

Introduction

The GPL6333 series are a group of positive voltage regulators manufactured by CMOS technologies with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. The GPL6333 series can deliver 500mA output current and allow an input voltage as high as 18V. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

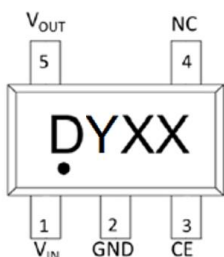
Features

- Low Quiescent Current: 2.5 μ A
- Operating Voltage Range: 2.5V~18V
- Output Current: 500mA
- Low Dropout Voltage:
150mV@100mA($V_{OUT}=3.3V$)
- Output Voltage: 1.2~ 5.0V
- High Accuracy: $\pm 2\%/\pm 1\%$ (Typ.)
- High Power Supply Rejection Ratio: 65dB@1kHz
- Low Output Noise: $27 \times V_{OUT} \mu V_{RMS}$ (10Hz~100kHz)
- Excellent Line and Load Transient Response
- Built-in Current Limiter, Short-Circuit Protection
- Over-Temperature Protection

Applications

- Cordless Phones
- Radio control systems
- Laptop, Palmtops and PDAs
- Single-lens reflex DSC
- PC peripherals with memory
- Wireless Communication Equipment
- Portable Audio Video Equipment
- Car Navigation Systems
- LAN Cards
- Ultra-low Power Microcontrollers

Marking



D : Device Code
Y : Voltage Code
XX : Data Code

Order Information

GPL6333①②③④

Designator	Symbol	Description
①②③	Integer	Output Voltage e.g. 1.2V=①:V, ②:1, ③:2
④	K5	Package: SOT-23-5L

Absolute Maximum Ratings⁽¹⁾ ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Input Voltage ⁽²⁾	V_{IN}	-0.3~24	V
Output Voltage ⁽²⁾	V_{OUT}	-0.3~10	V
CE Pin Voltage	V_{CE}	-0.3~24	V
Output Current	I_{OUT}	700	mA
Power Dissipation	P_D	400	mW
Operating Junction Temperature Range ⁽³⁾	T_j	-40~125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-40~125	$^{\circ}\text{C}$
Lead Temperature(Soldering, 10 sec)	T_{solder}	260	$^{\circ}\text{C}$
ESD rating ⁽⁴⁾	Human Body Model -(HBM)	2	kV
	Machine Model- (MM)	200	V

Note:

(1) Stresses beyond those listed under *absolute maximum ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *recommended operating conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltages are with respect to network ground terminal.

(3) The GPL6333 includes over temperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

(4) ESD testing is performed according to the respective JESD22 JEDEC standard. The human body model is a 100 pF capacitor discharged through a 1.5k Ω resistor into each pin. The machine model is a 200pF capacitor discharged directly into each pin.

Recommended Operating Conditions

Parameter	Min.	Nom.	Max.	Units
Supply Voltage at V_{IN}	2.5		18	V
Operating Junction Temperature Range, T_j	-40		125	$^{\circ}\text{C}$
Operating Free Air Temperature Range, T_A	-40		85	$^{\circ}\text{C}$

