Monolithic Linear IC

SANYO No. 3246

LA5315M

Variable Divided Voltage Generator for LCD Use

Overview

The LA5315M is a variable divided voltage regulator IC for multiple drive of LCD matrix.

Features

- Power supply for variable bias LCD drive (1/5 to 1/13 bias available by internal resistances)
- 5 voltage outputs
- Low current dissipation (1.5mA max)
- Miniflat package

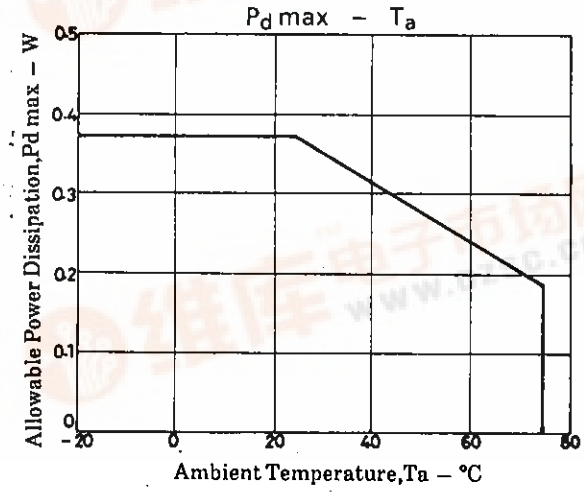
Maximum Ratings at Ta = 25°C

				unit
Maximum Supply Voltage	V_{CC} max	GND-V_{CC}	−35 to 0	V
Maximum Output Current	I_{OUT} max	V_1, V_2, V_3, V_4, V_5	15	mA
Allowable Power Dissipation	Pd max		370	mW
Operating Temperature	**Topr**		−20 to +75	°C
Storage Temperature	Tstg		−30 to +125	°C

Operating Conditions at Ta = 25°C

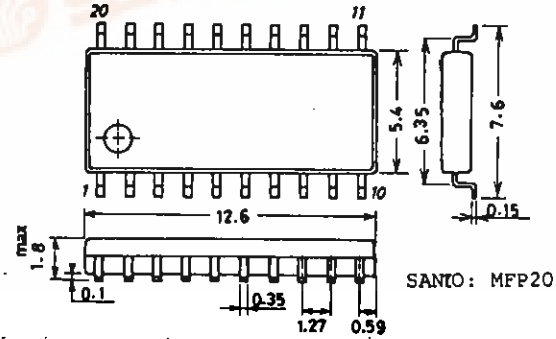
				unit
Recommended Supply Voltage	V_{CC}	GND-V_{CC} : (When $V_1 > -1V$, I_{IN} is needed.) Note 1	−30 to −10	V
Recommended Input Voltage	V_{REF}	GND-V_{REF} : $V_{REF} \geqq V_{CC}$ Note 1	−30 to −6	V
Recommended Input Current	I_{IN}	V_{IN} : $V_1 > -1V$, current source of I_{IN} : 1V or greater relative to GND	0.2 to 3	mA
Recommended Output Current	I_{OUT1}	V_1	−0.1 to +5	mA
	$I_{OUT2,3}$	V_2, V_3	−5 to +5	mA
	$I_{OUT4,5}$	V_4, V_5	−10 to +0.1	mA

Note 1 : Set V_{CC}, V_{REF} so that $|V_2|$, $|V_{CC}-V_5|$ become 1V or greater.



Package Dimensions 3036B

(unit : mm)



