

LR8558

Low noise, fast response 500mA LDO regulator

Features:

- Low Power Consumption: 75uA (Typ.)
- Low output noise (47uVRMS)
- Standby Mode: 0.1uA
- Low dropout Voltage: 0.46V@500mA (Typ.)
- High Ripple Rejection: 66dB@100Hz (Typ.)
- Low Temperature Coefficient: $\pm 100\text{ppm}/^{\circ}\text{C}$
- Excellent Line regulation: 0.05%/V
- Build-in chip enable and discharge circuit
- Output Voltage Range: 1.2V~4.5V (customized on command every 0.1V step)
- Highly Accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Output Current Limit

Applications:

- Power source for cellular phones and various kind of PCs
- Battery Powered equipment
- Power Management of MP3, PDA, DSC, Mouse, PS2 Games
- Reference Voltage Source
- Regulation after Switching Power

General Description:

LR8558 series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

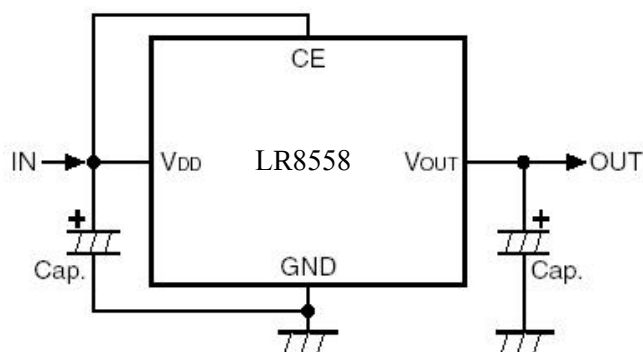
LR8558 can provide output value in the range of 1.2V~4.5V every 0.1V step. It also can be customized on command.

LR8558 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module with discharge capability.

LR8558 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

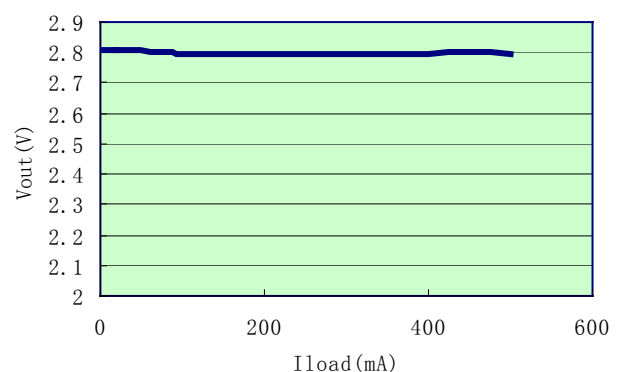
LR8558 is available in SOT-23-5, SC-82 packages which is lead free. It also can be available in these packages with lead.

LR8558 Typical Application Circuit



LR8558 Typical Performance Characteristics:

LR8558-2.8V Output



Selection Guide:

LR8558-XX X X

Package Type:

SA: SOT-89-3

SB: SOT-89-3

RM: SOT-23-3

RN: SOT-23-5

T: TO-92

Features:

P: Standard (default, lead free)

C: Customized

Output Voltage:

12.....1.2V

15.....1.5V

28.....2.8V

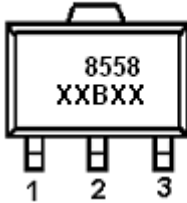
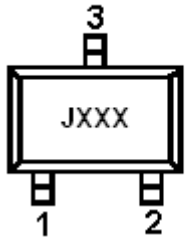
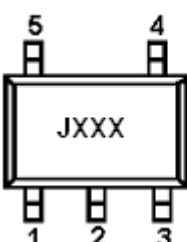
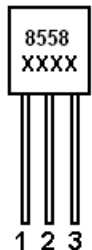
30.....3.0V

35.....3.5V

.....

