

**LA5312V****Variable Divided Voltage Generator for LCDs****Overview**

The LA5312V is a variable divided voltage generator IC for multiple drive of LCD matrix.

Features

- Power supply for variable bias LCD drive (1/5 to 1/19 bias available by internal resistors)
- Four voltage outputs generated by four operational amplifiers.
- Low current drain (0.18 mA typ.)
- Miniflat package for miniaturization.

Specifications**Maximum Ratings at Ta = 25°C**

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{EE\ max}$	$V_{CC} - V_{EE}$	36	V
Maximum output current	$I_{OUT\ max}$	V1 – V4	*Internal	mA
Allowable power dissipation	$P_d\ max$		330	mW
Operating temperature	T_{opr}		–20 to +75	°C
Storage temperature	T_{stg}		–30 to +125	°C

Note 1: Continuous operation (without damage) is guaranteed in the above ranges.

Note 2: *The maximum output current is the value stipulated under the test conditions on page 4.

Note 3: Output pins V1 to V4-to- V_{CC} or GND short not exceeding 1 ms is acceptable. ($|V_{CC} - V_{EE}| < 35\ V$)

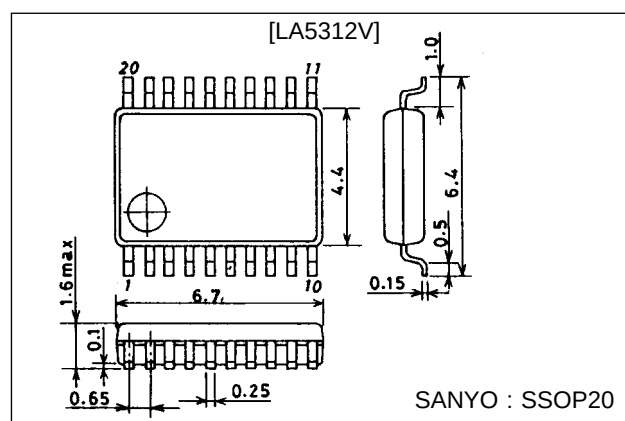
Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{EE}	$V_{CC} - V_{EE}$	–35.5 to –6	V
Input voltage	V_{REF}	$V_{REF} \geq V_{EE} : V_{CC} - V_{REF}$	–35 to –6	V
Output current	$I_{OUT1,2}$	V1, V2	–0.5 to +5	mA
	$I_{OUT3,4}$	V3, V4	–10 to +5	mA

Note 4: Set V_{CC} and V_{EE} so that $|V1|$ and $|V_{EE} - V4|$ are 1 V or more.