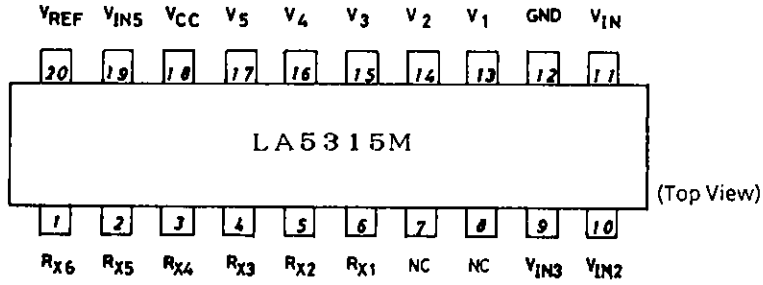
Operating Characteristics at Ta = 25°C, V_{CC} = −16V					min	typ	max	unit
Current Dissipation		I_{CC}	V_{IN}, GND-V_{CC}, V_{REF} : V_{CC} = V_{REF} = −16V, V_{IN} = GND, R_X = 5R				1.5	mA
Output Voltage Ratio	1	Ra1	V_2/V_1		1.96	2.00	2.04	
	2	Ra2	$(V_5-V_3)/(V_5-V_4)$	Vref = −12V	1.96	2.00	2.04	
	3	Rb1	V_5/V_1	V_{CC} = −16V,	8.73	9.00	9.27	
	4	Rb2	V_5/V_2	1/9 bias	4.37	4.50	4.63	
	5	Rb3	$V_5/(V_5-V_3)$	(R_X = 5R)	4.37	4.50	4.63	
	6	Rb4	$V_5/(V_5-V_4)$		8.73	9.00	9.27	
Internal Resistance Ratio	1	4R	$V_{IN}3$-R_X1			4		
	2	5R	$V_{IN}3$-R_X2	Resistance ratio		5		
	3	6R	$V_{IN}3$-R_X3	referenced to R		6		
	4	7R	$V_{IN}3$-R_X4	across pins ⑤ and ⑥		7		
	5	8R	$V_{IN}3$-R_X5			8		
	6	9R	$V_{IN}3$-R_X6			9		
Resistance		R	R_X1-R_X2 : R value when 0.5V is applied across pins ⑤ and ⑥.			20		kΩ
Load Regulation	1	ΔV_1	V_1 : +100μA < I_{OUT1} < +5mA				20	mV
	2	ΔV_2	V_2 : +100μA < I_{OUT2} < +5mA				20	mV
	3	ΔV_3	V_3 : +100μA < I_{OUT3} < +5mA				20	mV
	4	$-\Delta V_2$	V_2 : −5mA < I_{OUT2} < −100μA				20	mV
	5	$-\Delta V_3$	V_3 : −5mA < I_{OUT3} < −100μA				20	mV
	6	$-\Delta V_4$	V_4 : −10mA < I_{OUT4} < −100μA				20	mV
	7	$-\Delta V_5$	V_5 : −10mA < I_{OUT5} < −100μA				20	mV

