

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

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

### Three-Terminal Negative Voltage Regulators

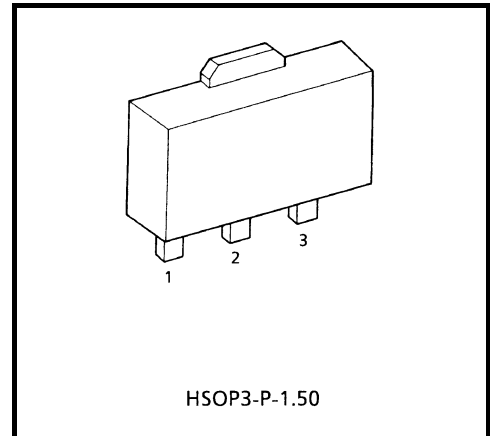
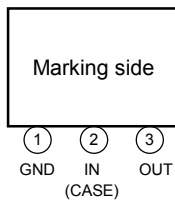
-5 V, -6 V, -8 V, -9 V, -10 V, -12 V, -15 V, -18 V, -20 V, -24 V

### Features

Best suited to a power supply for TTL and C<sup>2</sup>MOS.

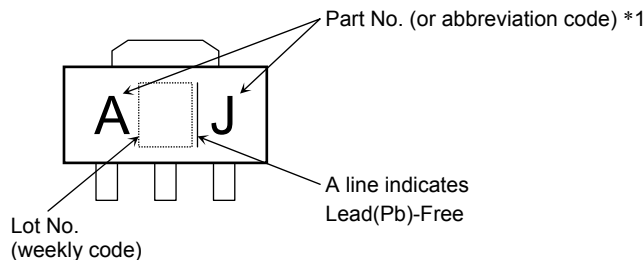
- Built-in overcurrent protection.
- Built-in overheating protection.
- Maximum output current of 150 mA (T<sub>j</sub> = 25°C).
- Packaged in Power Mini. (SOT-89).

### Pin Assignment



Weight: 0.05 g (Typ.)

