−25 V ≤ V_{IN} ≤ −12.5 V	—	80	230	mV
				−25 V ≤ V_{IN} ≤ −13 V	—	30	170	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	18	190	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	8.5	90	
Output voltage	V_{OUT}	1	T_j = 25°C	−25 V ≤ V_{IN} ≤ −12.5 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−10.5	—	−9.5	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−10.5	—	−9.5	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−25 V ≤ V_{IN} ≤ −13 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	70	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	22	—	mV/kh
Ripple rejection ratio	R.R.	3	−24 V ≤ V_{IN} ≤ −13 V, T_j = 25°C, f = 120 Hz		36	43	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	0.9	—	mV/°C

TA79L12F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −19 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−12.5	−12.0	−11.5	V
Line regulation	Reg·line	1	T_j = 25°C	−27 V ≤ V_{IN} ≤ −14.5 V	—	120	250	mV
				−27 V ≤ V_{IN} ≤ −16 V	—	100	200	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	20	225	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	10	105	
Output voltage	V_{OUT}	1	T_j = 25°C	−27 V ≤ V_{IN} ≤ −14.5 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−12.6	—	−11.4	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−12.6	—	−11.4	
Quiescent current	I_B	1	T_j = 25°C		—	3.2	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−27 V ≤ V_{IN} ≤ −16 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	80	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	24	—	mV/kh
Ripple rejection ratio	R.R.	3	−25 V ≤ V_{IN} ≤ −15 V, T_j = 25°C, f = 120 Hz		37	42	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	1.0	—	mV/°C

TA79L15F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −23 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−15.6	−15.0	−14.4	V
Line regulation	Reg·line	1	T_j = 25°C	−30 V ≤ V_{IN} ≤ −17.5 V	—	130	300	mV
				−30 V ≤ V_{IN} ≤ −20 V	—	110	250	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	25	280	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	12	130	
Output voltage	V_{OUT}	1	T_j = 25°C	−30 V ≤ V_{IN} ≤ −17.5 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−15.75	—	−14.25	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−15.75	—	−14.25	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−30 V ≤ V_{IN} ≤ −20 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	90	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	30	—	mV/kh
Ripple rejection ratio	R.R.	3	−28.5 V ≤ V_{IN} ≤ −18.5 V, T_j = 25°C, f = 120 Hz		34	39	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	1.3	—	mV/°C

TA79L18F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −27 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−18.7	−18.0	−17.3	V
Line regulation	Reg·line	1	T_j = 25°C	−33 V ≤ V_{IN} ≤ −20.7 V	—	32	325	mV
				−33 V ≤ V_{IN} ≤ −21 V	—	27	275	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	30	335	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	15	155	
Output voltage	V_{OUT}	1	T_j = 25°C	−33 V ≤ V_{IN} ≤ −20.9 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−18.9	—	−17.1	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−18.9	—	−17.1	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−33 V ≤ V_{IN} ≤ −21 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	150	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	45	—	mV/kh
Ripple rejection ratio	R.R.	3	−33 V ≤ V_{IN} ≤ −23 V, T_j = 25°C, f = 120 Hz		33	48	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	1.5	—	mV/°C

TA79L20F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −29 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 0°C ≤ T_j ≤ 125°C)

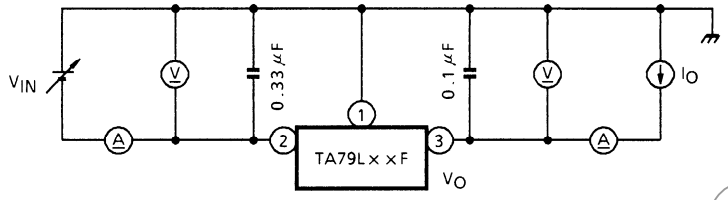
Characteristics	Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1	T_j = 25°C		−20.8	−20.0	−19.2	V
Line regulation	Reg·line	1	T_j = 25°C	−35 V ≤ V_{IN} ≤ −23.5 V	—	33	330	mV
				−35 V ≤ V_{IN} ≤ −24 V	—	28	285	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	33	370	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	17	170	
Output voltage	V_{OUT}	1	T_j = 25°C	−35 V ≤ V_{IN} ≤ −23.5 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−21.0	—	−19.0	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−21.0	—	−19.0	
Quiescent current	I_B	1	T_j = 25°C		—	3.3	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−35 V ≤ V_{IN} ≤ −24 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	170	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	49	—	mV/kh
Ripple rejection ratio	R.R.	3	−35 V ≤ V_{IN} ≤ −27 V, T_j = 25°C, f = 120 Hz		31	37	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	1.7	—	mV/°C

