

| | | |
|---|---------|----------------------|
| SANYO | No.2896 | Monolithic Linear IC |
| | | LA7220M |
| 3-Channel 2-Position Electronic Switch for VCR / Audio Use | | |

The LA7220M is a 3-channel 2-position high-performance analog switch having wide application from audio band to video band. It is also provided with 2 channels of muting function.

Features

- 3-channel 2-position switch
- Wide input dynamic range
- Low distortion
- Good frequency characteristic
- Muting available

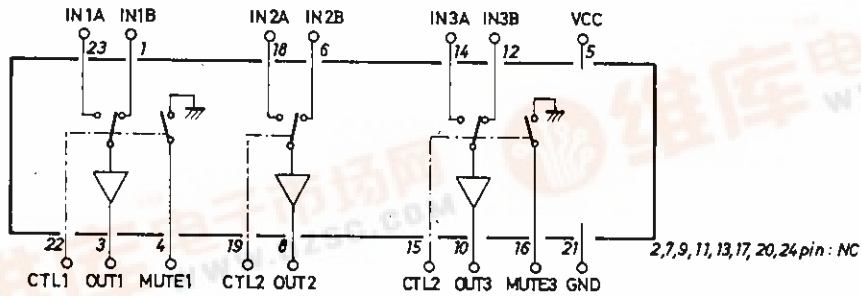
Maximum Ratings at Ta = 25°C

| | | | | |
|-----------------------------|---------------------|-------------|----|-----------|
| Maximum Supply Voltage | V _{CC} max | 15 | V | unit |
| Allowable Power Dissipation | P _d max | 500 | mW | Ta ≤ 65°C |
| Operating Temperature | T _{opr} | -20 to +65 | °C | |
| Storage Temperature | T _{stg} | -40 to +125 | °C | |

Operating Conditions at Ta = 25°C

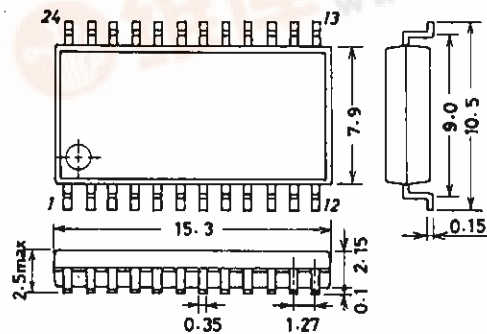
| | | | | |
|----------------------------|--------------------|---------|---|------|
| Recommended Supply Voltage | V _{CC} | 12 | V | unit |
| Operating Voltage Range | V _{CC} op | 9 to 13 | V | |

