

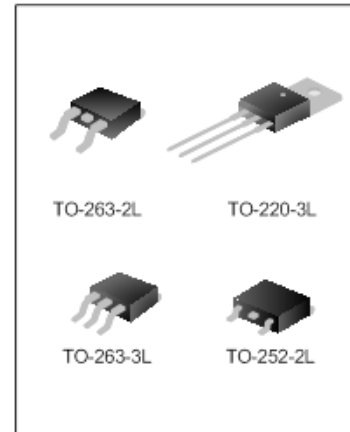
# 3A Low Dropout Voltage Regulator

## General Description

The GGA1085 is a positive low voltage dropout regulator, and voltage dropout is 1.18V at 3A.

GGA1085 provides two versions: fixed and adjustable versions. V<sub>OUT</sub> has a tolerance of less than 1.5% for five kinds of fixed voltages 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V and adjustable version.

The GGA1085 offers some key features including thermal shutdown and current limiting. The GGA1085 is an excellent choice for use in various electronic equipment.



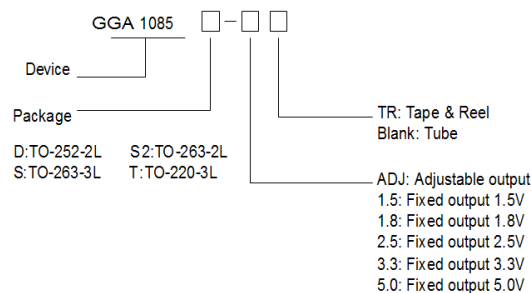
## Features

- 1.5% accuracy in fixed version of 1.5V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable version
- Low Dropout Voltage: 1.18V at 3A output current
- Current Limiting: 4.5A
- Thermal Shutdown
- Line Regulation(Adj Version: Typical): 0.015%
- Load Regulation (Adj Version: Typical): 0.1%
- \* Temperature Range: 0 to 125°C

## Applications

- High Efficiency Linear Regulators
- Post Regulators for Switching Supplies
- Battery Charger
- Microprocessor Supply
- \* Desktop PCs, RISC and Embedded Processors Supply

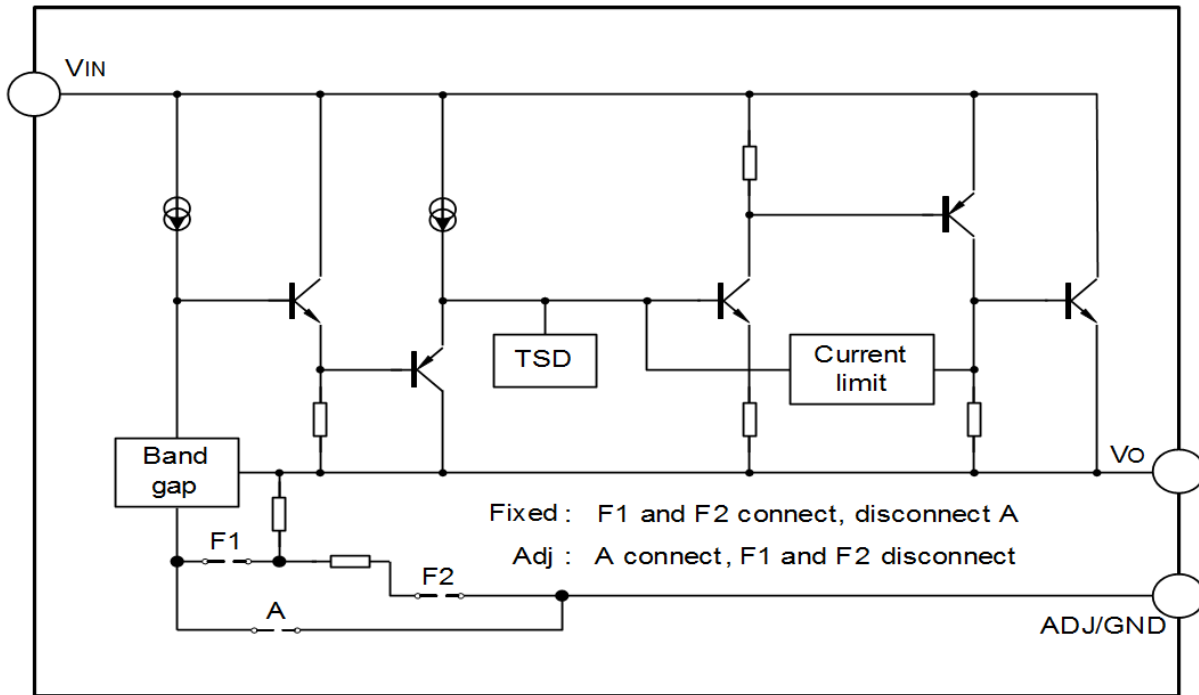
## ORDERING INFORMATION (T<sub>amb</sub>=0~125°C)



