GTM CORPORATION

G3U1085

3A Low Dropout Positive Adjustable or Fixed-Mode Regulator

Description

The G3U1085 is a low dropout positive adjustable or fixed-mode regulator with minimum of 3A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. G3U1085 is also well suited for other applications such as VGA cards. G3U1085 is guaranteed to have <1.4V dropout at full load current making it ideal to provide well-regulated outputs of 1.25 to 5.0V with 4.7 to 12V input supply by different output voltage.

Features

- 3-Terminal Adjustable or fixed 1.5V,1.8V,2.5V,3.3V,5.0V
- 1.4V Maximum Dropout at Full Load current
- Fast Transient response
- Built-in Thermal Shutdown
- Output current limiting

Package Dimensions

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.80	c2	1.25	1.45
b	0.76	1.00	b2	1.17	1.47
L4	0.00	0.30	D	8.6	9.0
c	0.36	0.5	e	2.54 REF.	
L3	1.50 REF.		L	14.6	15.8
L1	2.29	2.79	θ	0°	8°
E	9.80	10.4	L2	1.27 REF.	

Typical Circuit

$$V_{OUT} = V_{ref} \times (1 + R2/R1)$$

Note: $V_o = V_{REF} * (1 + \dfrac{R_2}{R_1})$

Block Diagram

Pin Descriptions

Name	I/O	Pin#	Function
Adj (GND)		1	Adjustable (Ground only for fixed mode)
Vout	O	2	The output of the regulator. A minimum of 10uF capacitor must be connected from this pin to ground to insure stability.
Vin	I	3	The input pin of regulator. Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.4V higher than Vout in order for the device to regulate properly.

Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V_{in}	DC Supply Voltage	-0.3 to 12	V
P_D	Power Dissipation	Internally Limited	
T_{ST}	Storage Temperature	-65 ~ + 150	℃
T_{OP}	Operating Junction Temperature Range	0 ~ + 150	℃

Electrical Characteristics

Parameter	Conditions		MIN	TYP	MAX	UNIT
Reference Voltage	G3U1085-ADJ	Io=10mA, T_J =25℃ , (Vin-Vout)=1.5V	1.225	1.250	1.275	V
Output Voltage	G3U1085-1.5	Io=10mA, T_J =25℃, 3.0V≤Vin≤12V	1.470	1.500	1.530	V
	G3U1085-1.8	Io=10mA, T_J =25℃, 3.3V≤Vin≤12V	1.764	1.800	1.836	V
	G3U1085-2.5	Io=10mA, T_J =25℃, 4.0V≤Vin≤12V	2.450	2.500	2.550	V
	G3U1085-3.3	Io=10mA, T_J =25℃, 4.8V≤Vin≤12V	3.235	3.300	3.365	V
	G3U1085-5.0	Io=10mA, T_J =25℃, 6.5V≤Vin≤12V	4.900	5.000	5.100	V
Line Regulator	G3U1085-XXX	Io=10mA, Vout+1.5<Vin<12	-	-	0.2	%
Load Regulation	G3U1085-ADJ	Vin=3.3V, 0mA<Io<3A, TJ=25℃ (Note 1,2)	-	-	1	%
	G3U1085-1.5	Vin=3.0V, 0mA<Io<3A, TJ=25℃ (Note 1,2)	-	12	15	mV
	G3U1085-1.8	Vin=3.3V, 0mA<Io<3A, TJ =25℃ (Note 1,2)	-	15	18	mV
	G3U1085-2.5	Vin=4.0V, 0mA<Io<3A, TJ=25℃ (Note 1,2)	-	20	25	mV
	G3U1085-3.3	Vin=5.0V, 0mA<Io<3A, TJ=25℃ (Note 1,2)	-	26	33	mV
	G3U1085-5.0	Vin=8.0V, 0mA<Io<3A, TJ=25℃ (Note 1,2)	-	40	50	mV
Dropout Voltage (Vin-Vout)	G3U1085-XXX	Io=3A(ΔVout=1% Vout)	-	1.3	1.4	V
Current Limit	G3U1085-XXX	Vin-Vout=5V	3.1	-	-	A
Minimum Load Current	Adjustable model	Vin=5V	-	5	10	mA
Adjust Pin Current	Adjustable model	Vin=12V, Io=10mA	-	55	100	uA
Quiescent Current	fixed model	Vin=12V, Io=0mA	-	-	12	mA
Thermal Regulation	T_A=25℃ , 30ms pulse		-	0.008	0.04	%/W
Ripple Rejection	F=120Hz, C_{OUT}=25uF, Tantalum, Io=3A					
	G3U1085-XXX	Vin=Vout+3V	-	60	70	dB
Temperature Stability	Io=10mA		-	0.5	-	%
Thermal Resistance Junction–to-Ambient (No heat sink ;No air flow)			-	91	-	℃/W
Thermal Resistance Junction-to-Case	Control Circuitry/Power Transistor		-	10	-	℃/W