Package Dimensions

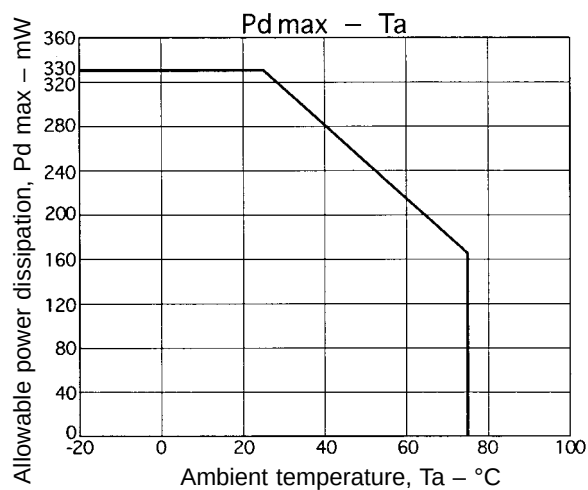
unit : mm

3179-SSOP20

LA5312V

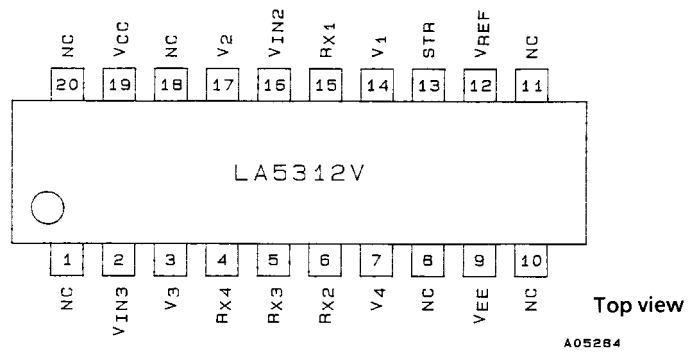
Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} - V_{EE} = 20\text{ V}$, $V_{REF} = V_{EE}$, $R_X = 8\text{ R}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	I_{CC}, I_{EE}	$STR = 5\text{ V} : V_{CC}, V_{EE}$		0.18	0.3	mA
Input current	I_{STR}	$STR = 5\text{ V} : STR$		9	12	μA
Output voltage ratio	Ra1	V_2 / V_1	1.96	2.00	2.04	—
	Ra2	$(V_{REF} - V_3) / (V_{REF} - V_4)$	1.96	2.00	2.04	—
	Rb1	V_{REF} / V_1	11.64	12.00	12.36	—
	Rb2	V_{REF} / V_2	5.82	6.00	6.18	—
	Rb3	$V_{REF} / (V_{REF} - V_3)$	5.82	6.00	6.18	—
	Rb4	$V_{REF} / (V_{REF} - V_4)$	11.64	12.00	12.36	—
Internal resistance ratio	R_{X1}	Referenced to R across : $R_{X1} - R_{X2}$: $R_{X1} - R_{X3}$ R_{X4} and V_{IN3} : $R_{X1} - R_{X4}$: $R_{X1} - V_{IN3}$		8		—
	R_{X2}			12		—
	R_{X3}			14		—
	R_{X4}			15		—
Resistance value	R	R value when voltage is applied across R_{X4} and V_{IN3} is 0.5 V : $R_{X4} - V_{IN3}$		30		k Ω
Load regulation	ΔV_1	+0.1 mA < I_{OUT1} < +5 mA : V1			± 20	mV
	ΔV_2	+0.1 mA < I_{OUT2} < +5 mA : V2			± 20	mV
	ΔV_3	+0.1 mA < I_{OUT3} < +5 mA : V3			± 20	mV
	ΔV_4	+0.1 mA < I_{OUT4} < +5 mA : V4			± 20	mV
	$-\Delta V_1$	-0.5 mA < I_{OUT1} < -0.1 mA : V1			± 20	mV
	$-\Delta V_2$	-0.5 mA < I_{OUT2} < -0.1 mA : V2			± 20	mV
	$-\Delta V_3$	-10 mA < I_{OUT3} < -0.1 mA : V3			± 20	mV
	$-\Delta V_4$	-10 mA < I_{OUT4} < -0.1 mA : V4 (Source I_{OUT} is negative and sink I_{OUT} is positive).			± 20	mV