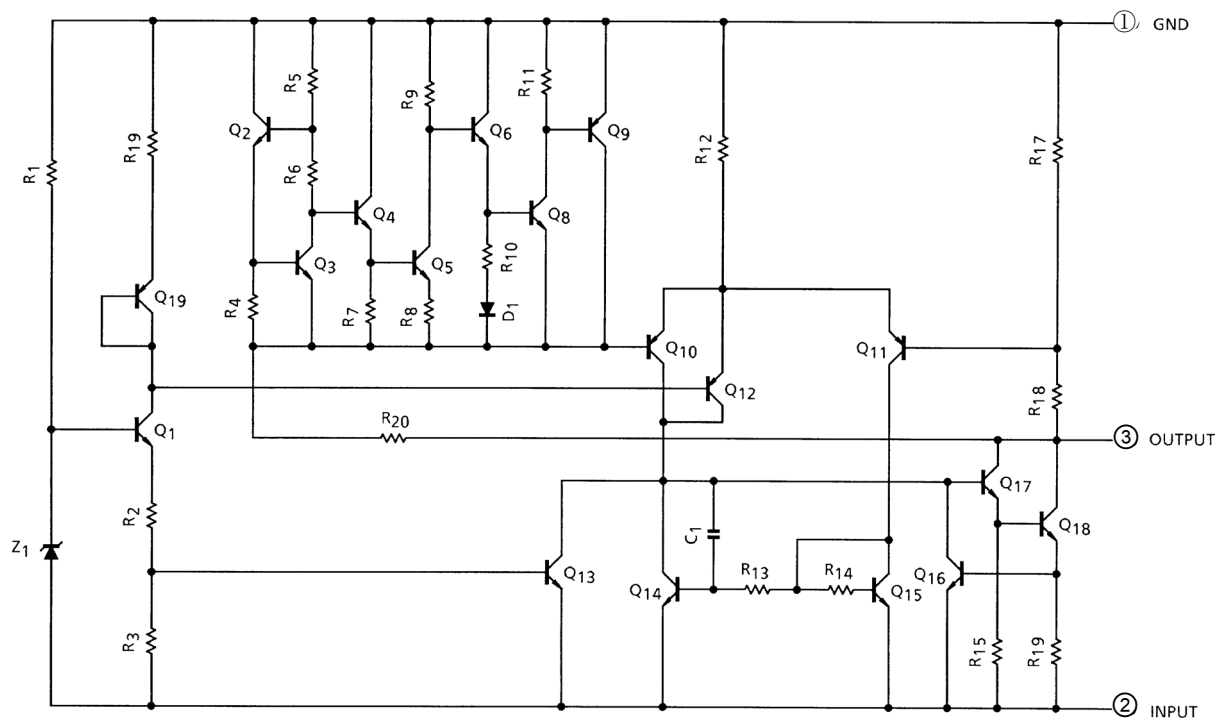
### Marking



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

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 <sub>IN</sub>	-35	V
	TA79L06F			
	TA79L08F			
	TA79L09F			
	TA79L10F			
	TA79L12F			
	TA79L15F			
	TA79L18F			
	TA79L20F			
	TA79L24F		-40	
Output current		I <sub>OUT</sub>	0.15	A
Power dissipation	(Ta = 25°C)	P <sub>D</sub>	500	mW
Operating temperature		T <sub>opr</sub>	-30 to 85	°C
Storage temperature		T <sub>stg</sub>	-55 to 150	°C
Junction temperature		T <sub>j</sub>	150	°C
Thermal resistance		R <sub>th(j-a)</sub>	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,  $V_{IN} = -10\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-5.2	-5.0	-4.8	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-20\text{ V} \leq V_{IN} \leq -7.0\text{ V}$	—	55	150	mV
				$-20\text{ V} \leq V_{IN} \leq -8.0\text{ V}$	—	45	100	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	11	100	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	5.0	50	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-20\text{ V} \leq V_{IN} \leq -7.0\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-5.25	—	-4.75	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-5.25	—	-4.75	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.1	6.0	mA	
			$T_j = 125^\circ\text{C}$	—	—	5.5		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-20\text{ V} \leq V_{IN} \leq -8.0\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	40	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	12	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-18\text{ V} \leq V_{IN} \leq -8.0\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	41	49	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	0.6	—	$\text{mV}/^\circ\text{C}$	

## TA79L06F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -11\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-6.24	-6.0	-5.76	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-21\text{ V} \leq V_{IN} \leq -8.1\text{ V}$	—	50	150	mV
				$-21\text{ V} \leq V_{IN} \leq -9.0\text{ V}$	—	45	110	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	12	120	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	5.5	60	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-21\text{ V} \leq V_{IN} \leq -8.1\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-6.3	—	-5.7	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-6.3	—	-5.7	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.1	6.0	mA	
			$T_j = 125^\circ\text{C}$	—	—	5.5		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-20\text{ V} \leq V_{IN} \leq -9.0\text{ V}$ $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			—	—	0.1	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	40	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	14	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-19\text{ V} \leq V_{IN} \leq -9.0\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	39	47	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	0.7	—	$\text{mV}/^\circ\text{C}$	

## TA79L08F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -14\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-8.3	-8.0	-7.7	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-23\text{ V} \leq V_{IN} \leq -10.5\text{ V}$	—	20	175	mV
				$-23\text{ V} \leq V_{IN} \leq -11\text{ V}$	—	12	125	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	15	155	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	7.0	75	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-23\text{ V} \leq V_{IN} \leq -10.5\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-8.4	—	-7.6	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-8.4	—	-7.6	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.1	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-23\text{ V} \leq V_{IN} \leq -11\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	60	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	20	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-23\text{ V} \leq V_{IN} \leq -12\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	37	45	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	0.8	—	$\text{mV}/^\circ\text{C}$	

