

FM NOISE CANCELLER FOR CAR AUDIO

The KIA6010SN is FM noise canceller IC. It built in LPF and HPF. The space merit is improved. It suitable for FM CAR radio.

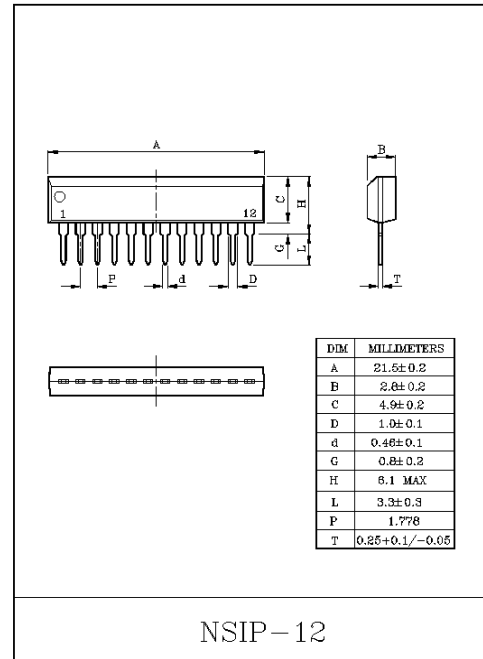
APPLICATION

- Noise Detection
- Noise AGC
- FM Noise Canceller
- Signal Delay
- Adjustment Free Pilot Canceller
- Signal Holding
- Operating Supply Voltage : $V_{CC}=8\pm 1V$
- Recommended Main Signal Frequency : $f \leq 76kHz$

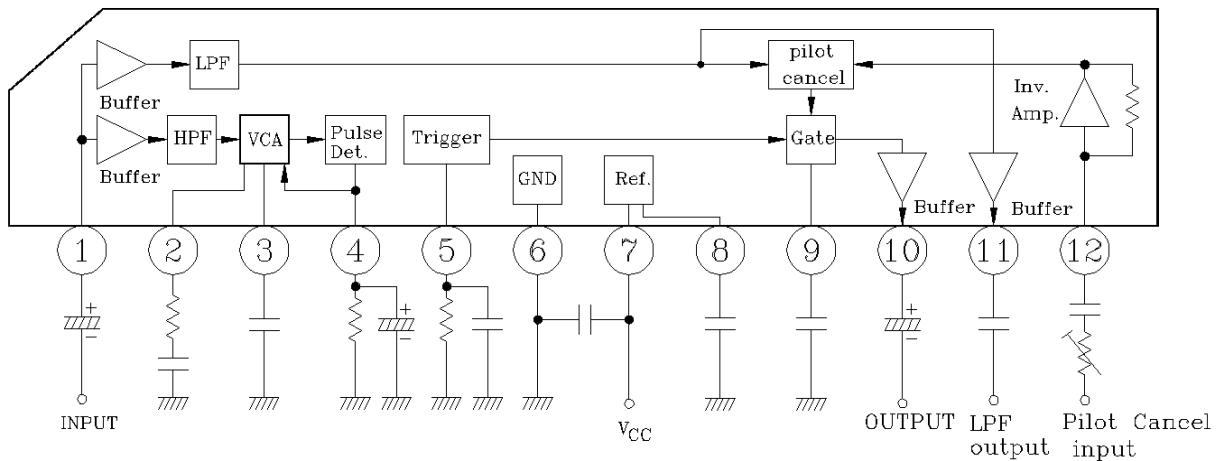
MAXIMUM RATINGS (Ta=25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|--------------------------|-----------|---------|------|
| Supply Voltage | V_{CC} | 10 | V |
| Power Dissipation (Note) | P_D | 750 | mW |
| Operating Temperature | T_{opr} | -40~85 | °C |
| Storage Temperature | T_{stg} | -55~150 | °C |

Note : Derated above Ta=25°C in the Proportion of 6mW/°C for KIA6010SN



BLOCK DIAGRAM



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ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, ($V_{CC}=8V$, $T_a=25^{\circ}C$, $f_{IN}=1kHz$, $V_{IN}=400mV$, $SW1=A$, $SW2=OFF$))

