



SANYO Semiconductors

DATA SHEET

LA3210

Monolithic Linear IC For Cassette Tape Recorders, Radio Cassette Recorders Equalizer Amplifier with ALC

Overview

The LA3210 is a low-noise equalizer amplifier with ALC for cassette tape recorders, radio cassette recorders.

Features

- Low noise.
- Wide automatic level control range.
- Good reduced voltage characteristics.

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		15	V
Current dissipation in amplifier	I _{CC} max		3.0	mA
Allowable current in ALC transistor	I ₆ max		3.5	mA
Allowable power dissipation	P _d max		200	mW
Operating temperature	T _{opr}		-20 to +80	°C
Storage temperature	T _{stg}		-40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		5	V
Recommended load resistance	R _L		5.1	kΩ

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LA3210

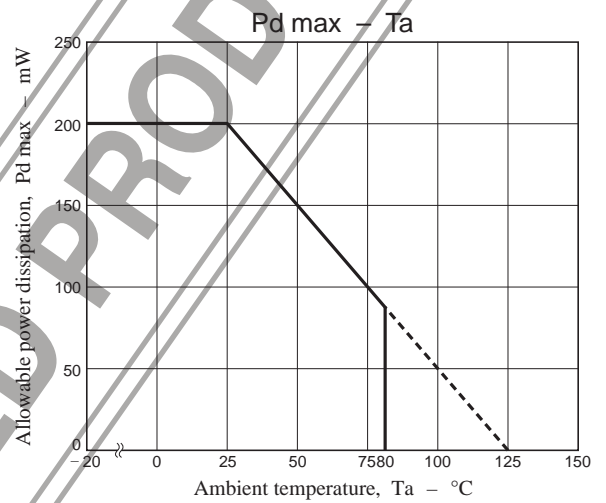
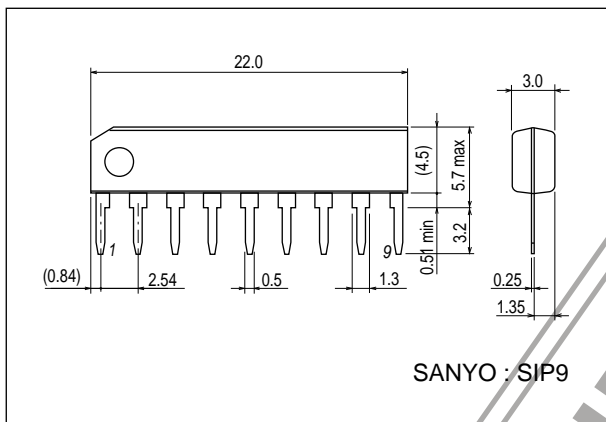
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$, $R_L = 5.1\text{k}\Omega$, $R_g = 600\Omega$, $f = 1\text{kHz}$, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current dissipation	I_{CC}	$V_i = 0$, ALC off		1.4	2.0	mA
Voltage gain	V_{GO}	Open loop	66	69		dB
	V_G	Closed loop	33	35	37	dB
Output voltage	V_O	THD = 1%	0.7	1.0		V
Total harmonic distortion	THD	$V_O = 0.2\text{V}$		0.1		%
Input resistance	r_i		60	100		$\text{k}\Omega$
Equivalent input noise voltage	V_{NI}	$R_g = 2.2\text{k}\Omega$, NAB		1	2	μV
ALT transistor saturation voltage	V_{sat}			75	100	mV

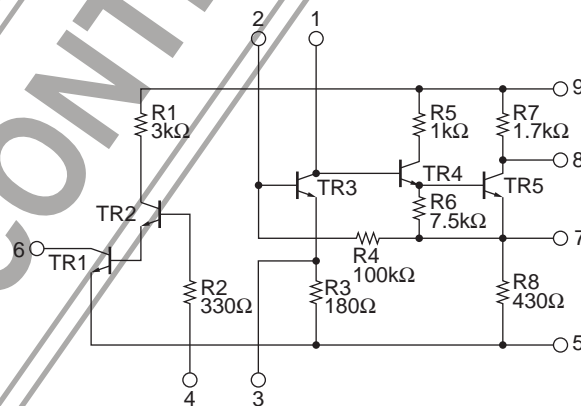
Package Dimensions

unit : mm (typ)

