

**LA5314**

## Variable Divided Voltage Generator for LCD Use

### Overview

The LA5314 is a variable divided voltage generator IC for multiple drive of LCD matrix.

### Features

- Power supply for variable bias LCD matrix. (1/5 to 1/20 bias available by built-in resistances)
- Five operational amplifiers to deliver 5 voltage outputs
- Low current drain (1.6 mA typ)
- Miniflat package for miniturization

### Specifications

#### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	$V_{CC} - V_{EE}$	38	V
Maximum output current	$I_{OUT \text{ max}}$	V0 to V4	*±25	mA
Allowable power dissipation	$P_d \text{ max}$		600	mW
Operating temperature	$T_{opr}$		-20 to +75	°C
Storage temperature	$T_{stg}$		-30 to +150	°C

Note: 1. Continuous operation (non breakdown) is guaranteed when operated at the maximum ratings shown above.  
2. \*The maximum output current is a value specified under the conditions otherwise specified separately.

#### Operating Conditions at $T_a = 25^\circ\text{C}$

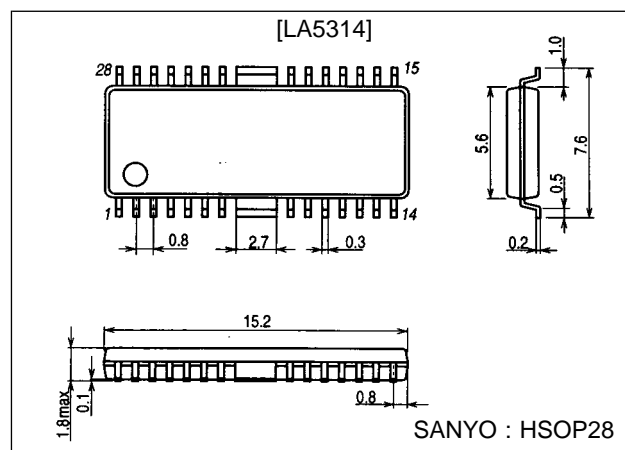
Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$	$V_{CC} - V_{EE}$	10 to 35	V
Output current	$I_{OUT0, 1}$	V0, V1	-0.5 to +10	mA
	$I_{OUT2, 3}$	V2, V3	-10 to +10	mA
	$I_{OUT4}$	V4	-15 to +0.5	mA

Note: 3. Set  $V_{CC}$  and  $V_{EE}$  so that  $|V_0 - V_1|$  and  $|V_4|$  become 1V or greater.

