

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA58L05S, TA58L06S, TA58L08S, TA58L09S TA58L10S, TA58L12S, TA58L15S

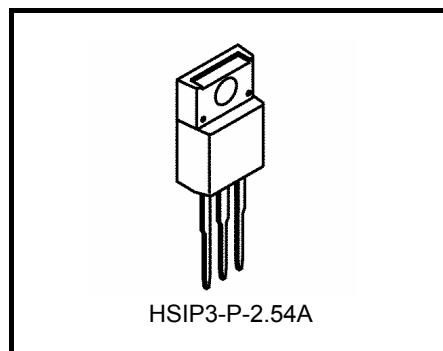
250 mA Low Dropout Voltage Regulator

The TA58L**S Series consists of fixed-positive-output, low-dropout regulators with an output current of 250 mA (max) that utilize PNP transistors for the output stage. Low dropout voltage and standby current make the TA58L**S Series suitable for applications requiring low power consumption.

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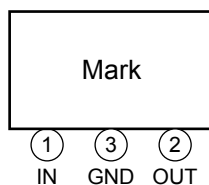
Features

- Maximum output current : 250 mA
- Output voltage : 5/ 6/ 8/ 9/ 10/ 12/ 15 V
- Output voltage accuracy : $V_{OUT} \pm 3\%$ (@ $T_j = 25^\circ\text{C}$)
- Low-dropout voltage : 0.4 V (Max) (@ $I_{OUT} = 200\text{mA}$)
- Protection function : Over current protection/ thermal shutdown/
Reverse connection of power supply / 60 V load dump
- Package type : TO-220NIS

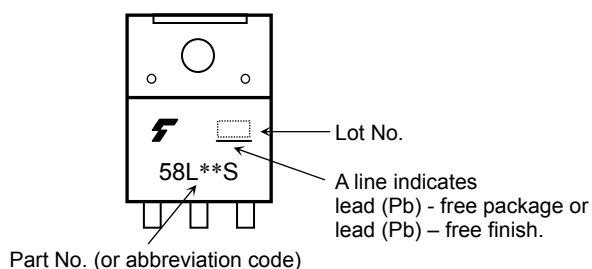


Weight : 1.7 g (Typ.)

Pin Assignment



Marking



Note 1: The “**” in each product name is replaced with the output voltage of each product.

Pin Description

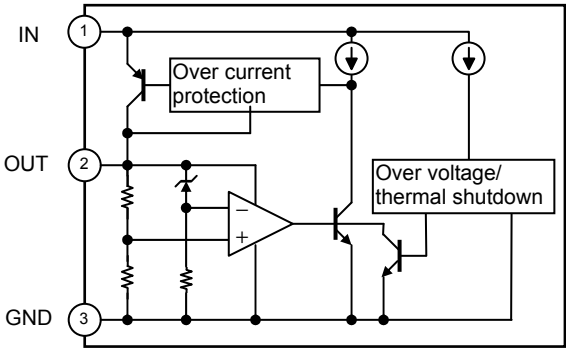
Pin No.	Symbol	Description
1	IN	Input terminal. Connected by capacitor (C_{IN}) to GND.
3	GND	Ground terminal
2	OUT	Output terminal. Connected by capacitor (C_{OUT}) to GND.

How to Order

Product No.	Package	Package Type and Capacity
TA58L**S(Q) (Note2)	TO-220NIS	Loose in bag: 50 (1 bag)

Note 2: The “**” in each product number is replaced with the output voltage of each product.

Block Diagram



Absolute Maximum Rating (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Input voltage	DC	V _{IN} (DC)	29	V
	Pulse	V _{IN} (Pulse)	60(τ =200ms)	V
Output current		I _{OUT}	250	mA
Operating temperature		T _{opr}	−40~105	°C
Junction temperature		T _j	150	°C
Storage temperature		T _{stg}	−55~150	°C
Power dissipation	Ta = 25°C	P _D	2	W
	Tc= 25°C		20	

Note 3: Do not apply current and voltage (including reverse polarity) to any pin that is not specified.

