

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

About this document

Scope and purpose

This user guide provides an overview and detailed feature description of the REF_AUDIO_SiC_2kW Class D audio reference board with Infineon's 400 V CoolSiC™ IMLT40R045M2H MOSFET and MERUS™ IRS2452BM audio controller IC. It demonstrates the superior power density and audio performance of CoolSiC™ MOSFETs in Class D audio systems. The user guide demonstrates how to convert from the TOLT package to TOLL and TO-247 packages to enable evaluation of multiple package types.

A key advantage of this reference design is its ability to support both high-impedance constant-voltage audio distribution systems ($100 V_{RMS}/70 V_{RMS}$) and low-impedance direct-drive audio amplifier applications from a single platform. This is enabled by the inherently low $R_{DS(on)}$ and parasitic capacitances of CoolSiC™ MOSFETs, which minimize power losses in high-voltage and high-current applications.

Intended audience

This document is intended for power electronics engineers, technicians, and developers of Class D audio systems interested in evaluating the performance of Infineon's CoolSiC™ 400 V power transistors with MERUS™ IRS2452BM audio controller.

About this product group

Target applications

- [Constant voltage distribution systems \(\$100 V_{RMS}/70 V_{RMS}\$ \)](#)
- [Installation systems](#)
- [Paging systems](#)
- [Low impedance systems](#)

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



About this product group

Product family

CoolSiC™

Infineon's **CoolSiC™** MOSFETs offer exceptional performance in switching behavior and total losses. These devices are designed to offer high efficiency and optimal reliability, while also boasting a low on-resistance that remains stable and reproducible even in large-scale production.

MERUS™

Infineon's **MERUS™** amplifier solutions are designed to maximize power efficiency and dynamic range while providing best-in-class audio performance in product form factors that make them an optimal fit for any audio application, in both low- and high-voltage ranges.

Note: Boards do not necessarily meet safety, EMI, quality standards (for example UL, CE) requirements.

Safety precautions

Safety precautions

Note: Please note the following warnings regarding the hazards associated with development systems.

Table 1 Safety precautions

	Warning: The evaluation or reference board contains DC bus capacitors which take time to discharge after removal of the main supply. Before working on the drive system, wait five minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication that capacitors have discharged to safe voltage levels.
	Caution: The heat sink and device surfaces of the evaluation or reference board may become hot during testing. Hence, necessary precautions are required while handling the board. Failure to comply may cause injury.
	Caution: The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.

Table of contents

Table of contents

About this document.....	1
About this product group.....	1
Safety precautions.....	3
Table of contents.....	4
1 REF_AUDIO_SiC_2kW overview	5
1.1 Features	6
1.2 Board description.....	6
1.3 Board connections	8
1.4 CoolSiC™ 400 V MOSFET	9
1.5 MERUS™ IRS2452BM protected digital audio driver	9
1.6 EiceDRIVER™ 1EDN9550B gate driver	10
2 Board setup	11
3 Audio analyzer setup	12
3.1 Dual-channel configuration	12
4 Reference board operations	14
4.1 Power up.....	14
4.2 Functional audio test	14
4.3 Internal sync clock function.....	14
4.4 Power down.....	14
5 Audio performance.....	15
5.1 Total harmonic distortion - THD+N	15
5.2 Frequency response	19
5.3 Noise floor.....	21
6 Efficiency	23
7 Thermal testing TOLT package	27
7.1 Thermal performance	27
8 TO-247/TOLL variants of REF_AUDIO_SiC_2kW	34
8.1 Rework instructions to convert to TO-247	35
8.2 Rework instructions to convert TOLL.....	37
9 Thermal testing TO-247 and TOLL packages	39
9.1 Thermal performance TO-247	39
9.2 Thermal performance TOLL.....	42
10 Schematic	45
11 PCB specification and layout	46
11.1 PCB specification.....	46
11.2 Layout	47
12 Bill of materials.....	49
13 Summary	55
References.....	56
Revision history.....	57
Disclaimer.....	58

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

REF_AUDIO_SiC_2kW overview

1 REF_AUDIO_SiC_2kW overview

The REF_AUDIO_SiC_2kW reference board features Infineon's CoolSiC™ 400 V MOSFETs combined with the MERUS™ IRS2452BM dual-channel Class D audio driver IC. This two-channel design is scalable up to 1000 W x 2 channel for 100 V_{RMS} or 70 V_{RMS} distribution systems and 1000 W x 2 channels and 4 Ω and 2 Ω for low-impedance systems. The 1000 W x 2 channel output power rating is constrained by the heatsink used on the evaluation board. This limitation is thermal in nature and does not reflect the inherent power capability of CoolSiC™ MOSFETs.

The REF_AUDIO_SiC_2kW reference board represents an analog version of a second-order sigma-delta modulation, having a Class D switching stage inside the loop. The benefit of the sigma-delta modulation, compared to the carrier-signal based modulation, is that all the errors in the audible frequency range are shifted to the inaudible upper-frequency range by the nature of its operation. Additionally, sigma-delta modulation enables you to apply sufficient error correction.