### Package Dimensions

unit : mm

#### 3222-HSOP28

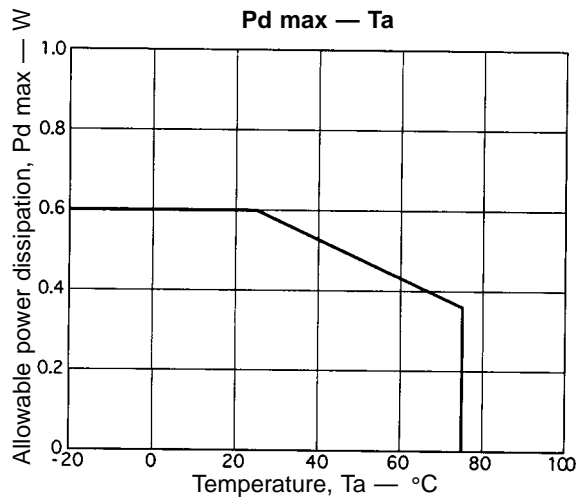


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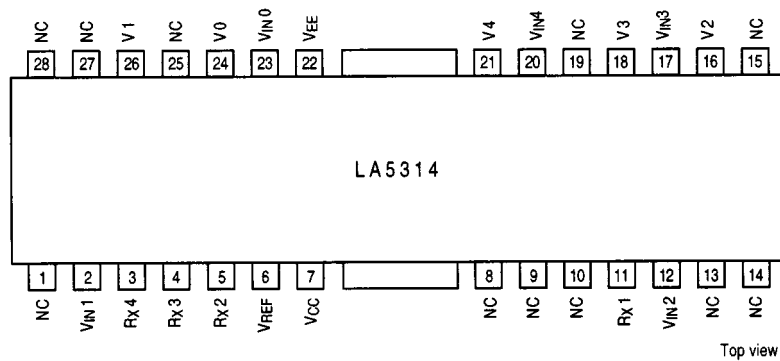
## Operating Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} - V_{EE} = 20\text{ V}$ , $V_{REF} = V_{CC}$ , $R_X = 8R$

Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	$I_{CC}, I_{EE}$	$V_{CC}, V_{EE}: V_{CC} - V_{EE} = 20\text{ V}, R_X = 8R$		1.6	3	mA
Output voltage difference 1	Vd1	$(V_0 - V_1) - (V_1 - V_2)$	-30		+30	mV
Output voltage difference 2	Vd2	$(V_3 - V_4) - (V_4 - V_{EE})$	-30		+30	mV
Output voltage ratio 1	Rb1	$V_0/(V_0 - V_1)$	11.64	12.00	12.36	—
Output voltage ratio 2	Rb2	$V_0/(V_0 - V_2)$	5.82	6.00	6.18	—
Output voltage ratio 3	Rb3	$V_0/V_3$	5.82	6.00	6.18	—
Output voltage ratio 4	Rb4	$V_0/V_4$	11.64	12.00	12.36	—
Internal resistnace ratio 1	8R	$R_{X1} - R_{X2}^*$		8		—
Internal resistance ratio 2	12R	$R_{X1} - R_{X3}^*$		12		—
Internal resistance ratio 3	14R	$R_{X1} - R_{X4}^*$		14		—
Internal resistance ratio 4	15R	$R_{X1} - V_{IN3}^*$		15		—
Resistance	R	R value when 0.6 V is applied across $R_{X5} - R_{X6}$ :		20		k $\Omega$
Load regulation 1	$\Delta V_0$	$V_0: -0.2\text{ mA} < I_{OUT0} < +10.0\text{ mA}$	-20		+20	mV
Load regulation 2	$\Delta V_1$	$V_1: -0.2\text{ mA} < I_{OUT1} < +10.0\text{ mA}$	-20		+20	mV
Load regulation 3	$\Delta V_2$	$V_2: -10.0\text{ mA} < I_{OUT2} < +10.0\text{ mA}$	-20		+20	mV
Load regulation 4	$\Delta V_3$	$V_3: -10.0\text{ mA} < I_{OUT3} < +10.0\text{ mA}$	-20		+20	mV
Load regulation 5	$\Delta V_4$	$V_4: -10.0\text{ mA} < I_{OUT4} < +0.2\text{ mA}$	-20		+20	mV