Equivalent Circuit Block Diagram



Package Dimensions

(unit : mm)
3045B



SANYO : MFP24



LA7220M

| Operating Characteristics at Ta = 25°C, V _{CC} = 12V | | | | min | typ | max | unit |
|---|--------------------|---|-----------|-------|------|------|------|
| Current Dissipation | I _{CC} | | | | 30.0 | 39.9 | mA |
| Total Harmonic Distortion | THD | *1, R _g = 600Ω, 4.5Vp-p, f = 1kHz R _L = ∞ | | 0.007 | | 0.1 | % |
| Noise Voltage | V _{NO} | *1, R _g = 600Ω, f = 20Hz to 20kHz R _L = ∞ | | -93 | | -80 | dBs |
| Crosstalk | 1ch CR1 | *2, Input 1: R _g = 50Ω, 2Vp-p, f = 3.58MHz, Input 2: R _g = 500Ω | | -50 | | | dB |
| | 2ch CR2 | *2, Input 1: R _g = 50Ω | | -60 | | | dB |
| | 3ch CR3 | *2, Input 1: R _g = 50Ω | | -50 | | | dB |
| Pedestal Level | ΔV _{ped} | *1, V _{CTL} (Pins 10, 13, 15) = 0 to 12V | -100 | 0 | +100 | | mV |
| Maximum Input Voltage | v _{inmax} | *1, R _g = 600Ω, f = 1kHz, R _L = ∞, THD = 1% | 5.0 | | | | Vp-p |
| 2nd Harmonic Voltage | H2 | *1, R _g = 50Ω, 4.0Vp-p, f = 1MHz, R _L = ∞ | -46 | -55 | | | dB |
| 3rd Harmonic Voltage | H3 | *1, " | -46 | -55 | | | dB |
| Switch Changeover Voltage | V _{CTLs} | *1 | 2.6 | 3.1 | 4.0 | | V |
| Mute Threshold Voltage | V _{ML} | *3, L Level, mute threshold voltage | 1.1 | 1.5 | 1.9 | | V |
| | V _{MH} | *3, H Level, mute threshold voltage | 6.6 | 7.3 | 8.0 | | V |
| Crosstalk between Channels | | | | | | | |
| | 1ch | *4, R _g = 500Ω, R _L = ∞, other channel input R _g = 50Ω, 2Vp-p, f = 3.58MHz | -50 | -68 | | | dB |
| | 2ch | *4, " | -50 | -68 | | | dB |
| | 3ch | *4, " | -50 | -68 | | | dB |
| Mute Compression Ratio | | *3, R _g = 600Ω, 2Vp-p, f = 1kHz, R _L = ∞, series resistance 10kΩ | | -60 | | | dB |
| Control Pin Flow-in Current | I _{CTL} | *1 | | | | 8 | μA |
| Input Impedance | z _{in} | *1 | | | | 10 | kΩ |
| Output Impedance | z _{out} | *1 | | | | 29 | Ω |
| Pin Voltage | (Pin 1) | V1 | V22 = 0V | | | 7.9 | V |
| " | (Pin 1) | V1 | V22 = 12V | | | 7.9 | V |
| " | (Pin 3) | V3 | | | | 7.2 | V |
| " | (Pin 6) | V6 | V19 = 0V | | | 7.9 | V |
| " | (Pin 6) | V6 | V19 = 12V | | | 7.9 | V |
| " | (Pin 8) | V8 | | | | 7.2 | V |
| " | (Pin 10) | V10 | | | | 7.2 | V |
| " | (Pin 12) | V12 | V15 = 0V | | | 7.9 | V |
| " | (Pin 12) | V12 | V15 = 12V | | | 7.9 | V |
| " | (Pin 14) | V14 | V15 = 0V | | | 7.9 | V |
| " | (Pin 14) | V14 | V15 = 12V | | | 7.9 | V |
| " | (Pin 18) | V18 | V19 = 0V | | | 7.9 | V |
| " | (Pin 18) | V18 | V19 = 12V | | | 7.9 | V |
| " | (Pin 23) | V23 | V22 = 0V | | | 7.9 | V |
| " | (Pin 23) | V23 | V22 = 12V | | | 7.9 | V |

*1 Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.

Input A : V_{CTL}(pins 10, 13, 15) is 12V at the measurement mode.

Input B : V_{CTL} is 0V at the measurement mode.