## TA79L09F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -15\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-9.36	-9.0	-8.64	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-24\text{ V} \leq V_{IN} \leq -11.4\text{ V}$	—	80	200	mV
				$-24\text{ V} \leq V_{IN} \leq -12\text{ V}$	—	20	160	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	17	175	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	8.0	80	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-24\text{ V} \leq V_{IN} \leq -11.4\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-9.45	—	-8.55	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-9.45	—	-8.55	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.2	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-24\text{ V} \leq V_{IN} \leq -12\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	65	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	21	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-24\text{ V} \leq V_{IN} \leq -12\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	36	44	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	0.85	—	$\text{mV}/^\circ\text{C}$	

## TA79L10F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -16\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-10.4	-10.0	-9.6	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-25\text{ V} \leq V_{IN} \leq -12.5\text{ V}$	—	80	230	mV
				$-25\text{ V} \leq V_{IN} \leq -13\text{ V}$	—	30	170	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	18	190	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	8.5	90	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-25\text{ V} \leq V_{IN} \leq -12.5\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-10.5	—	-9.5	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-10.5	—	-9.5	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.2	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-25\text{ V} \leq V_{IN} \leq -13\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	70	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	22	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-24\text{ V} \leq V_{IN} \leq -13\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	36	43	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	0.9	—	$\text{mV}/^\circ\text{C}$	

## TA79L12F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -19\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-12.5	-12.0	-11.5	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-27\text{ V} \leq V_{IN} \leq -14.5\text{ V}$	—	120	250	mV
				$-27\text{ V} \leq V_{IN} \leq -16\text{ V}$	—	100	200	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	20	225	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	10	105	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-27\text{ V} \leq V_{IN} \leq -14.5\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-12.6	—	-11.4	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-12.6	—	-11.4	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.2	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-27\text{ V} \leq V_{IN} \leq -16\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	80	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	24	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-25\text{ V} \leq V_{IN} \leq -15\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	37	42	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	1.0	—	$\text{mV}/^\circ\text{C}$	

## TA79L15F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -23\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-15.6	-15.0	-14.4	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-30\text{ V} \leq V_{IN} \leq -17.5\text{ V}$	—	130	300	mV
				$-30\text{ V} \leq V_{IN} \leq -20\text{ V}$	—	110	250	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	25	280	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	12	130	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-30\text{ V} \leq V_{IN} \leq -17.5\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-15.75	—	-14.25	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-15.75	—	-14.25	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.3	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-30\text{ V} \leq V_{IN} \leq -20\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	90	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	30	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-28.5\text{ V} \leq V_{IN} \leq -18.5\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	34	39	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	1.3	—	$\text{mV}/^\circ\text{C}$	

## TA79L18F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -27\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-18.7	-18.0	-17.3	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-33\text{ V} \leq V_{IN} \leq -20.7\text{ V}$	—	32	325	mV
				$-33\text{ V} \leq V_{IN} \leq -21\text{ V}$	—	27	275	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	30	335	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	15	155	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-33\text{ V} \leq V_{IN} \leq -20.9\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-18.9	—	-17.1	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-18.9	—	-17.1	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.3	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-33\text{ V} \leq V_{IN} \leq -21\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	150	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	45	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-33\text{ V} \leq V_{IN} \leq -23\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	33	48	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	1.5	—	$\text{mV}/^\circ\text{C}$	

## TA79L20F

### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -29\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

