User's Guide
SLLU151–July 2011

SN65LVDS4 Evaluation Module

The Texas Instruments SN65LVDS4 Evaluation Module board is used to evaluate the SN65LVDS4 LVDS receiver with selectable output levels.

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1 Introduction

The Texas Instruments SN65LVDS4 Evaluation Module (EVM) board is used to evaluate the SN65LVDS4 LVDS receiver. The device can provide output voltage logic levels based on an external VDD pin, thus eliminating the need for external level translation. The board enables the system designer to connect 50-Ω coaxial cables via SMA connectors at the inputs and an SMA or high-impedance probe at the output.

WARNING

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case, users at their own expense will be required to take whatever measures may be required to correct this interference.

2 SN65LVDS4EVM Kit Contents

The SN65LVDS4EVM kit contains the following:

- SN65LVDS4EVM board
- SN65LVDS4EVM User's Guide (this document)

3 SN65LVDS4EVM Board Configuration

The SN65LVDS4 input differential pair (J1, J3) and single-ended output (J2) are available through the edge launch SMA connectors.

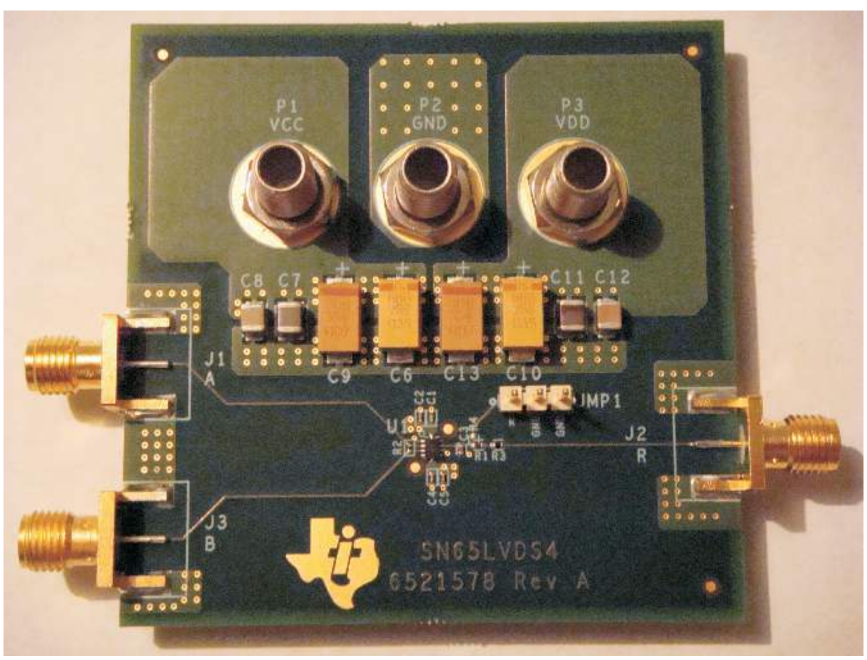

Figure 1. SN65LVDS4EVM Board

4 Power Supply Configuration

Two power supplies are needed to bias the SN65LVDS4 – VCC, the core power supply, and VDD, the output drive power supply. For proper device operation, it is recommended that VCC is powered up first and then VDD or VCC applied at the same time as VDD (In the later case, VCC and VDD are tied together). Further, it is also recommended that VCC is equal to or less than VDD as shown in Table 1.

Table 1. Power Supply Acceptable Combinations

VCC (V)	VDD (V)	Recommended
1.8	1.8	Yes
1.8	2.5	Yes
1.8	3.3	Yes
2.5	1.8	No
2.5	2.5	Yes
2.5	3.3	Yes

5 Test Setup

Measuring the output signal on J2 with a 50-Ω cable terminated into 50 Ω at the scope attenuates the signal due to the 453-Ω resistor (R1) in series with the receiver output on the EVM board. The resistor is installed as a current limit for termination into a 50-Ω load, thus providing a 10x attenuation on the measured output signal.