Part No.	Package	Marking	Material	Packing
GGA1085D-ADJ	TO-252-2L	GGA1085D-ADJ	Pb free	Tube
GGA1085D-ADJTR		GGA1085D-ADJ	Pb free	Tape & Reel
GGA1085D-1.5		GGA1085D-1.5	Pb free	Tube
GGA1085D-1.5TR		GGA1085D-1.5	Pb free	Tape & Reel
GGA1085D-1.8		GGA1085D-1.8	Pb free	Tube
GGA1085D-1.8TR		GGA1085D-1.8	Pb free	Tape & Reel

Part Number	Package	Marking	Material	Packing Type	
GGA1085D-2.5	TO-252-2L	GGA1085D-2.5	Pb free	Tube	
GGA1085D-2.5TR		GGA1085D-2.5	Pb free	Tape & Reel	
GGA1085D-3.3		GGA1085D-3.3	Pb free	Tube	
GGA1085D-3.3TR		GGA1085D-3.3	Pb free	Tape & Reel	
GGA1085D-5.0		GGA1085D-5.0	Pb free	Tube	
GGA1085D-5.0TR		GGA1085D-5.0	Pb free	Tape & Reel	
GGA1085S-ADJ	TO-263-3L	GGA1085S-ADJ	Pb free	Tube	
GGA1085S-ADJTR		GGA1085S-ADJ	Pb free	Tape & Reel	
GGA1085S-1.5		GGA1085S-1.5	Pb free	Tube	
GGA1085S-1.5TR		GGA1085S-1.5	Pb free	Tape & Reel	
GGA1085S-1.8		GGA1085S-1.8	Pb free	Tube	
GGA1085S-1.8TR		GGA1085S-1.8	Pb free	Tape & Reel	
GGA1085S-2.5		GGA1085S-2.5	Pb free	Tube	
GGA1085S-2.5TR		GGA1085S-2.5	Pb free	Tape & Reel	
GGA1085S-3.3		GGA1085S-3.3	Pb free	Tube	
GGA1085S-3.3TR		GGA1085S-3.3	Pb free	Tape & Reel	
GGA1085S-5.0		GGA1085S-5.0	Pb free	Tube	
GGA1085S-5.0TR		GGA1085S-5.0	Pb free	Tape & Reel	
GGA1085T-ADJ		TO-220-3L	GGA1085T-ADJ	Pb free	Tube
GGA1085T-1.5			GGA1085T-1.5	Pb free	Tube
GGA1085T-1.8	GGA1085T-1.8		Pb free	Tube	
GGA1085T-2.5	GGA1085T-2.5		Pb free	Tube	
GGA1085T-3.3	GGA1085T-3.3		Pb free	Tube	
GGA1085T-5.0	GGA1085T-5.0		Pb free	Tube	
GGA1085S2-ADJ	TO-263-2L	GGA1085S2-ADJ	Pb free	Tube	
GGA1085S2-ADJTR		GGA1085S2-ADJ	Pb free	Tape & Reel	
GGA1085S2-1.5		GGA1085S2-1.5	Pb free	Tube	
GGA1085S2-1.5TR		GGA1085S2-1.5	Pb free	Tape & Reel	
GGA1085S2-1.8		GGA1085S2-1.8	Pb free	Tube	
GGA1085S2-1.8TR		GGA1085S2-1.8	Pb free	Tape & Reel	
GGA1085S2-2.5		GGA1085S2-2.5	Pb free	Tube	
GGA1085S2-2.5TR		GGA1085S2-2.5	Pb free	Tape & Reel	
GGA1085S2-3.3		GGA1085S2-3.3	Pb free	Tube	
GGA1085S2-3.3TR		GGA1085S2-3.3	Pb free	Tape & Reel	
GGA1085S2-5.0		GGA1085S2-5.0	Pb free	Tube	
GGA1085S2-5.0TR		GGA1085S2-5.0	Pb free	Tape & Reel	