Note 4: 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).

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal resistance, junction to ambient	R _{th} (j-a)	62.5	°C/ W
Thermal resistance, junction to case	R _{th} (j-c)	6.25	°C/ W

Protection Function (Reference)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Thermal shutdown	T _{SD}	V _{IN} = 14 V (05~06S)/ 16 V (08~10S)/ 18 V (12S)/ 20 V (15S)	—	170	—	°C
Peak circuit current	I _{PEAK}	V _{IN} = 14 V (05~06S)/ 16 V (08~10S)/ 18 V (12S)/ 20 V (15S), T _j = 25°C	—	600	—	mA
Short circuit current	I _{SC}	V _{IN} = 14 V (05~06S)/ 16 V (08~10S)/ 18 V (12S)/ 20 V (15S), T _j = 25°C	—	330	—	mA
Overvoltage protection	V _{IN}	T _j = 25°C	29	33	—	V

Note4: Ensure that the devices operate within the limits of the maximum rating when in actual use.

Note5: When the input voltage exceeds 29 V, the overvoltage protection circuit is activated to turn off the output voltage.

TA58L05S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 14\text{ V}, I_{OUT} = 10\text{ mA}$	4.85	5.00	5.15	V
		$5.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	4.8	5.0	5.2	
Line regulation	Reg·line	$9\text{ V} \leq V_{IN} \leq 16\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	10	mV
		$5.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	15	
Load regulation	Reg·load	$V_{IN} = 14\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	10	30	mV
Quiescent current	I_B	$6\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.45	1.00	mA
		$6\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L06S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 14\text{ V}, I_{OUT} = 10\text{ mA}$	5.82	6.00	6.18	V
		$6.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	5.76	6.00	6.24	
Line regulation	Reg·line	$10\text{ V} \leq V_{IN} \leq 17\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	10	mV
		$6.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	15	
Load regulation	Reg·load	$V_{IN} = 14\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	10	30	mV
Quiescent current	I_B	$7\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.5	1.0	mA
		$7\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L08S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 16\text{ V}, I_{OUT} = 10\text{ mA}$	7.76	8.00	8.24	V
		$8.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	7.68	8.00	8.32	
Line regulation	Reg·line	$12\text{ V} \leq V_{IN} \leq 19\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	10	mV
		$8.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	15	
Load regulation	Reg·load	$V_{IN} = 16\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	10	40	mV
Quiescent current	I_B	$9\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.55	1.00	mA
		$9\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L09S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 16\text{ V}, I_{OUT} = 10\text{ mA}$	8.73	9.00	9.27	V
		$9.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	8.64	9.00	9.36	
Line regulation	Reg·line	$13\text{ V} \leq V_{IN} \leq 20\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	12	mV
		$9.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	20	
Load regulation	Reg·load	$V_{IN} = 16\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	12	40	mV
Quiescent current	I_B	$10\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.6	1.0	mA
		$10\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L10S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 16\text{ V}, I_{OUT} = 10\text{ mA}$	9.7	10.0	10.3	V
		$10.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	9.6	10.0	10.4	
Line regulation	Reg·line	$14\text{ V} \leq V_{IN} \leq 21\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	12	mV
		$10.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	20	
Load regulation	Reg·load	$V_{IN} = 16\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	12	40	mV
Quiescent current	I_B	$11\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.6	1.2	mA
		$11\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L12S

Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 18\text{ V}, I_{OUT} = 10\text{ mA}$	11.64	12.00	12.36	V
		$12.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	11.52	12.00	12.48	
Line regulation	Reg·line	$16\text{ V} \leq V_{IN} \leq 23\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	12	mV
		$12.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	20	
Load regulation	Reg·load	$V_{IN} = 18\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	20	50	mV
Quiescent current	I_B	$13\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.65	1.20	mA
		$13\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