Measuring the output signal with a high-impedance probe on JMP1 requires removing R1, the 453-Ω resistor, and installing a 0-Ω resistor on R4 (0402). Measuring the output signal on JMP1 allows the user to see absolute signal levels out of the device.

See Table 2 for input and output connections.

Table 2. EVM and Device Connections

EVM Connection	Pin		I/O	Description
	Name	No.		
J1	A	2	I	LVDS input, positive
J3	B	3	I	LVDS input, negative
P2	GND	1, 7	—	Ground
—	NC	4, 6, 9	—	No connect
J2	R	8	O	1.8/2.5 LVCMOS/3.3 LVTTL output
P1	VCC	5	—	Core supply voltage
P3	VDD	10	—	Output supply voltage

6 Schematic, Bill of Materials, and Board Layouts

6.1 Schematic

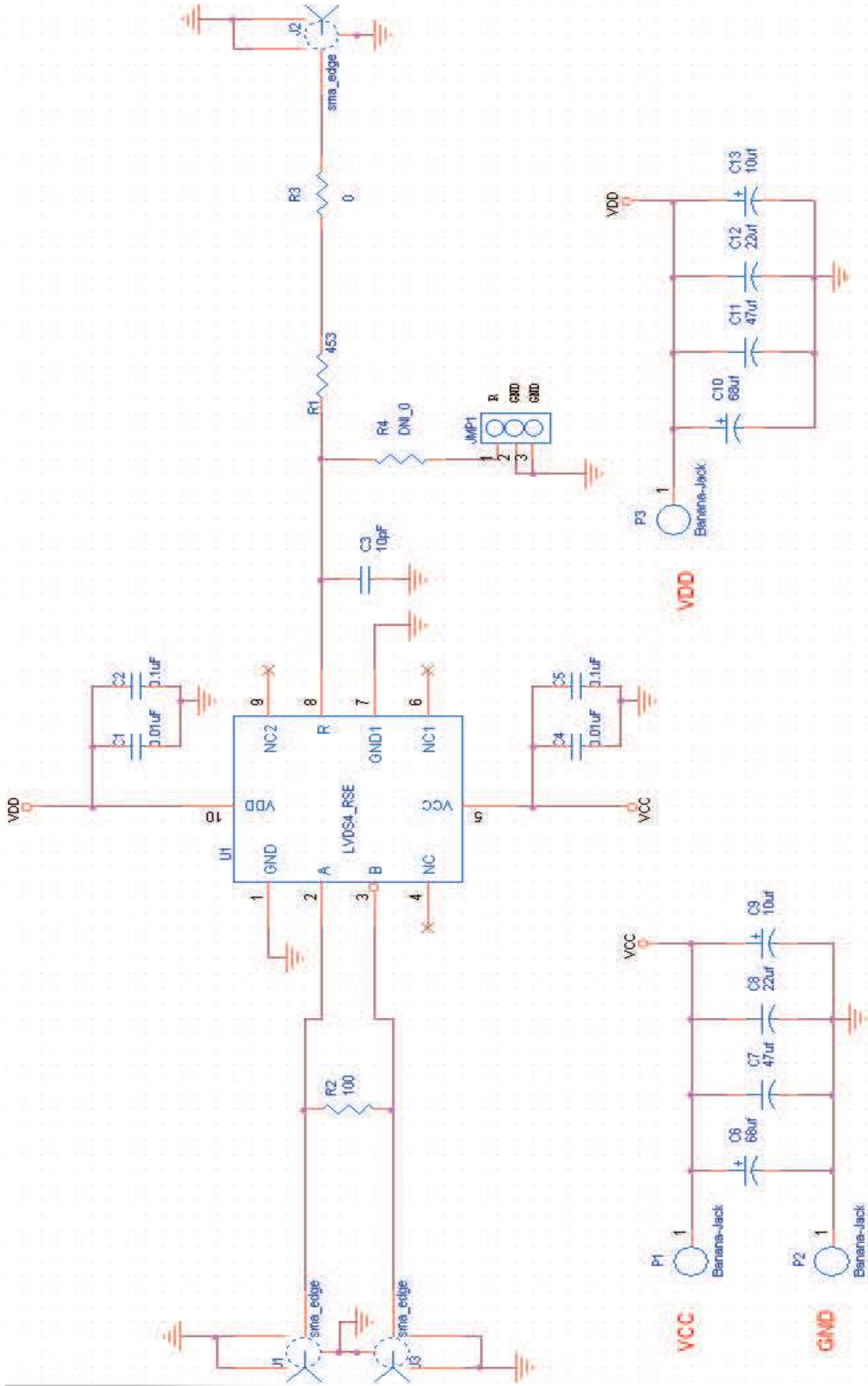

Figure 2. SN65LVDS4 Schematic

6.2 Bill of Materials

Table 3. SN65LVDS4EVM Bill of Materials

Qty	Reference	Value	Part	Part Number	Manufacturer
2	C1,C4	0.01 µF	CC0201	GRM033R70J103KA01D	Murata
2	C2,C5	0.1 µF	CC0201	GRM033R60J104KE19D	Murata
1	C3	10 pF	CC0402	ECD-G0E100C	Panasonic - ECG
2	C6,C10	68 µF	CT7343	TAJE686K025R	AVX
2	C7,C11	47 µF	CC1210	EMK325BJ476MM-T	Taiyo Yuden
2	C8,C12	22 µF	CC1206	C1206X5R6R3-226KNE	Venkel
2	C9,C13	10 µF	CT7343	C1206X7R160-106KNE	Venkel
1	JMP1	3 Pin Berg Jumper	HDR1X3	HTSW-150-07-G-S	Samtec