Pin Description

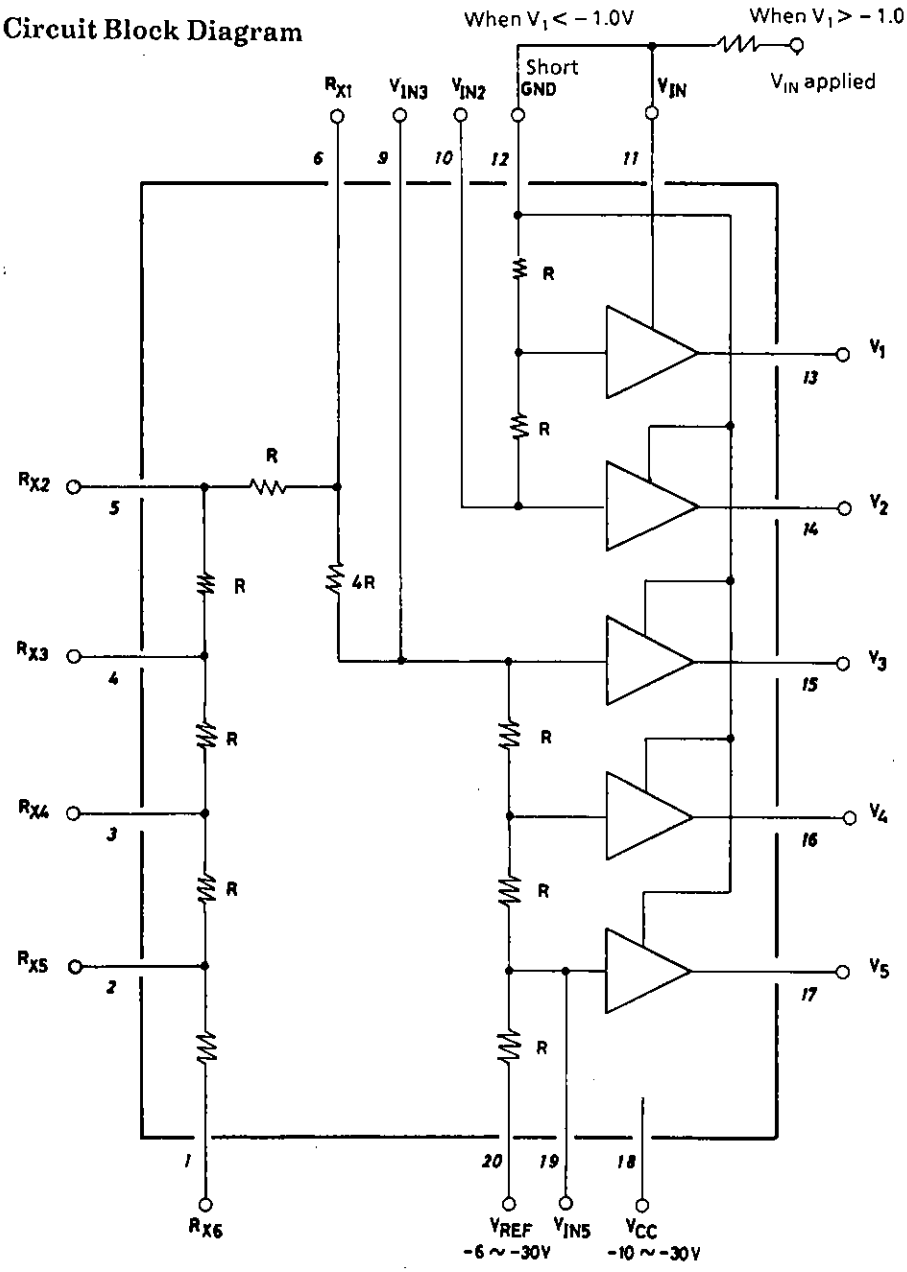
Pin No.	Pin Name	Description	Remarks
1	R_{X6}	R_X pin	Pin ⑩ shorted R_X = 9R
2	R_{X5}	R_X pin	Pin ⑩ shorted R_X = 8R
3	R_{X4}	R_X pin	Pin ⑩ shorted R_X = 7R
4	R_{X3}	R_X pin	Pin ⑩ shorted R_X = 6R
5	R_{X2}	R_X pin	Pin ⑩ shorted R_X = 5R
6	R_{X1}	R_X pin	Pin ⑩ shorted R_X = 4R
7		NC	
8		NC	
9	V_{IN3}	V_3 input	
10	V_{IN2}	V_2 input	
11	V_{IN}	V_1 supply (+supply)	When V_1 > −1.0V, V_{IN} is applied. When V_1 < −1.0V, this pin is shorted to GND.
12	GND	GND	
13	V_1	V_1 output	
14	V_2	V_2 output	
15	V_3	V_3 output	
16	V_4	V_4 output	
17	V_5	V_5 output	
18	V_{CC}	V_{CC} supply (−supply)	
19	V_{IN5}	V_5 input	
20	V_{REF}	V_{REF} supply (−supply)	

Note) Do not use the NC pin.