TA58L15S

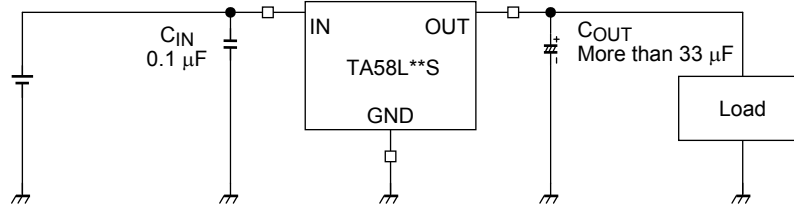
Electrical Characteristics (unless otherwise specified, $T_j = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN} = 20\text{ V}, I_{OUT} = 10\text{ mA}$	14.55	15.00	15.45	V
		$15.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}, -40^\circ\text{C} \leq T_a \leq 105^\circ\text{C}$	14.4	15.0	15.6	
Line regulation	Reg·line	$19\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	1	12	mV
		$15.35\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 10\text{ mA}$	—	2	20	
Load regulation	Reg·load	$V_{IN} = 20\text{ V}, 10\text{ mA} \leq I_{OUT} \leq 250\text{ mA}$	—	20	60	mV
Quiescent current	I_B	$16\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 0\text{ A}$	—	0.75	1.40	mA
		$16\text{ V} \leq V_{IN} \leq 26\text{ V}, I_{OUT} = 250\text{ mA}$	—	25	50	
Dropout voltage	V_D	$I_{OUT} = 50\text{ mA}$	—	0.08	0.20	V
		$I_{OUT} = 200\text{ mA}$	—	0.22	0.40	

