

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA48L018F, TA48L02F, TA48L025F, TA48L03F, TA48L033F, TA48L05F

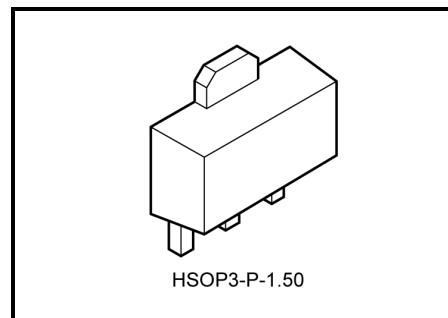
1.8 V, 2 V, 2.5 V, 3 V, 3.3 V, 5 V

Three-Terminal Low Dropout Voltage Regulator with Output Current of 0.15 A

The TA48L**F series consists of fixed-positive-output, low-dropout regulators with an output current of 1 A (max) that utilize V-PNP transistors for the output stage. In response to the need for low-voltage and low-power dissipation devices for use in consumer electronics and industrial appliances, the series offers devices with low output voltages: 1.8 V, 2 V, 2.5 V, 3 V, 3.3 V, 5 V.

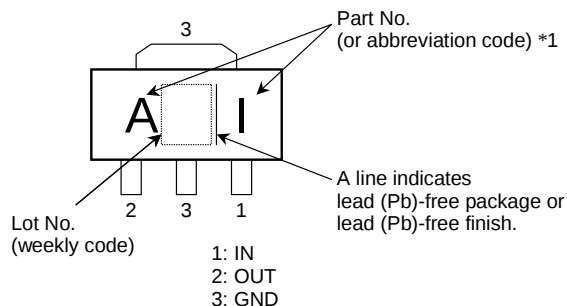
Features

- Maximum output current: 0.15 A
- Output voltage accuracy: $V_{OUT} \pm 3\%$ ($@T_j = 25^\circ\text{C}$)
- Low standby current: 400 μA (typ.) ($@I_{OUT} = 0\text{ A}$)
- Low-dropout voltage: $V_D = 0.5\text{ V}$ (max) ($@I_{OUT} = 100\text{ mA}$)
- Protection function: overheat/overcurrent
- Package type: PW-MINI (SOT-89) package



Weight: 0.05 g (typ.)

Pin Assignment/Marking

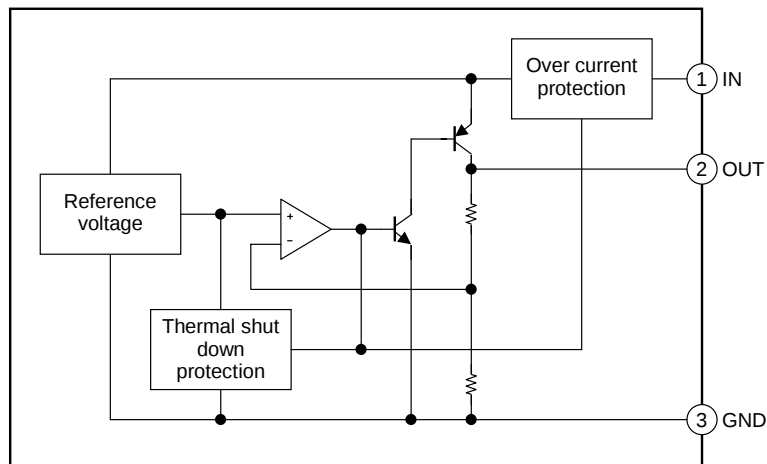


*1	Part No. (or abbreviation code)	Part No.
	AI	TA48L018F
	BI	TA48L02F
	CI	TA48L025F
	DI	TA48L03F
	EI	TA48L033F
	FI	TA48L05F

How to Order

Product No.	Package	Packing Type and Unit for Orders
TA48L**F	PW-MINI (SOT-89)	On cut tape (TE12L): 100/tape section
TA48L**F (TE12L)	Surface-mount package	Embossed tape: 1000 pcs/tape

Block Diagram



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Input voltage	V_{IN}	16	V
Output current	I_{OUT}	0.15	A
Operating temperature	T_{opr}	-40~85	°C
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55~150	°C
Power dissipation	P_D	0.5	W
Thermal resistance (Junction to ambient)	$R_{th(j-a)}$	250	°C/W

Note 1: External current and voltage (including negative voltage) should not be applied to pins not specified.