## Block Diagram



## Absolute Maximum Ratings (Operating Temperature Range Applies Unless Otherwise Specified)

Characteristics	Symbol	Ratings	Unit
Input Supply Voltage	V <sub>IN</sub>	20	V
Lead Temperature (Soldering, 5 seconds)	T <sub>LEAD</sub>	260	°C
Operating Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>S</sub>	-40 ~ +125	V
Power Dissipation	PD	Internally Limited (note1)	mW
ESD Tolerance (Minimum)	ESD	2000	V

Note1: The maximum allowable power dissipation is a function of maximum operating junction temperature, T<sub>J</sub> (max), the junction to ambient thermal resistance, θ<sub>JA</sub>, and the ambient temperature T<sub>amb</sub>. The maximum allowable power dissipation at any ambient temperature is given: PD (max) = (T<sub>J</sub> (max) – T<sub>amb</sub>)/θ<sub>JA</sub>, exceeding the maximum allowable power limit will result in excessive die temperature; thus, the regulator will go into thermal shutdown. The junction to ambient thermal resistance, θ<sub>JA</sub> of some packages may be different, The value of θ<sub>JA</sub> depends on mounting technique.

## Recommended Operating Conditions

Characteristics	Symbol	Ratings	Unit
Input Voltage	V <sub>IN</sub>	12	V
Operating Junction Temperature Range	T <sub>J</sub>	0 ~ +125	°C

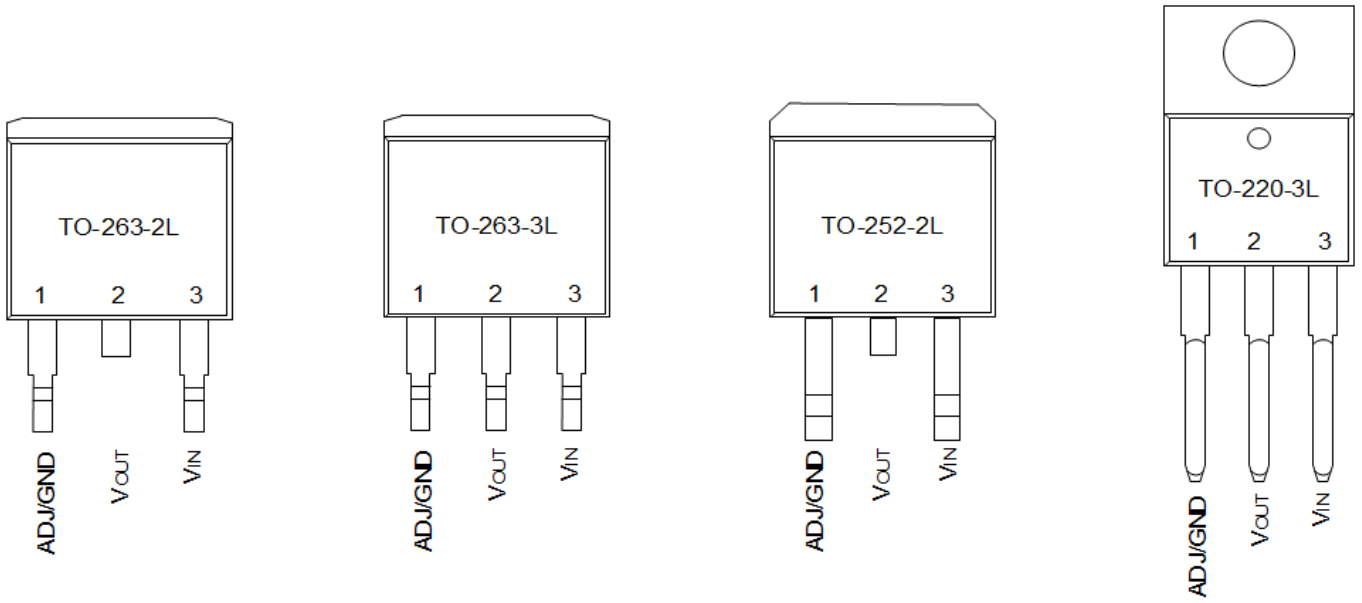
**Electrical Characteristics** ( $T_{AMB}=25^{\circ}\text{C}$ , Unless Otherwise Specified. Limits appearing in Boldface type