TA79L24F
Electrical Characteristics
(Unless otherwise specified, V_{IN} = −33 V, I_{OUT} = 40 mA, C_{IN} = 0.33 μF, C_{OUT} = 0.1 μF, 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		−25.0	−24.0	−23.0	V
Line regulation	Reg·line	1	T_j = 25°C	−38 V ≤ V_{IN} ≤ −27 V	—	35	350	mV
				−38 V ≤ V_{IN} ≤ −28 V	—	30	300	
Load regulation	Reg·load	1	T_j = 25°C	1.0 mA ≤ I_{OUT} ≤ 100 mA	—	40	440	mV
				1.0 mA ≤ I_{OUT} ≤ 40 mA	—	20	200	
Output voltage	V_{OUT}	1	T_j = 25°C	−38 V ≤ V_{IN} ≤ −27 V, 1.0 mA ≤ I_{OUT} ≤ 40 mA	−25.2	—	−22.8	V
				1.0 mA ≤ I_{OUT} ≤ 70 mA	−25.2	—	−22.8	
Quiescent current	I_B	1	T_j = 25°C		—	3.5	6.5	mA
			T_j = 125°C		—	—	6.0	
Quiescent current change	ΔI_{BI}	1	T_j = 25°C	−38 V ≤ V_{IN} ≤ −28 V	—	—	1.5	mA
	ΔI_{BO}	1		1.0 mA ≤ I_{OUT} ≤ 40 mA	—	—	0.1	
Output noise voltage	V_{NO}	2	Ta = 25°C, 10 Hz ≤ f ≤ 100 kHz		—	200	—	μV_{rms}
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—		—	56	—	mV/kh
Ripple rejection ratio	R.R.	3	−35 V ≤ V_{IN} ≤ −29 V, T_j = 25°C, f = 120 Hz		31	47	—	dB
Dropout voltage	V_D	1	T_j = 25°C		—	1.7	—	V
Average temperature coefficient of output voltage	T_{CVO}	1	I_{OUT} = 5 mA		—	2.0	—	mV/°C