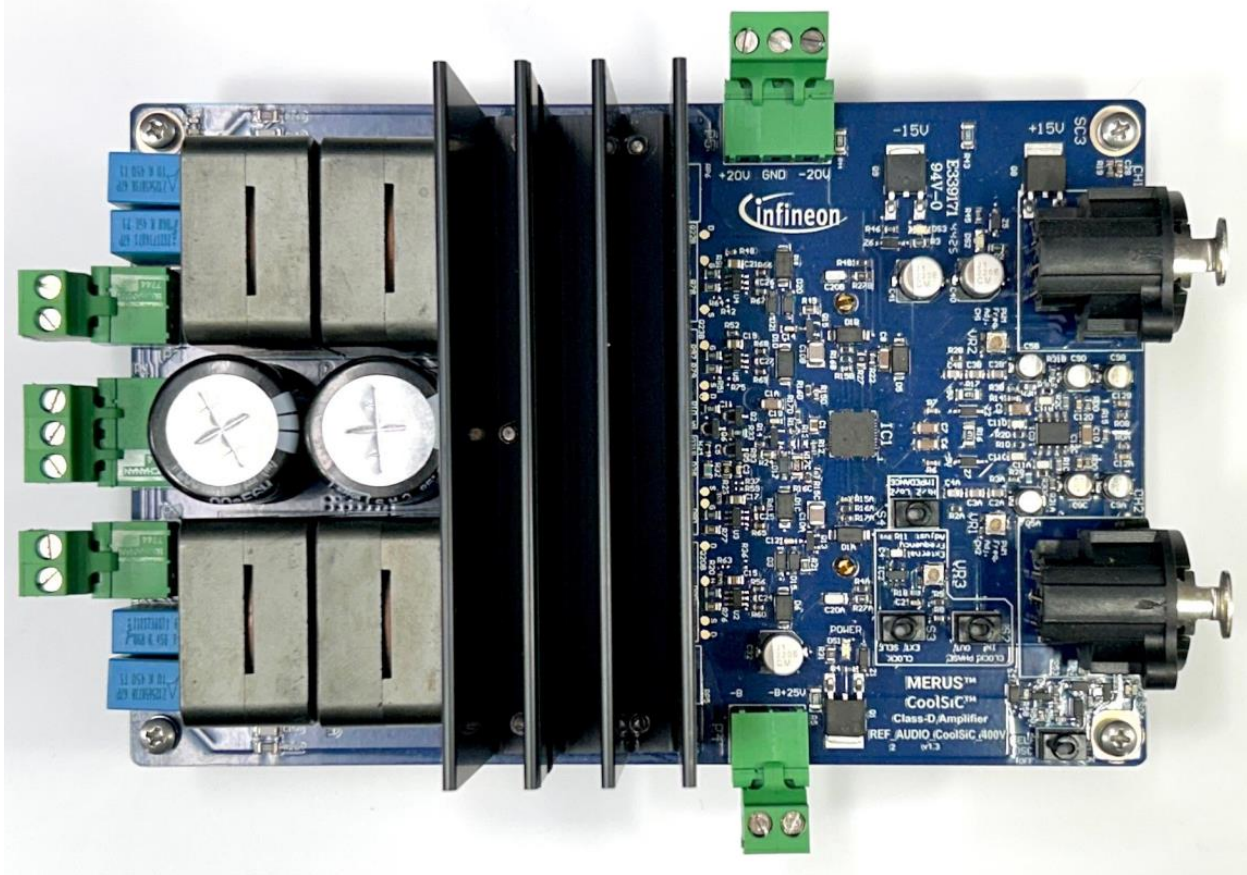


Figure 1 REF_AUDIO_SiC_2kW reference board

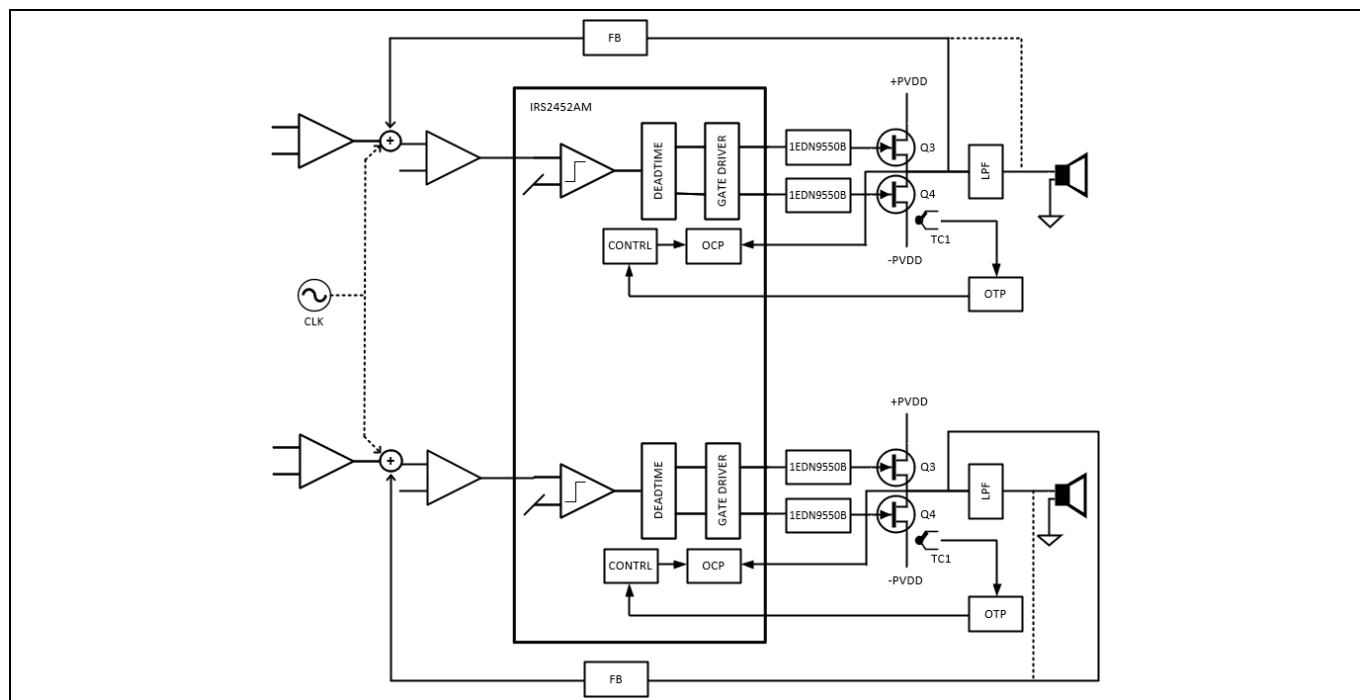


Figure 2 REF_AUDIO_SiC_2kW: Simplified block diagram

1.1 Features

- Overcurrent protection (OCP)
- Overvoltage protection (OVP)
- Undervoltage protection (UVP)
- Overtemperature protection (OTP)
- Self-oscillating half-bridge topology
- Optional clock synchronization
- Configured for single-ended (SE)
- Quiet turn on/turn off

1.2 Board description

Table 2 General specifications

Condition	Value	Notes
Supply voltage	$\pm 50 \text{ V} \sim \pm 180 \text{ V}$	Bipolar power supply
	$\pm 148.3 \text{ V}$	Nominal bipolar power supply for $100 \text{ V}_{\text{RMS}}$
	$\pm 101 \text{ V}$	Nominal bipolar power supply for $70 \text{ V}_{\text{RMS}}$
Rated load impedance	2Ω to 10Ω	Resistive load
Self-oscillating frequency	325 kHz	No input signal, adjustable
Voltage gain	33.8 – 38 dB	33.8 dB Low-Z mode 38 dB High-Z mode
Number of audio channels	2 x single-ended	–

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



REF_AUDIO_SiC_2kW overview

Condition	Value	Notes
Audio input format	Analog balanced	–
Modulator	Self-oscillating, second order sigma-delta modulation	

Table 3 Electrical specifications

Condition	Typ.	Note
Output power (1% THD+N), 1 kHz	1000 W x 2 ch, 100 V _{RMS}	RL = 10 Ω, 4 Ω, ±148.3 V
	1000 W x 2 ch, 70 V _{RMS}	RL = 5 Ω, 4 Ω, ±101 V
	1000 W x 2 ch	RL = 4 Ω, ±97 V
	1000 W x 2 ch	RL = 2 Ω, ±70 V
Output power (10% THD+N), 1 kHz	1350 W x 2 ch	RL = 10 Ω, ±148.3 V
	1200 W x 2 ch	RL = 5 Ω, ±101 V
	1400 W x 2 ch	RL = 4 Ω, ±97 V
	1350 W x 2 ch*	RL = 2 Ω, ±70 V
Idling supply current	+56 mA -54 mA	No input signal ±148.3 V, ±10 mA
Channel efficiency	97.9%	1 ch driven, 1350 W, 10 Ω, ±148.3 V
Channel efficiency	96.2%	1 ch driven, 1400 W, 4 Ω, ±97 V
Channel efficiency	93.8%	1 ch driven, 1000 W, 4 Ω, ±148.3 V
THD+N	0.03%	1 kHz, 100 W, 10 Ω, ±148.3 V
THD+N	.05%	1 kHz, 100 W, 4 Ω, ±148.3 V
THD+N	0.04%	1 kHz, 100 W, 4 Ω, ±97 V

Table 4 Audio performance

Parameter	Value	Notes
Signal-to-noise ratio (SNR)	>112 dB	Filter: A-weighting (12017), 20 kHz SPCL, ±148.3 V
Residual noise	<280 μV	Filter: A-weighting (12017), 20 kHz SPCL, ±148.3 V

Note: The low impedance (2 Ω) operation is limited by the heatsink design of the evaluation board and requires a reduced supply voltage (±70 V) to achieve 1350 W x 2 Ch, whereas 4 Ω operation is supported up to the full ±148.3 V supply voltage typical of 100 V_{RMS} constant-voltage systems.