 apply over the entire junction temperature range for operation,  $0^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	VREF	GGA1085-ADJ, IOUT=10mA, VIN-VOUT=3V, 10mA≤IOUT≤3A, 1.5V≤VIN-VOUT≤5V	1.231 1.225	1.250 1.250	1.269 1.275	V
Output Voltage	VOUT	GGA1085-1.5, IOUT=10mA, VIN=4.5V, 10mA≤IOUT≤3A, 3.0V≤VIN≤6V	1.478 1.47	1.5 1.5	1.523 1.53	V
		GGA1085-1.8, IOUT=10mA, VIN=4.8V, 10mA≤IOUT≤ 3A, 3.3V≤VIN≤7V	1.773 1.764	1.8 1.8	1.827 1.836	V
		GGA1085-2.5, IOUT=10mA, VIN=5.5V 10mA≤IOUT≤3A, 4.0V≤VIN≤7V	2.462 2.45	2.5 2.5	2.537 2.55	V
		GGA1085-3.3, IOUT=10mA, VIN=6.3V, 10mA≤IOUT≤3A, 4.8V≤VIN≤8V	3.225 3.234	3.3 3.3	3.350 3.366	V
		GGA1085-5.0, IOUT=10mA, VIN=8V, 10mA≤IOUT≤3A, 6.5V≤VIN≤10V	4.925 4.9	5 5	5.075 5.1	V
		Line Regulation	ΔVOUT	GGA1085-ADJ, IOUT=10mA, 2.85V≤VIN≤10V		0.015 0.035
GGA1085-1.5, IOUT=10mA, 3.0V≤VIN≤10V				0.5 1	6 6	mV
GGA1085-1.8, IOUT=10mA, 3.3V≤VIN≤10V				0.5 1	6 6	mV
GGA1085-2.5, IOUT=10mA, 4.0V≤VIN≤10V				0.5 1	6 6	mV
GGA1085-3.3, IOUT=10mA, 4.8V≤VIN≤10V				0.5 1	6 6	mV
GGA1085-5.0, IOUT=10mA, 6.5V≤VIN≤10V				0.5 1	10 10	mV
Load Regulation	ΔVOUT	GGA1085-ADJ, 0mA≤IOUT≤3A, VIN- VOUT=3V		0.1 0.2	0.3 0.4	%
		GGA1085-1.5, 0mA≤IOUT≤3A, VIN- VOUT=3V		3 7	15 20	mV
		GGA1085-1.8, 0mA≤IOUT≤3A, VIN- VOUT=3V		3 7	15 20	mV
		GGA1085-2.5, 0mA≤IOUT≤3A, VIN- VOUT=3V		3 7	15 20	mV

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Load Regulation	$\Delta V_{OUT}$	GGA1085-3.3, $0mA \leq I_{OUT} \leq 3A$ , $V_{IN} - V_{OUT} = 3V$		3 7	15 20	mV
		GGA1085-5.0, $0mA \leq I_{OUT} \leq 3A$ , $V_{IN} - V_{OUT} = 3V$		5 10	20 35	mV
Dropout Voltage	$V_{DROP}$	$I_{OUT} = 3A$ , $\Delta V_{REF}$ , $\Delta V_{OUT} = 1\%$		1.18	1.3	V
Current Limit	$I_{LIMIT}$	$V_{IN} - V_{OUT} = 3V$	3.2	4.5		A
Minimum Load Current	$I_{LOAD (MIN)}$	$V_{IN} = 10V$ (GGA1085-ADJ)		3	10	mA
Quiescent Current	$I_Q$	$V_{IN} = 10V$ (GGA1085)		5	10	mA
Ripple Rejection	PSRR	fRIPPLE=120Hz, $C_{OUT} = 25\mu F$ , $I_{OUT} = 3A$ , $V_{IN} - V_{OUT} = 3V$	60	72		dB
Adjust Pin Current	$I_{ADJ}$	$V_{IN} = 4.25V$ , $I_{OUT} = 10mA$		55	120	$\mu A$
Adjust Pin Current Change	$\Delta I_{ADJ}$	$10mA \leq I_{OUT} \leq 3A$ , $1.5V \leq (V_{IN} - V_{OUT}) \leq 6V$		0.2	5	$\mu A$
Temperature Stability		$I_{OUT} = 10mA$ , $V_{IN} - V_{OUT} = 1.5V$		0.5		%
Long Term Stability		$T_{amb} = 125^\circ C$ , 1000Hrs		0.5		%
RMS Noise (% of $V_{OUT}$ )		$T_{amb} = 125^\circ C$ , $10Hz \leq f \leq 10kHz$		0.003		%
Thermal Resistance	$\theta_{JA}$	TO-263-3L		60		$^\circ C/W$
		TO-263-2L		60		
		TO-220-3L		60		
		TO-252-2L		100		