3	J1,J2,J3	sma_edge	JOHNSON_142-0701-801	142-0701-801	EF Johnson
3	P1,P2,P3	Banana-Jack	JOHNSON_108-0740-001	108-0740-001	Emerson Network Power
1	R1	453	R0402	RMCF0402FT453R	Stackpole Electronics
1	R2	100	R0201	ERJ-1GEJ101C	Panasonic - ECG
1	R3	0	R0402	RMCF0402ZT0R00	Stackpole Electronics
1	R4	DNI_0	R0402	RMCF0402ZT0R00	Stackpole Electronics
1	U1	SN65LVDS4	10-pin RSE	SN65LVDS4	Texas Instruments

6.3 Board Layouts

Table 4. SN65LVDS4EVM Printed-Circuit Board Layer Construction

Subclass Name	Type	Material	Thickness (mil)	Conductivity (mho/cm)	Dielectric Constant	Loss Tangent	Artwork	Width (mil)	Impedance (Ω) [(1)]
	SURFACE	AIR							
	MASK	LPI							
	FINISH	ENIG	1.29						
TOP	CONDUCTOR	COPPER	0.689	595900	1	0	POSITIVE	10	50
	DIELECTRIC	FR-4	6	0	4.2	0.035			
L2_GND	PLANE	COPPER	1.378	595900	1	0	POSITIVE		
	DIELECTRIC	FR-4	10	0	4.2	0.035			
L3_POWER	CONDUCTOR	COPPER	1.378	595900	1	0	POSITIVE		
	DIELECTRIC	FR-4	6	0	4.2	0.035			
BOTTOM	CONDUCTOR	COPPER	0.689	595900	1	0	POSITIVE	N/A	
	FINISH	ENIG	1.29						
	MASK	LPI							
	SURFACE	AIR							

(1) Always consult with your board manufacturer for their process/design requirements to ensure the desired impedance is achieved.