1.3 Board connections

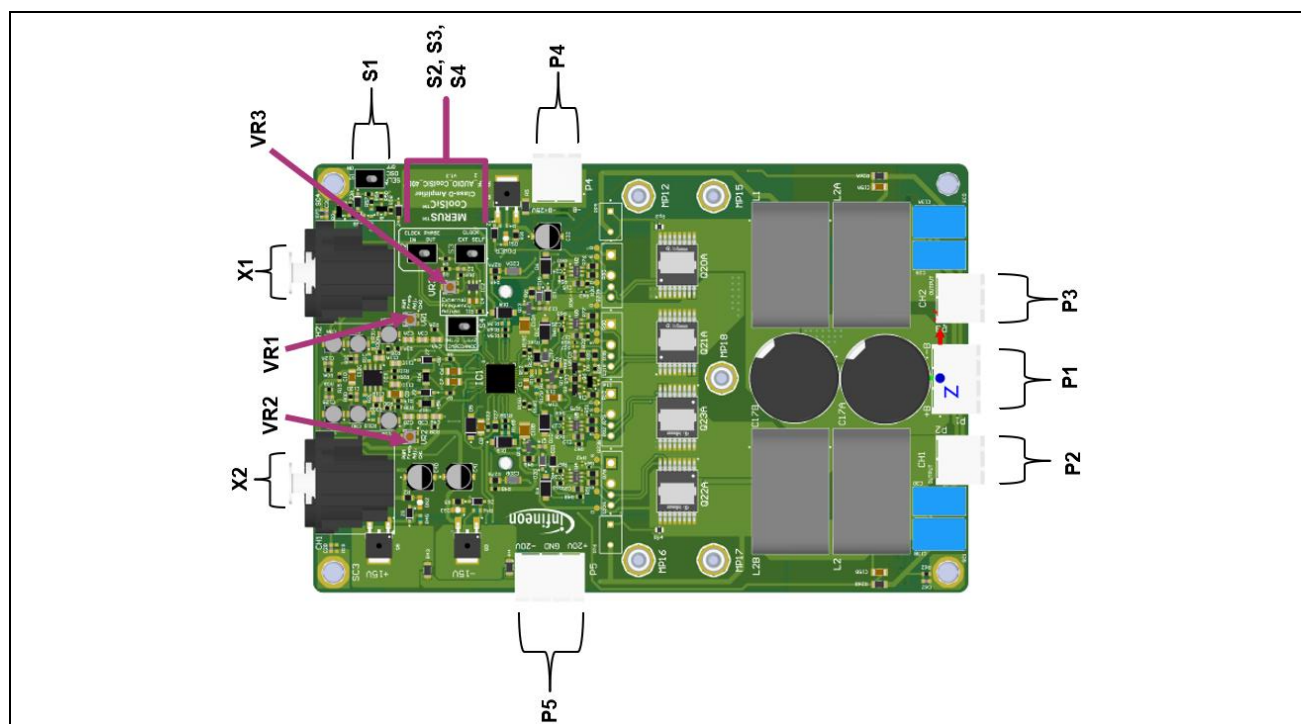


Figure 3 Board connections

Table 5 Function description of main REF_AUDIO_SiC_2kW board connections

Designator	Function	Description
P1	+B / -B power supply input	Operating range $\pm 50\text{ V}$ to $\pm 180\text{ V}$
P2	CH1 speaker out	$10\ \Omega - 4\ \Omega$
P3	CH2 speaker out	$10\ \Omega - 4\ \Omega$
P4	V_{CC} power supply input	25 Vdc
P5	Low voltage supply input	$\pm 20\text{ Vdc}$
X1	CH2 signal input	XLR balanced analog
X2	CH1 signal input	XLR balanced analog
S1	On (Self-osc) Off (Mute)	Self-osc/mute
S2	Clock phase	Changes the clock phase for CH1
S3	External clock sync	External clock sync on/off
S4	Low Z/ High Z gain select	Optimizes pre-amp gain for High Z or Low Z mode. $1.24\text{ V}_{\text{RMS}}$ input = 1 kW into $10\ \Omega$ in High Z mode. $1.24\text{ V}_{\text{RMS}}$ input = 1 kW into $4\ \Omega$ in low Z mode
VR1	CH2 frequency adjust	$250\text{ kHz} - 450\text{ kHz}$
VR2	CH1 frequency adjust	$250\text{ kHz} - 450\text{ kHz}$
VR3	Sync clock adjust	$250\text{ kHz} - 400\text{ kHz}$

1.4 CoolSiC™ 400 V MOSFET



Figure 4 CoolSiC™ 400 V G2 IMLT40R045M2H power MOSFET

The CoolSiC™ 400 V IMLT40R045M2H [1] power transistor is packaged in the TOLT (PG-HDSOP-19) package and features low Q_g , $R_{DS(on)}$, Q_{fr} , and C_{OSS} . Compared to conventional silicon MOSFETs of similar voltage rating, CoolSiC™ provides significantly lower conduction and switching losses, enabling higher overall system efficiency. The reduced switching and conduction losses allow operation across both high- and low-impedance loads without requiring rail voltage reduction to accommodate lower load impedances. The device is available in TOLT, TOLL, and TO-247 packages, allowing for mechanical design versatility.

1.5 MERUS™ IRS2452BM protected digital audio driver

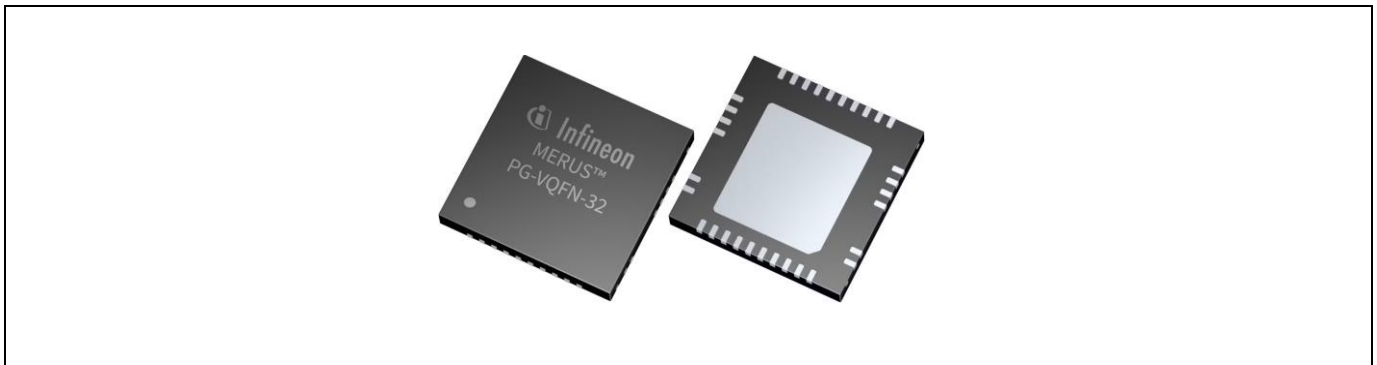


Figure 5 MERUS™ Class D controller IRS2452BM

MERUS™ IRS2452BM [2] is a dual-channel Class D audio amplifier driver rated at 400 V with integrated PWM modulators and overcurrent protection. Combined with four external MOSFETs and passive components, IRS2452AM forms a high-voltage dual-channel analog input Class D amplifier. The versatile structure of the analog input section with an error amplifier and a PWM comparator offer flexibility for implementing different types of PWM modulator schemes. Lossless current sensing utilizes the $R_{DS(on)}$ of the MOSFETs. The protection control logic monitors the status of the power supplies and load current through each MOSFET.

With the convenience of a half-bridge configuration, the differential input analog PWM modulator and protection logic interface are floated from the main power supply. IRS2452AM is equipped with startup click noise reduction to suppress unwanted audible noise during PWM startup and shutdown. A 7x7 mm PQFN package enhances the benefits achieved through a compact Class D topology.

1.6 EiceDRIVER™ 1EDN9550B gate driver

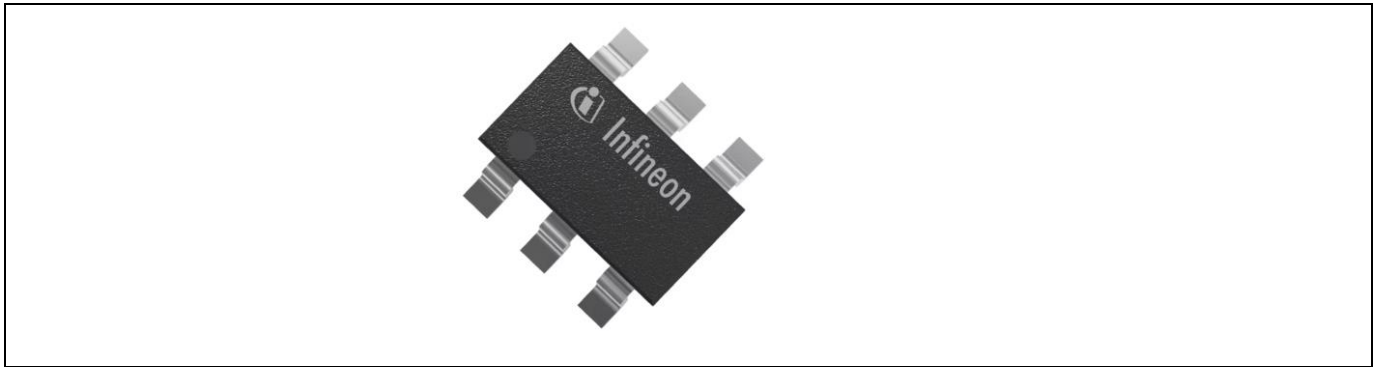


Figure 6 EiceDRIVER™ 1EDN9550B

EiceDRIVER™ 1EDN9550B [3] is a gate driver IC optimized for driving CoolSiC™ MOSFETs. It features a truly differential input (TDI), separate source and sink outputs, UVLO, and low-inductance TSOP package. TDI allows the gate driver output state to be controlled by the voltage difference between the two inputs. This is regardless of the driver's reference potential, as long as the common-mode voltage remains below 150 V (static) and 200 V (dynamic). This feature eliminates the risk of false triggering caused by ground bounce in low-side driving and enables 1EDN9550B to be used as a high-side driver. 1EDN9550B also supports the higher gate drive voltages required by CoolSiC™ MOSFETs. Supporting the recommended 18 V turn-on voltage of CoolSiC™ MOSFETs enables the device to achieve its lowest $R_{DS(on)}$ and optimal switching performance.