3017D



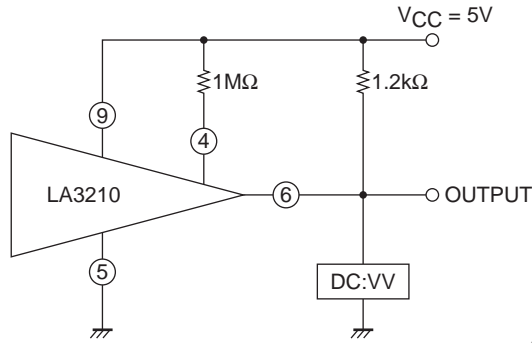
Equivalent Circuit



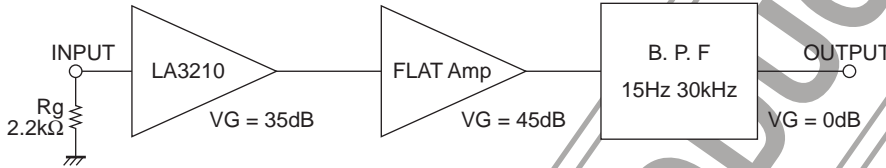
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Test Circuit

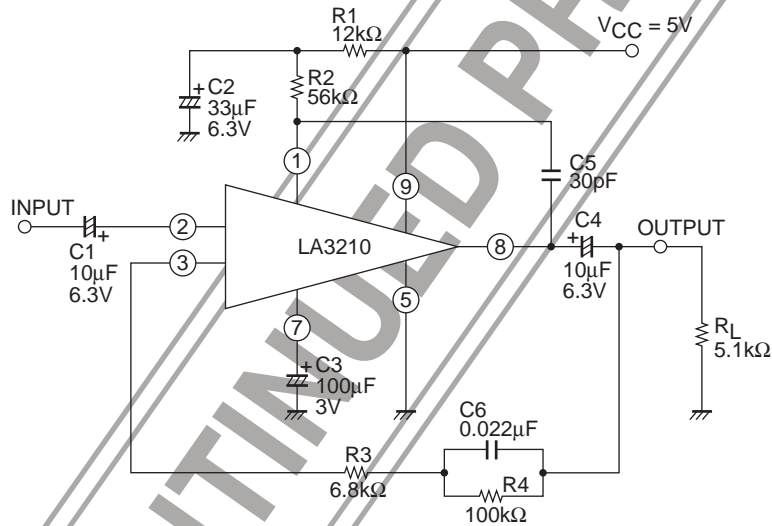
- ALC Saturation Voltage



- Noise Voltage

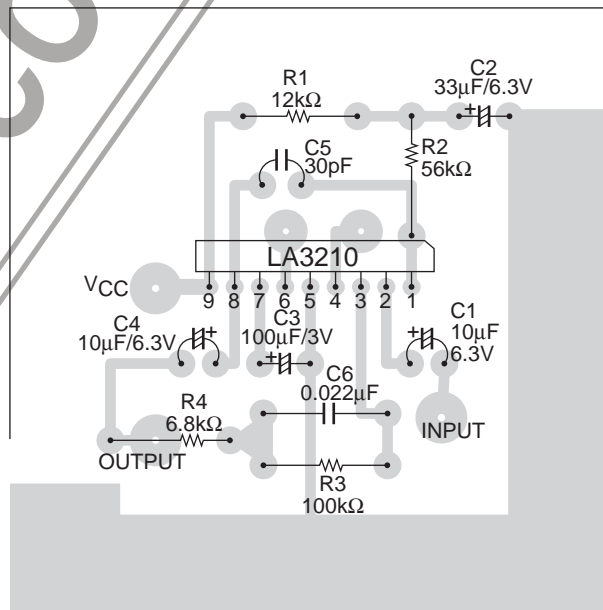


Sample Application Circuit : Equalizer Amplifier with Automatic Level Control designed for Cassette Tape Recorder, Radio