Protection Function (reference)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Thermal shutdown	$T_{SD} (T_j)$	—	—	160	—	°C
Peak circuit current	I_{PEAK}	$V_{IN} = V_{OUT} + 2 \text{ V}, T_j = 25^\circ\text{C}$	—	0.27	—	A
Short circuit current	I_{SC}	$V_{IN} = V_{OUT} + 2 \text{ V}, T_j = 25^\circ\text{C}$	—	0.27	—	A

Note 2: Note 2: The maximum ratings should not be exceeded when the IC is actually used.

TA48L018F
Electrical Characteristics

 ($C_{IN} = 0.33 \mu F$, $C_{OUT} = 3.3 \mu F$, $T_j = 25^\circ C$, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 3.8 V$, $I_{OUT} = 40 mA$	1.746	1.8	1.854	V
		$2.8 V \leq V_{IN} \leq 12 V$, $5 mA \leq I_{OUT} \leq 100 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	1.71	1.8	1.89	
Line regulation	Reg · line	$2.8 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$	—	2	20	mV
Load regulation	Reg · load	$V_{IN} = 3.8 V$, $5 mA \leq I_{OUT} \leq 150 mA$	—	18	40	mV
Quiescent current	I_B	$2.8 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 0 A$	—	0.4	0.8	mA
		$2.8 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 100 mA$	—	1	5	
Starting quiescent current	I_{Bstart}	$V_{IN} = 2.1 V$, $I_{OUT} = 0 A$	—	0.5	1.5	mA
		$V_{IN} = 2.1 V$, $I_{OUT} = 100 mA$	—	5	20	
Output noise voltage	V_{NO}	$V_{IN} = 3.8 V$, $I_{OUT} = 40 mA$, $10 Hz \leq f \leq 100 kHz$	—	45	—	μV_{rms}
Ripple rejection	R.R.	$2.8 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$, $f = 120 Hz$	54	72	—	dB
Dropout voltage	V_D	$I_{OUT} = 40 mA$	—	0.28	0.4	V
		$I_{OUT} = 100 mA$	—	0.32	0.5	
Average temperature coefficient of output voltage	T_{CVO}	$V_{IN} = 3.8 V$, $I_{OUT} = 5 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	—	0.3	—	$mV/^\circ C$

TA48L02F
Electrical Characteristics

 ($C_{IN} = 0.33 \mu F$, $C_{OUT} = 3.3 \mu F$, $T_j = 25^\circ C$, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 4.0 V$, $I_{OUT} = 40 mA$	1.94	2.0	2.06	V
		$3.0 V \leq V_{IN} \leq 12 V$, $5 mA \leq I_{OUT} \leq 100 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	1.90	2.0	2.10	
Line regulation	Reg · line	$3.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$	—	2	20	mV
Load regulation	Reg · load	$V_{IN} = 4.0 V$, $5 mA \leq I_{OUT} \leq 150 mA$	—	18	40	mV
Quiescent current	I_B	$3.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 0 A$	—	0.4	0.8	mA
		$3.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 100 mA$	—	1	5	
Starting quiescent current	I_{Bstart}	$V_{IN} = 2.1 V$, $I_{OUT} = 0 A$	—	0.5	1.5	mA
		$V_{IN} = 2.1 V$, $I_{OUT} = 100 mA$	—	5	20	
Output noise voltage	V_{NO}	$V_{IN} = 4.0 V$, $I_{OUT} = 40 mA$, $10 Hz \leq f \leq 100 kHz$	—	55	—	μV_{rms}
Ripple rejection	R.R.	$3.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$, $f = 120 Hz$	52	70	—	dB
Dropout voltage	V_D	$I_{OUT} = 40 mA$	—	0.2	0.35	V
		$I_{OUT} = 100 mA$	—	0.3	0.5	
Average temperature coefficient of output voltage	T_{CVO}	$V_{IN} = 4.0 V$, $I_{OUT} = 5 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	—	0.35	—	$mV/^\circ C$