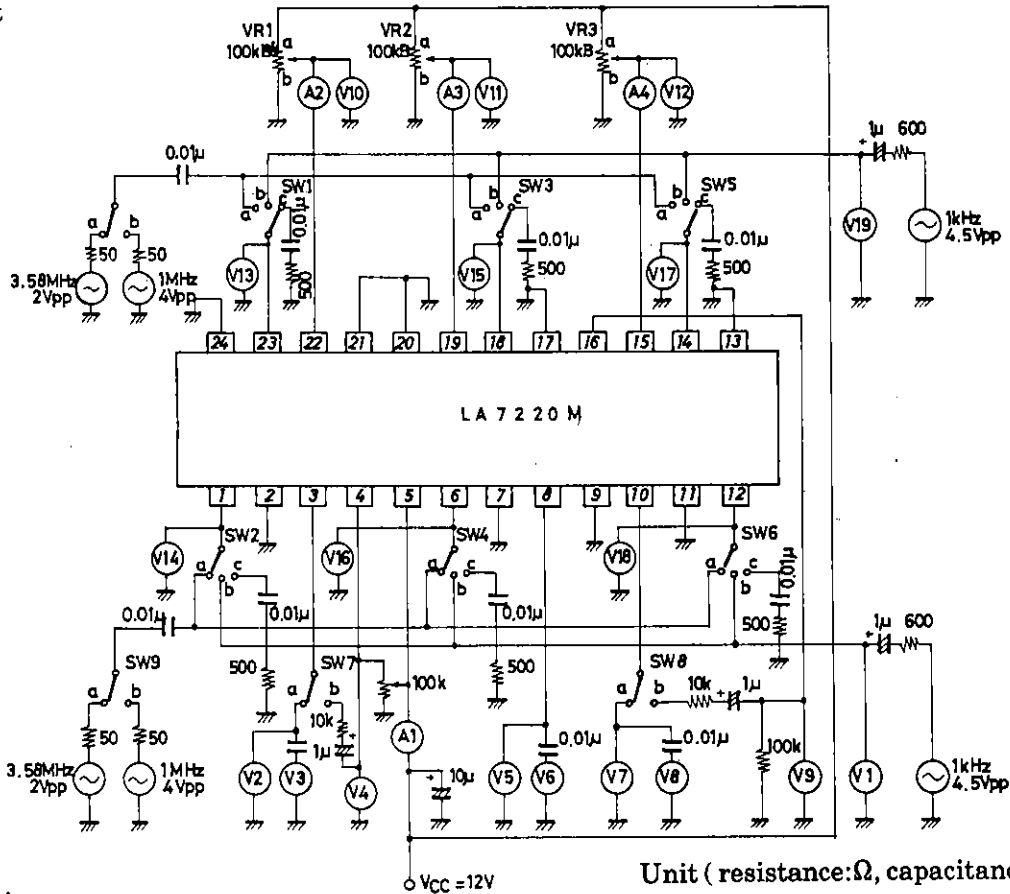
*2 Measurements are made using input A and input B.

*3 Measurements are made for 1ch, 3ch.

*4 Measurements are made for each of 1ch, 2ch, 3ch using input A and input B on other channel.

LA7220M

Test Circuit



Test Conditions

| Item | Symbol | SW VR Mode | | | | | | | | | | | | | Test Point |
|---------------------------|--------------------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | | |
| Current Dissipation | I _{CC} | c | c | c | c | c | c | c | a | a | a | b | b | b | A1 |
| Total Harmonic Distortion | 1 chA THD | b | c | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB THD | c | b | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA THD | c | c | b | c | c | c | c | a | a | a | b | a | b | V6 |
| | 2 chB THD | c | c | c | b | c | c | c | a | a | a | b | b | b | V6 |
| | 3 chA THD | c | c | c | c | c | b | c | a | a | a | b | b | a | V8 |
| | 3 chB THD | c | c | c | c | c | c | b | a | a | a | b | b | b | V8 |
| Noise | 1 chA V _{N0} | c | c | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB V _{N0} | c | c | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA V _{N0} | c | c | c | c | c | c | c | a | a | a | b | a | b | V6 |
| | 2 chB V _{N0} | c | c | c | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3 chA V _{N0} | c | c | c | c | c | c | c | a | a | a | b | b | a | V8 |
| | 3 chB V _{N0} | c | c | c | c | c | c | c | a | a | a | b | b | b | V8 |
| Crosstalk | 1 chA CR1 | c | a | c | c | c | c | c | a | a | a | a | b | b | V3 |
| | 1 chB CR1 | a | c | c | c | c | c | c | a | a | a | b | b | b | V3 |
| | 2 chA CR2 | c | c | c | a | c | c | c | a | a | a | b | a | b | V6 |
| | 2 chB CR2 | c | c | c | a | c | c | c | a | a | a | b | b | b | V6 |
| | 3 chA CR3 | c | c | c | c | c | c | a | a | a | a | b | b | a | V8 |
| | 3 chB CR3 | c | c | c | c | a | c | a | a | a | a | b | b | b | V8 |
| Pedestal | 1 ch ΔV _{PED} | c | c | c | c | c | c | c | a | a | a | a/b | b | b | V2 |
| | 2 ch ΔV _{PED} | c | c | c | c | c | c | c | a | a | a | b | a/b | b | V5 |
| | 3 ch ΔV _{PED} | c | c | c | c | c | c | c | a | a | a | b | b | a/b | V7 |
| Maximum Input Voltage | 1 chA V _{inmax} | b | c | c | c | c | c | c | a | a | a | a | b | b | V19 |
| | 1 chB V _{inmax} | c | b | c | c | c | c | c | a | a | a | b | b | b | V1 |
| | 2 chA V _{inmax} | c | c | b | c | c | c | c | a | a | a | b | a | b | V19 |
| | 2 chB V _{inmax} | c | c | c | b | c | c | c | a | a | a | b | b | b | V1 |
| | 3 chA V _{inmax} | c | c | c | c | b | c | c | a | a | a | b | b | a | V19 |
| | 3 chB V _{inmax} | c | c | c | c | c | c | b | a | a | a | b | b | b | V1 |