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

## TA79L24F

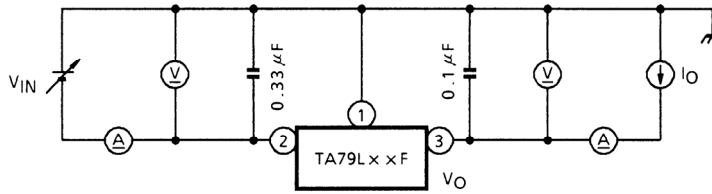
### Electrical Characteristics

(Unless otherwise specified,  $V_{IN} = -33\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	-25.0	-24.0	-23.0	V	
Line regulation	Reg-line	1	$T_j = 25^\circ\text{C}$	$-38\text{ V} \leq V_{IN} \leq -27\text{ V}$	—	35	350	mV
				$-38\text{ V} \leq V_{IN} \leq -28\text{ V}$	—	30	300	
Load regulation	Reg-load	1	$T_j = 25^\circ\text{C}$	$1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$	—	40	440	mV
				$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	20	200	
Output voltage	$V_{OUT}$	1	$T_j = 25^\circ\text{C}$	$-38\text{ V} \leq V_{IN} \leq -27\text{ V}$ , $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	-25.2	—	-22.8	V
				$1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	-25.2	—	-22.8	
Quiescent current	$I_B$	1	$T_j = 25^\circ\text{C}$	—	3.5	6.5	mA	
			$T_j = 125^\circ\text{C}$	—	—	6.0		
Quiescent current change	$\Delta I_B$	1	$T_j = 25^\circ\text{C}$	$-38\text{ V} \leq V_{IN} \leq -28\text{ V}$	—	—	1.5	mA
	$\Delta I_{BO}$	1			$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	—	—	
Output noise voltage	$V_{NO}$	2	$T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$	—	200	—	$\mu\text{V}_{rms}$	
Long term stability	$\Delta V_{OUT}/\Delta t$	1	—	—	56	—	mV/kh	
Ripple rejection ratio	R.R.	3	$-35\text{ V} \leq V_{IN} \leq -29\text{ V}$ , $T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$	31	47	—	dB	
Dropout voltage	$V_D$	1	$T_j = 25^\circ\text{C}$	—	1.7	—	V	
Average temperature coefficient of output voltage	$T_{CVO}$	1	$I_{OUT} = 5\text{ mA}$	—	2.0	—	$\text{mV}/^\circ\text{C}$	

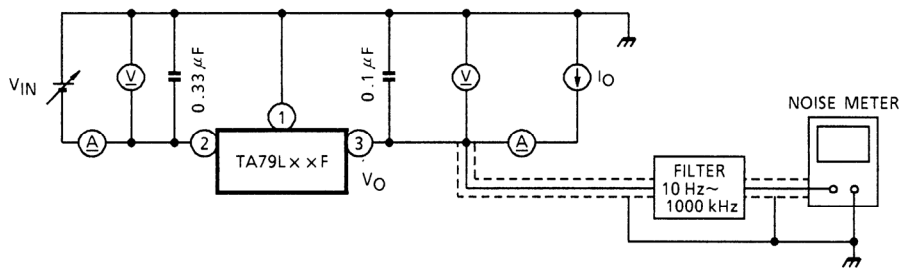
## Test Circuit 1

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



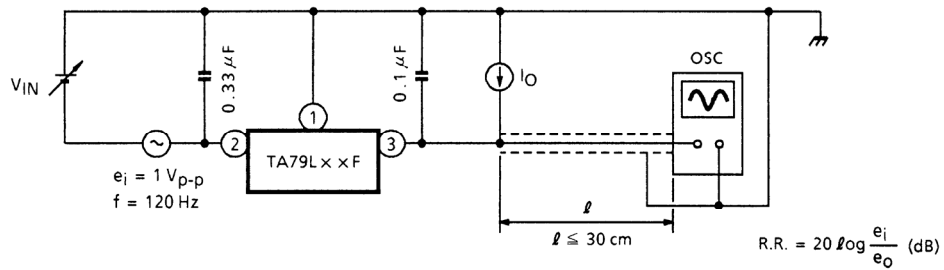
## Test Circuit 2

$V_{NO}$



## Test Circuit 3

R.R.