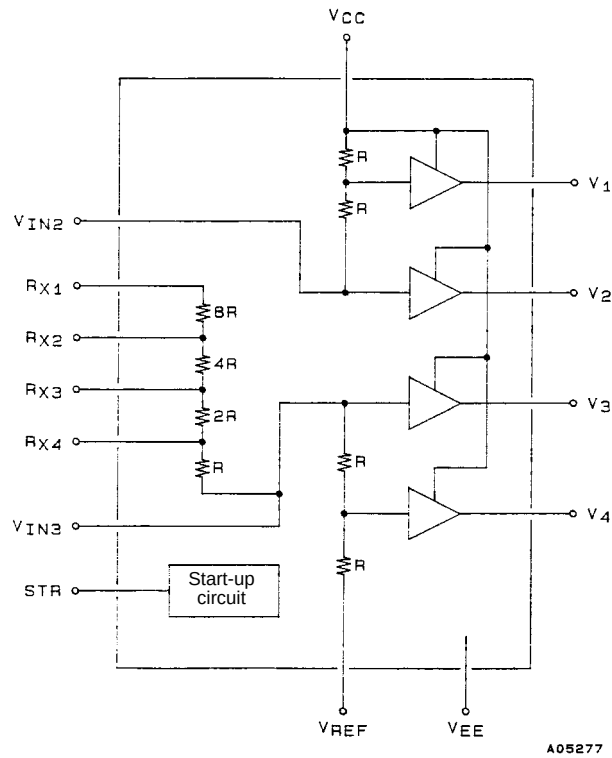


LA5312V

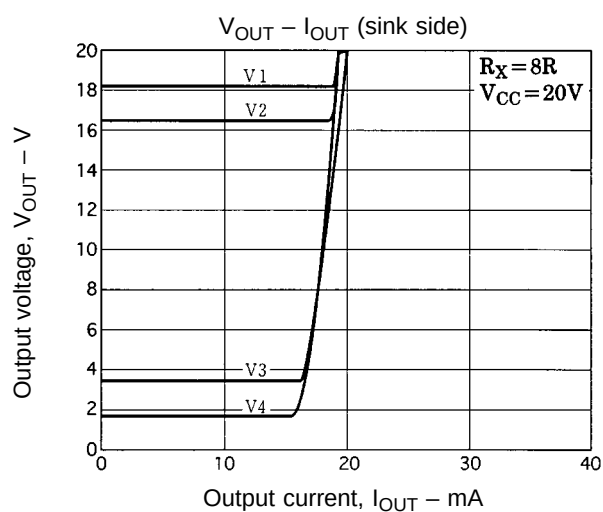
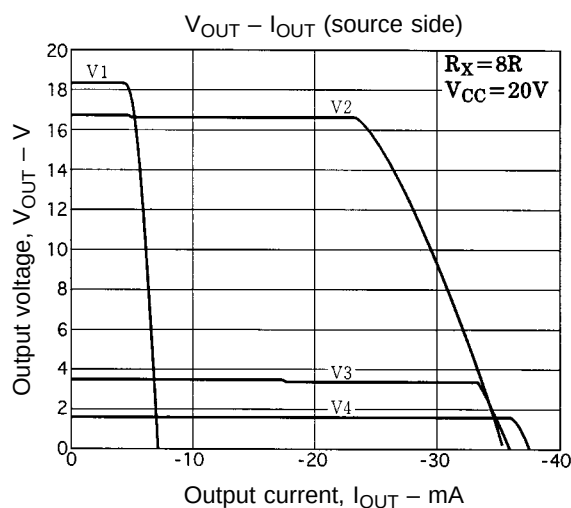
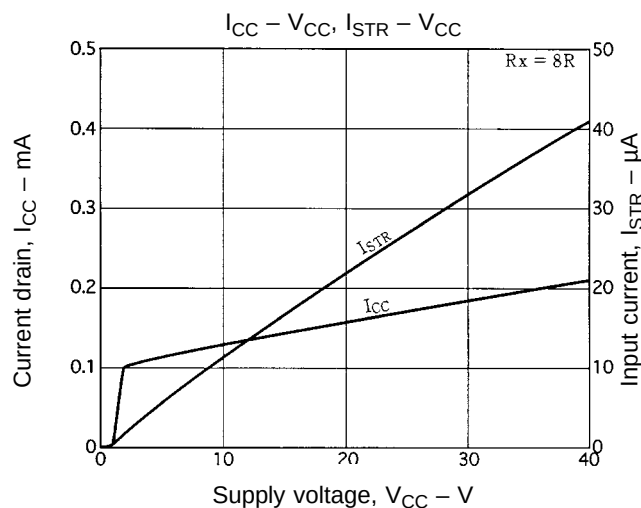
Pin Assignment



Block Diagram



(The voltages V_{RX1} , V_{RX2} , V_{RX3} , and V_{RX4} must obey the relationship $V_{RX1} \geq V_{RX2} \geq V_{RX3} \geq V_{RX4}$).



- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of May, 1996. Specifications and information herein are subject to change without notice.