TA48L025F
Electrical Characteristics

 (C_{IN} = 0.33 µF, C_{OUT} = 3.3 µF, T_j = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V _{OUT}	V _{IN} = 4.5 V, I _{OUT} = 40 mA	2.425	2.5	2.575	V
		3.5 V ≤ V _{IN} ≤ 12 V, 5 mA ≤ I _{OUT} ≤ 100 mA, 0°C ≤ T _j ≤ 125°C	2.375	2.5	2.625	
Line regulation	Reg · line	3.5 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 40 mA	—	2	20	mV
Load regulation	Reg · load	V _{IN} = 4.5 V, 5 mA ≤ I _{OUT} ≤ 150 mA	—	18	40	mV
Quiescent current	I _B	3.5 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 0 A	—	0.4	0.8	mA
		3.5 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 100 mA	—	1	5	
Starting quiescent current	I _{Bstart}	V _{IN} = 2.4 V, I _{OUT} = 0 A	—	0.5	1.5	mA
		V _{IN} = 2.4 V, I _{OUT} = 100 mA	—	7	20	
Output noise voltage	V _{NO}	V _{IN} = 4.5 V, I _{OUT} = 40 mA, 10 Hz ≤ f ≤ 100 kHz	—	65	—	µVrms
Ripple rejection	R.R.	3.5 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 40 mA, f = 120 Hz	52	70	—	dB
Dropout voltage	V _D	I _{OUT} = 40 mA	—	0.16	0.35	V
		I _{OUT} = 100 mA	—	0.27	0.5	
Average temperature coefficient of output voltage	T _{CV0}	V _{IN} = 4.5 V, I _{OUT} = 5 mA, 0°C ≤ T _j ≤ 125°C	—	0.45	—	mV/°C

TA48L03F
Electrical Characteristics

 (C_{IN} = 0.33 µF, C_{OUT} = 3.3 µF, T_j = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V _{OUT}	V _{IN} = 5.0 V, I _{OUT} = 40 mA	2.91	3.0	3.09	V
		4.0 V ≤ V _{IN} ≤ 12 V, 5 mA ≤ I _{OUT} ≤ 100 mA, 0°C ≤ T _j ≤ 125°C	2.85	3.0	3.15	
Line regulation	Reg · line	4.0 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 40 mA	—	2	20	mV
Load regulation	Reg · load	V _{IN} = 5.0 V, 5 mA ≤ I _{OUT} ≤ 150 mA	—	18	40	mV
Quiescent current	I _B	4.0 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 0 A	—	0.4	0.8	mA
		4.0 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 100 mA	—	1	5	
Starting quiescent current	I _{Bstart}	V _{IN} = 2.8 V, I _{OUT} = 0 A	—	0.5	1.5	mA
		V _{IN} = 2.8 V, I _{OUT} = 100 mA	—	7	20	
Output noise voltage	V _{NO}	V _{IN} = 5.0 V, I _{OUT} = 40 mA, 10 Hz ≤ f ≤ 100 kHz	—	80	—	µVrms
Ripple rejection	R.R.	4.0 V ≤ V _{IN} ≤ 12 V, I _{OUT} = 40 mA, f = 120 Hz	50	68	—	dB
Dropout voltage	V _D	I _{OUT} = 40 mA	—	0.16	0.35	V
		I _{OUT} = 100 mA	—	0.27	0.5	
Average temperature coefficient of output voltage	T _{CV0}	V _{IN} = 5 V, I _{OUT} = 5 mA, 0°C ≤ T _j ≤ 125°C	—	0.5	—	mV/°C