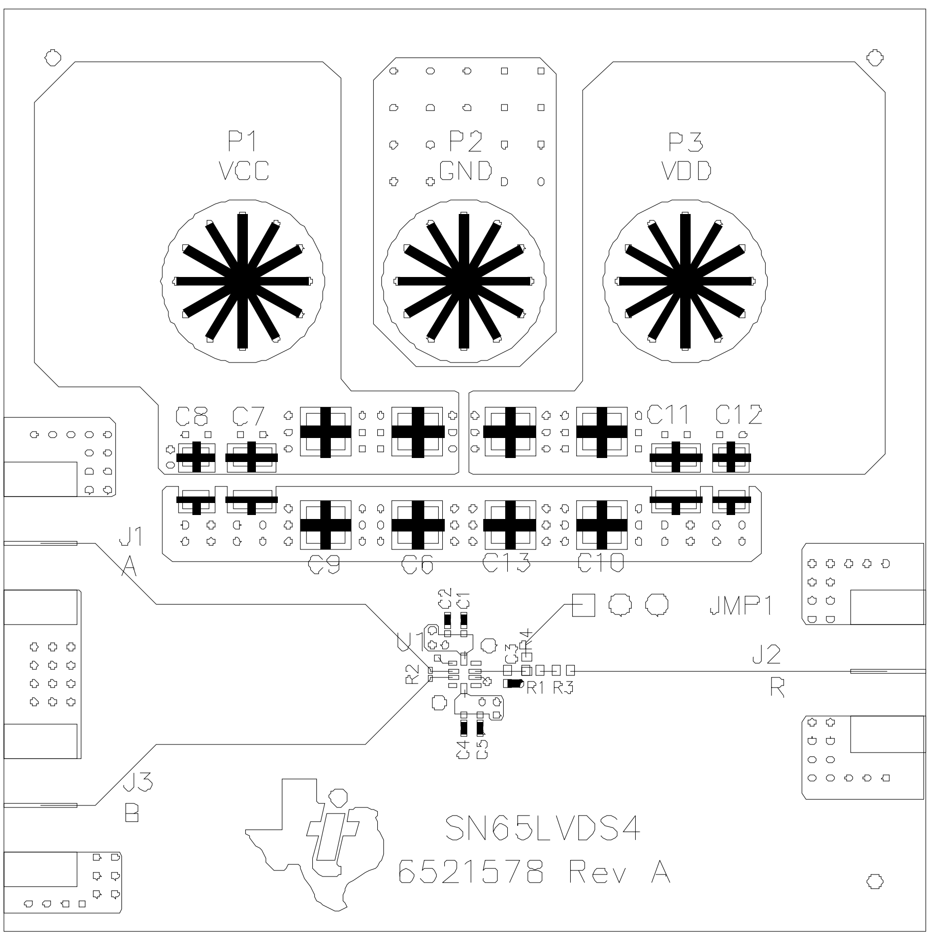

Figure 3. SN65LVDS4EVM Board Layout, Top – Layer 1

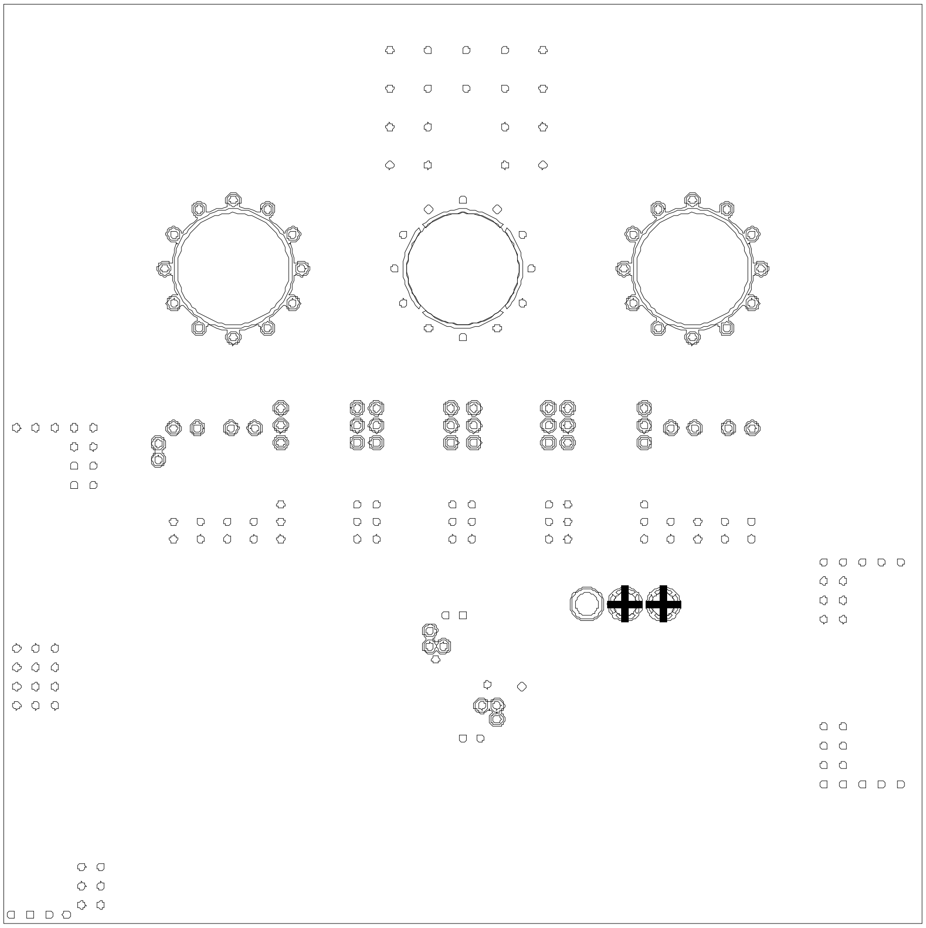

Figure 4. SN65LVDS4EVM Board Layout, GND – Layer 2

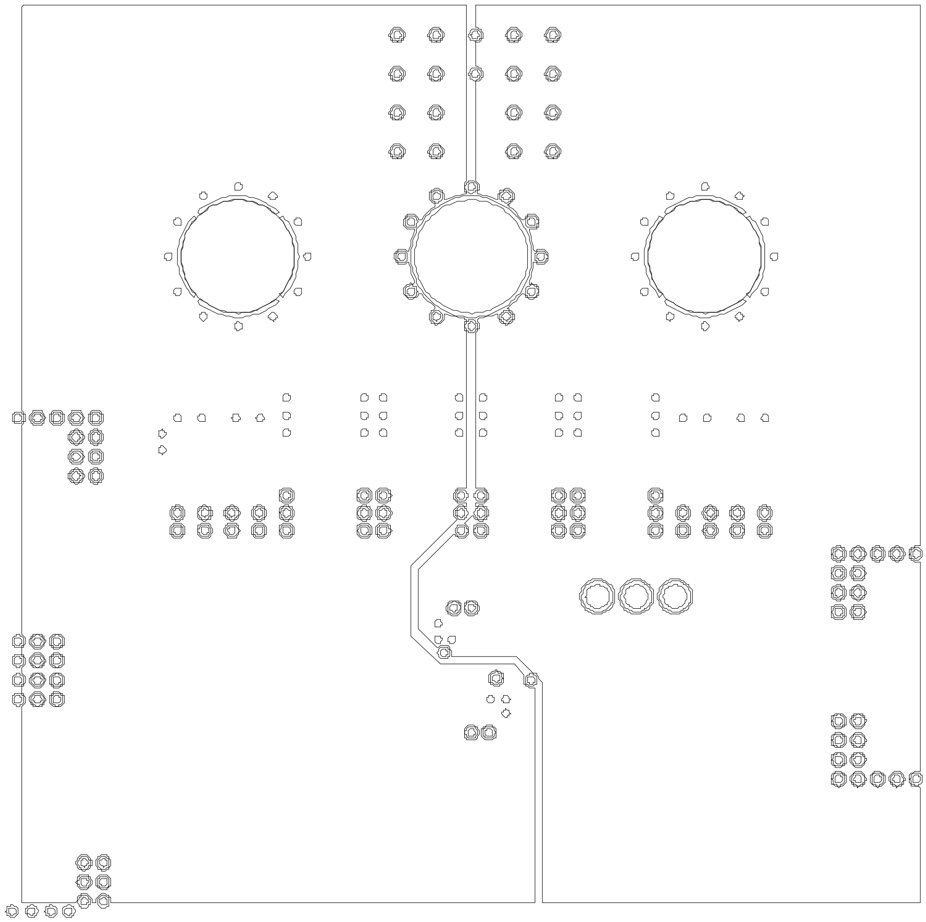

Figure 5. SN65LVDS4EVM Board Layout, POWER – Layer 3