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------------|-----------------------|--|------|------|------|---------|
| Quiescent Supply Current | I_{CCQ} | $V_{IN}=0$ | 4.5 | 7 | 9.5 | mA |
| Transfer Gain 1 | G_{V1} | | -1 | 0 | 1 | dB |
| Transfer Gain 2 | G_{V2} | $f_{IN}(\text{Pilot})=19kHz$ $V_{IN}(\text{Pilot})=40mV_{rms}$ | -1.5 | -0.5 | 0.5 | dB |
| Total Distortion Ratio | THD | | -70 | -77 | - | dB |
| Permissible Input | $V_{IN(\text{Max.})}$ | THD=40dB | 1000 | 1600 | - | mV |
| Signal to Noise Ratio | S/N 1 | $V_{IN}=400mV \rightarrow 0$ | 81 | 87 | - | dB |
| Signal to Residual Pilot Ratio | S/N 2 | $V_{IN}=360mV(1kHz) \rightarrow 40mV(19kHz)$ $SW2=off \rightarrow on$, $f_{IN}(\text{Pilot})=19kHz$ $V_{IN}(\text{Pilot})=40mV$ | 40 | 53 | - | dB |
| Signal to Residual Pilot Ratio | S/N 3 | $SW1=A \rightarrow B$ $A+A: V_{IN}=400mV$ $A+B: V_{IN}(\text{Pulse})=100mV_{pp}$ $f_{IN}=1kHz$, $tW=10\mu S$ | 68 | 77 | - | dB |
| Pulse Noise Detection Sensitivity | VS (Pulse) | $SW1=B$, $f_{IN}=1kHz$, $tW=10\mu S$ | - | 50 | - | mVp-o |
| Gate Open Time | t_G | $V_{IN}(\text{Pulse})=100mV_{pp}$ | - | 33 | - | μS |

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DESCRIPTION ON TERMINALS

(Terminal Voltage shows the value at $V_{CC}=8V$, $T_a=25^{\circ}C$, and non-signal in measuring circuit)

| Pin NO. | Terminal Name | Terminal Voltage (V) | Internal Equivalent Circuit/Typical Value of External Part (Resistance and capacity show the typical value) | Terminal Functions |
|---------|------------------|----------------------|--|--|
| 1 | NC _{in} | 3.0 | | <ul style="list-style-type: none"> •Input Terminal •Connect a Capacitor |
| 8 | Ref | 3.0 | | <ul style="list-style-type: none"> •Reference Voltage Terminal •Connect a Capacitor |
| 2 | NF | 3.0 | | <ul style="list-style-type: none"> •AGC AMP NF Terminal •Noise AGC high sensitivity by a small resistor value. |
| 3 | Bypass | 2.3 | | <ul style="list-style-type: none"> •Noise AMP bypass Terminal •Connect a capacitor |

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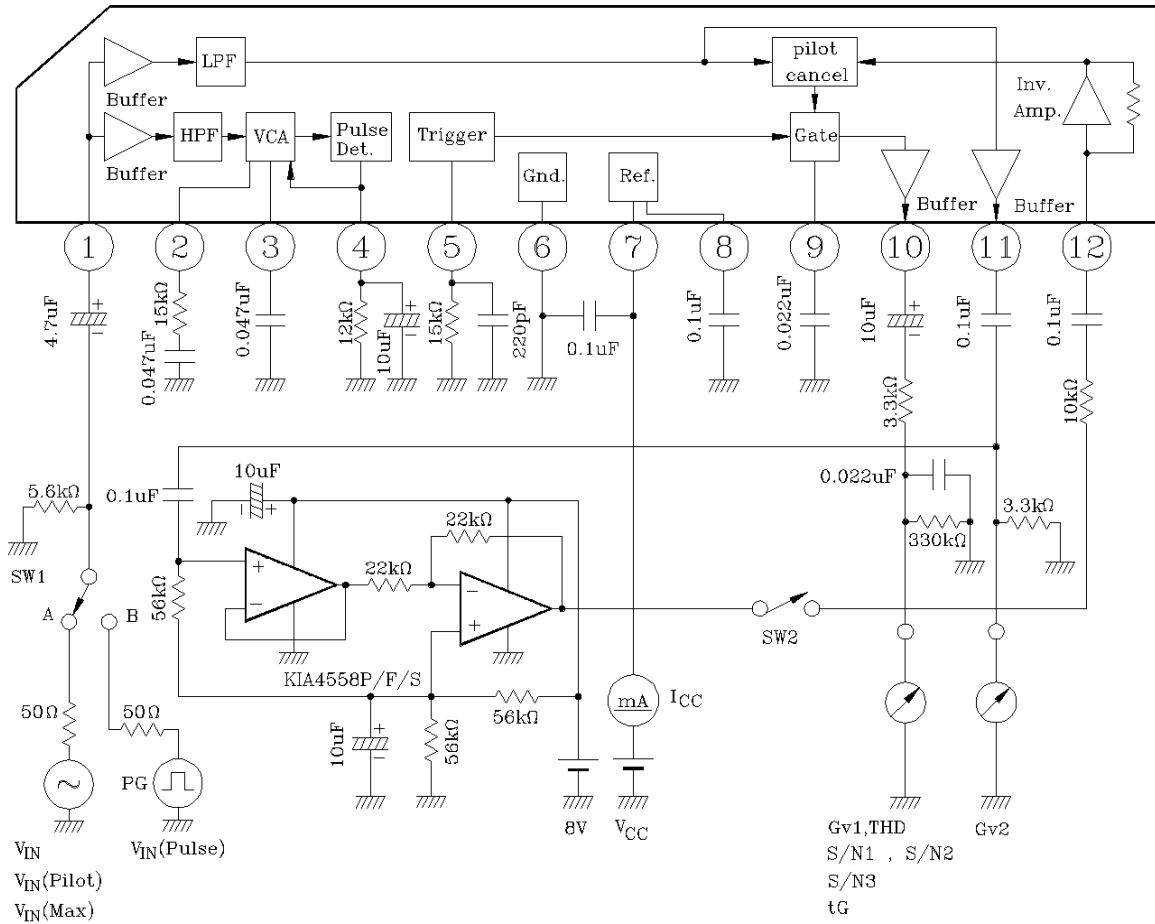
| Pin NO. | Terminal Name | Terminal Voltage (V) | Internal Equivalent Circuit/Typical Value of External Port (Resistance and capacity show the typical value) | Terminal Functions |
|---------|---------------|----------------------|---|---|
| 4 | AGC | 0 | | <ul style="list-style-type: none"> • Adjustment of a Noise AGC • Time Constant • Connect a capacitor and a resistor • Have a good effect on a noise with a large periodicity by a large resistor value. |
| 5 | PW | 0 | | <ul style="list-style-type: none"> • Adjustment of a Trigger Pulse width. • Connect a capacitor and a resistor (A large resistor value is to widen a pulse width) |
| 6 | GND | 0 | | <ul style="list-style-type: none"> • GND |
| 7 | B | 8.0 | | <ul style="list-style-type: none"> • Power Supply • Connect a capacitor |
| 9 | Gate | 3.8 | | <ul style="list-style-type: none"> • Composite Signal Holding Terminal • Connect a capacitor |