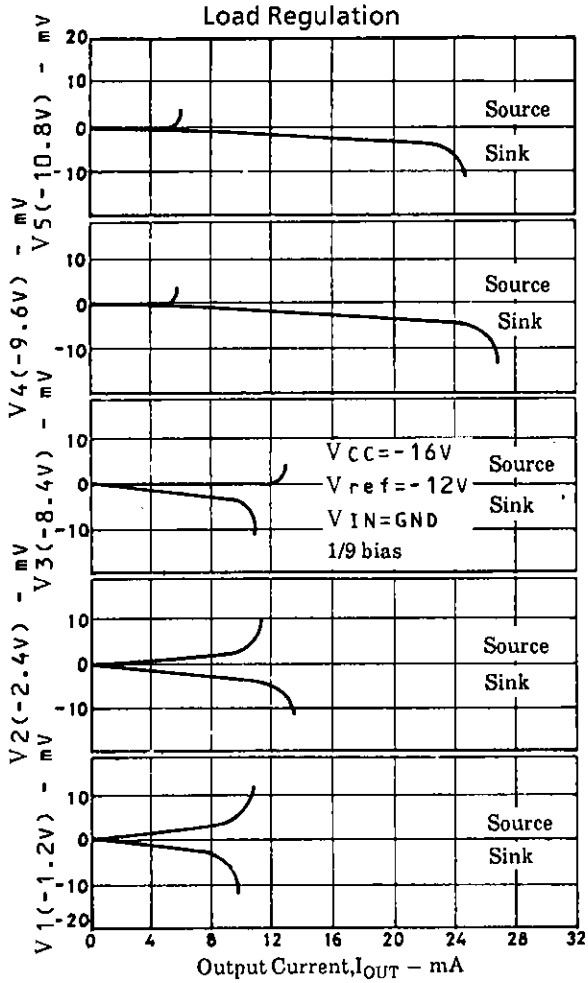
Pin Assignment



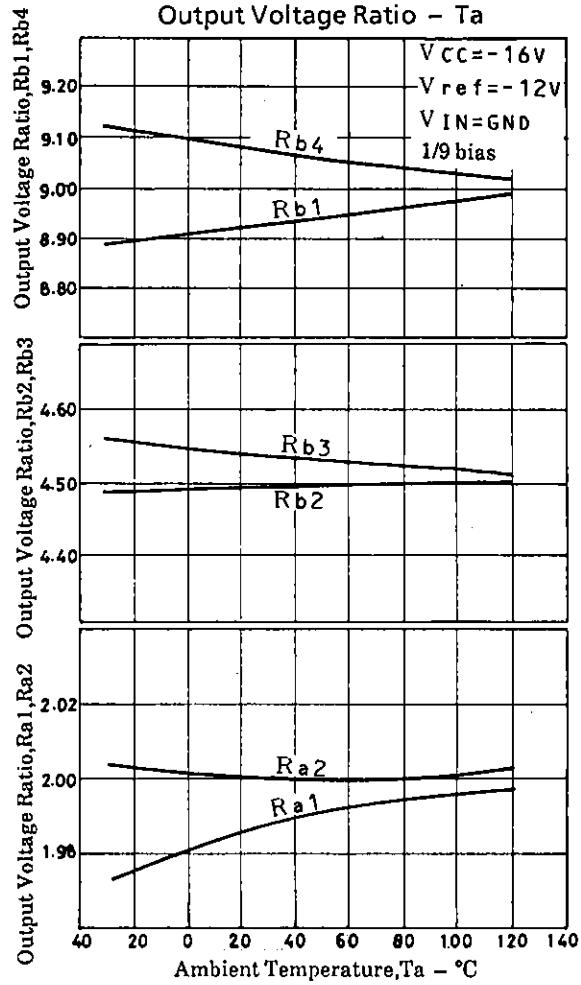
Equivalent Circuit Block Diagram



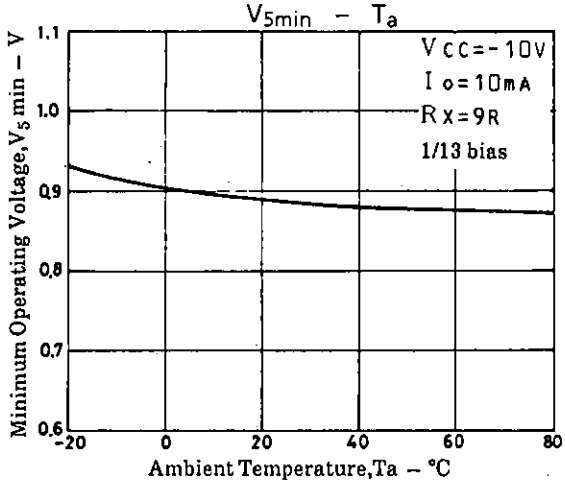
Load Regulation



Output Voltage Ratio – Ta



V_{5min} – Ta



V_{2min} – Ta