45.....4.5V

Pin Assignment:

LR8558-XXPSA	SOT-89-3  1 Vout 2 Vss 3 Vin	LR8558-XXPSB	SOT-89-3  1 Vss 2 Vin 3 Vout
LR8558-XXPRM	SOT-23-3  1 Vss 2 Vout 3 Vin	LR8558-XXPRN	SOT-23-5  1.Vin 2.Vss 3.CE 4.NC 5.Vout
LR8558-XXPT	TO-92  1 Vin 2 Vss 3 Vout		

Pin Description:

Pin Number					Symbol	Function
SOT-89-3 (A)	SOT-89-3 (B)	SOT-23-5	SOT-23-3	TO-92		
1	3	5	2	3	Vout	Output pin
3	2	1	3	1	Vin	Input Pin
2	1	2	1	2	Vss	Ground Pin
		3			CE	Chip Enable Pin
		4			NC	No Connection

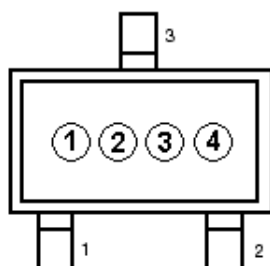
Product Classification:

Output Voltage	Package Type	Product Name	Package Type	Product Name	Package Type	Product Name
1.2V	SOT-89-3A	LR8558-12PSA	SOT-89-3B	LR8558-12PSB	SOT-23-5	LR8558-12PRN
1.5V	SOT-89-3A	LR8558-15PSA	SOT-89-3B	LR8558-15PSB	SOT-23-5	LR8558-15PRN
1.8V	SOT-89-3A	LR8558-18PSA	SOT-89-3B	LR8558-18PSB	SOT-23-5	LR8558-18PRN
2.1V	SOT-89-3A	LR8558-21PSA	SOT-89-3B	LR8558-21PSB	SOT-23-5	LR8558-21PRN
2.5V	SOT-89-3A	LR8558-25PSA	SOT-89-3B	LR8558-25PSB	SOT-23-5	LR8558-25PRN
2.8V	SOT-89-3A	LR8558-28PSA	SOT-89-3B	LR8558-28PSB	SOT-23-5	LR8558-28PRN
3.0V	SOT-89-3A	LR8558-30PSA	SOT-89-3B	LR8558-30PSB	SOT-23-5	LR8558-30PRN
3.2V	SOT-89-3A	LR8558-32PSA	SOT-89-3B	LR8558-32PSB	SOT-23-5	LR8558-32PRN
3.3V	SOT-89-3A	LR8558-33PSA	SOT-89-3B	LR8558-33PSB	SOT-23-5	LR8558-33PRN
3.5V	SOT-89-3A	LR8558-35PSA	SOT-89-3B	LR8558-35PSB	SOT-23-5	LR8558-35PRN
⋮	⋮	⋮	⋮	⋮	⋮	⋮
4.5V	SOT-89-3A	LR8558-45PSA	SOT-89-3B	LR8558-45PSB	SOT-23-5	LR8558-45PRN

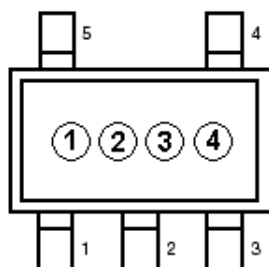
Output Voltage	Package Type	Product Name	Package Type	Product Name
1.2V	SOT-23-3	LR8558-12PRM	TO-92	LR8558-12PT
1.5V	SOT-23-3	LR8558-15PRM	TO-92	LR8558-15PT
1.8V	SOT-23-3	LR8558-18PRM	TO-92	LR8558-18PT
2.1V	SOT-23-3	LR8558-21PRM	TO-92	LR8558-21PT
2.5V	SOT-23-3	LR8558-25PRM	TO-92	LR8558-25PT
2.8V	SOT-23-3	LR8558-28PRM	TO-92	LR8558-28PT
3.0V	SOT-23-3	LR8558-30PRM	TO-92	LR8558-30PT
3.2V	SOT-23-3	LR8558-32PRM	TO-92	LR8558-32PT
3.3V	SOT-23-3	LR8558-33PRM	TO-92	LR8558-33PT
3.5V	SOT-23-3	LR8558-35PRM	TO-92	LR8558-35PT
⋮	⋮	⋮	⋮	⋮
4.5V	SOT-23-3	LR8558-45PRM	TO-92	LR8558-45PT

Product Marking information:

SOT-23-3



SOT23-5



- ① : Output current & EN availability
- ② : Output voltage
- ③ : Year of manufacturing
- ④ : Week of manufacturing

① LR8558 with output current 500mA, SOT-23-3 & SOT-23-5 package, its position ① is J