Note 1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction Temperature by low duty cycle pulse testing. Load regulation is measured at the output lead =1/18" from the package.

Note 2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the difference in input and output and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Functional Description

Introduction

The G3U1085 adjustable or fixed-mode Low Dropout (LDO) regulator is a 3 terminal device which can easily be programmed by internal mask change to any voltage within the range of 1.25 to Vin-1.4V. The G3U1085 only needs 1.4V differential between Vin and Vout to maintain output regulation, in addition, the output voltage tolerances are also extremely tight and they include the transient response as port of the specification. For example, Intel VRE specification calls for a total of ±100mV including initial tolerance, load regulation and 0 to 3A load step. The G3U1085 is specifically designed to meet the fast current transient needs as well as providing an accurate initial voltage, reducing the overall system cost with the need for fewer output capacitors.

Load Regulation

Since the G3U1085 is only a 3 terminal device, it is not possible to provide true remote sensing of the output voltage at the load. But it can supply good load regulation by internal feedback bypass the external loss such as adjustable mode.

Stability

The G3U1085 requires the use of an output capacitor as part of the frequency compensation in order to make the regulator stable .For most applications a minimum of 10uF aluminum electrolytic capacitor insures both stability and good transient response.

Thermal Design

The G3U1085 incorporates an internal shutdown that protects the device when the junction temperature exceeds the maximum allowable junction temperatures. Although this device can operate with junction temperatures in the range of 150℃, it is recommended that the selected heat sink be chosen such that during maximum continuous load operation the junction temperature is kept below the temperature.

Layout Consideration

The output capacitors must be located as close to the Vout terminal of the device as possible .It is recommended to use a section of a layer of the PC board as a plane to connect the Vout pin to the output capacitors to prevent any high frequency oscillation that may result due to excessive trace inductance.
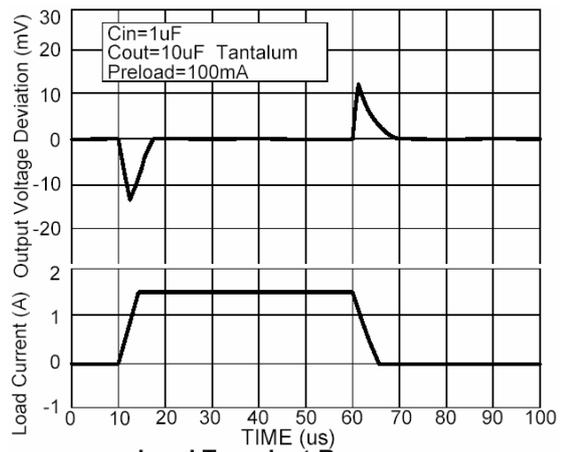
Typical Performance Characteristics