Note\* : Referenced to R between  $R_{X4}$  and  $V_{IN3}$



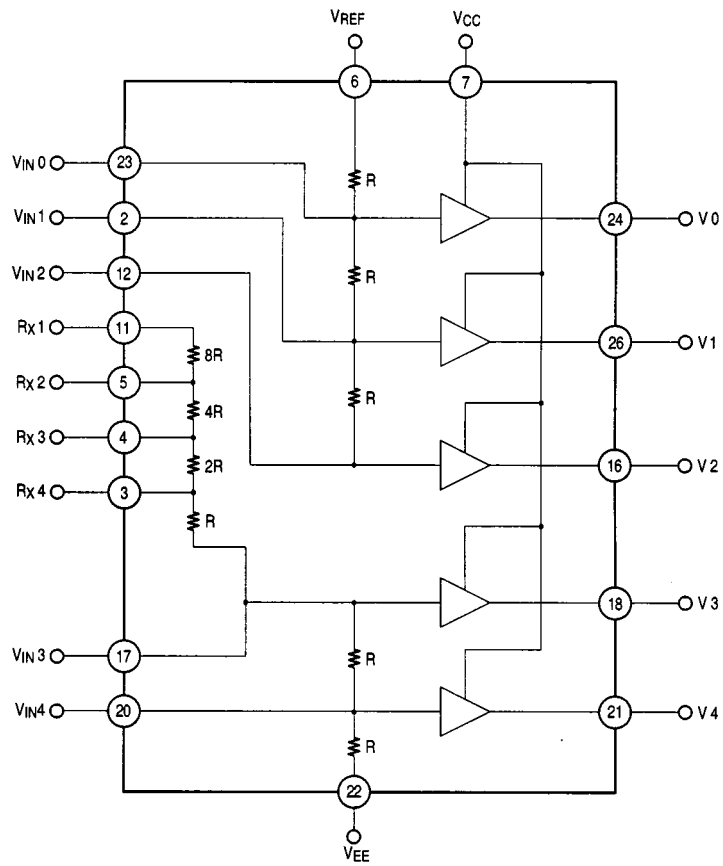
## Pin Assignment



T00025

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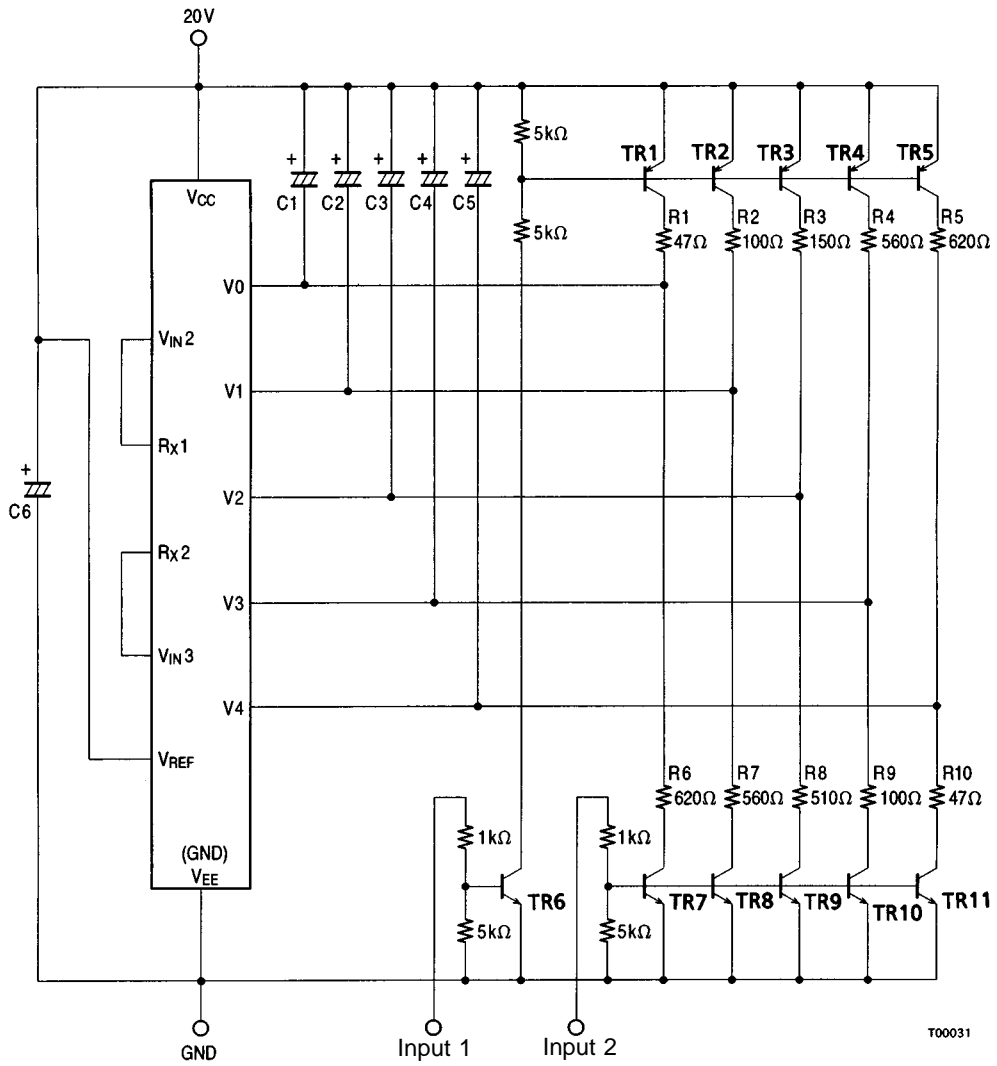
## Block Diagram