Board setup

2 Board setup

Perform the following steps to set up the board for two-channel configuration:

1. Connect 10 Ω or 4 $\Omega \geq 1000$ W capable loads to the output connectors P1 and P3
2. Connect P1 and P3 to Audio Precision AUX-0040 or AUX-0025
3. Connect AUX-0040 outputs to Audio Precision balanced inputs
4. Connect the Audio Precision XLR balanced analog outputs to X1 and X2
5. Turn off external power supplies before connecting to the DUT
6. Connect 25 V power supply to P4 = Vcc ext,-B
7. Connect ± 20 V dual power supply to P5 = Vaa, Gnd, Vss
8. Connect the ± 148.3 V_{DC} power supplies to P1
9. Ground audio precision chassis to power supply ground
10. Set S4 to high Z position for 10 Ω or low Z position for 4 Ω
11. Set S3 to the **Self** position
12. Set S2 to the **OUT** position
13. Set S1 to the **off** position

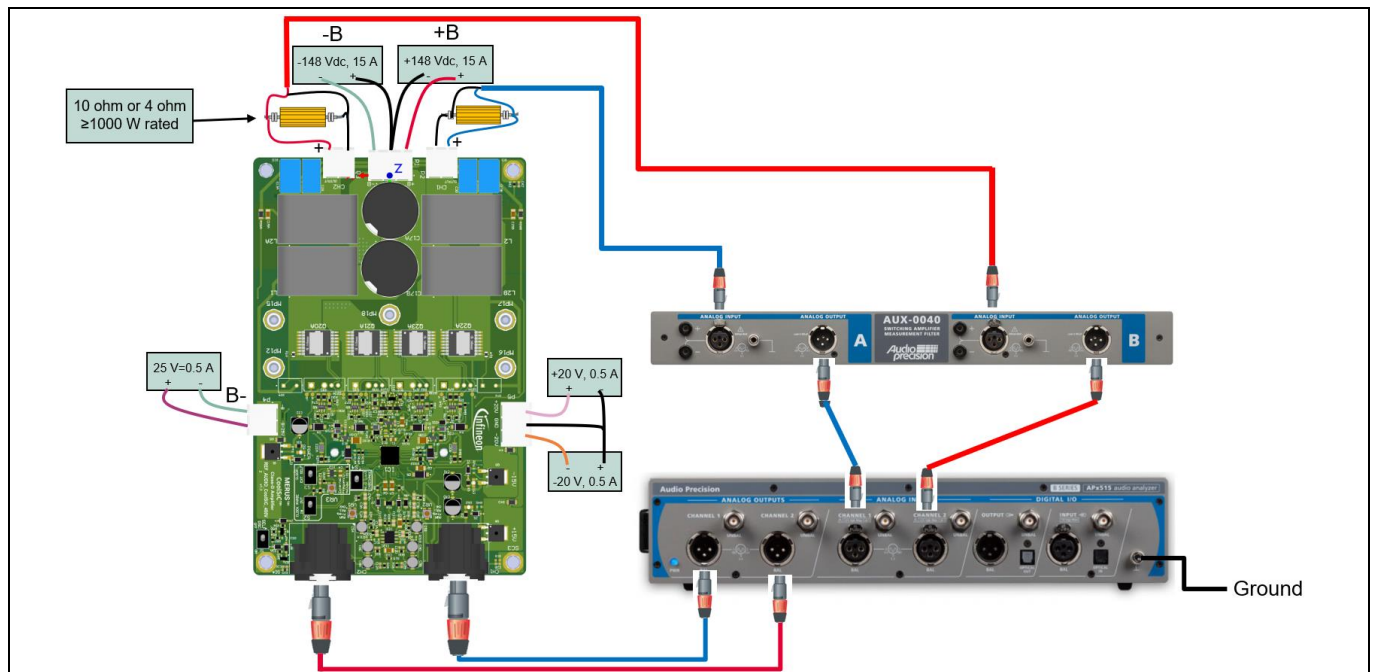


Figure 7 Typical setup for REF_AUDIO_SiC_2kW operation

3 Audio analyzer setup

3.1 Dual-channel configuration

Perform the following steps to set up **Audio Precision** for the two-channel single-ended operation, as shown in [Figure 8](#):

Output Configuration settings:

- **Connection:** Balanced
- **Channels:** 2

Input Configuration settings:

- Under **Input 1** > **Connection:** Analog balanced
- **Channels:** 2

For the **Filters** settings:

- **High-pass:** AC (< 10 Hz)
- **Low-pass:** AES17 (20 kHz)

Verify Connections settings:

- **Waveform:** Sine
- Check the **Levels Track Ch1** box and set the **Ch** as **250 mV_{RMS}**
- **Frequency:** 1 kHz

Input References settings:

- Under **Analog**,
- **W (watts):** 4 Ω or 10 Ω depending on load value

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

Audio analyzer setup

Signal Path Setup

Output Configuration

Connector: Analog Balanced

Channels: 2

EQ: None

Input Configuration

Input 1 Input 2

Connector: Analog Balanced

Channels: 2

Termination: 200 kohm

Measure: Auto

Auto Channels

Set dBR... Set dBSP... TEDS/SysCheck...

Channel	Source	Name	Sensitivity	Gain
1	Ch1	Ch1	0.00 dB	0.00 dB
2	Ch2	Ch2	0.00 dB	0.00 dB

Filters

High-pass: AC (<10 Hz)

Low-pass: AES17 (20 kHz)

Weighting: None

EQ: None

Device Under Test

DUT Delay: 0.000 s

Verify Connections

Generate OFF

Waveform: Sine

Test Channel: All Channels

Levels Track Ch1

Level	DC Offset
Ch1 250.0 mVrms	0.000 V

Frequency: 1.00000 kHz

Channels: 1 2

Advanced Settings...

Figure 8 Typical analyzer setup for REF_AUDIO_SiC_2kW operation

4 Reference board operations

4.1 Power up

1. Turn on 25 V power supply
2. Turn on ± 20 V power supply at the same time
3. Turn on ± 148.3 V power supply at the same time
4. Set switch S1 to the on position
5. Power supply should read ± 148.3 V and +56 mA (± 5 mA), -56 mA (± 5 mA)

4.2 Functional audio test

1. Apply 250 mV_{RMS} at 1 kHz sinusoidal signal from **Audio Precision**
2. Monitor the output signals at P1 and P3 with an oscilloscope and audio analyzer
3. Sweep the audio input signal from 10 mV_{RMS} to 1.25 V_{RMS}

4.3 Internal sync clock function

1. Monitor VS1 and VS2 switching frequency
2. Set S3 to **EXT** (external clock) position to enable the onboard clock oscillator
3. Monitor switching waveform adjust VR3 to achieve 325 kHz, confirm switching frequencies are synced at 325 kHz
4. Sweep the audio input signal from 10 mV_{RMS} to 1.25 V_{RMS}

4.4 Power down

1. Switch S1 to the off position
2. Turn off +/- power supplies

Audio performance

5 Audio performance

This section shows audio performance results of REF_AUDIO_SiC_2kW.