②

Code	Vout	Code	Vout	Code	Vout
2	1.2V	7	2.7V	2	4.2V
3	1.3V	8	2.8V	3	4.3V
4	1.4V	9	2.9V	4	4.4V
5	1.5V	0	3.0V	5	4.5V
6	1.6V	1	3.1V		
7	1.7V	2	3.2V		
8	1.8V	3	3.3V		
9	1.9V	4	3.4V		
0	2.0V	5	3.5V		
1	2.1V	6	3.6V		
2	2.12V	7	3.7V		
3	2.3V	8	3.8V		
4	2.4V	9	3.9V		
5	2.5V	0	4.0V		
6	2.6V	1	4.1V		

③ The year of manufacturing. "5" stands for year 2005, "6" stands for year 2006, and "0" for year 2010.

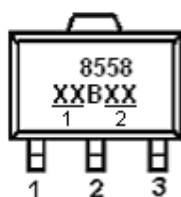
④

Code	Week of Mfg	Code	Week of Mfg	Code	Week of Mfg	Code	Week of Mfg	Code	Week of Mfg
A	1	L	12	W	23	H	34	S	45
B	2	M	13	X	24	T	35	T	46
C	3	N	14	Y	25	J	36	U	47
D	4	O	15	Z	26	K	37	V	48
E	5	P	16	A	27	L	38	W	49
F	6	Q	17	B	28	M	39	X	50
G	7	R	18	C	29	N	40	Y	51
H	8	S	19	D	30	O	41	Z	52
I	9	T	20	E	31	P	42		
J	10	U	21	F	32	Q	43		
K	11	V	22	G	33	R	44		

SOT-89-3(A)



SOT-89-3(B)

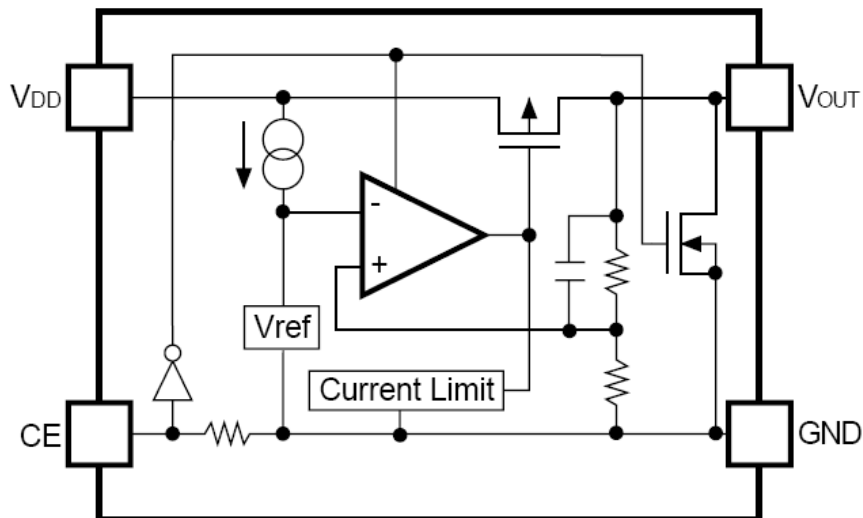


TO-92



- 1: Output voltage
- 2.: Lot NO.

Block Diagram:



Absolute Maximum Ratings:

Max input voltage	10V
Junction Temperature (T _J)	125°C
Output Current	500mA
Power Dissipation	
SOT-23-5	250mW
SOT-23-3	200mW
SOT-89-3	500mW
TO-92	350mW
Storage Temperature (T _S)	-45°C~150°C

Recommended Work Conditions:

Item	Min	Recommended	Max	unit
Input Voltage Range			8	V
Ambient Temperature	-40		85	°C

Electrical Characteristics:

(Test Conditions: C_{in}=1uF, C_{out}=3.4uF, T_A=25°C, unless otherwise specified.)