T00024

Note: Use the IC so that  $V_{RX1} \cong V_{RX2} \cong V_{RX3} \cong V_{RX4}$  is obeyed.

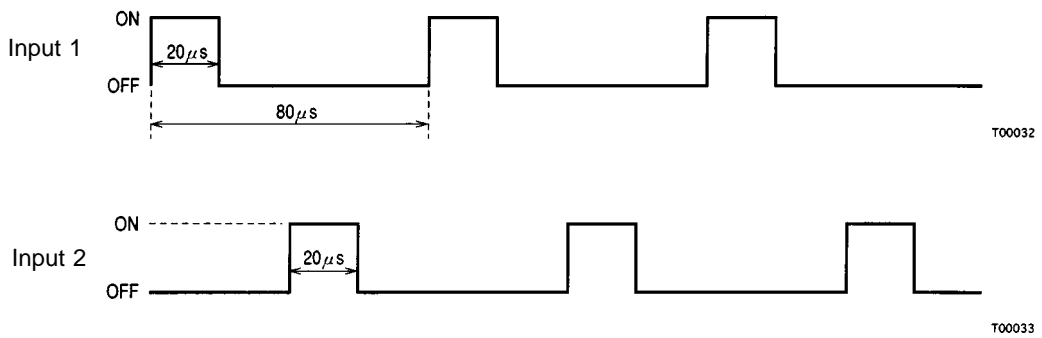
Maximum Output Current Load Test Conditions