TA48L033F
Electrical Characteristics

 ($C_{IN} = 0.33 \mu F$, $C_{OUT} = 3.3 \mu F$, $T_j = 25^\circ C$, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 5.3 V$, $I_{OUT} = 40 mA$	3.2	3.3	3.4	V
		$4.3 V \leq V_{IN} \leq 12 V$, $5 mA \leq I_{OUT} \leq 100 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	3.135	3.3	3.465	
Line regulation	Reg · line	$4.3 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$	—	2	20	mV
Load regulation	Reg · load	$V_{IN} = 5.3 V$, $5 mA \leq I_{OUT} \leq 150 mA$	—	18	40	mV
Quiescent current	I_B	$4.3 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 0 A$	—	0.4	0.8	mA
		$4.3 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 100 mA$	—	1	5	
Starting quiescent current	I_{Bstart}	$V_{IN} = 3.0 V$, $I_{OUT} = 0 A$	—	0.5	1.5	mA
		$V_{IN} = 3.0 V$, $I_{OUT} = 100 mA$	—	7	20	
Output noise voltage	V_{NO}	$V_{IN} = 5.3 V$, $I_{OUT} = 40 mA$, $10 Hz \leq f \leq 100 kHz$	—	85	—	μV_{rms}
Ripple rejection	R.R.	$4.3 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$, $f = 120 Hz$	50	68	—	dB
Dropout voltage	V_D	$I_{OUT} = 40 mA$	—	0.16	0.35	V
		$I_{OUT} = 100 mA$	—	0.27	0.5	
Average temperature coefficient of output voltage	T_{CVO}	$V_{IN} = 5.3 V$, $I_{OUT} = 5 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	—	0.55	—	$mV/^\circ C$

TA48L05F
Electrical Characteristics

 ($C_{IN} = 0.33 \mu F$, $C_{OUT} = 3.3 \mu F$, $T_j = 25^\circ C$, unless otherwise specified)

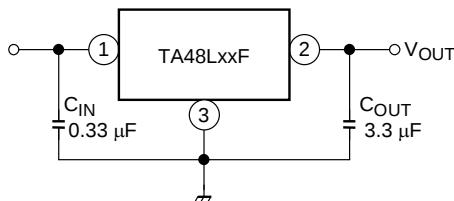
Characteristics	Symbol	Test Conditions	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 7.0 V$, $I_{OUT} = 40 mA$	4.85	5.0	5.15	V
		$6.0 V \leq V_{IN} \leq 12 V$, $5 mA \leq I_{OUT} \leq 100 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	4.75	5.0	5.25	
Line regulation	Reg · line	$6.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$	—	2	20	mV
Load regulation	Reg · load	$V_{IN} = 7.0 V$, $5 mA \leq I_{OUT} \leq 150 mA$	—	18	45	mV
Quiescent current	I_B	$6.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 0 A$	—	0.4	0.8	mA
		$6.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 100 mA$	—	1	5	
Starting quiescent current	I_{Bstart}	$V_{IN} = 4.5V$, $I_{OUT} = 0 A$	—	0.5	1.5	mA
		$V_{IN} = 4.5 V$, $I_{OUT} = 100 mA$	—	7	20	
Output noise voltage	V_{NO}	$V_{IN} = 7.0V$, $I_{OUT} = 40 mA$, $10 Hz \leq f \leq 100 kHz$	—	135	—	μV_{rms}
Ripple rejection	R.R.	$6.0 V \leq V_{IN} \leq 12 V$, $I_{OUT} = 40 mA$, $f = 120 Hz$	50	64	—	dB
Dropout voltage	V_D	$I_{OUT} = 40 mA$	—	0.16	0.35	V
		$I_{OUT} = 100 mA$	—	0.27	0.5	
Average temperature coefficient of output voltage	T_{CVO}	$V_{IN} = 7.0 V$, $I_{OUT} = 5 mA$, $0^\circ C \leq T_j \leq 125^\circ C$	—	0.85	—	$mV/^\circ C$

Electrical Characteristics for All Products

Generally, the characteristics of power supply ICs change according to temperature fluctuations.