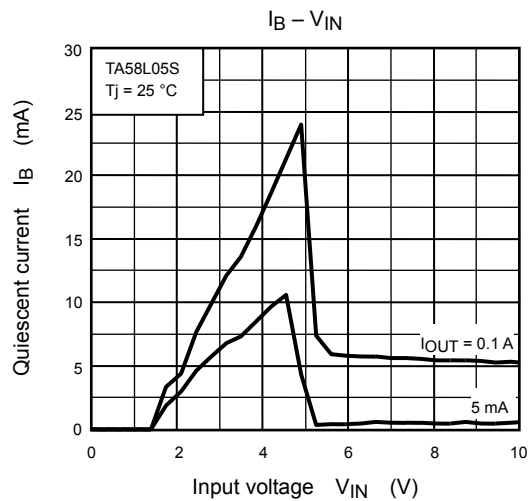
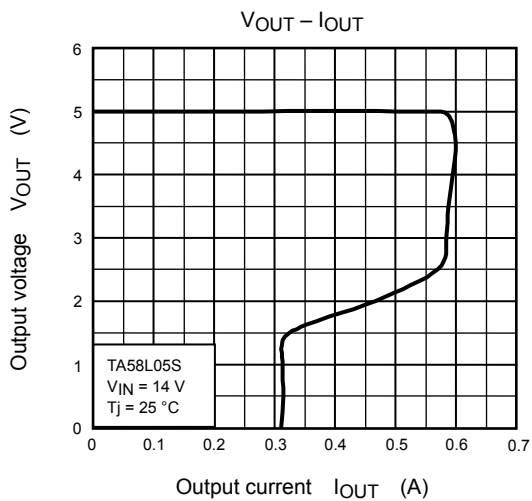
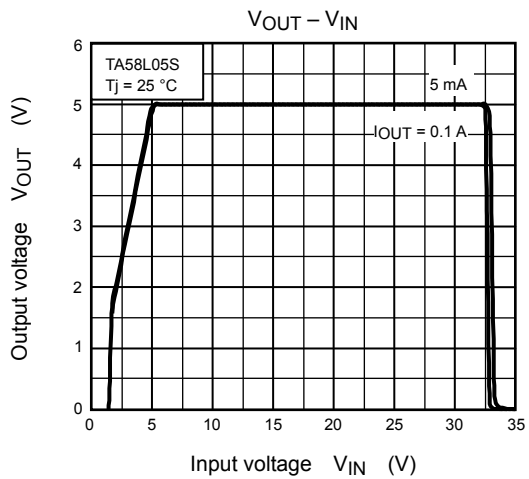
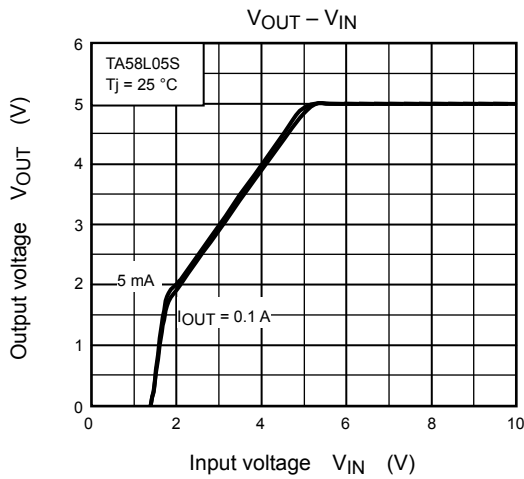
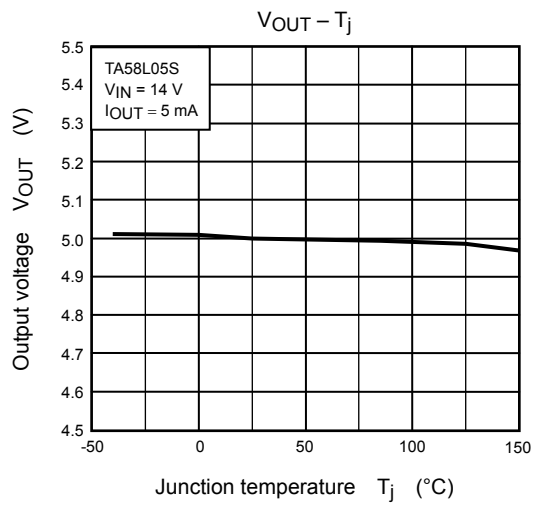
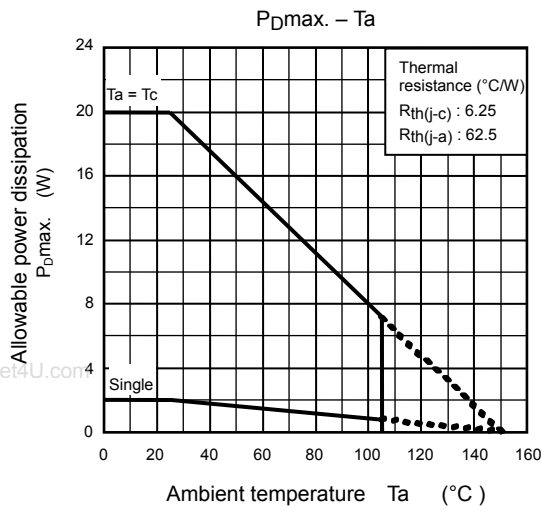
Electrical Characteristics Common to All Products