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| Pin NO. | Terminal Name | Terminal Voltage (V) | Internal Equivalent Circuit/Typical Value of External Port (Resistance and capacity show the typical value) | Terminal Functions |
|---------|---------------|----------------------|--|--|
| 10 | NCout | 2.4 | | <ul style="list-style-type: none"> • Output Terminal • Connect a phase Correction Circuit to set a maximum Separation Characteristic |
| 11 | LPFout | 3.0 | | <ul style="list-style-type: none"> • LPF Output Terminal • Signal Supply to pilot-in Terminal for next stage. MPX IC KIA6030Z |
| 12 | Pilot-in | 3.0 | | <ul style="list-style-type: none"> • input signal 19kHz is input to MPX IC KIA6030Z of the next stage. (Pilot signal 19kHz is Equal phase triangular) • Connect C, VR to get a Maximum pilot canceller by adjust R_{pc}. |

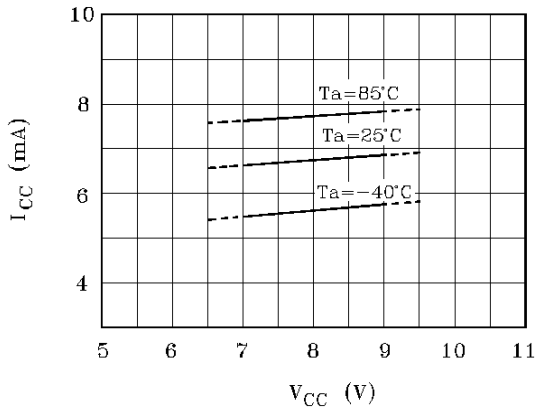
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TEST CIRCUIT

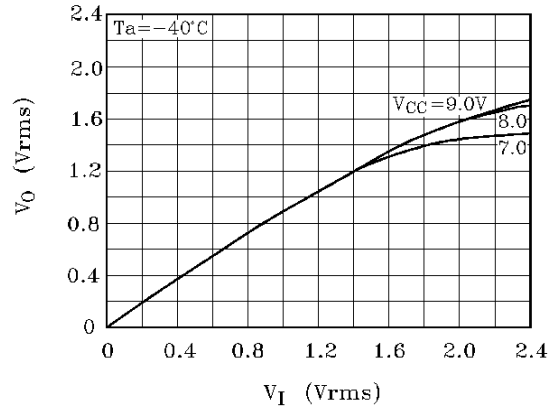


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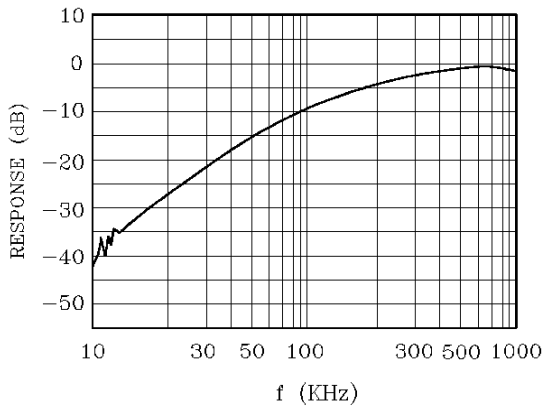
$I_{CC} - V_{CC}$