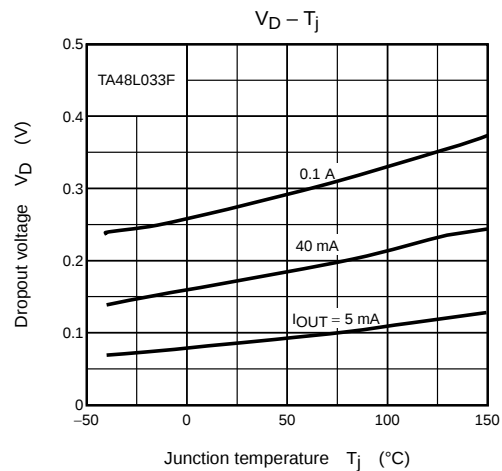
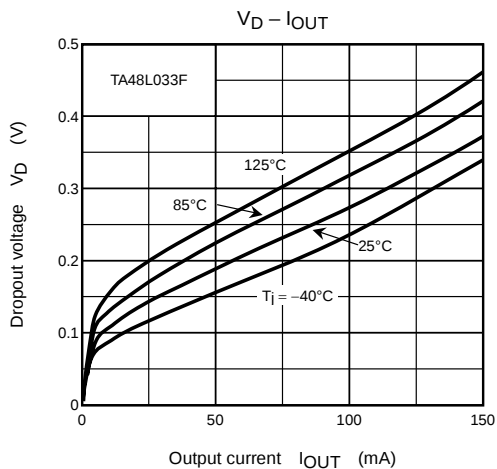
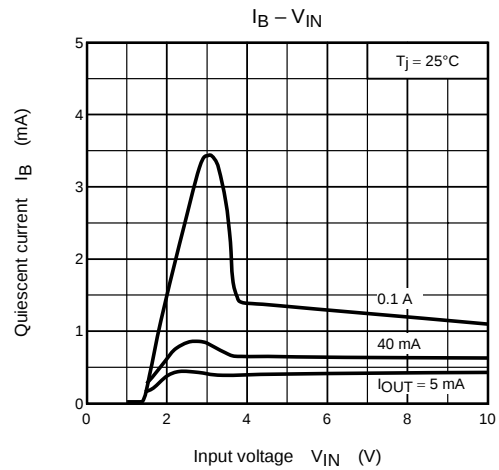
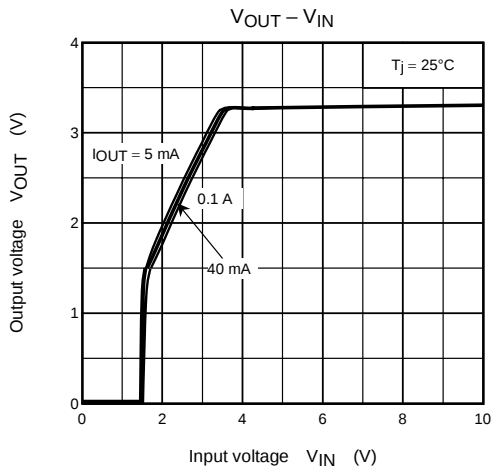
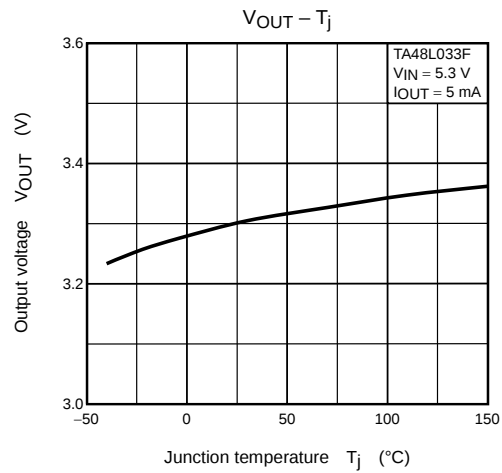
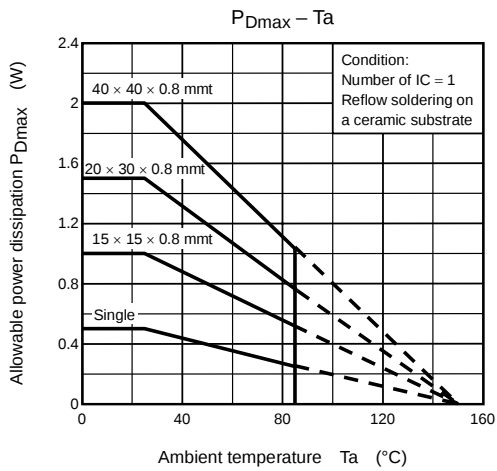
The specification $T_j = 25^\circ\text{C}$ is based on a state where temperature increase has no effect (assuming no fluctuation in the characteristics) as ascertained by pulse tests.