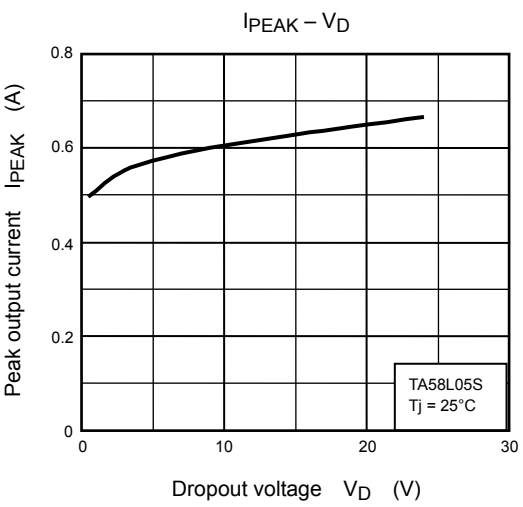
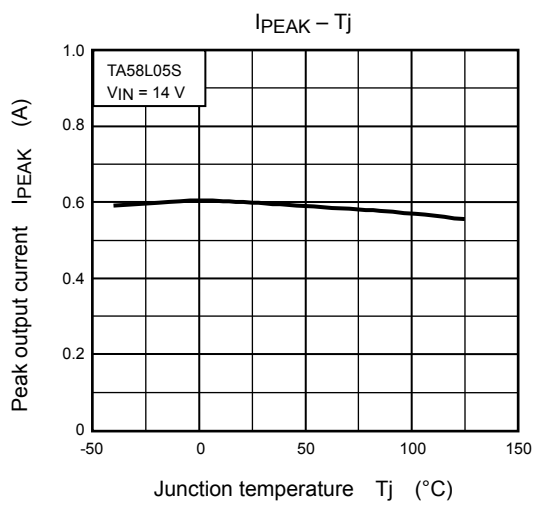
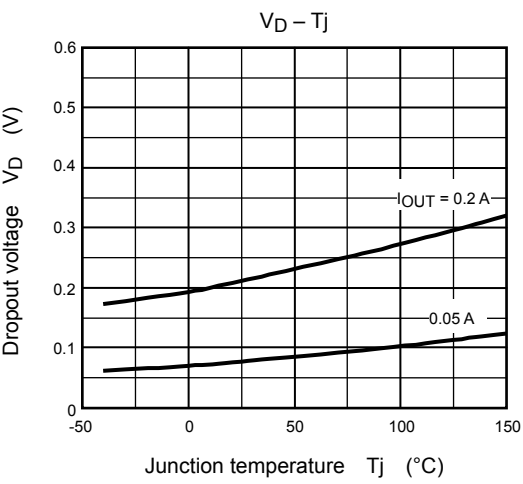
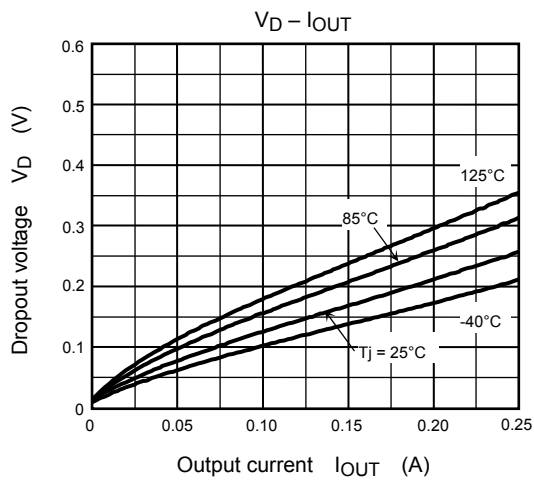
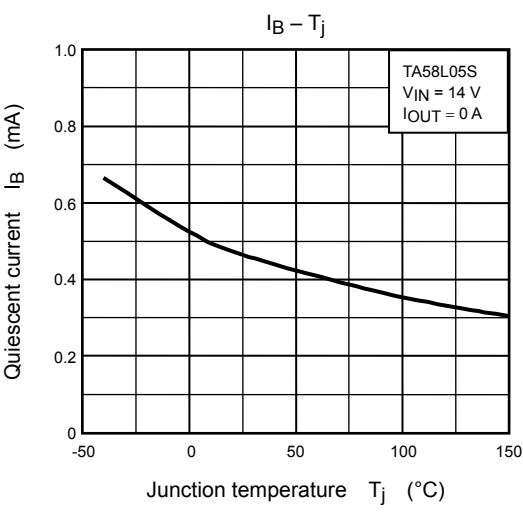
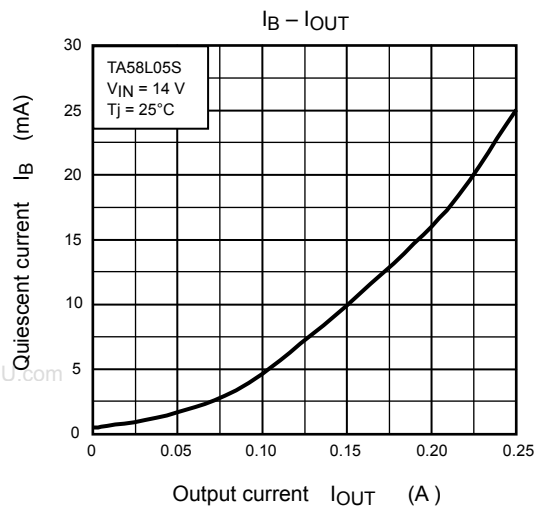
- $T_j = 25^\circ\text{C}$ in the measurement conditions of each item is the standard condition when a pulse test is carried out, and any drift in the electrical characteristic due to a rise in the junction temperature of the chip may be disregarded.