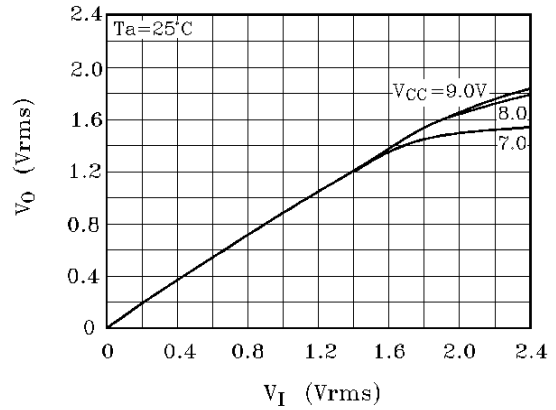
$V_0 - V_I$



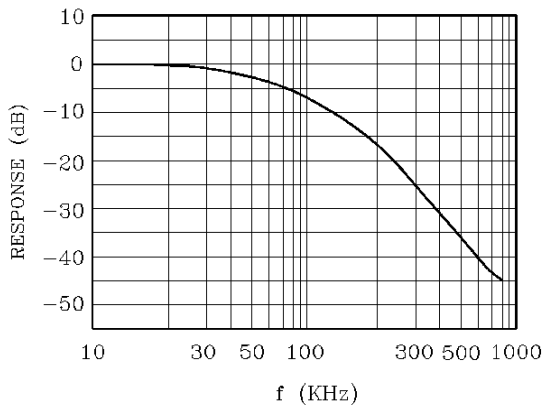
HPF



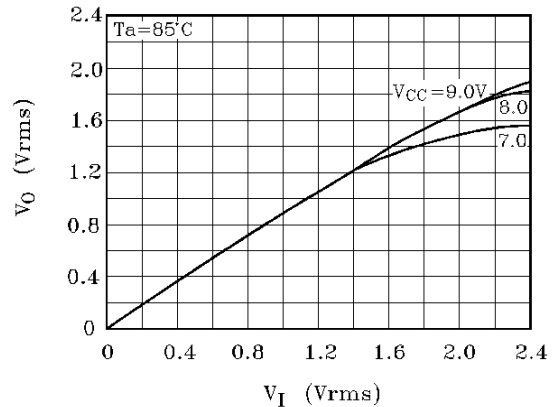
$V_0 - V_I$



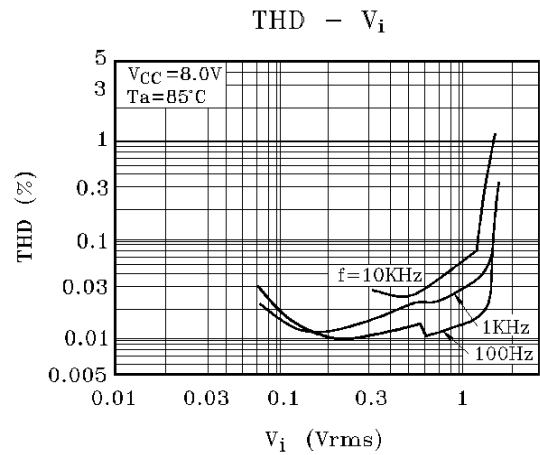