LA7220M

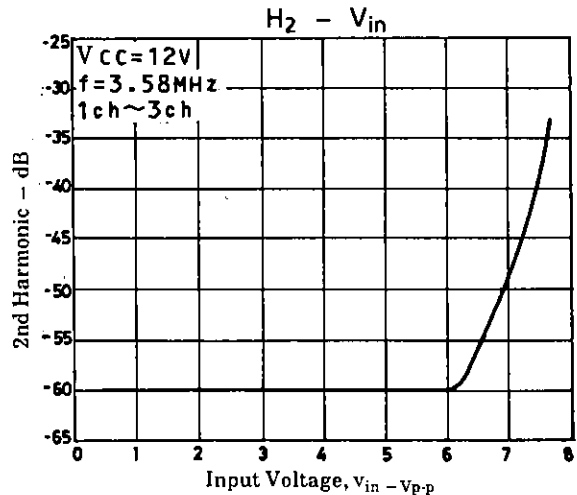
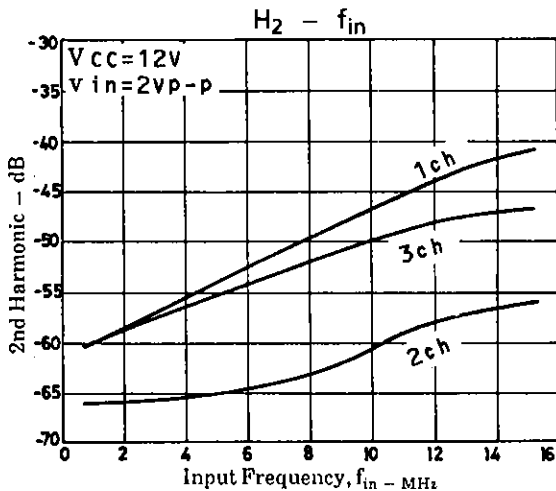
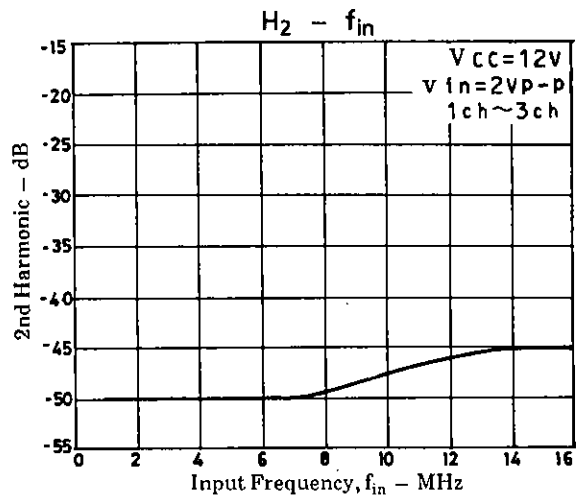
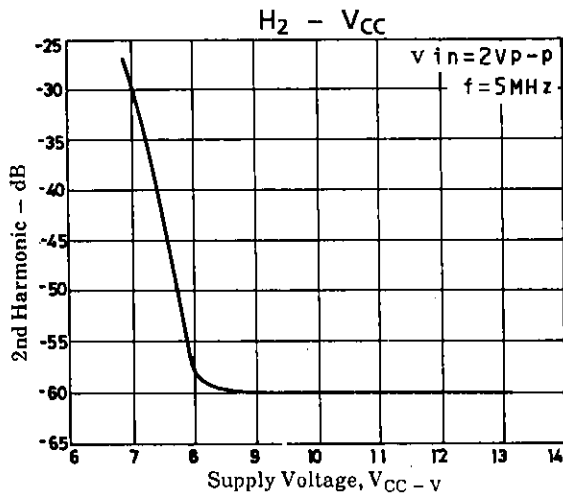
| Item | Symbol | SW VR Mode | | | | | | | | | | | | Test Point | |
|-----------------------------|----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------------|-----|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | | |
| 2nd Harmonic | 1 chA | H2-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1 chB | H2-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2 chA | H2-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2 chB | H2-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3 chA | H2-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3 chB | H2-3 | c | c | c | c | c | c | a | a | a | b | b | b | V8 |
| 3rd Harmonic | 1 chA | H3-1 | a | c | c | c | c | c | a | a | b | a | b | b | V3 |
| | 1 chB | H3-1 | c | a | c | c | c | c | a | a | b | b | b | b | V3 |
| | 2 chA | H3-2 | c | c | a | c | c | c | a | a | b | b | a | b | V6 |
| | 2 chB | H3-2 | c | c | c | a | c | c | a | a | b | b | b | b | V6 |
| | 3 chA | H3-3 | c | c | c | c | a | c | a | a | b | b | b | a | V8 |
| | 3 chB | H3-3 | c | c | c | c | c | c | a | a | a | b | b | b | V8 |
| Switch Changeover Voltage | 1 ch | VCTLS | a | a | c | c | c | c | a | a | a | Var* | b | b | V10 |
| | 2 ch | VCTLS | c | c | a | a | c | c | a | a | a | b | Var* | b | V11 |
| | 3 ch | VCTLS | c | c | c | c | a | a | a | a | a | b | b | Var* | V12 |
| Mute Threshold | 1 ch | VML | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 1 ch | VMH | b | b | c | c | c | c | b | a | a | Var* | b | b | V10 |
| | 3 ch | VML | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| | 3 ch | VMH | c | c | c | c | b | b | a | b | a | b | b | Var* | V12 |
| Crosstalk between Channels | 1 ch | | c | c | c | c | a | c | a | a | a | a | a | a | V3 |
| | 1 ch | | c | c | c | c | c | a | a | a | a | a | a | b | V3 |
| | 1 ch | | c | c | c | c | a | c | a | a | a | a | b | a | V3 |
| | 1 ch | | c | c | c | c | c | a | a | a | a | a | b | b | V3 |
| | 1 ch | | c | c | a | c | c | c | a | a | a | b | a | a | V3 |