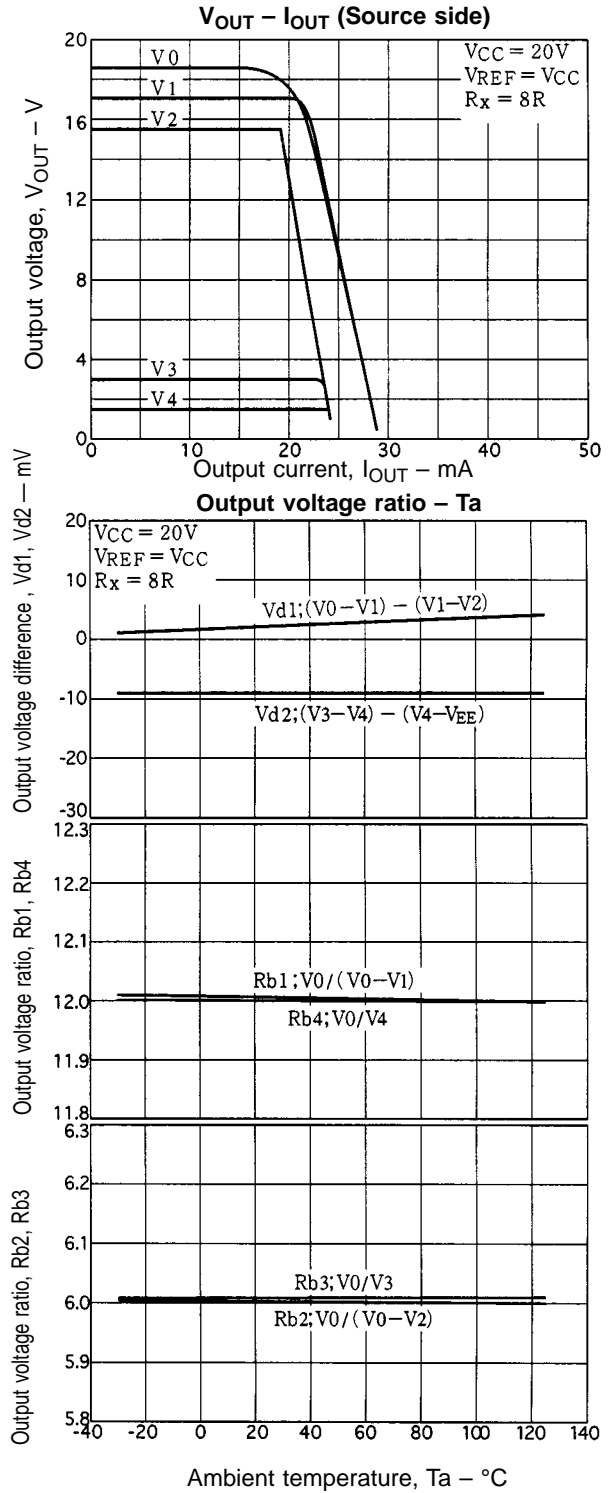
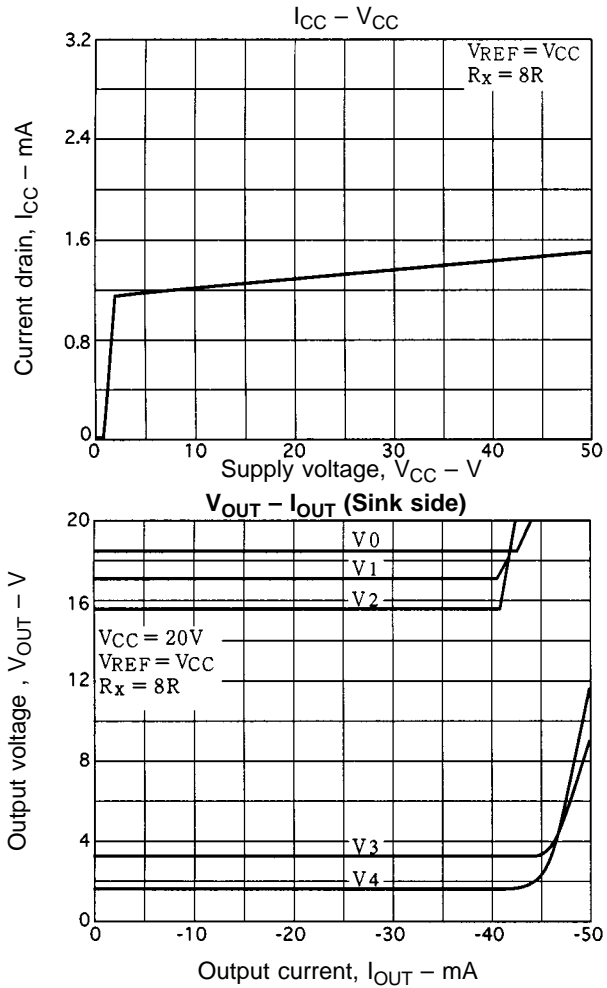


$V_{CC} - V_{EE} = 20\text{ V}$ ,  $R_X = 8R$   
 $C1 = 5\ \mu\text{F}$ ,  $C2 = 10\ \mu\text{F}$ ,  $C3 = 10\ \mu\text{F}$ ,  $C4 = 5\ \mu\text{F}$ ,  $C5 = 10\ \mu\text{F}$ ,  $C6 = 33\ \mu\text{F}$   
 TR1 to TR5: 2SA984 E or F rank  
 TR6 to TR11: 2SC2274 E or F rank

Unit (resistance:  $\Omega$ , capacitance: F)

Output load resistances R1 to R10 are set in order that current of 30 mA max. are supplied to both source and sink sides when an on-level input is applied to the inputs 1 or 2.





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