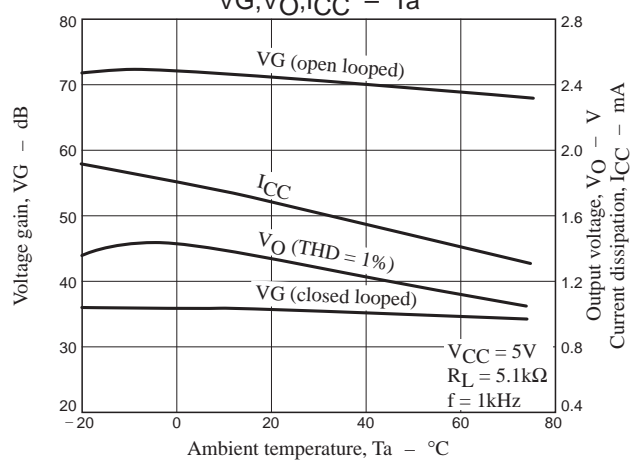
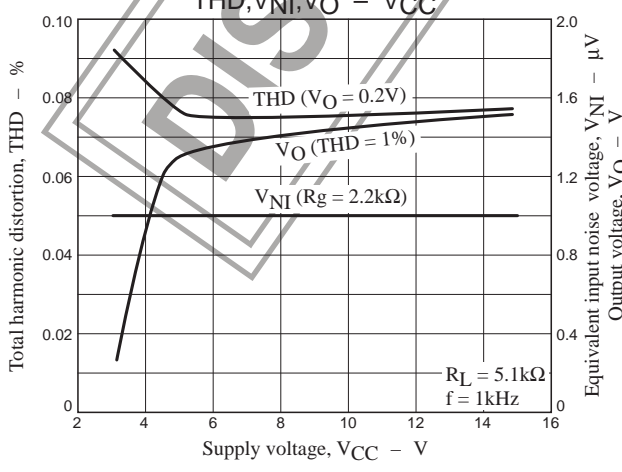
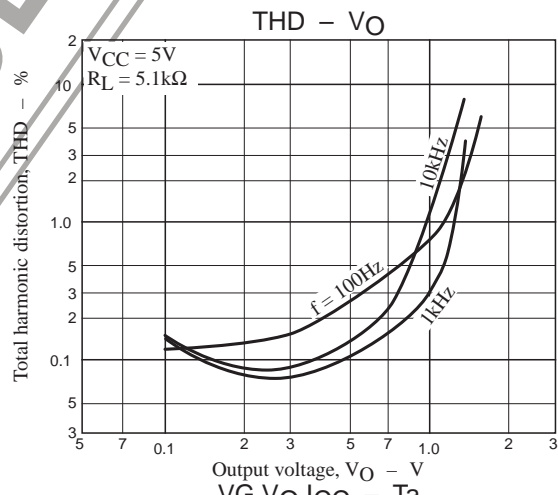
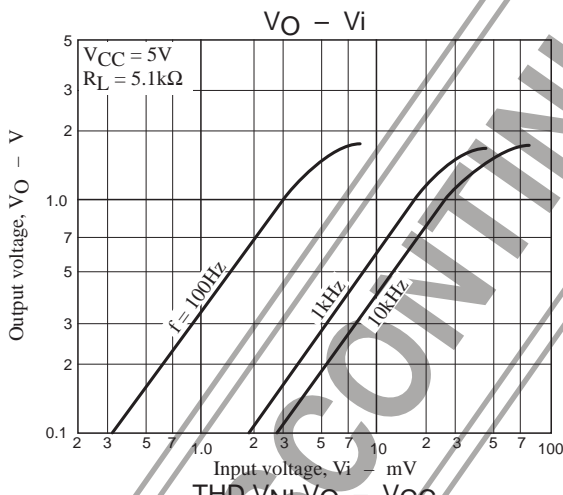
Sample Printed Circuit Pattern