5.1 Total harmonic distortion - THD+N

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Input signal = 1 kHz
- Load impedance = 10Ω
- $F_{PWM} = 325 \text{ kHz}$

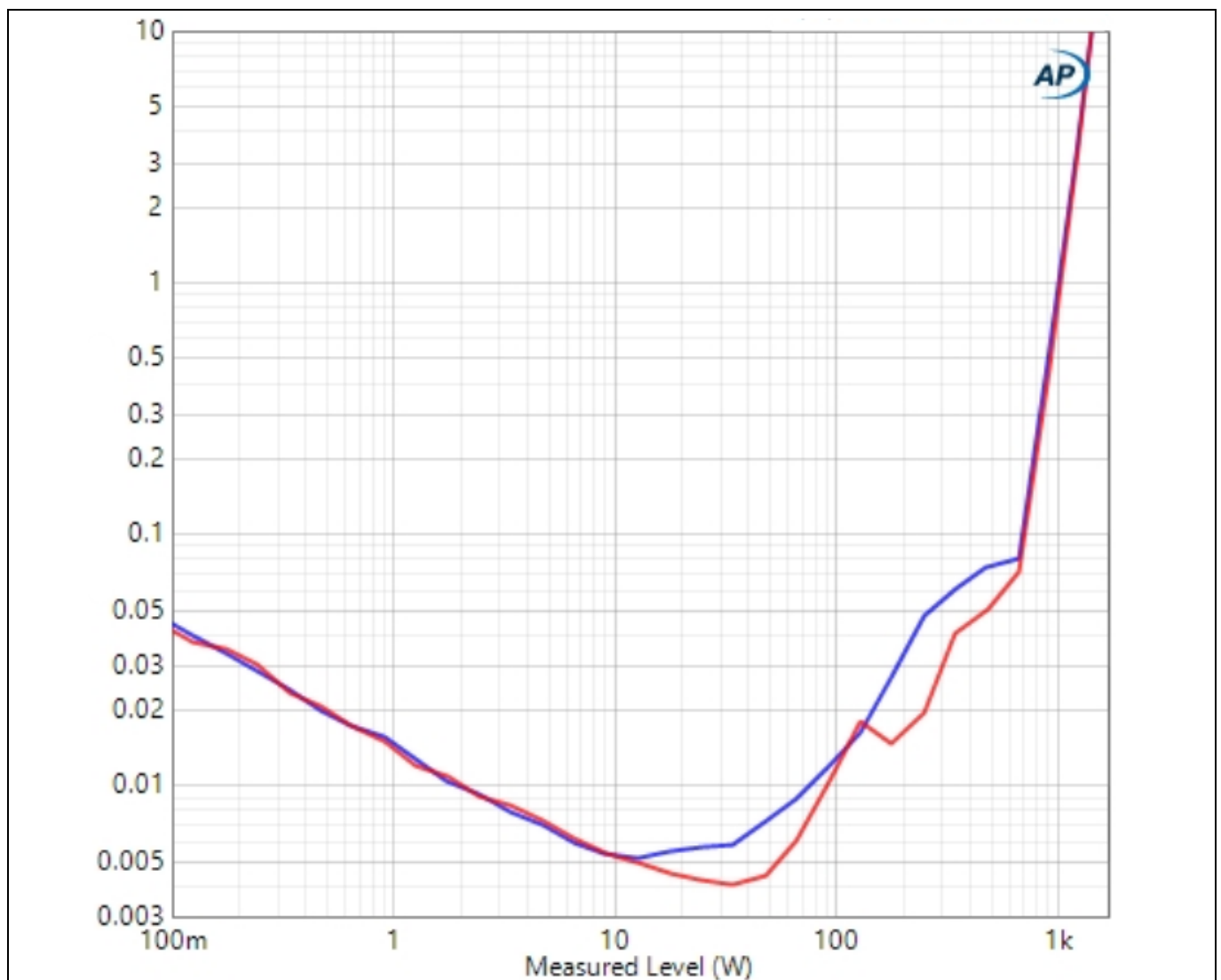


Figure 9 Power vs. THD+N 10 Ω load

Audio performance

Test conditions:

- $V_{BUS} = \pm 101\text{ V}$
- Input signal = 1 kHz
- Load impedance = $5\ \Omega$
- $F_{PWM} = 325\text{ kHz}$

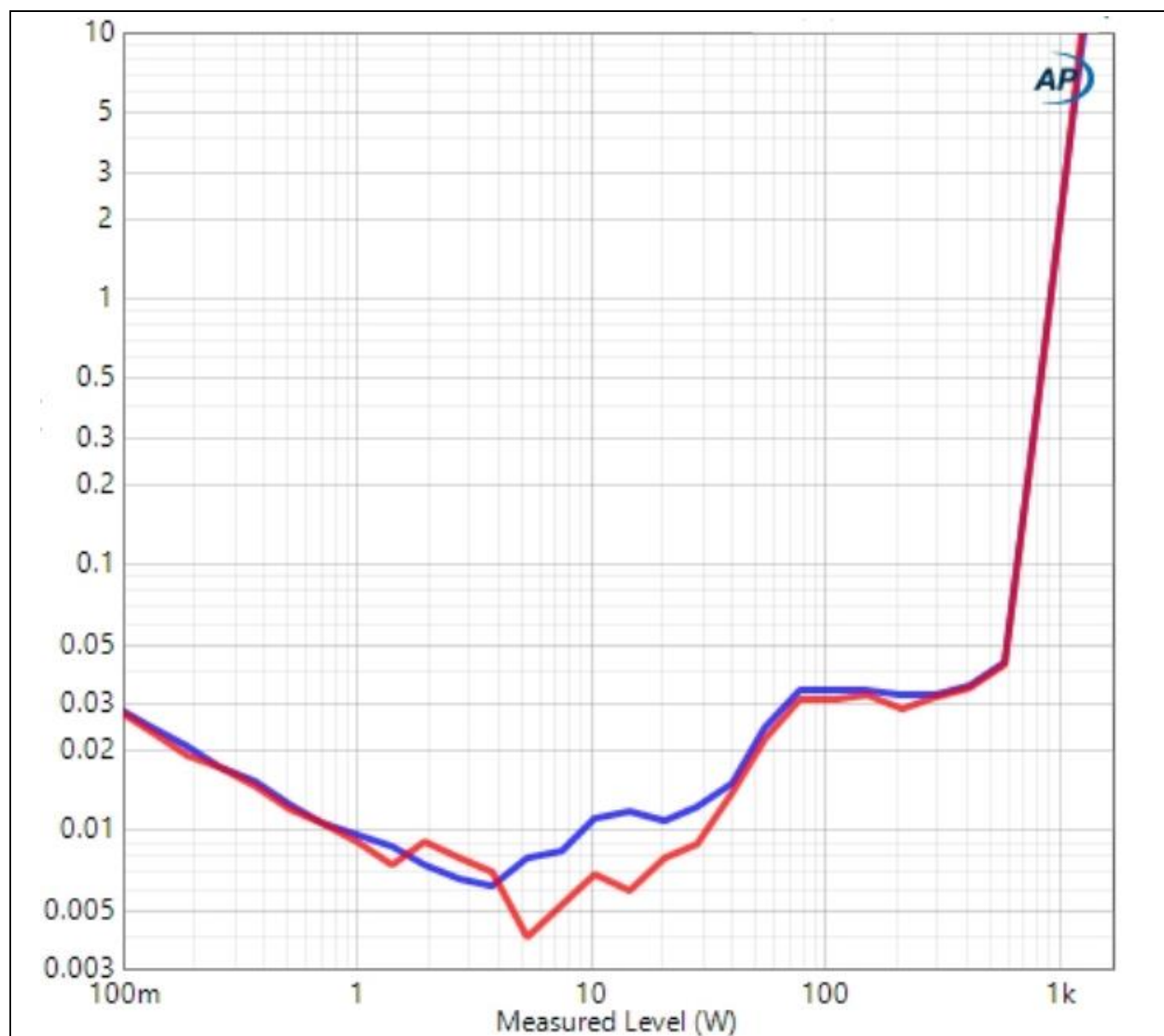


Figure 10 Power vs. THD+N 5 Ω load

Audio performance

Test conditions:

- $V_{BUS} = \pm 97\text{ V}$
- Input signal = 1 kHz
- Load impedance = 4 Ω
- $F_{PWM} = 325\text{ kHz}$