## Pin Configuration



## Pin Description

Pin No.	Pin name	I/O	Functions
1	GND/ADJ	G/O	Ground/ADJ
2	V <sub>OUT</sub>	O	Output voltage
3	V <sub>IN</sub>	I	Input supply voltage

## Functional Description

The GGA1085 is a LDO regulator, its pass transistor is made up of a single NPN transistor being driven by a PNP. The dropout voltage is defined as:  $V_{DRO} = V_{BE} + V_{SAT}$ .

The GGA1085 series of fixed and adjustable regulators are easy to use. Output voltages are 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. On-chip thermal shut down provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The GGA1085 requires an output capacitor for device stability. Its value of 22  $\mu\text{F}$  tantalum covers all cases of bypassing the adjustment terminal. Without bypassing the adjustment terminal smaller capacitors can be used with equally good results .depends upon the application circuit. In general, linear regulator stability decreases with higher output currents.

## Applications Circuits

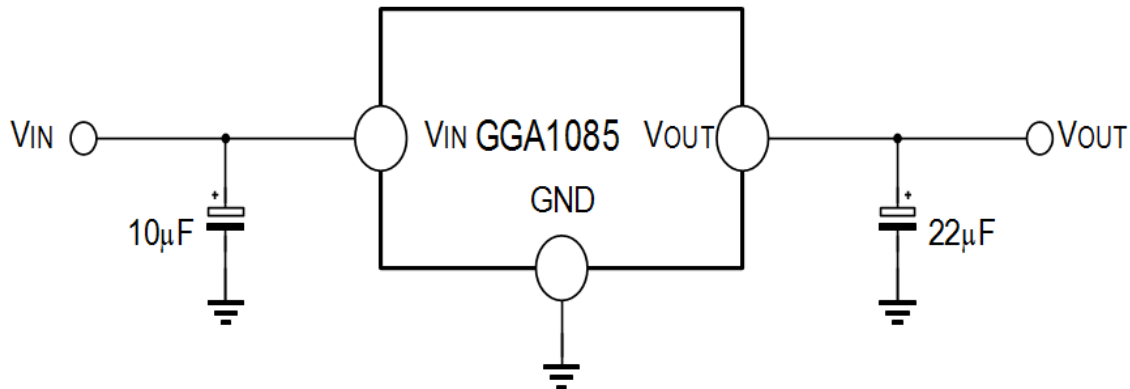


Figure 1. Typical Fixed Output Voltage

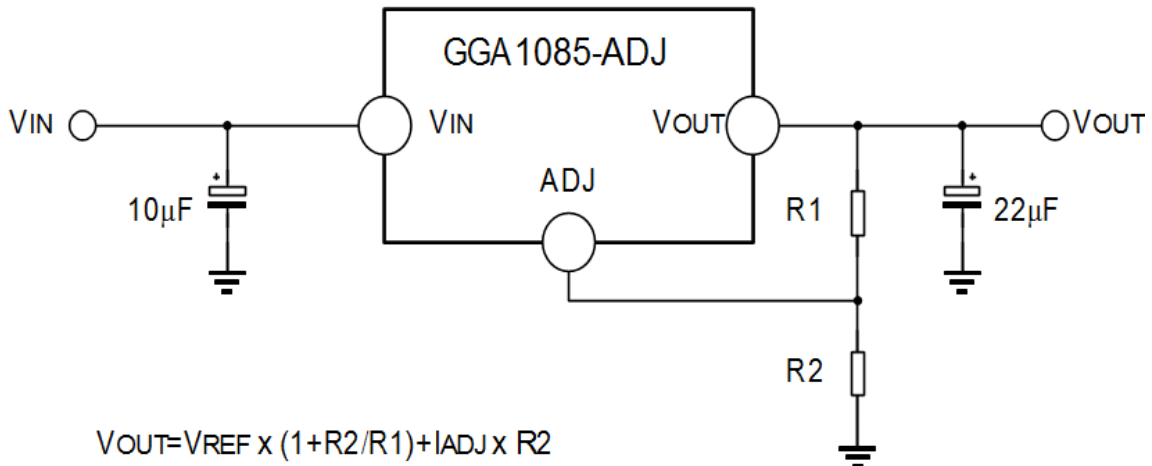
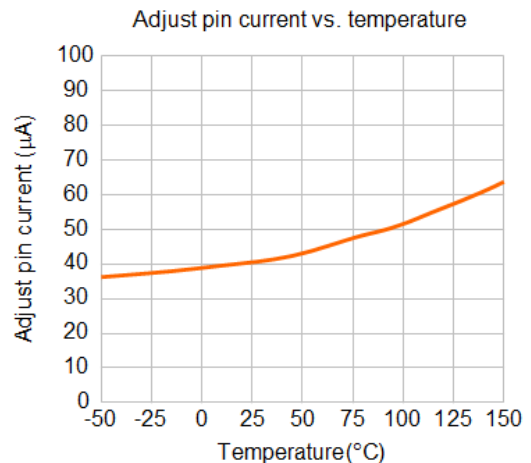
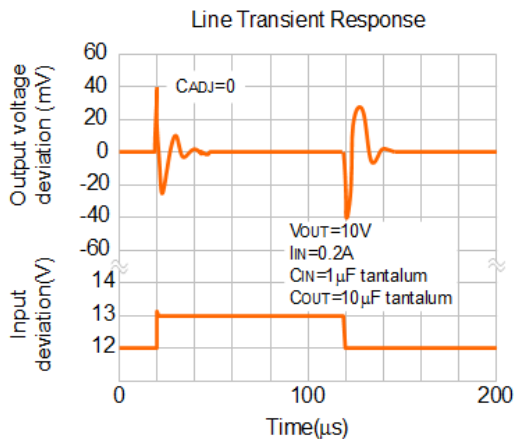
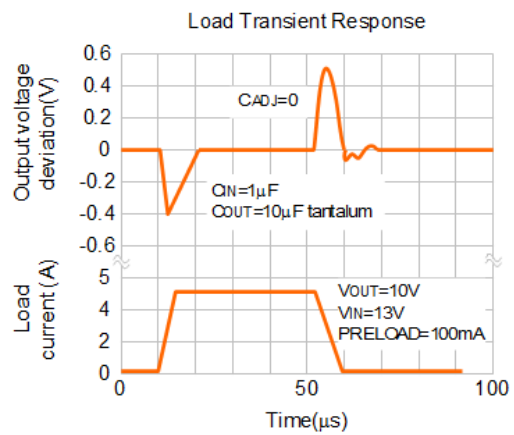
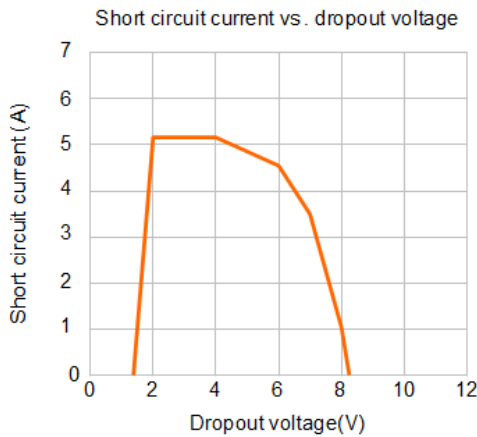
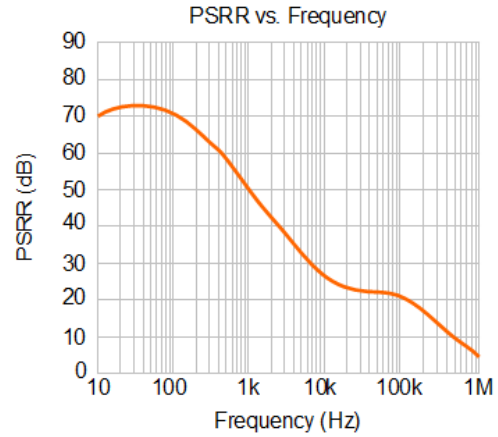
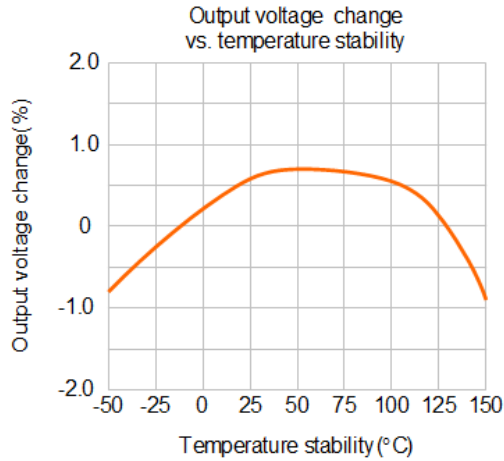