| | 1 ch | | c | c | a | c | c | c | a | a | a | b | a | b | V3 |
| | 1 ch | | c | c | c | a | c | c | a | a | a | b | b | a | V3 |
| | 1 ch | | c | c | c | a | c | c | a | a | a | b | b | b | V3 |
| | 2 ch | | c | c | c | c | a | c | a | a | a | a | a | a | V6 |
| | 2 ch | | c | c | c | c | c | a | a | a | a | a | a | b | V6 |
| | 2 ch | | c | c | c | c | a | c | a | a | a | b | a | a | V6 |
| | 2 ch | | c | c | c | c | c | a | a | a | a | b | a | b | V6 |
| | 2 ch | | a | c | c | c | c | c | a | a | a | a | b | a | V6 |
| | 2 ch | | a | c | c | c | c | c | a | a | a | a | b | b | V6 |
| | 2 ch | | c | a | c | c | c | c | a | a | a | b | b | a | V6 |
| | 2 ch | | c | a | c | c | c | c | a | a | a | b | b | b | V6 |
| | 3 ch | | c | c | a | c | c | c | a | a | a | a | a | a | V8 |
| | 3 ch | | c | c | c | a | c | c | a | a | a | a | b | a | V8 |
| | 3 ch | | c | c | a | c | c | c | a | a | a | b | a | a | V8 |
| | 3 ch | | c | c | c | a | c | c | a | a | a | b | b | a | V8 |
| 3 ch | | a | c | c | c | c | c | a | a | a | a | a | b | V8 | |
| 3 ch | | a | c | c | c | c | c | a | a | a | b | a | b | V8 | |
| 3 ch | | c | a | c | c | c | c | a | a | a | b | a | b | V8 | |
| 3 ch | | c | a | c | c | c | c | a | a | a | b | b | b | V8 | |
| Mute Compression Ratio | 1 ch | | b | b | c | c | c | c | b | a | a | Var* | b | b | V4 |
| | 3 ch | | c | c | c | c | b | b | a | b | a | b | b | Var* | V9 |
| Control Pin Flow-in Current | 1 ch | I CTL1 | c | c | c | c | c | c | a | a | a | a | b | b | A2 |
| | 2 ch | I CTL2 | c | c | c | c | c | c | a | a | a | b | a | b | A3 |
| | 3 ch | I CTL3 | c | c | c | c | c | c | a | a | a | b | b | a | A4 |
| Pin Voltage | (Pin 1) | V1 | c | c | c | c | c | c | a | a | a | b | b | b | V14 |
| | (Pin 1) | V1 | c | c | c | c | c | c | a | a | a | a | b | b | V14 |
| | (Pin 3) | V3 | c | c | c | c | c | c | a | a | a | b | b | b | V2 |
| | (Pin 6) | V6 | c | c | c | c | c | c | a | a | a | b | b | b | V16 |
| | (Pin 6) | V6 | c | c | c | c | c | c | a | a | a | b | a | b | V16 |
| | (Pin 8) | V8 | c | c | c | c | c | c | a | a | a | b | b | b | V5 |
| | (Pin 10) | V10 | c | c | c | c | c | c | a | a | a | b | b | b | V7 |