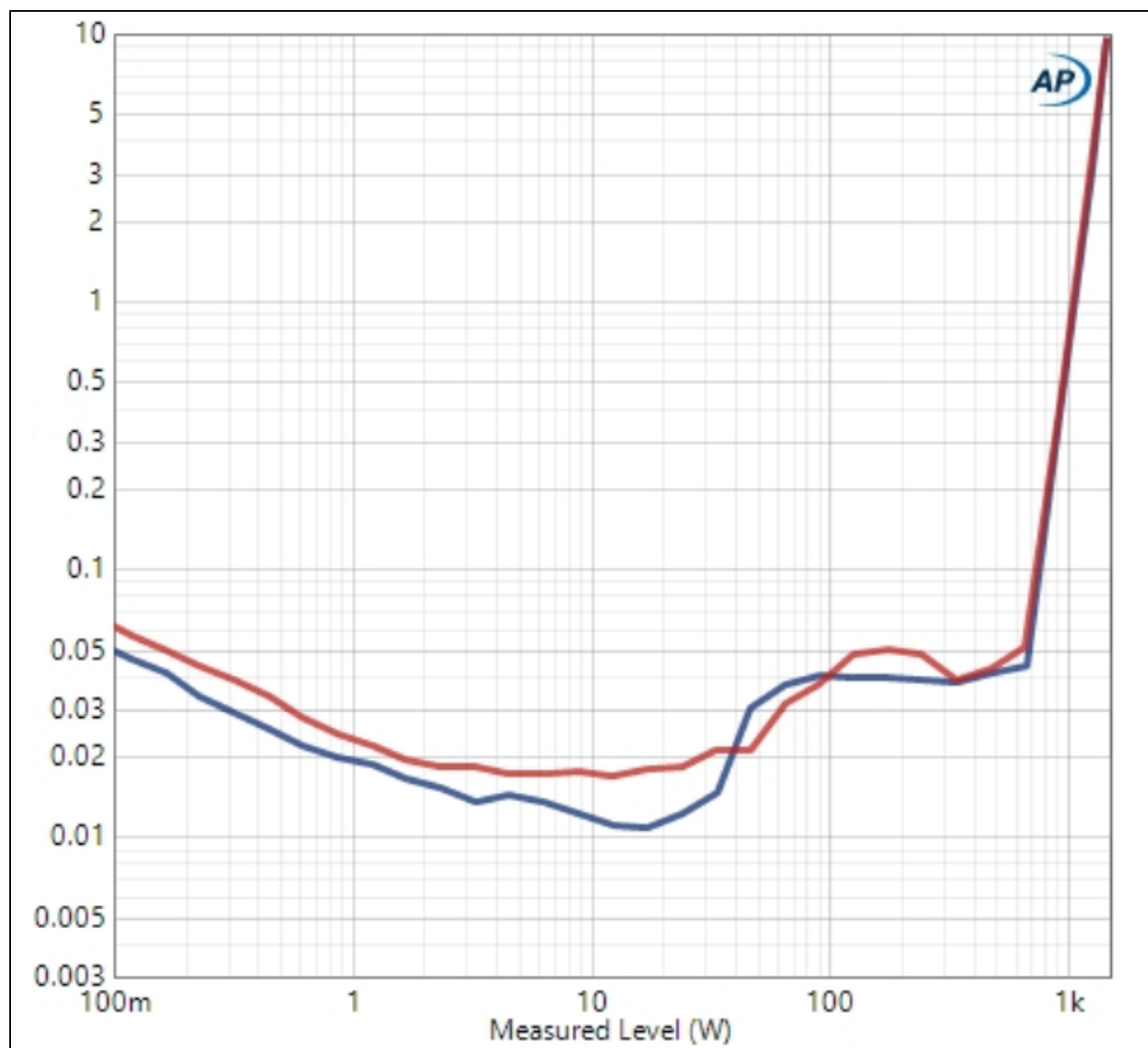


Figure 11 Power vs. THD+N at 4 Ω load

Audio performance

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Input signal = 1 kHz
- Load impedance = 4 Ω
- $F_{PWM} = 325 \text{ kHz}$

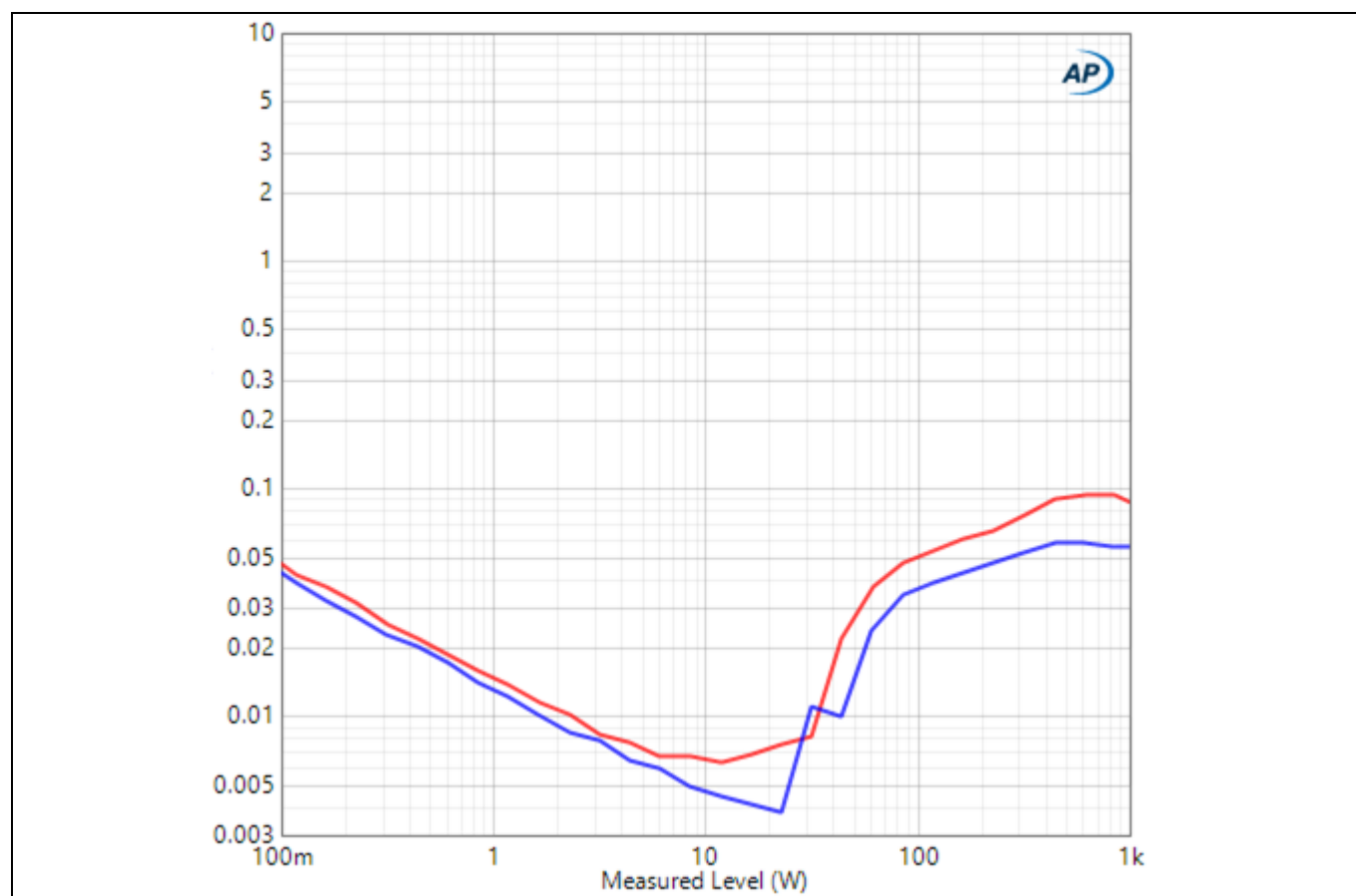


Figure 12 Power vs. THD+N at 4 Ω load

Audio performance

5.2 Frequency response

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Output power = 1 W
- Load impedance = 10Ω