Electrical Characteristics

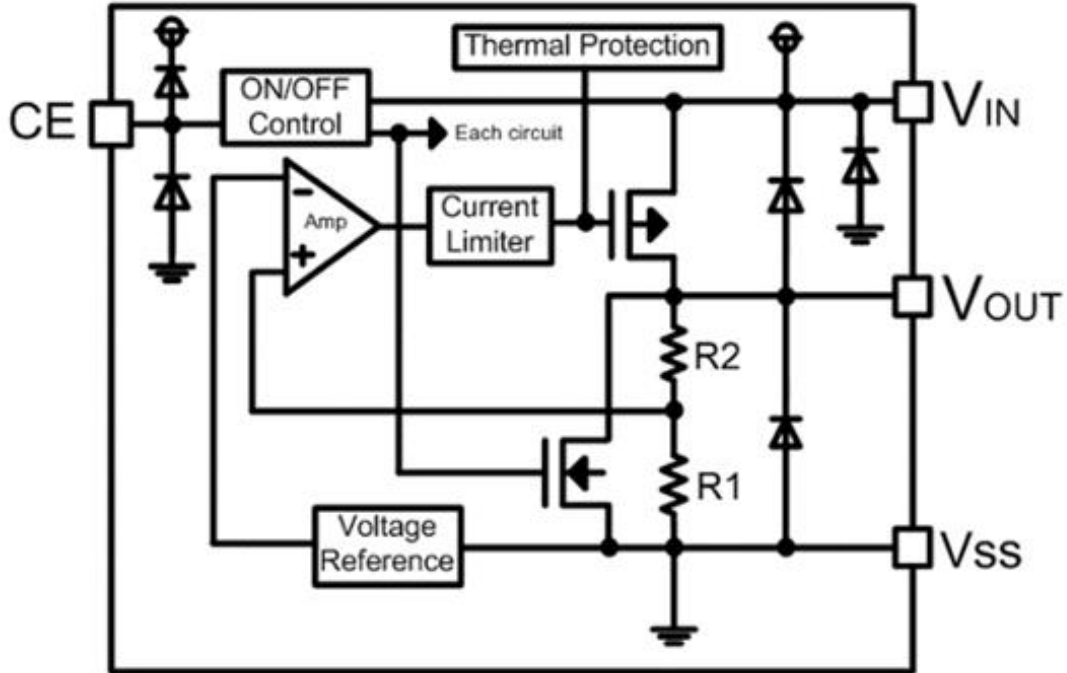
GPL6333 Series ($V_{IN}=V_{OUT}+1V$, $C_{IN}=C_{OUT}=1\mu F$, $T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP. ⁽⁵⁾	MAX.	UNITS	
Input Voltage	V_{IN}		2.5	—	18	V	
Output Voltage Range	V_{OUT}		1.2		5	V	
DC Output Accuracy		$I_{OUT}=1mA$	-2	—	2	%	
			-1	—	1	%	
Dropout Voltage	$V_{dif}^{(6)}$	$I_{OUT}=100mA, V_{OUT}=3.3V$	—	150	—	mV	
Supply Current	I_{SS}	$I_{OUT}=0A$	—	2.5	5	μA	
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	$I_{OUT}=10mA$ $V_{OUT}+1V \leq V_{IN} \leq 18V$	—	0.01	0.3	%/V	
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	$V_{IN}=V_{OUT}+1V$, $1mA \leq I_{OUT} \leq 100mA$	—	10	—	mV	
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_A}$	$I_{OUT}=10mA$, $-40^\circ C < T_A < 125^\circ C$		50		ppm	
Output Current Limit	I_{LIM}	$V_{OUT}=0.5 \times V_{OUT(Normal)}$, $V_{IN}=5V$	500	700	—	mA	
Short Current	I_{SHORT}	$V_{OUT}=V_{SS}$	—	150	—	mA	
Power Supply Rejection Ratio	PSRR	$I_{OUT}=50mA$	100Hz		80		dB
			1kHz	—	70	—	
			10kHz	—	60	—	
			100kHz	—	40	—	
Output Noise Voltage	V_{ON}	BW=10Hz to 100kHz	—	$27 \times V_{OUT}$	—	μV_{RMS}	
Thermal Shutdown Temperature	T_{SD}	—	—	150	—	$^\circ C$	
Thermal Shutdown Hysteresis	ΔT_{SD}	—	—	20	—	$^\circ C$	
Standby Current	I_{STBY}	$CE = V_{SS}$			0.2	μA	
CE "High" Voltage	V_{CE}^{H}		1.5		V_{IN}	V	
CE "Low" Voltage	V_{CE}^{L}				0.3	V	
C_{OUT} Auto-Discharge Resistance	$R_{DISCHRG}$	$V_{IN}=5V, V_{OUT}=3.0V$, $V_{CE}=V_{SS}$		150		Ω	

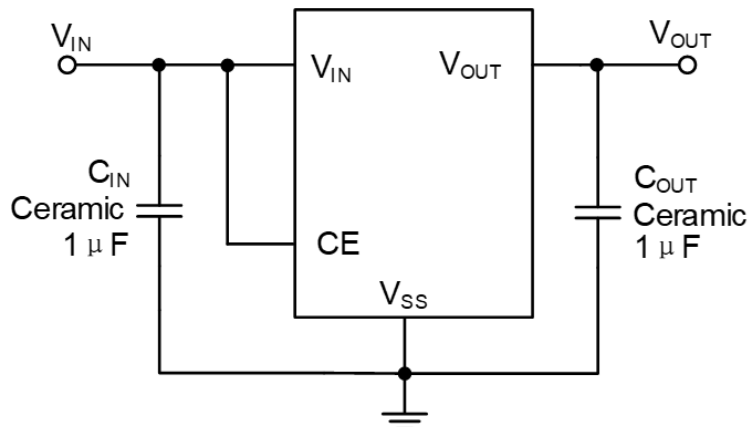
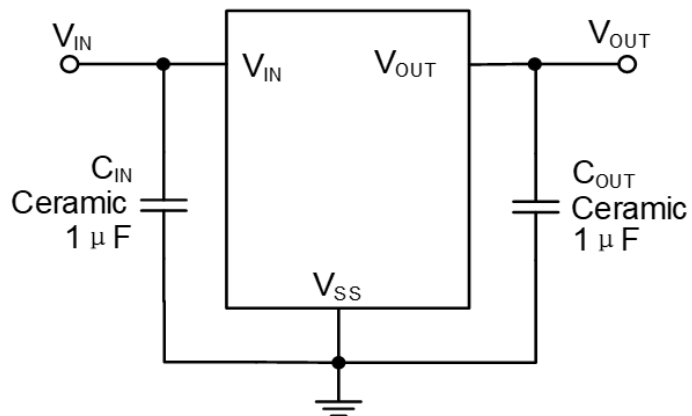
(5) Typical numbers are at 25°C and represent the most likely norm.