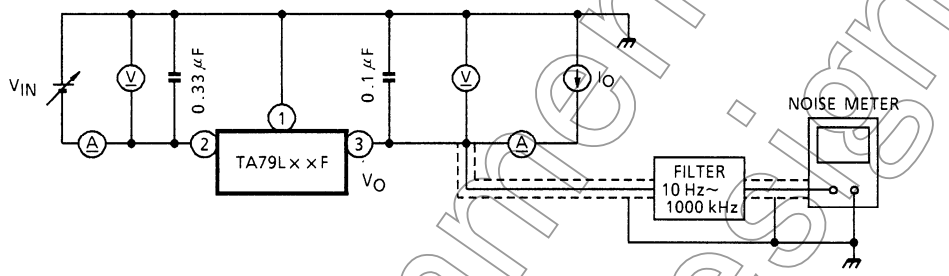
Test Circuit 1

V_{OUT}, Reg·line, Reg·load, I_B, ΔI_B, $\Delta V_{OUT}/\Delta t$, V_D, T_{CVO}



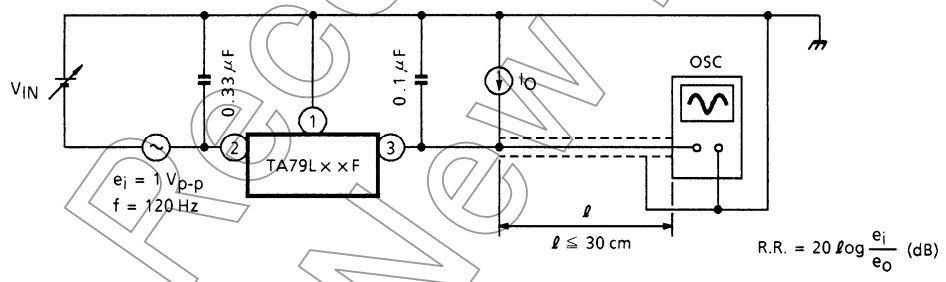
Test Circuit 2

V_{NO}



Test Circuit 3

R.R.



Usage Precautions

- 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.

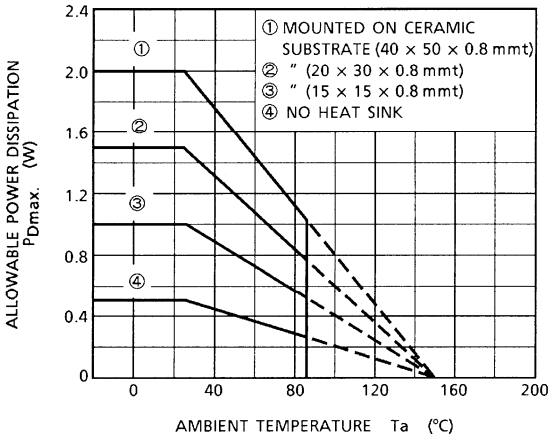
- Overcurrent Protection

  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.

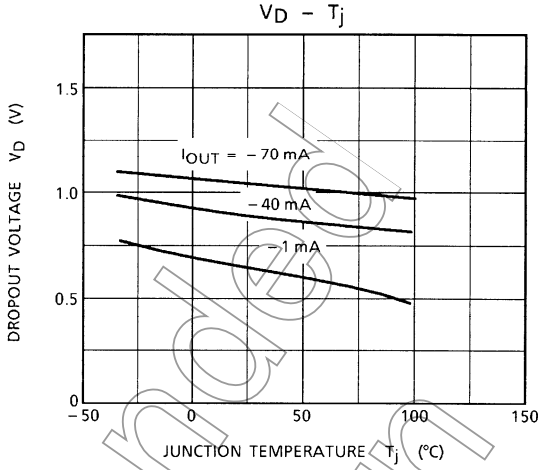
- Overheating Protection

  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.