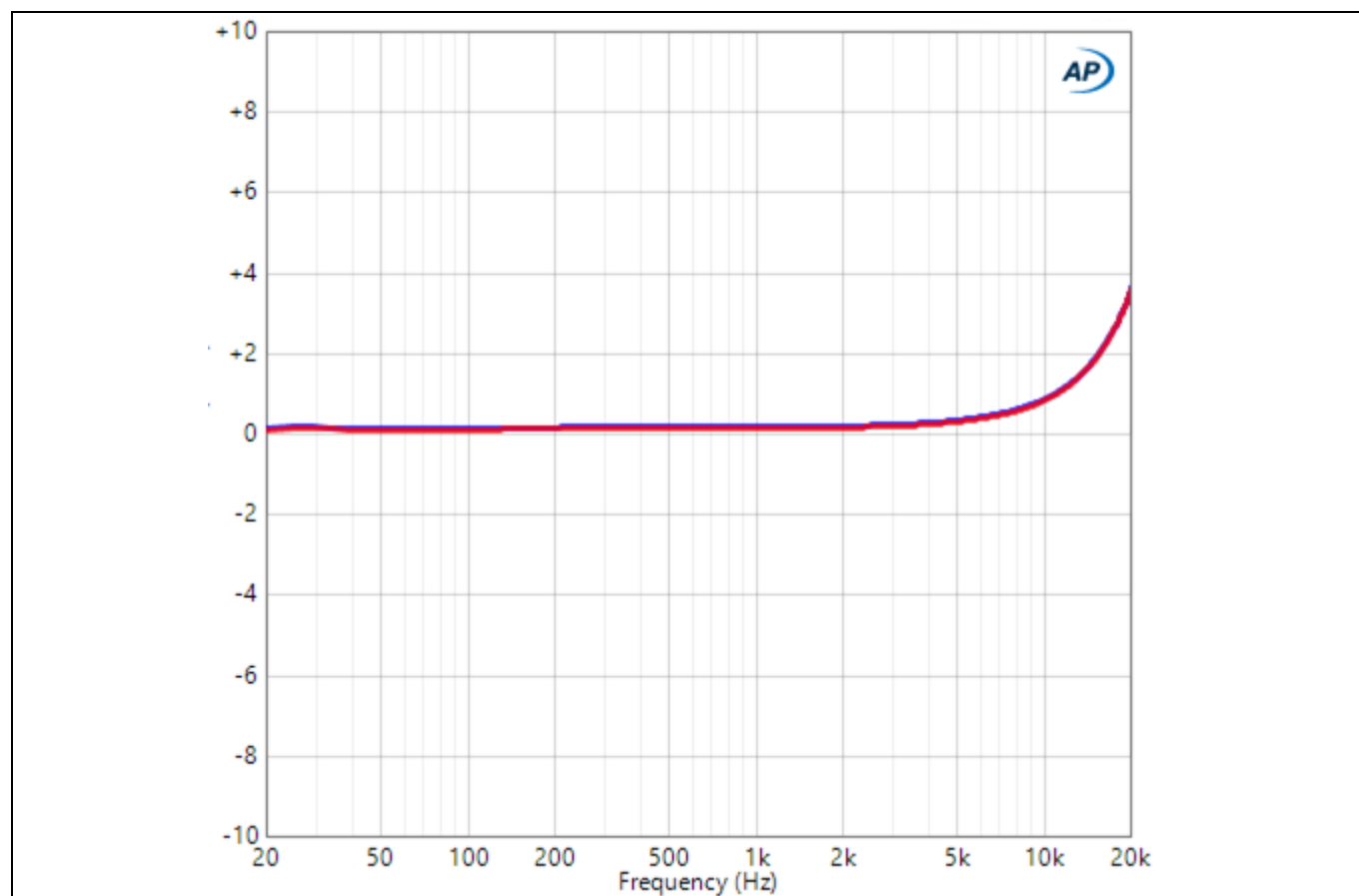


Figure 13 Frequency response 10 Ω load

Audio performance

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Output power = 1 W
- Load impedance = 4Ω

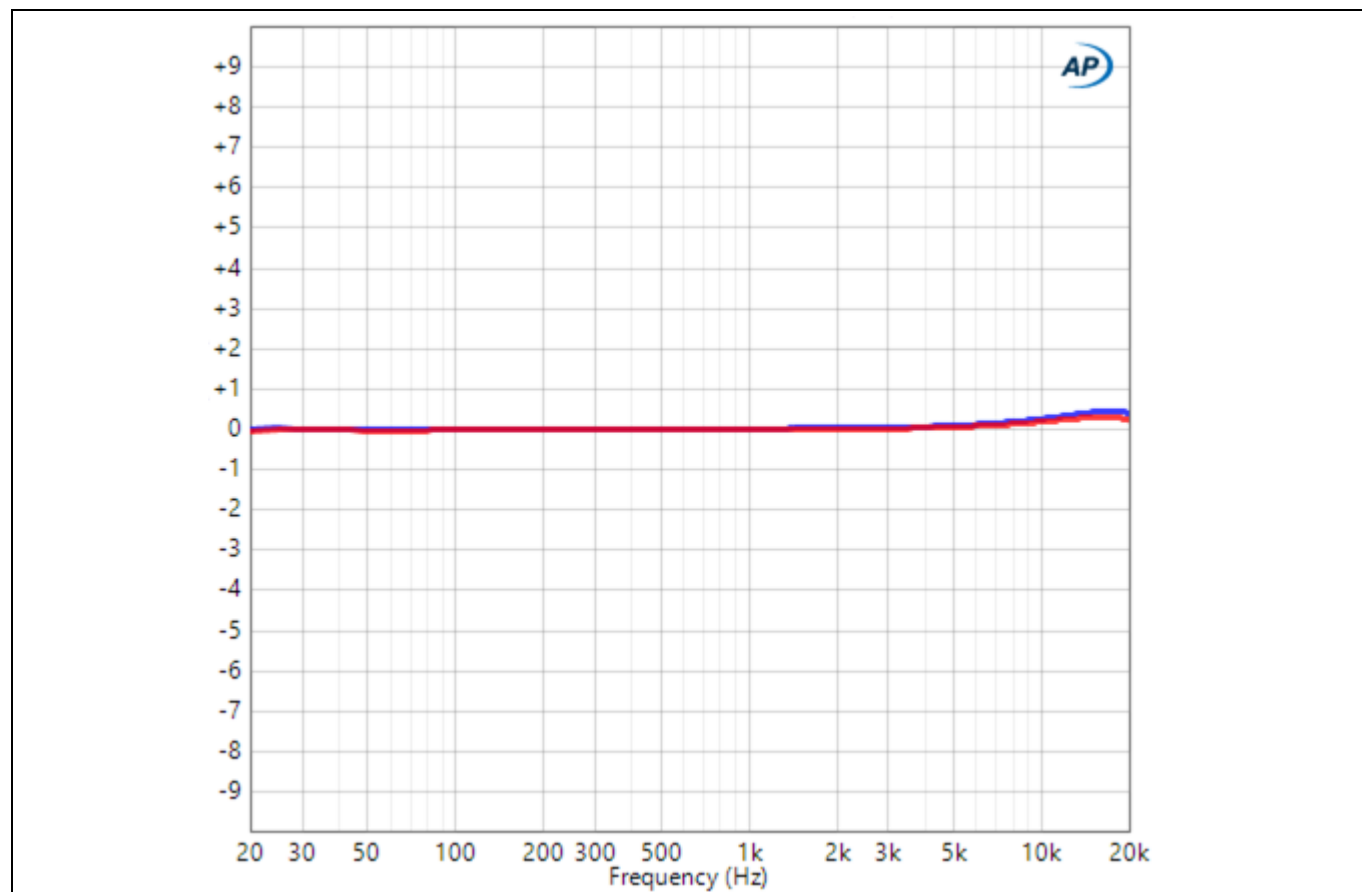


Figure 14 Frequency response 4Ω load

Audio performance

5.3 Noise floor

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Idle
- Load impedance = 10Ω
- $F_{PWM} = 325 \text{ kHz}$