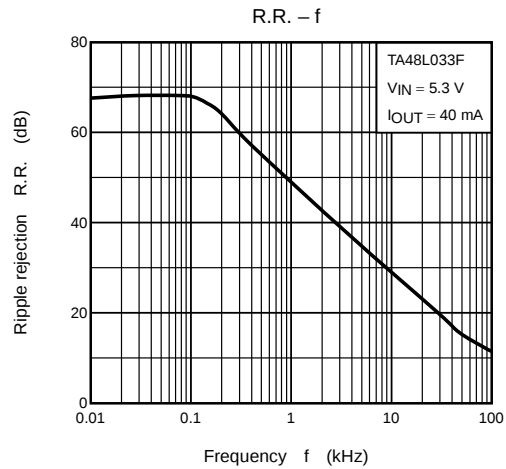
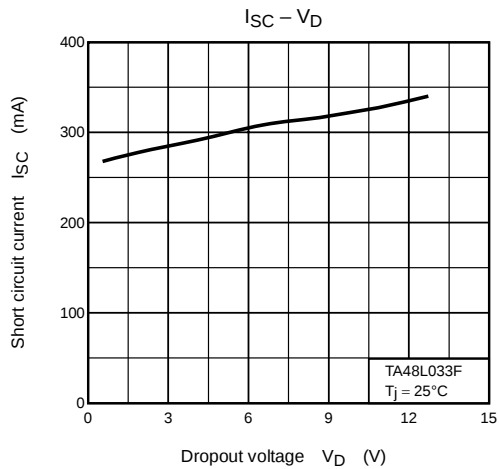
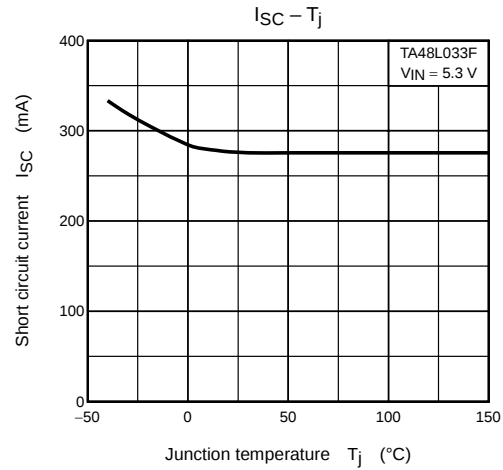
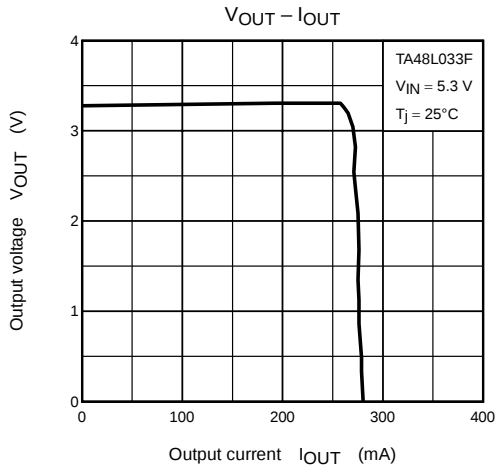
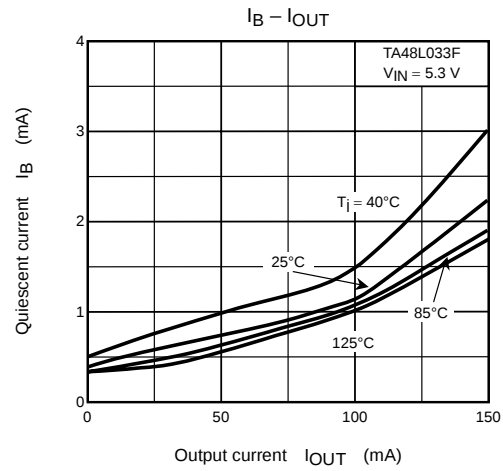
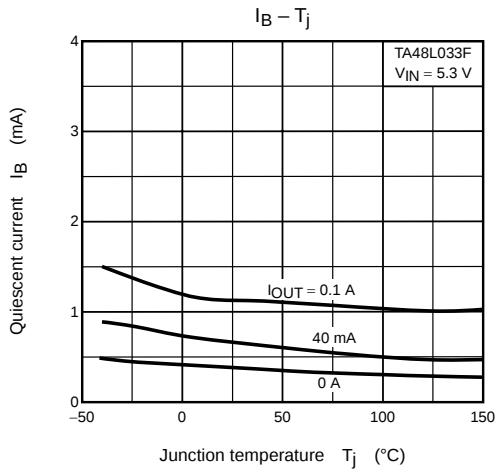
Standard Application Circuit