Dropout Voltage vs Output Current

Load Regulation vs Temperature
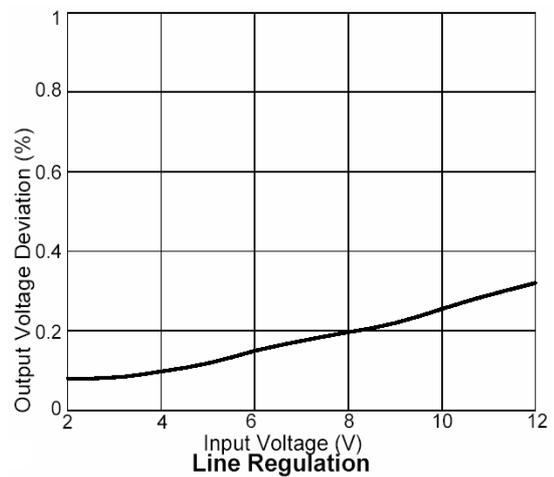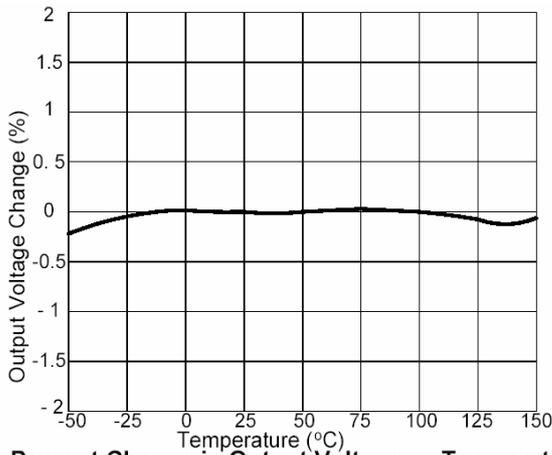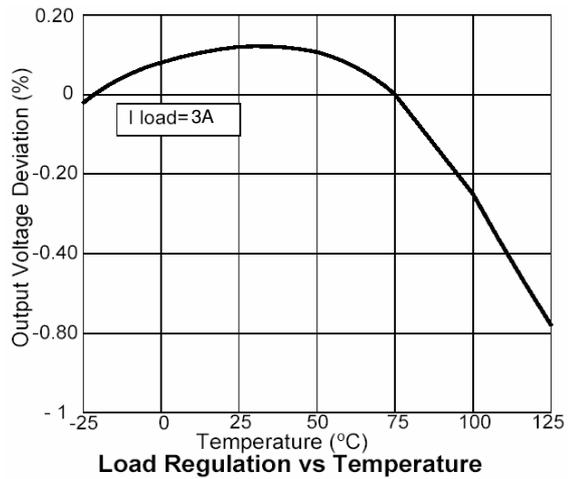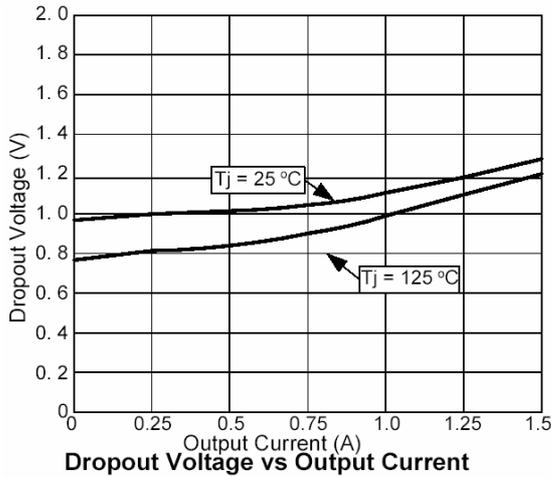
Percent Change in Output Voltage vs Temperature

Line Regulation
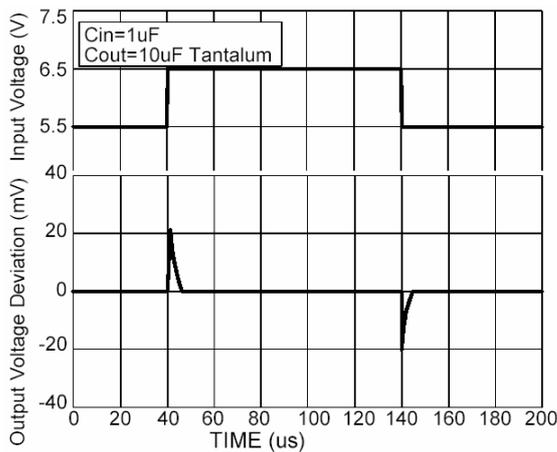
Line Transient Response

Load Transient Response