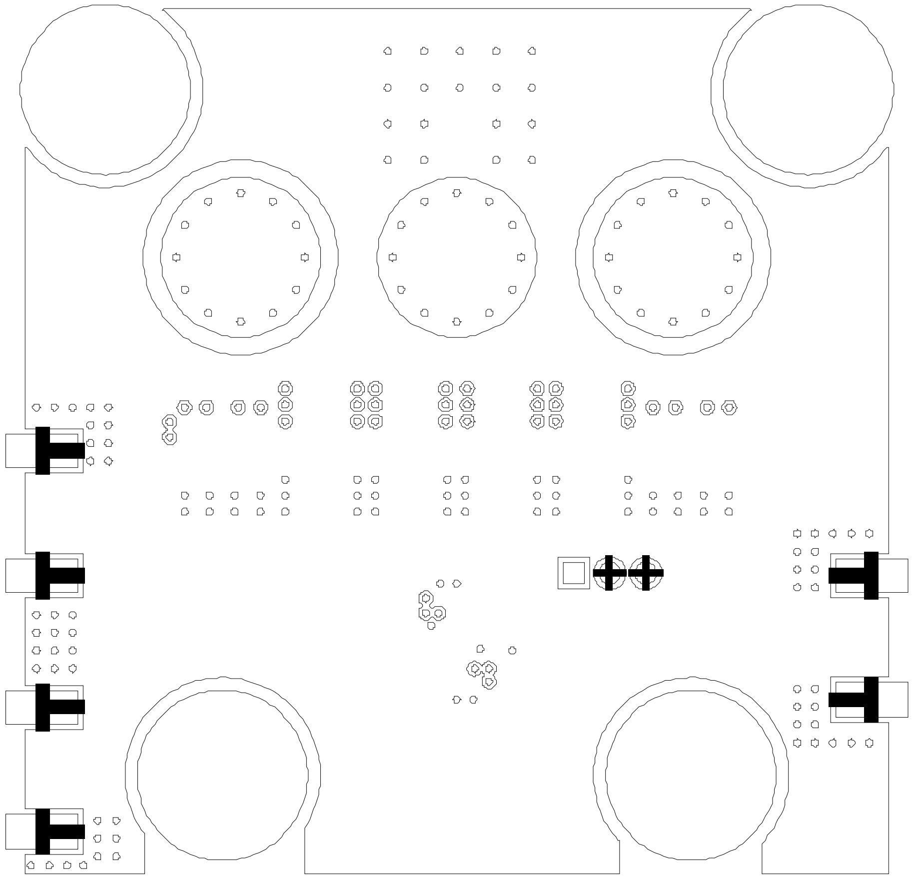

Figure 6. SN65LVDS4EVM Board Layout, Bottom – Layer 4

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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 1.62 V to 2.75 V and the output voltage range of 1.62 V to 3.6 V .

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 40° C. The EVM is designed to operate properly with certain components above 40° C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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