Be sure to connect a capacitor near the input terminal and output terminal between both terminals and GND.

The capacitances should be determined experimentally. In particular, adequate investigation should be made so that there is no problem even in high or low temperatures.

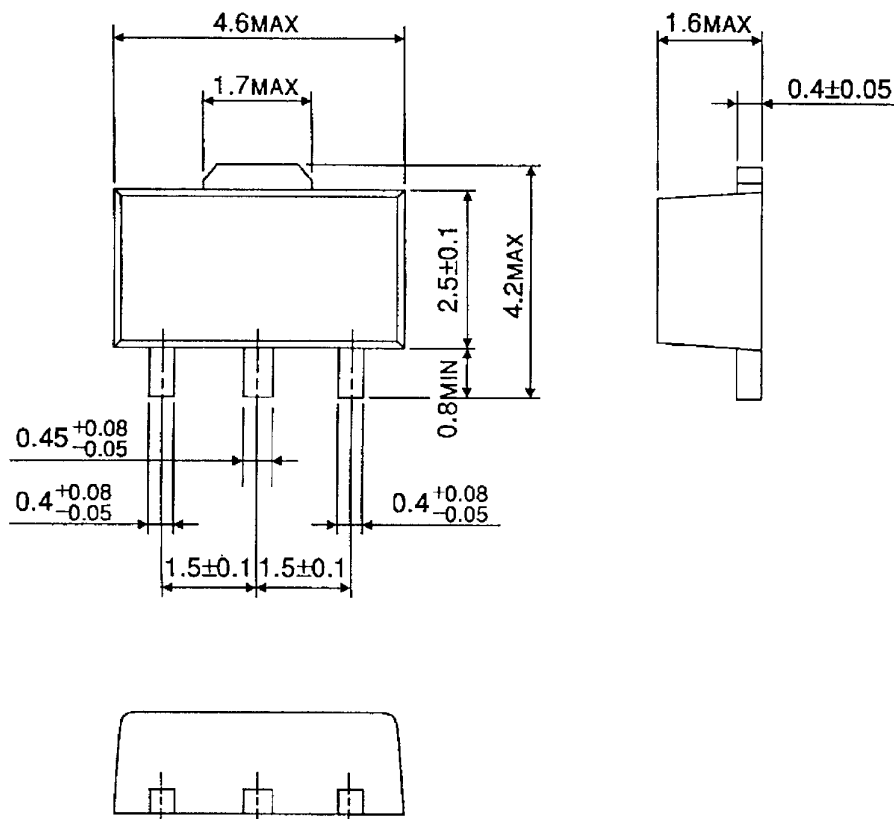




Package Dimensions

HSOP3-P-1.50

Unit : mm



Weight: 0.05 g (typ.)

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