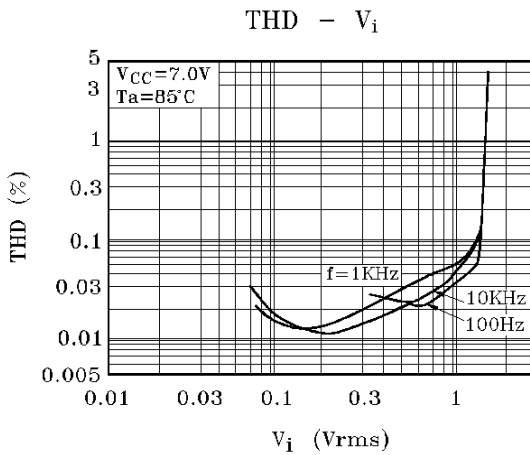
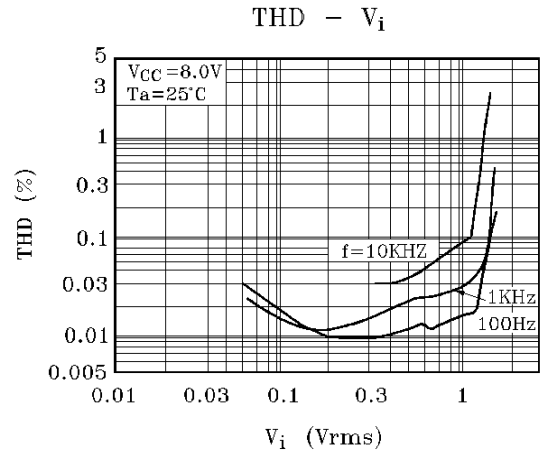
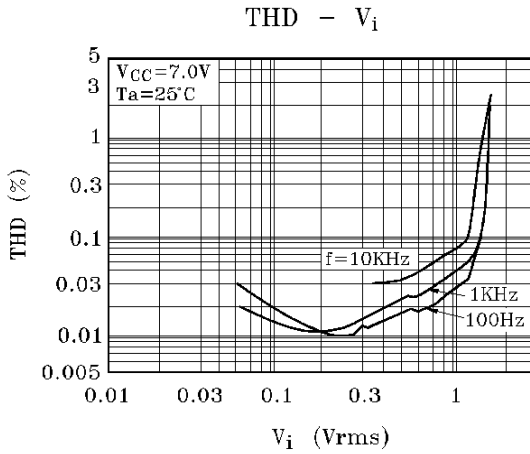
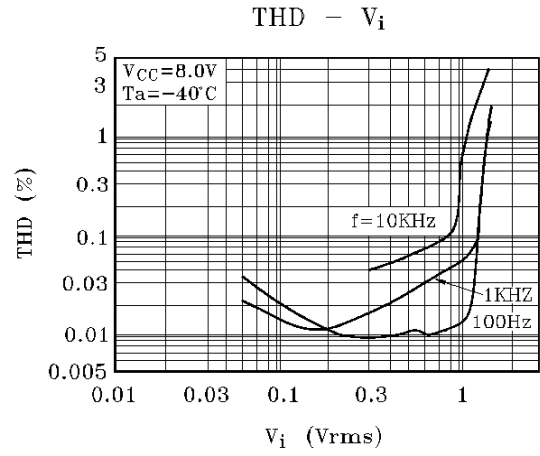
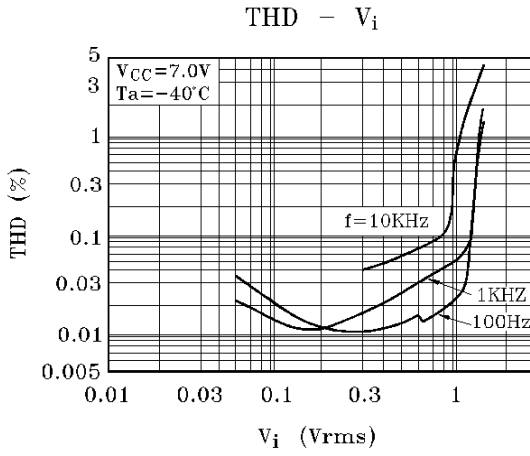
LPF