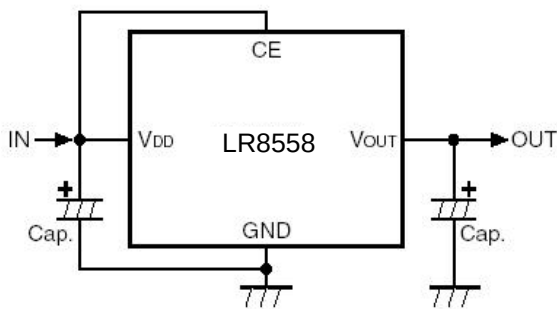
LR8558, for arbitrary output voltage

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V _{in}	Input Voltage				8	V
V _{out}	Output Voltage	V _{in} =Set V _{out} +1V 1mA≤I _{out} ≤30mA	V _{out} x0.98	V _{out} 1	V _{out} X1.02	V
I _{out} (Max.)	Maximun Output Current	V _{in} -V _{out} =1V	500			mA

Vdrop ¹	Dropout Voltage, Vout≥2.8V	Iout=100mA		88	120	mV
		Iout=300mA		270	350	mV
		Iout=500mA		460	600	mV
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation	Iout=40mA 2.8V≤Vin≤8V		0.05	0.2	%/V
$\Delta V_{out} / \Delta I_{out}$	Load Regulation	Vin=Set Vout+1V 1mA≤Iout≤500mA		20	40	mV
Iss	Supply Current	Vin=Set Vout+1V		75	90	uA
Istandby	Supply Current (Srandby)	Vin=Set Vout+1V Vce=GND		0.1	1.0	uA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficiency	Iout=30mA		± 100		ppm/°C
PSRR	Ripple Rejection	F=100Hz, Ripple=0.5Vp-p Vin=Set Vout+1V		65		dB
Ilim	Short Current Limit	Vout=0V		200		mA
Rpd	CE Pull down Resistance		2.0	5.0	10.0	MΩ
Vceh	CE Input Voltage “H”		1.5		Vin	V
Vcel	CE Input Voltage “L”		0		0.25	V
en	Output Noise	BW=10Hz~100kHz		47		uVrms

1. $V_{drop} = V_{in1} - (V_{out2} \cdot 0.98)$ Vout2 is the output voltage when $V_{in} = V_{out1} + 1.0V$ and $I_{out} = 300mA$ or $I_{out} = 500mA$.
Vin1 is the input voltage at which the output voltage becomes 98% of Vout1 after gradually decreasing the input voltage.

Typical Application Circuit:



Application hints:

NOTE1: Input capacitor (Cin=1uF) is recommended in all application circuit.

NOTE2: Output capacitor (Cout=3.3uF/4.7uF) is recommended in all application to assure the stability of circuit.

Explanation:

LR8558 series is a group of positive voltage output, low noise, low power consumption, low dropout voltage regulator.

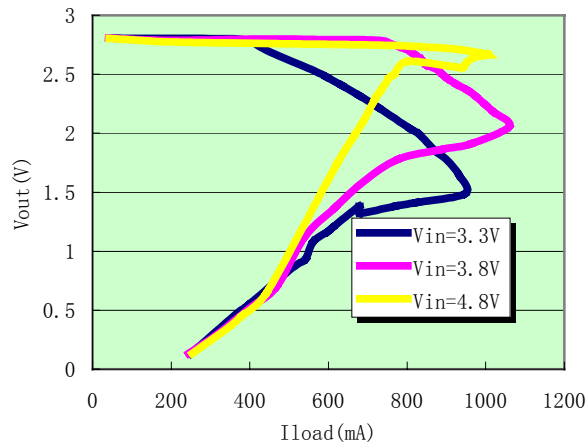
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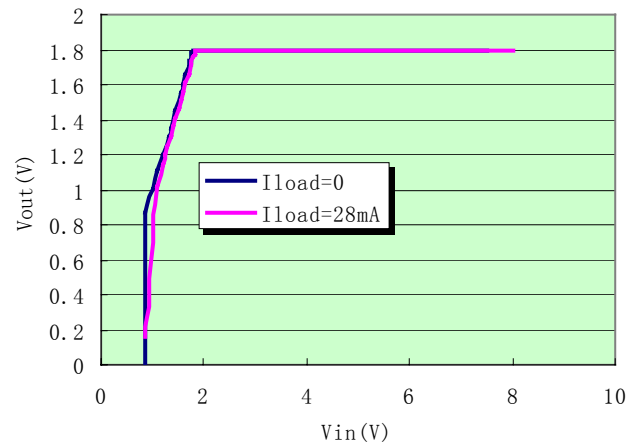
LR8558 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within ±2%.