## Usage Precautions

- Low voltage

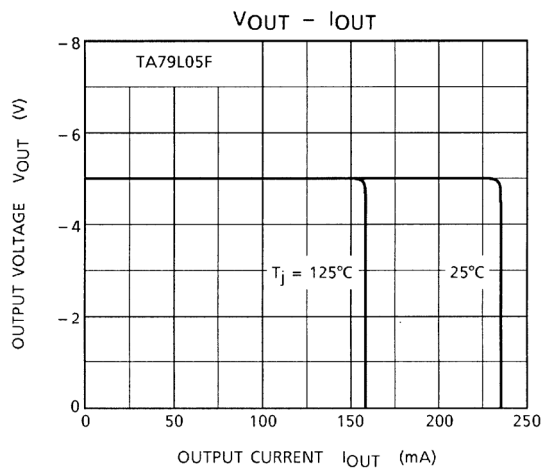
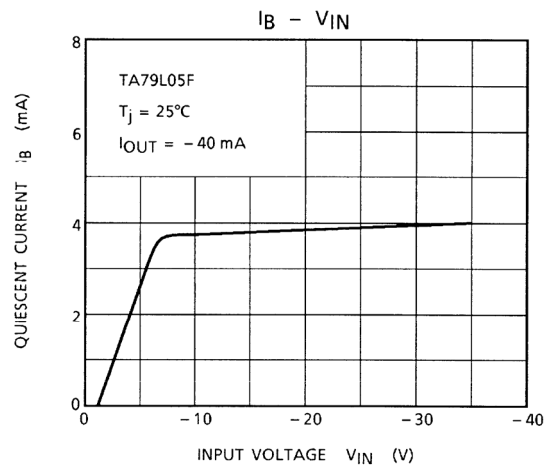
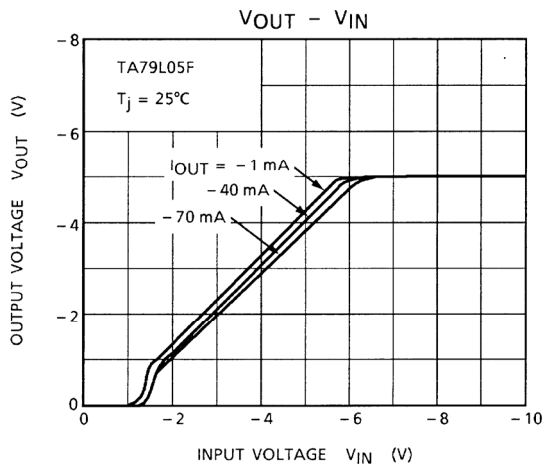
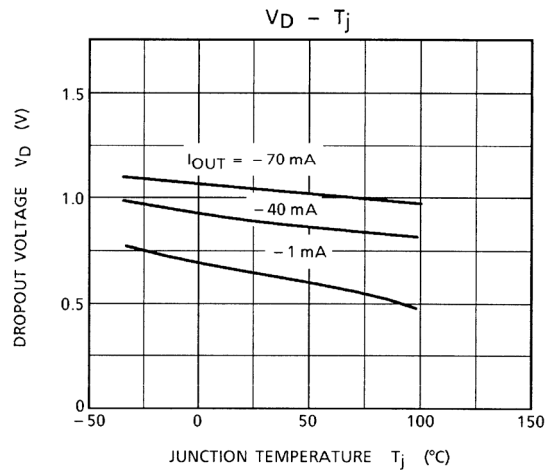
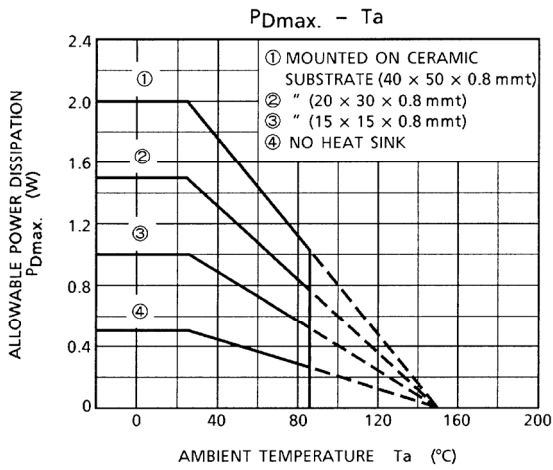
Do not apply voltage to the Product that is lower than the minimum operating voltage, or the Product's protective functions will not operate properly and the Product may be permanently damaged.