(6) V_{dif} : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of V_{OUT} (E).

Functional Block Diagram

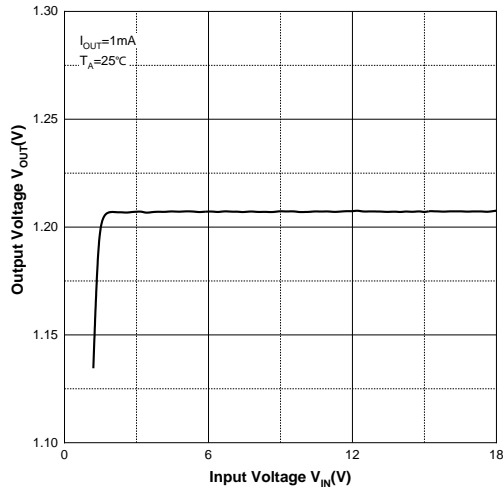


Typical Application Circuit

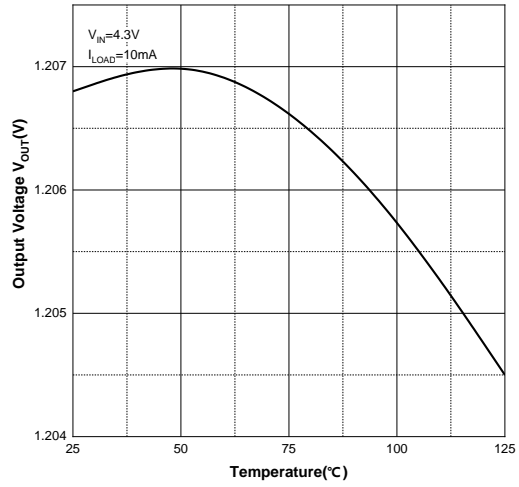


Typical Performance Characteristics

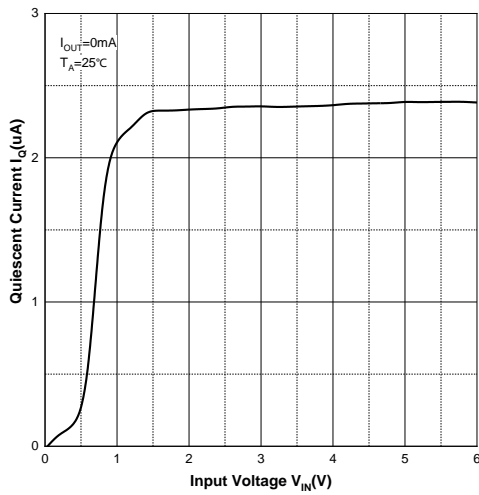
Line Regulation



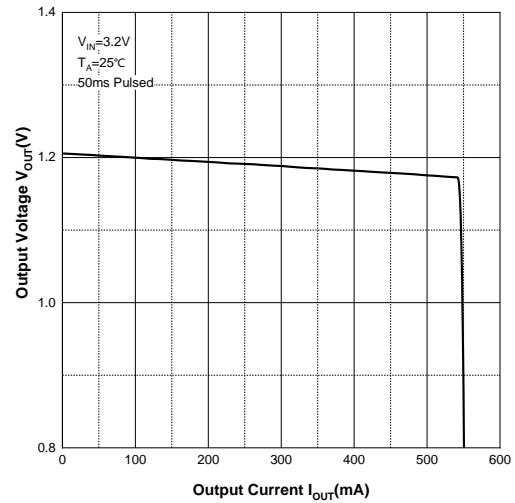
Temperature Regulation