LA7220M

| Item | Symbol | SW VR Mode | | | | | | | | | | | | Test Point |
|----------|--------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| | | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | VR1 | VR2 | VR3 | |
| (Pin 12) | V 12 | c | c | c | c | c | c | a | a | a | b | b | b | V 18 |
| (Pin 12) | V 12 | c | c | c | c | c | c | a | a | a | b | b | a | V 18 |
| (Pin 14) | V 14 | c | c | c | c | c | c | a | a | a | b | b | b | V 17 |
| (Pin 14) | V 14 | c | c | c | c | c | c | a | a | a | b | b | a | V 17 |
| (Pin 18) | V 18 | c | c | c | c | c | c | a | a | a | b | b | b | V 15 |
| (Pin 18) | V 18 | c | c | c | c | c | c | a | a | a | b | a | b | V 15 |
| (Pin 23) | V 23 | c | c | c | c | c | c | a | a | a | b | b | b | V 13 |
| (Pin 23) | V 23 | c | c | c | c | c | c | a | a | a | a | b | b | V 13 |

(Note) Var* : While monitoring pins 3, 8, 10, adjust so that the minimum output is obtained.

Mute Threshold : While monitoring pins 4, 16, measure the minimum and maximum values of V15, V18 when the minimum output is obtained.



■ 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.