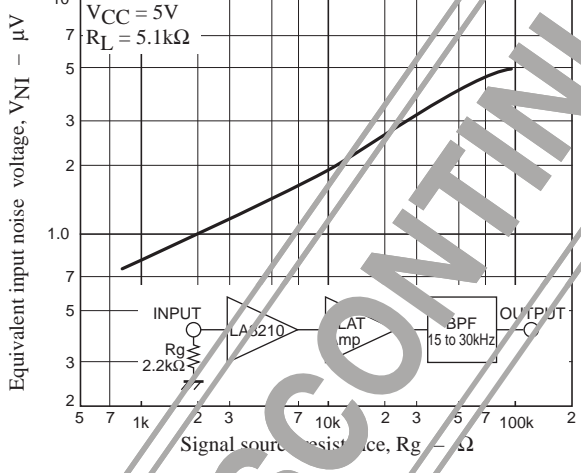
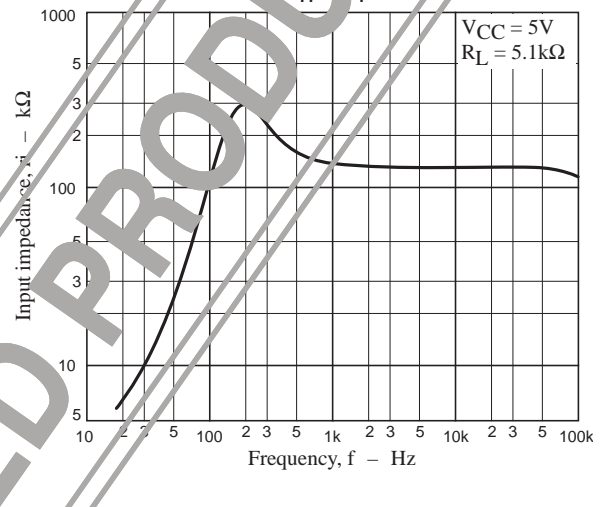
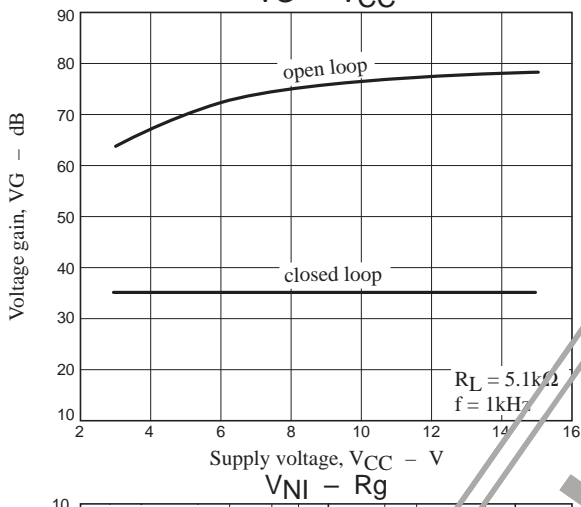
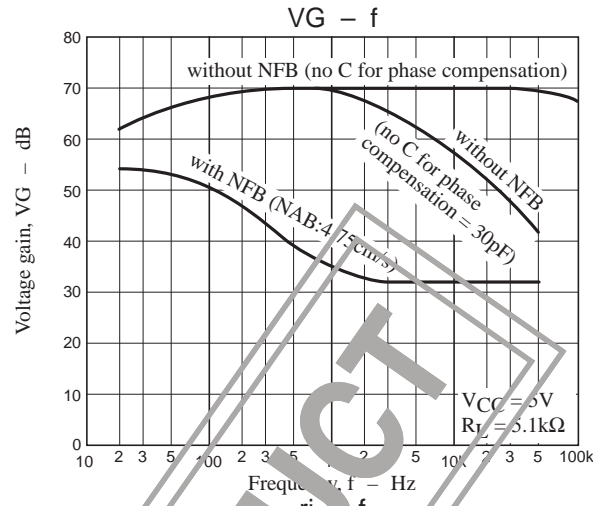
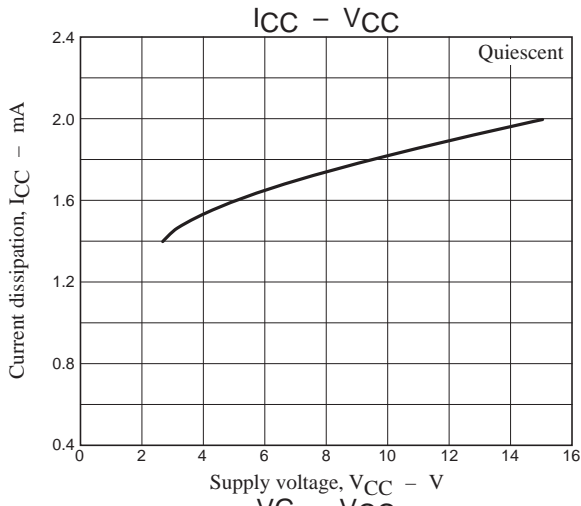
(Cu-foiled side, 60×60mm²)



Description of External Parts

- C1 : Input coupling capacitor (10μF)
DC current blocking capacitor used to prevent the DC current applied to the base from mixing in the AC signal source.
The C1 is calculated using $C1 = 1/2\pi f_T z_i$ (z_i : input resistance, f_T : low cutoff frequency). If the capacitance value is too decreased, your set is subjected to inductive hum. We recommend using a capacitor of 2.2μF or greater. We also recommend using 6.3V or greater because the chemical capacitor becomes less leaky as the withstand voltage gets higher.
- C2 : Decoupling capacitor (33μF)
Used to bypass the power source ripple.
Decreasing the capacitance value makes the starting time shorter. We recommend using a capacitor of 33μF.
- C3 : Bypass capacitor (100μF)
Used to AC-Short the emitter resistance and prevent AC components from being fed back to the input.
- C4 : Output capacitor (10μF)
Used to block DC components and pass AC Components only.
The C4 is calculated using $C4 = 1/1\pi f_L \cdot R_L$ (f_L : low cutoff frequency, R_L : load resistance).
- C5 : Phase compensation capacitor (30pF)
Used to prevent high-frequency oscillation caused by phase shift when a deep feedback is provided. It should be noted that the high frequency response depends on the capacitance value of C5.
- R1 : Decoupling resistor used to bypass the power source ripple through C2.
- R2 : Collector resistor of the first stage transistor of IC. Taken as load resistance in terms of AC.
- C6, R3, R4 : Equalizer parts on which the closed-loop voltage gain depends. NAB 4.75cm/s is provided.