Standard Application Circuit



- Place C_{IN} as close as possible to the input terminal and GND. Place C_{OUT} as close as possible to the output terminal and GND. Although capacitor C_{OUT} acts to smooth the dc output voltage during suspension of output oscillation or load change, it might cause output oscillation in a cold environment due to increased capacitor ESR. It is therefore recommended to use a capacitor with small variations temperature sensitivity. Also, ensure that the regulator performance is satisfactory over the operating temperature range of the target system..

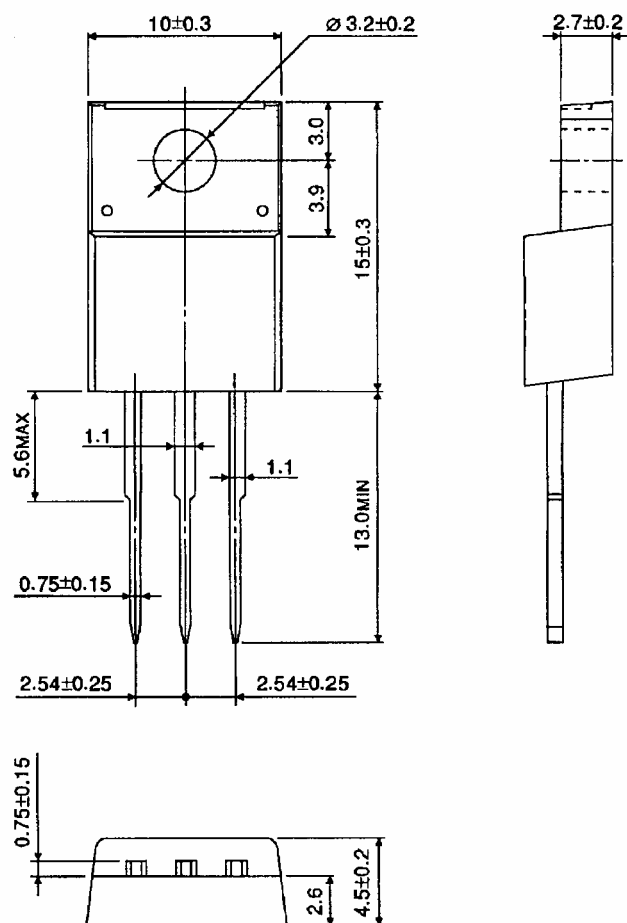




Package Dimensions

HSIP3-P-2.54A

Unit : mm



Weight: 1.7 g (Typ.)

RESTRICTIONS ON PRODUCT USE

20070701-EN

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