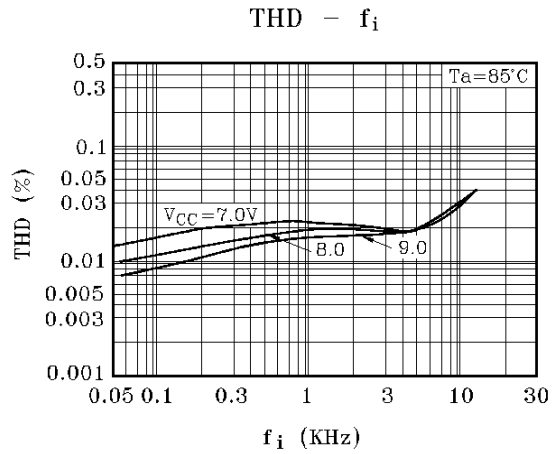
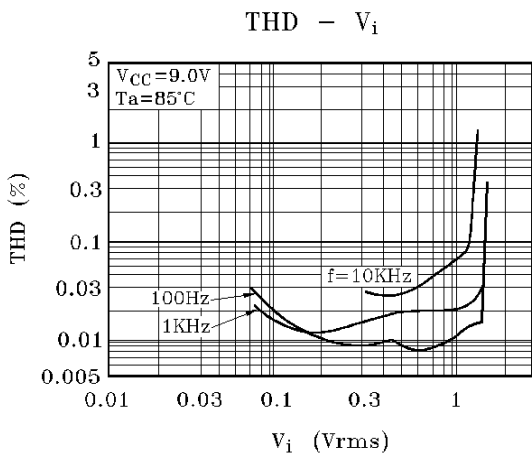
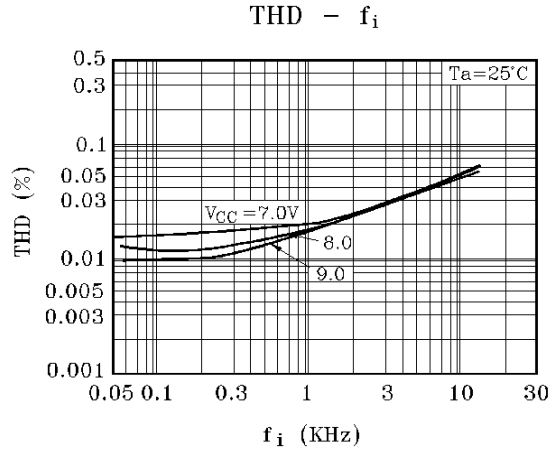
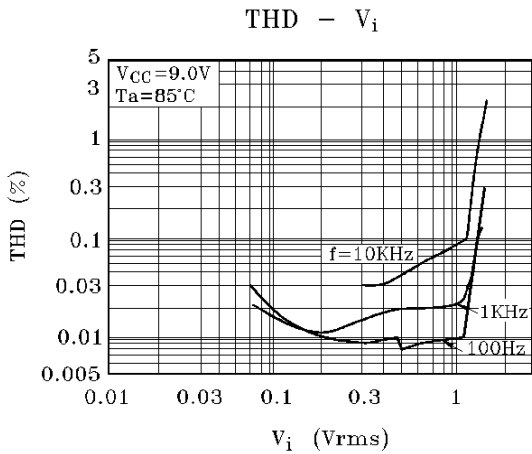
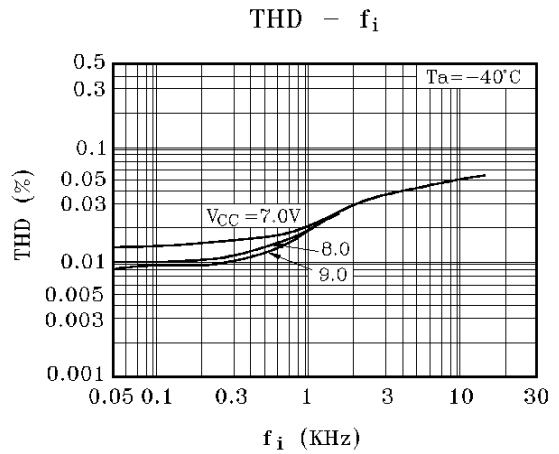
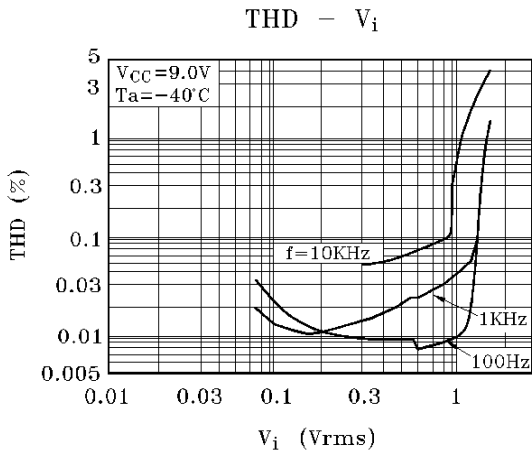
$V_0 - V_I$