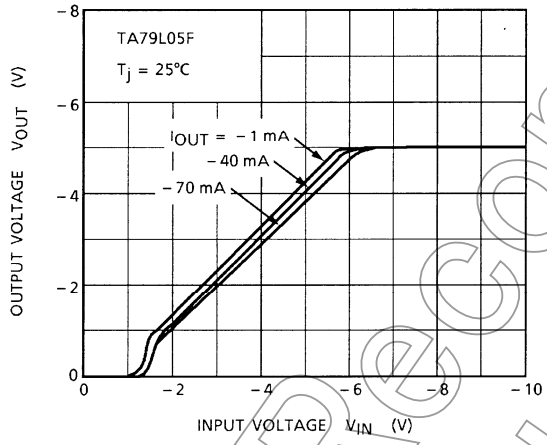
$P_{Dmax.}$ – Ta



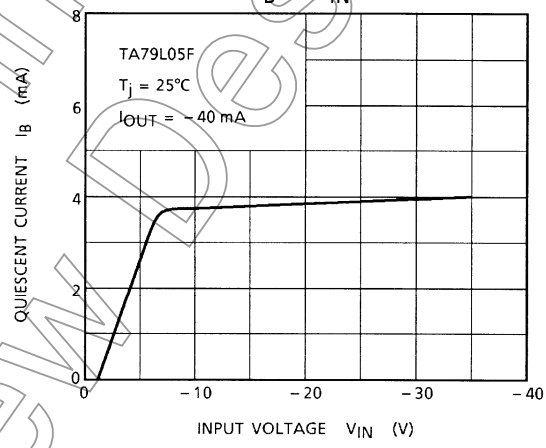
V_D – T_j



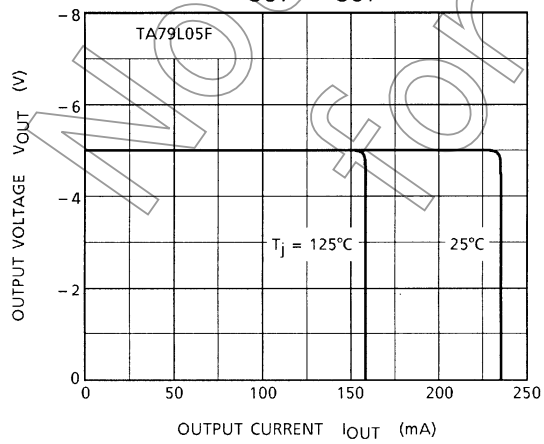
V_{OUT} – V_{IN}



I_B – V_{IN}

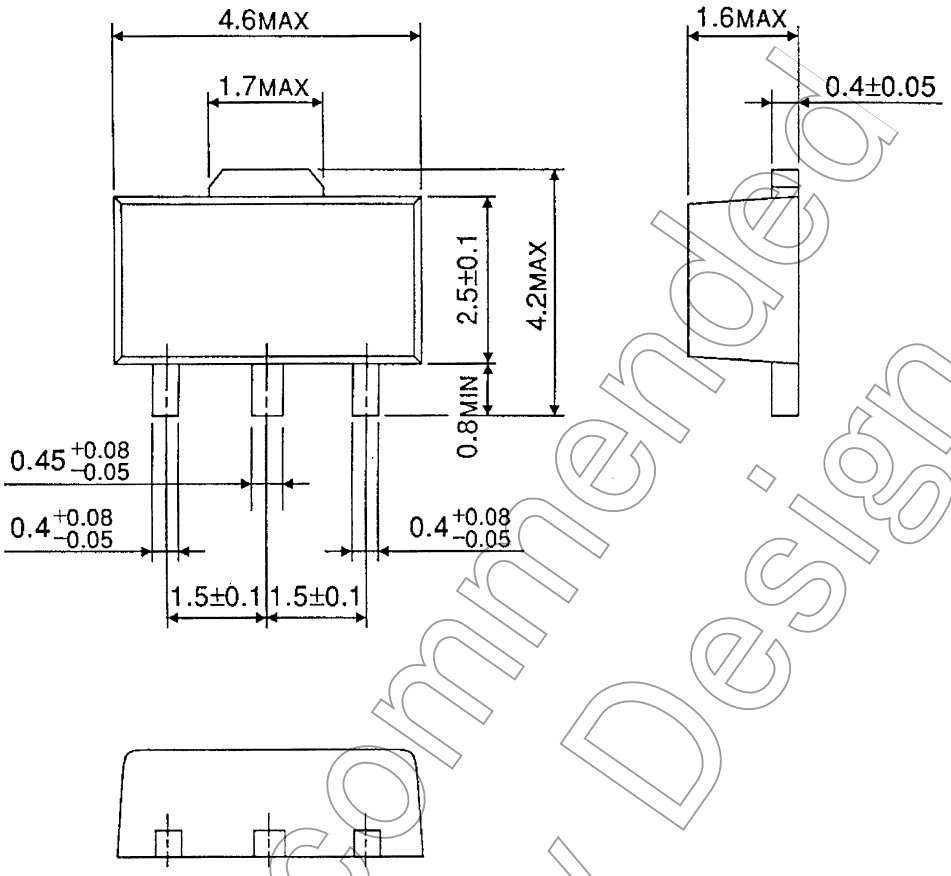


V_{OUT} – I_{OUT}



Package Dimensions

HSOP3-P-1.50 Unit : mm



Weight : 0.05 g (Typ.)

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