Typical Performance Characteristics:

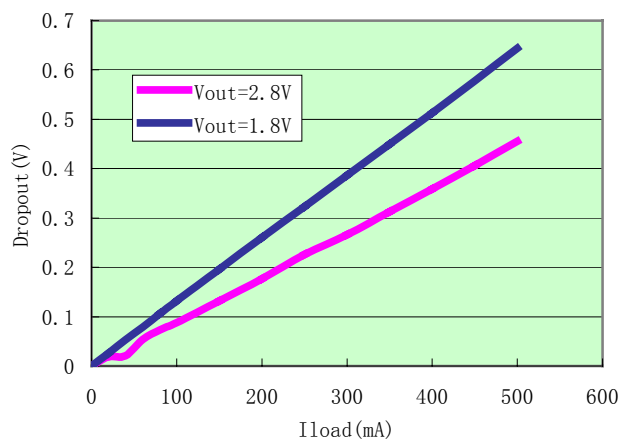
1) Output Voltage vs. Output Current (with output short protection)



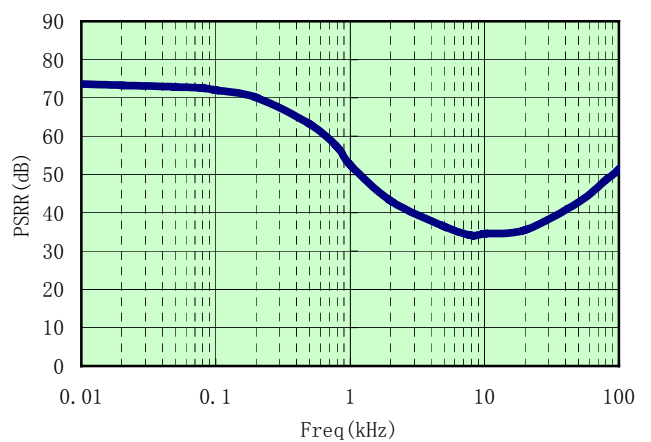
2) Output Voltage vs. Input Voltage



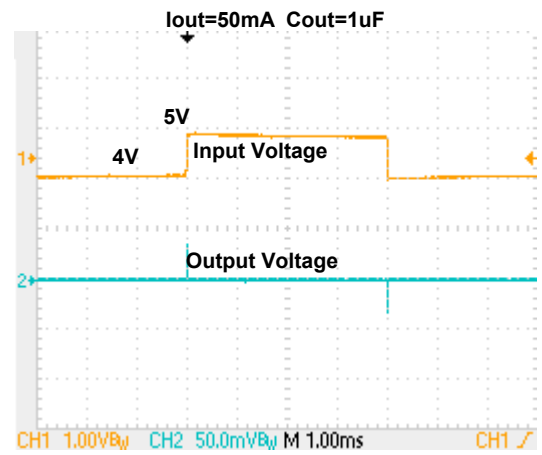
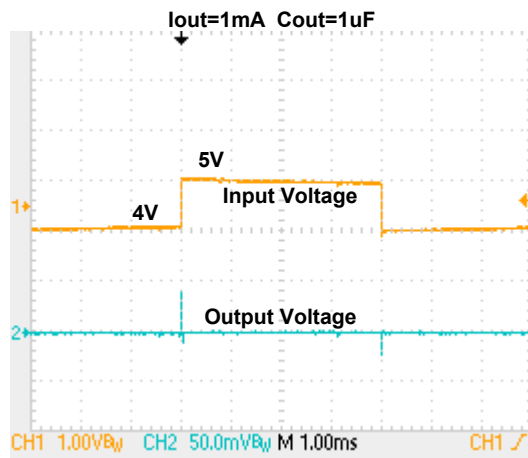
3) Dropout Voltage vs. Output Current