Figure 2. Typical Adjustable Output Voltage

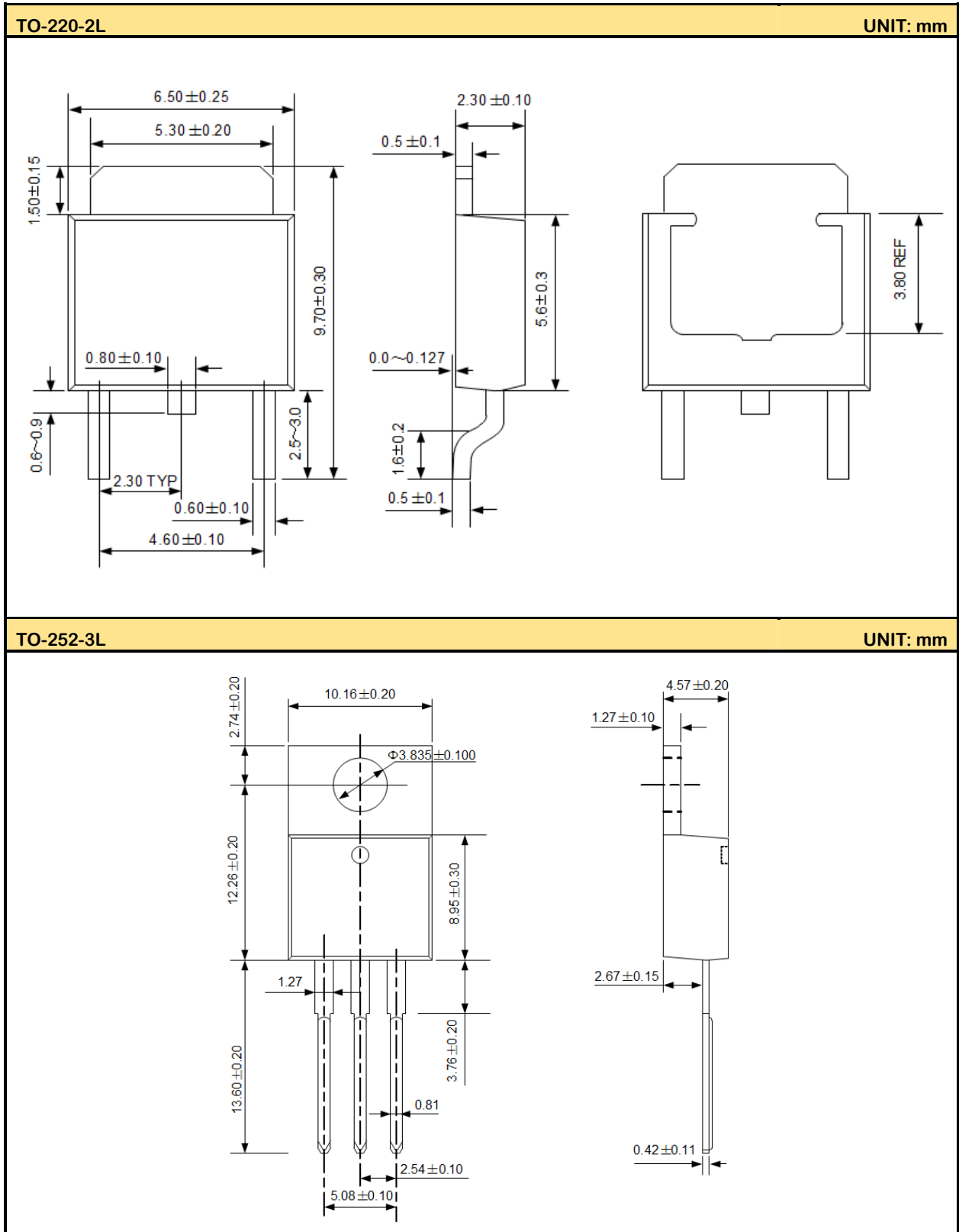
Note: The above circuit and parameters are reference only, please set the parameters of the real application circuit based on the real test.