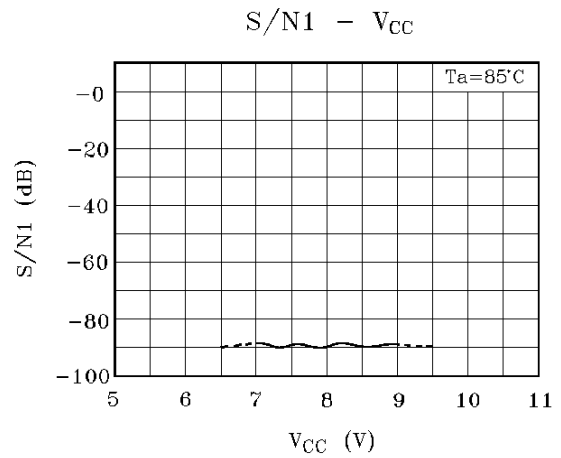
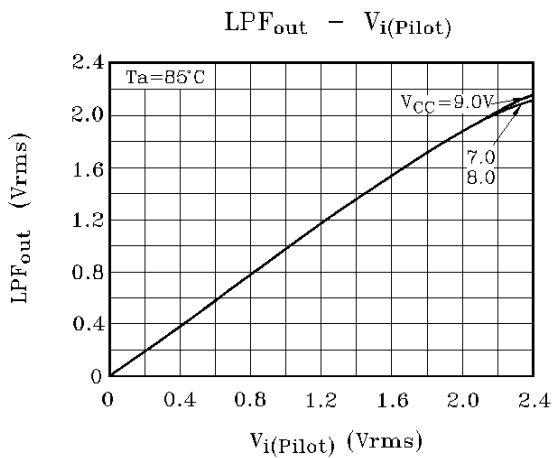
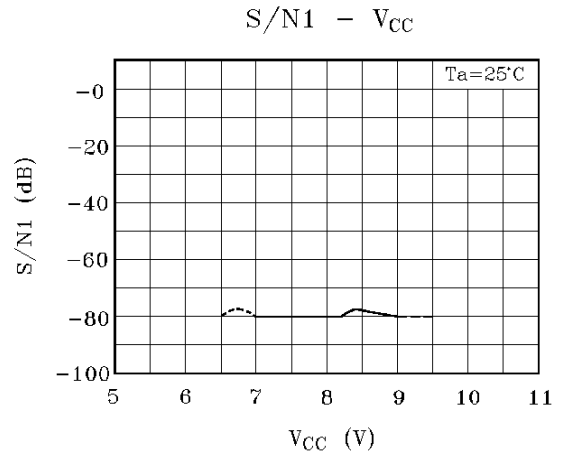
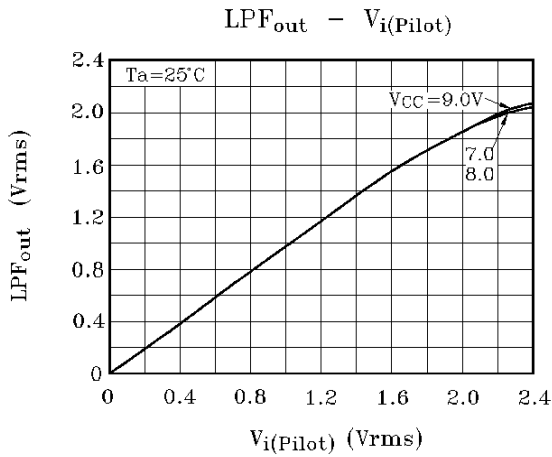
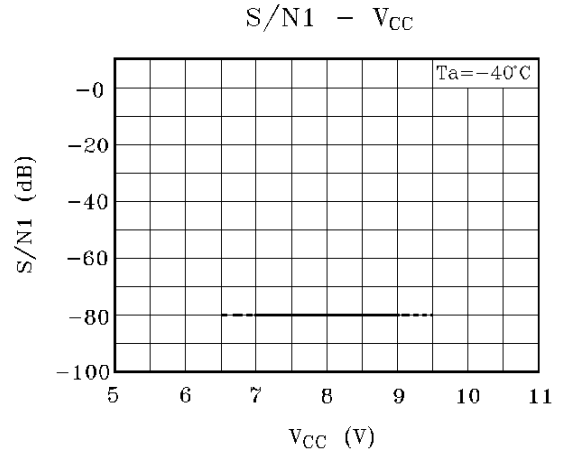
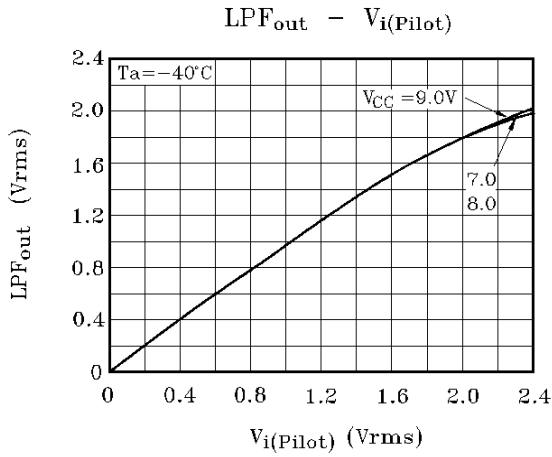
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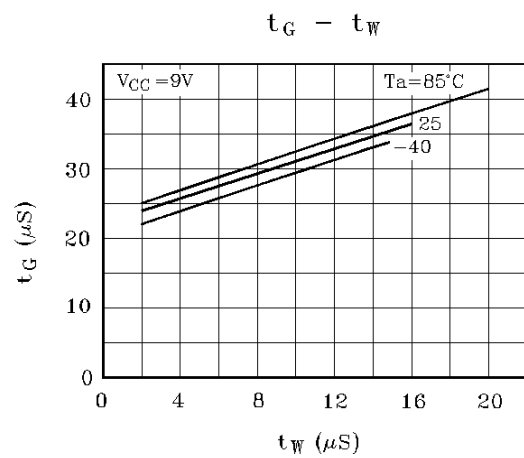