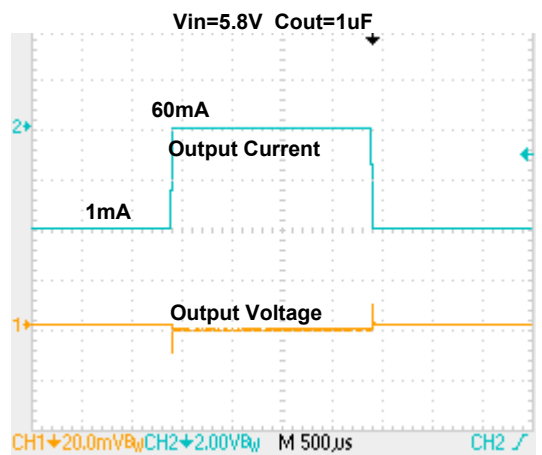
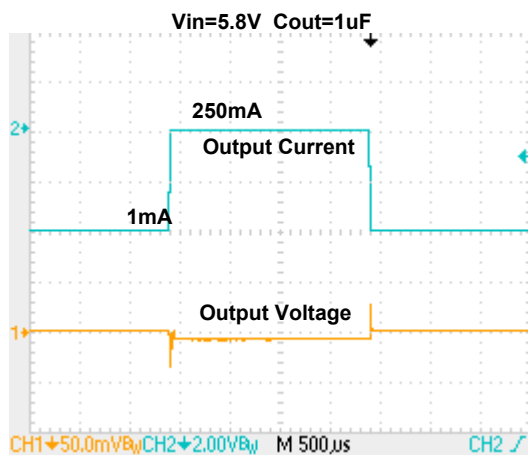
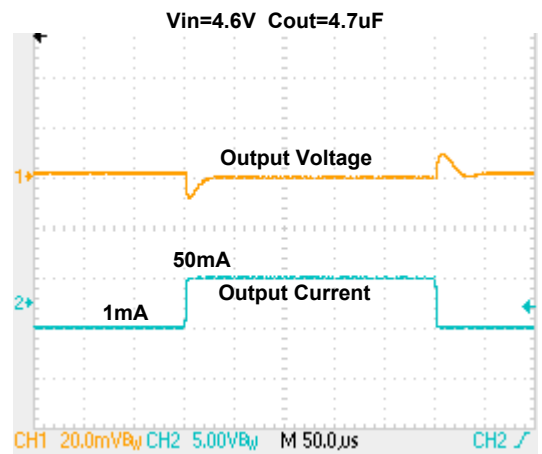
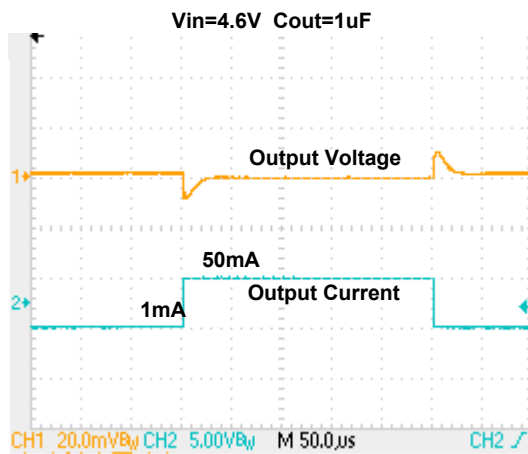
4) Ripple rejection vs. Frequency