**Typical Characteristics**

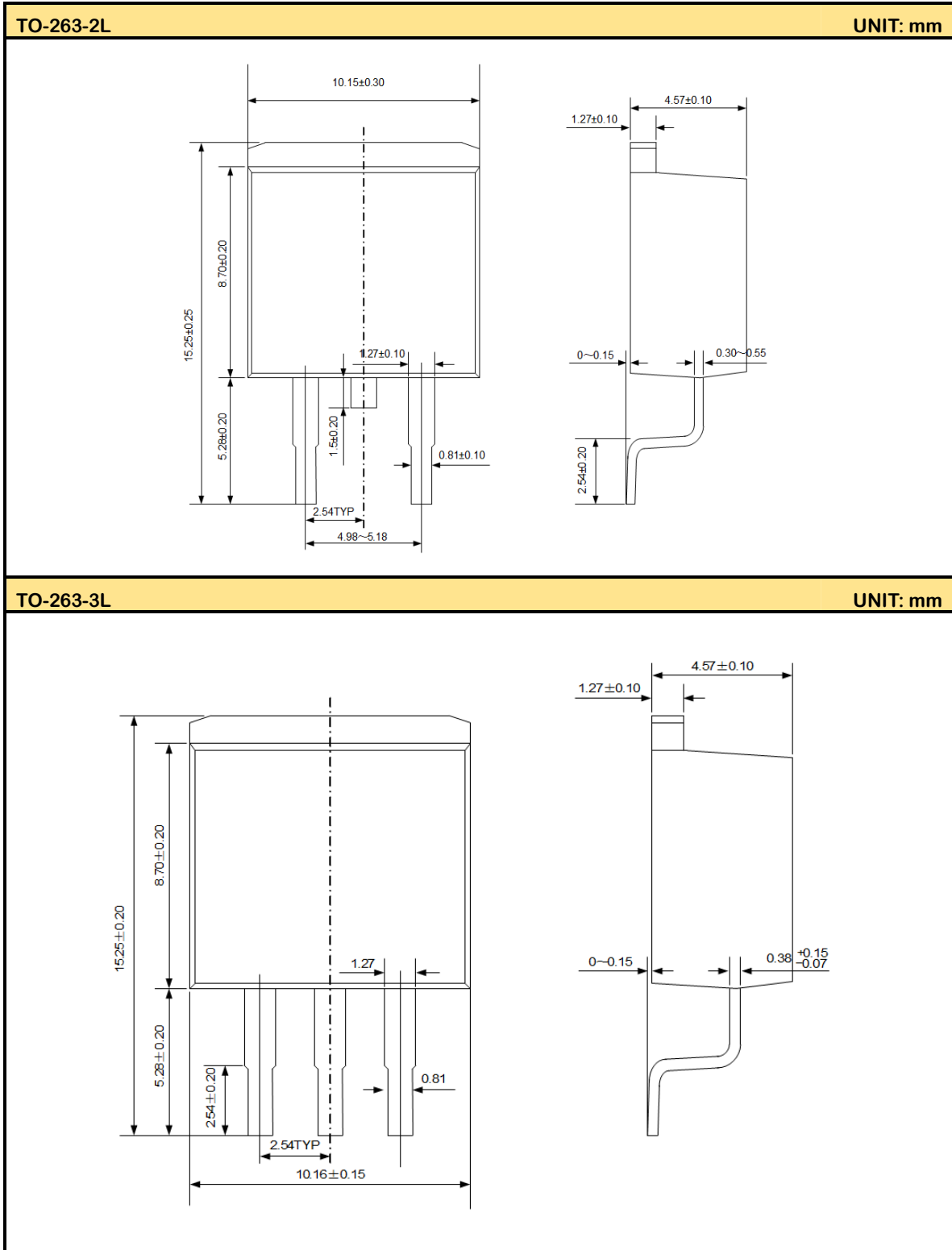




**Package Outline**



**Package Outline**



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