- 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

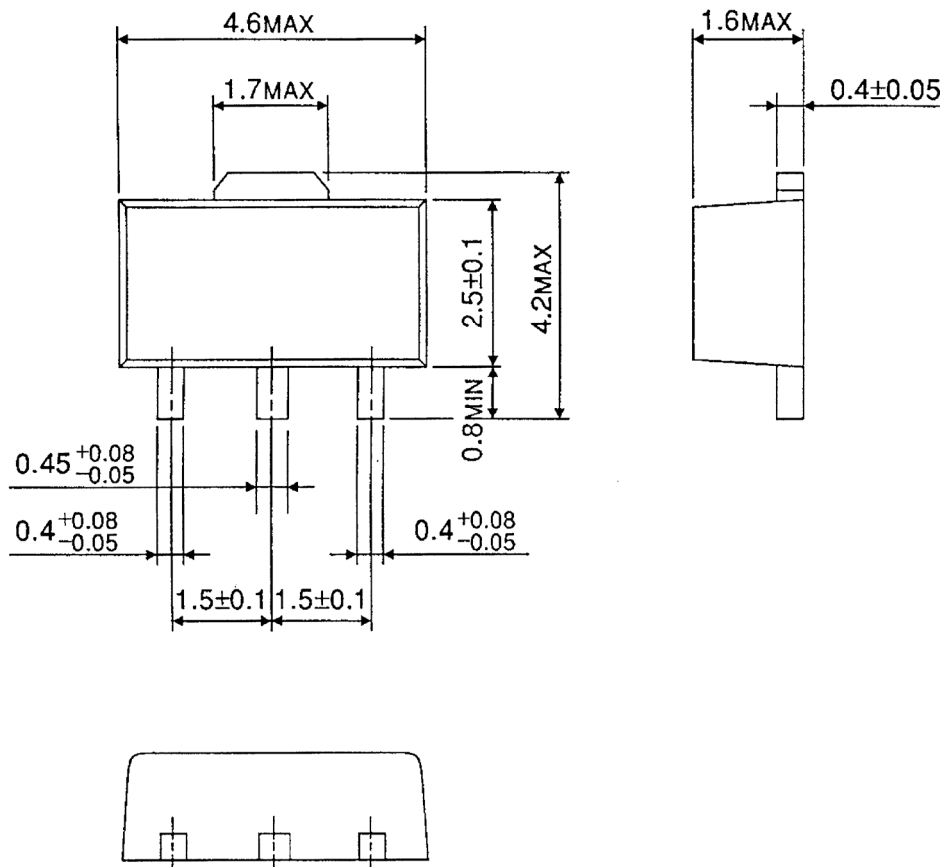
The thermal shutdown circuits in the Product are designed to temporarily protect Product from minor overheating of brief duration. When the overheating protective function in the Product activates, immediately correct the overheating situation. Improper usage of Product, such as the application of heat 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.



## Package Dimensions

HSOP3-P-1.50

Unit : mm



Weight : 0.05 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

20070701-EN GENERAL

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or the third parties.
- Please contact your sales representative for product-by-product details in this document regarding RoHS compatibility. Please use these products in this document in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances. Toshiba assumes no liability for damage or losses occurring as a result of noncompliance with applicable laws and regulations.