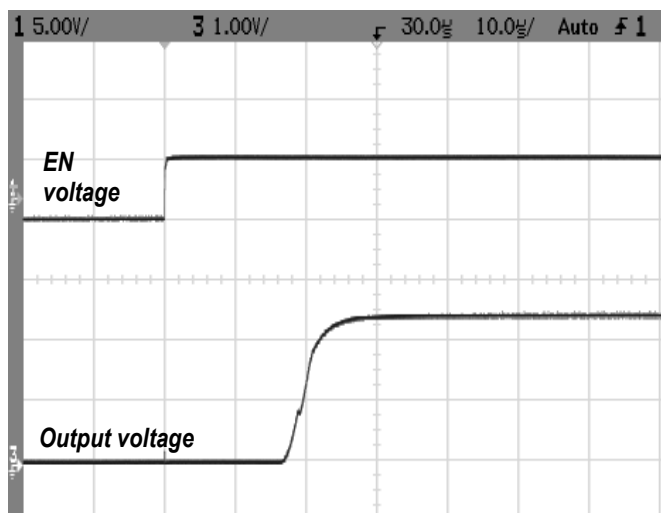
5) Line transient response



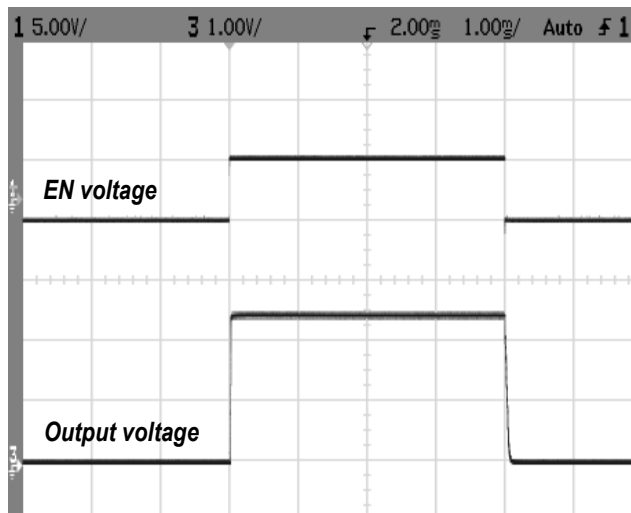
6) Load transient response



7) Startup response



8) Shutdown response

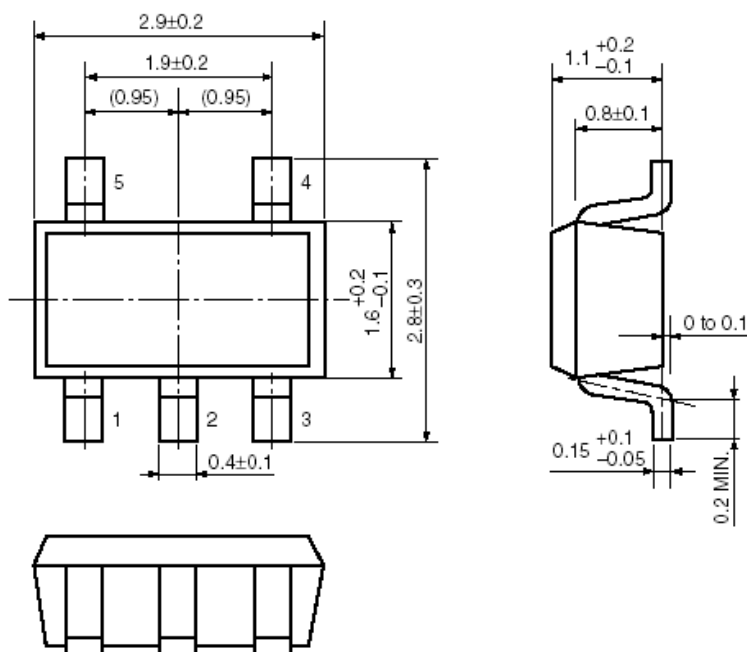


Package Information:

SOT-23-5:

Package specification:

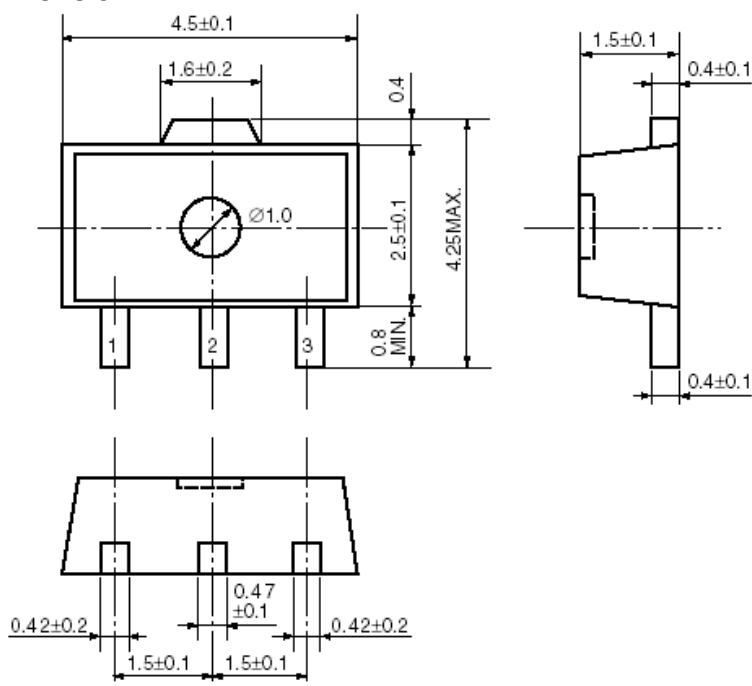
Unit: mm



SOT-89-3:

Package Dimension:

Unit: mm



SOT-23-3:

Package dimension:

Unit: mm