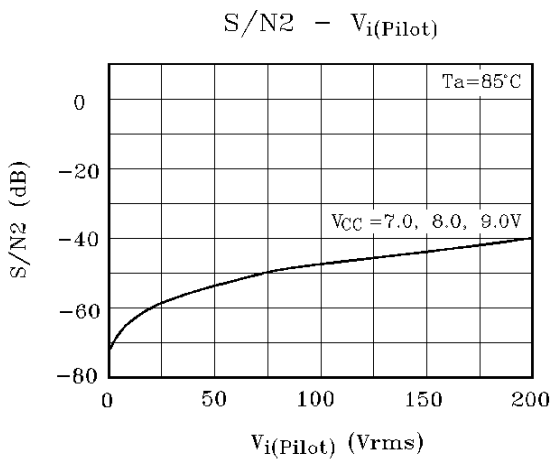
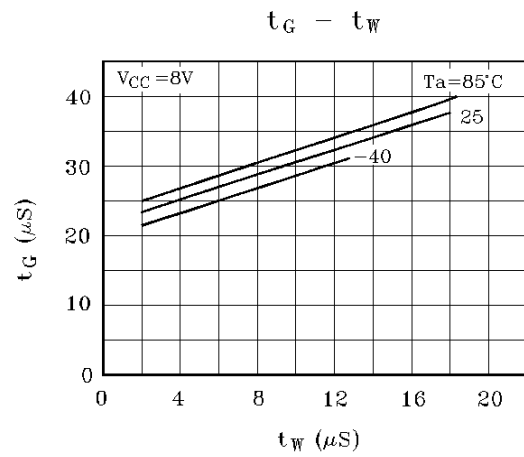
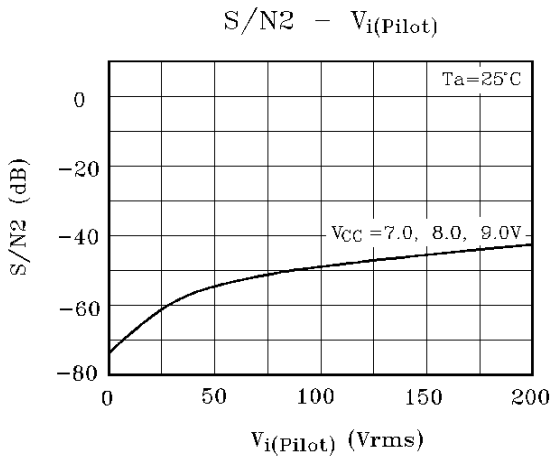
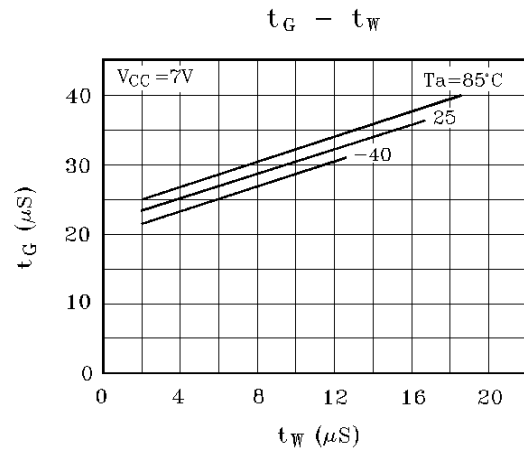
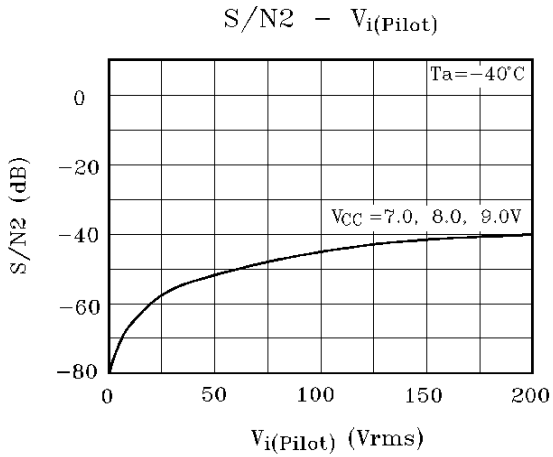
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