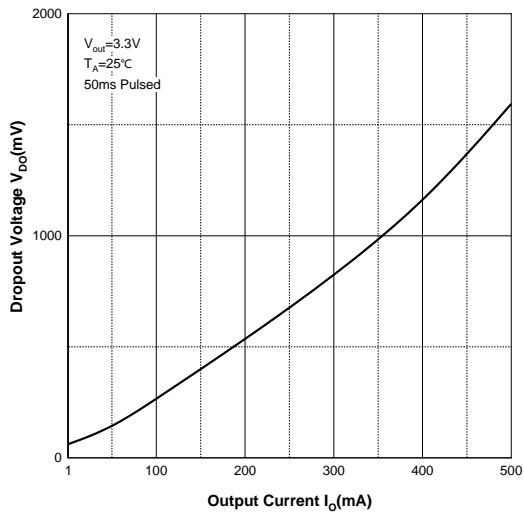
Quiescent Current



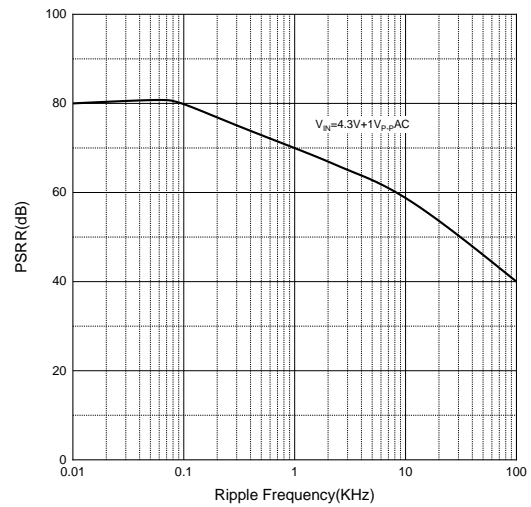
Load Regulation



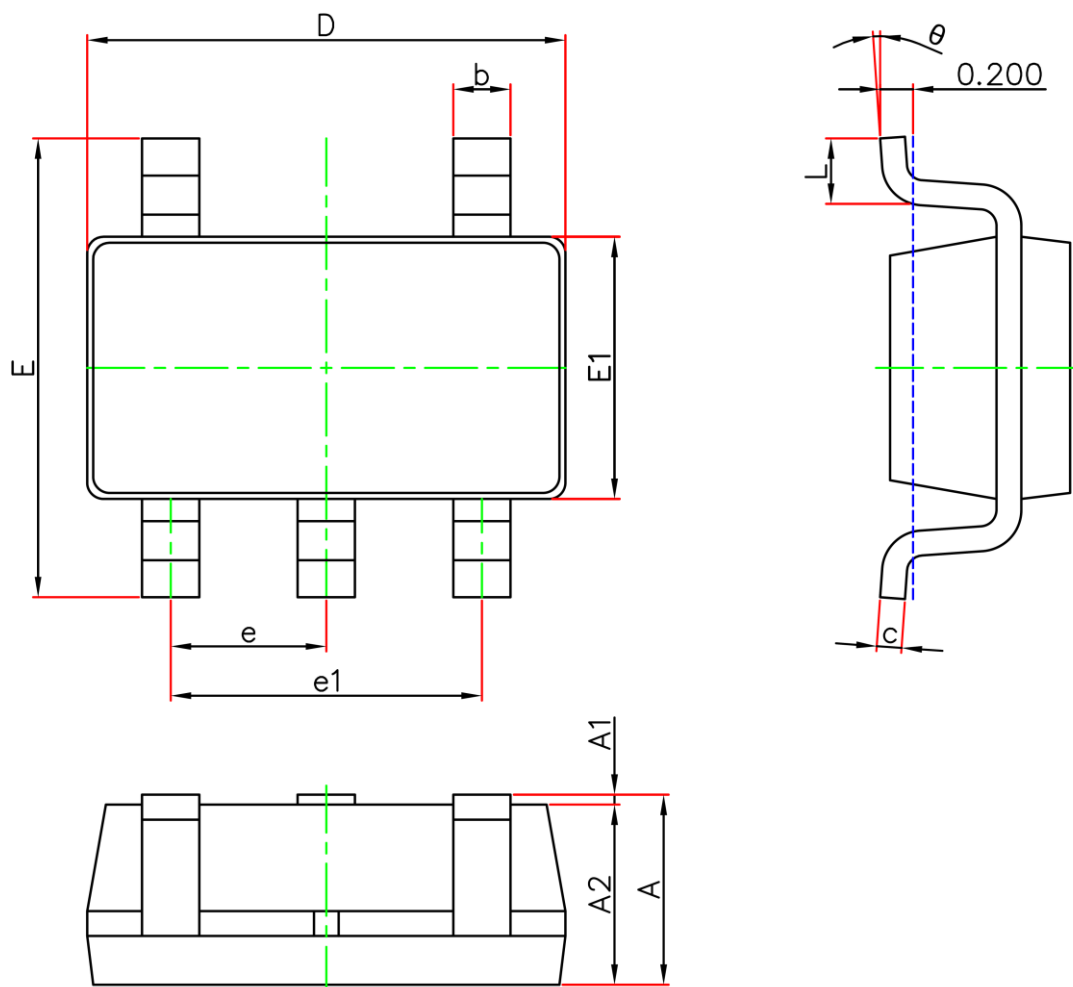
Dropout Voltage



PSRR vs. Frequency



SOT-23-5L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.150	0.000	0.006
A2	1.050	1.250	0.041	0.049
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°