

DC Detect on TPA311xDx Devices

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ABSTRACT

The TPA311xDx device has circuitry which protects speakers from DC current on the input, or shorts on the printed circuit board at the inputs. The minimum differential input voltages required to trigger the DC detect are described in this application report. This document only applies for TPA311xDx devices.

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1 General Overview

The TPA311xD2 device has circuitry which protects the speakers from DC current, which may occur due to defective capacitors on the input or shorts on the printed circuit board at the inputs. A DC detect fault is reported on the FAULT pin as a low state. The DC Detect fault also causes the amplifier to shutdown, by changing the state of the outputs to Hi-Z. To clear the DC Detect fault, it is necessary to cycle the PVCC supply. Cycling SD does not clear a DC detect fault.

The minimum differential input voltages required to trigger the DC detect depend on the gain and PVCC. This document shows some data collected on the TPA3113D2 device.

2 Effect of PVCC

The DC detect threshold increases as PVCC increases when Gain is fixed. There is a linear relationship between the threshold and PVCC. [Figure 1](#) shows the DC detect threshold at the input when gain = 26 dB.

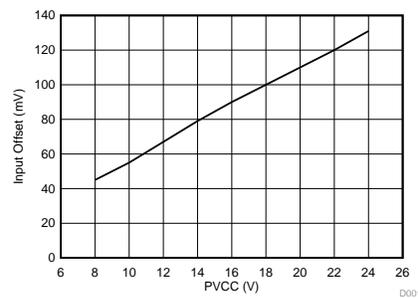


Figure 1. DC Detect Threshold at Input Versus PVCC

[Figure 2](#) shows the DC detect threshold at the output when gain = 26 dB.

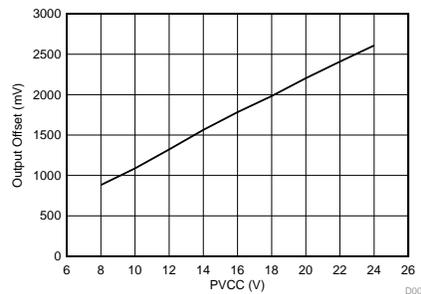


Figure 2. DC detect threshold at output Versus PVCC

[Table 1](#) lists the raw data for [Figure 1](#) and [Figure 2](#).

Table 1. DC Detect Threshold Versus PVCC

PVCC (V)	Input DC Offset (mV)	Output DC Offset (mV)
8	45	882
10	55	1088
12	67	1322
14	79	1564
16	90	1783
18	100	1983
20	110	2204
22	120	2409
24	131	2609

3 Effect of Gain

The DC detect threshold at the input decreases as the gain value increases when PVCC is fixed. There is a linear relationship between the logarithm of the threshold and gain in dB. Figure 3 shows the DC detect threshold at the input when PVCC = 12 V and 18 V.

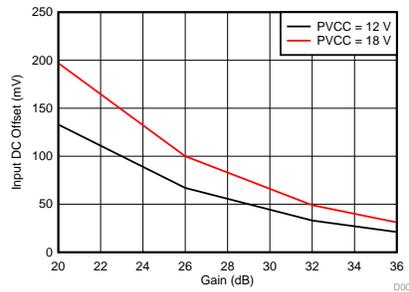


Figure 3. DC Detect Threshold at Input Versus Gain

Figure 4 shows the DC detect threshold at the output when PVCC = 12 V and 18 V.

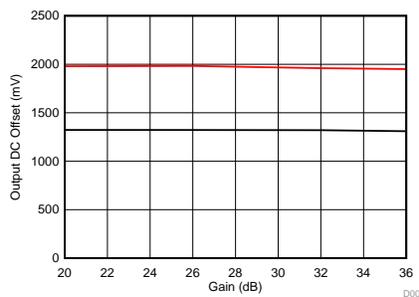


Figure 4. DC Detect Threshold at Output Versus Gain

Table 2 and Table 3 list the raw data for Figure 3 and Figure 4.

Table 2. DC Detect Threshold When PVCC = 12 V

Gain (dB)	Input DC Offset (mV)	Output DC Offset (mV)
20	133	1323
26	67	1322
32	33	1320
36	21	1309

Table 3. DC Detect Threshold When PVCC = 18 V

Gain (dB)	Input DC Offset (mV)	Output DC Offset (mV)
20	197	1979
26	100	1983
32	49	1960
36	31	1950

4 Conclusion

The DC detect threshold at the input depends on the PVCC and gain. While the DC detect threshold at the output only depends on the PVCC.

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