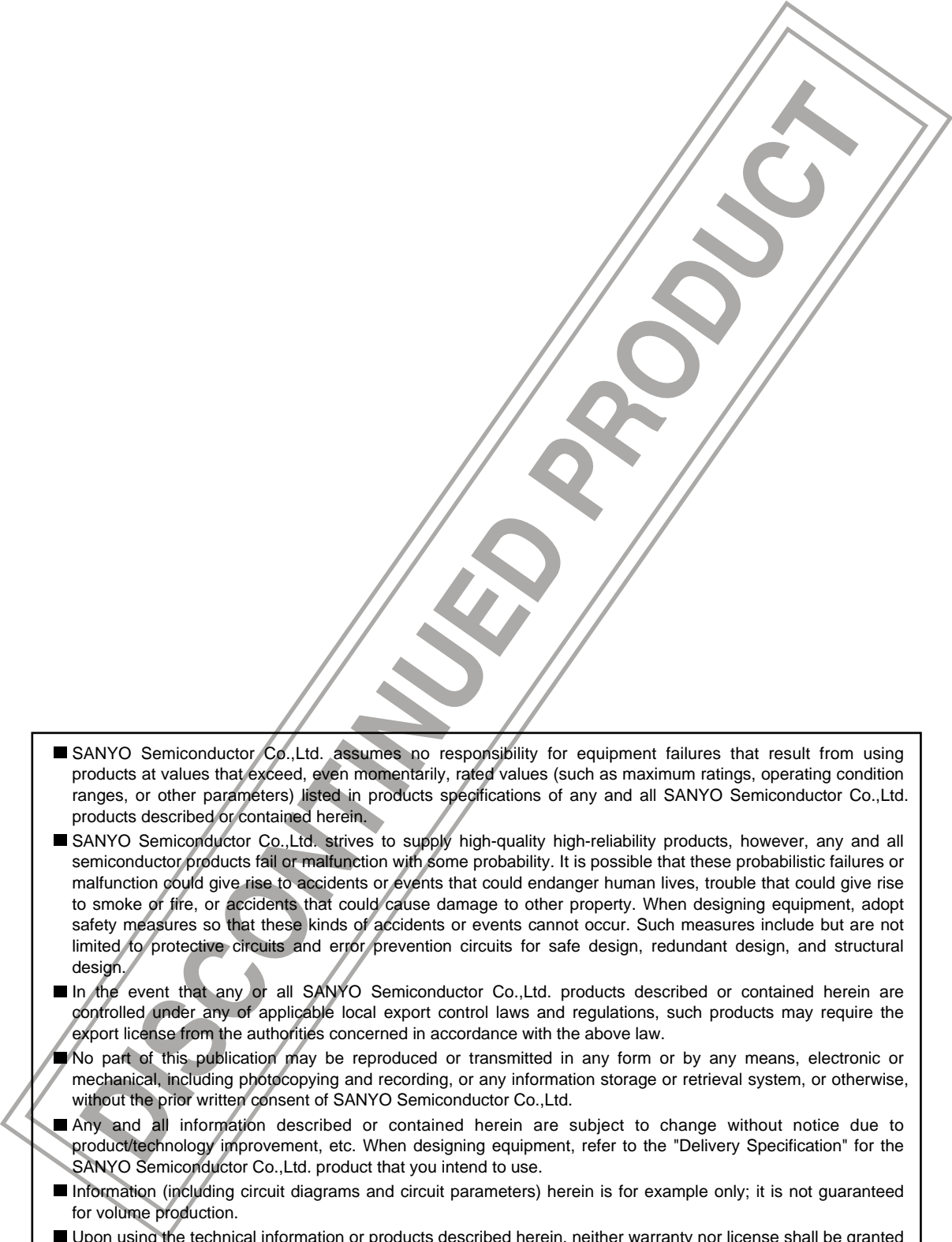
Proper cares in using IC

1. Maximum Rating

If the IC is used in the vicinity of the maximum rating, even a slight variation in conditions may cause the maximum rating to be exceeded, thereby leading to a breakdown. Allow an ample margin of variation for supply voltage, etc. and use the IC in the range where the maximum rating is not exceed.

2. Pin-to-pin Short

If the supply voltage is applied when the space between pins is shorted, a breakdown or deterioration may occur. When installing the IC on the board or applying the supply voltage, make sure that the space between pins is not shorted with solder, etc.

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