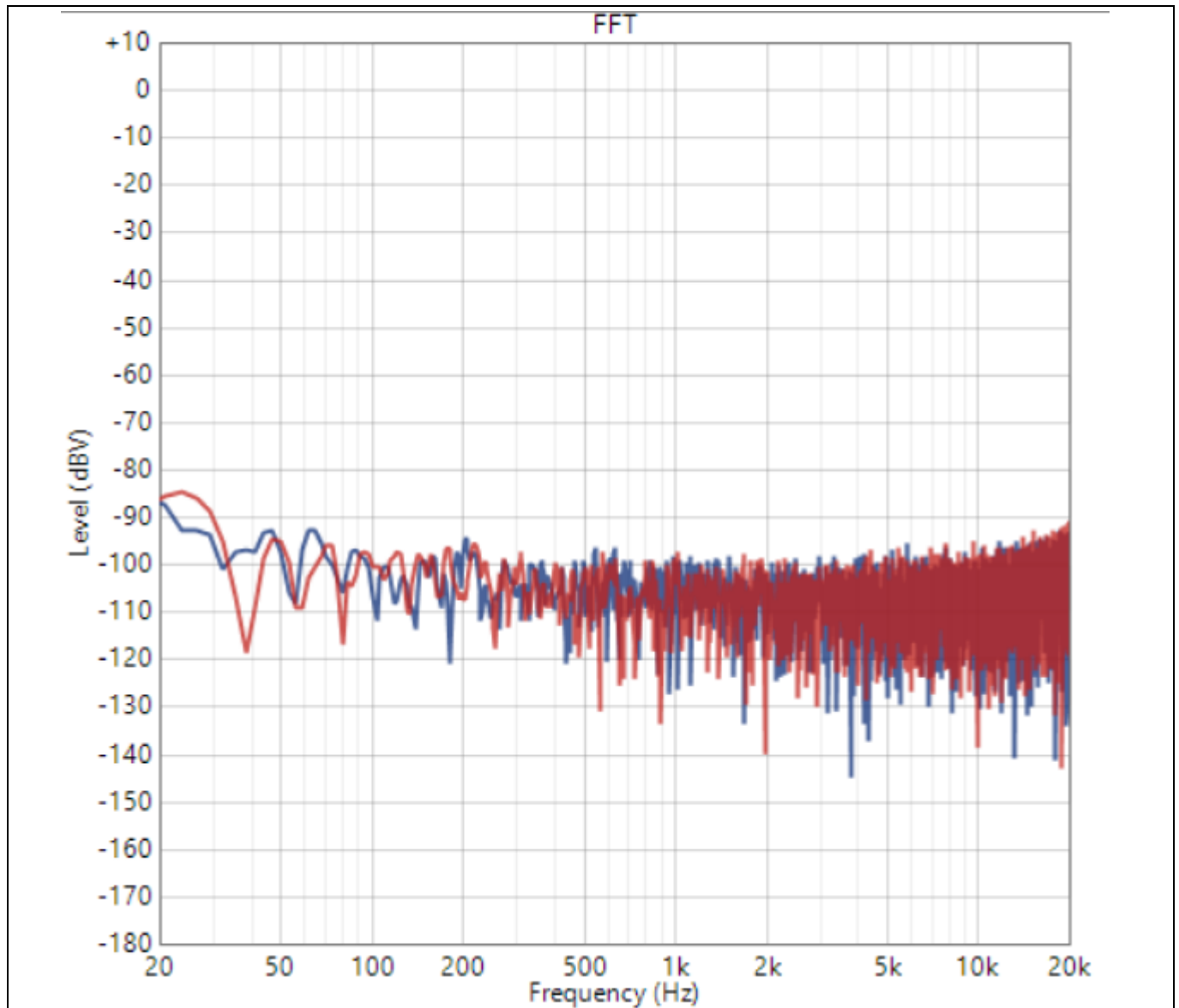


Figure 15 Noise floor idle

Audio performance

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Output = 1 V_{RMS} at 1 kHz
- Load impedance = 10Ω
- $F_{PWM} = 325 \text{ kHz}$

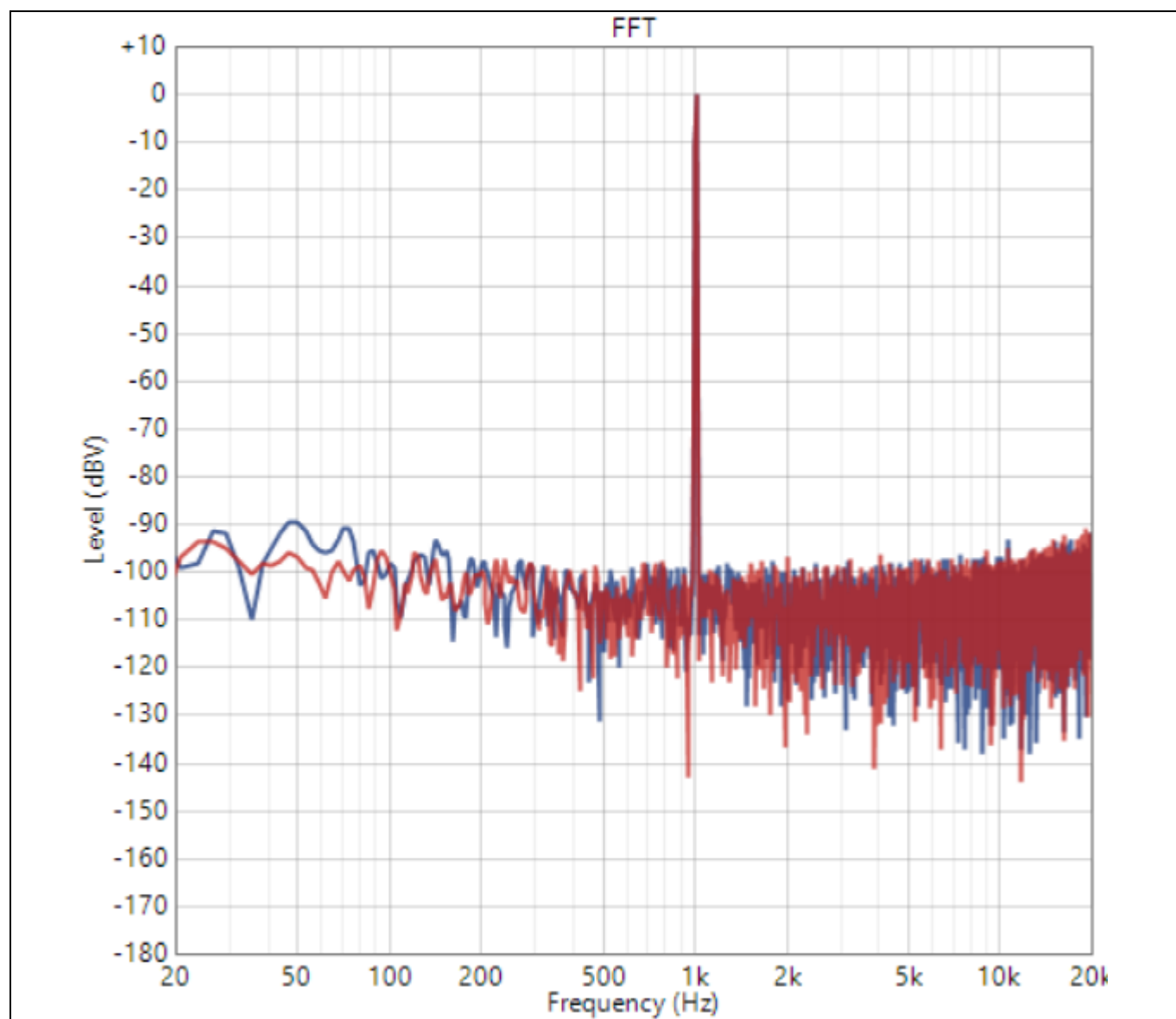


Figure 16 Noise floor 1 V_{RMS} output

Efficiency

6 Efficiency

Figure 17 through Figure 21 show efficiency characteristics under different bus voltage and load conditions.

High channel efficiency is achieved by the following factors:

- Low conduction and switching losses of CoolSiC™
- Secure dead time provided by IRS2452BM, avoiding cross conduction

Test conditions:

- $V_{BUS} = \pm 148.3 \text{ V}$
- Input signal = 1 kHz
- Load impedance = $10 \Omega - 4 \Omega$
- $F_{PWM} = 325 \text{ kHz}$

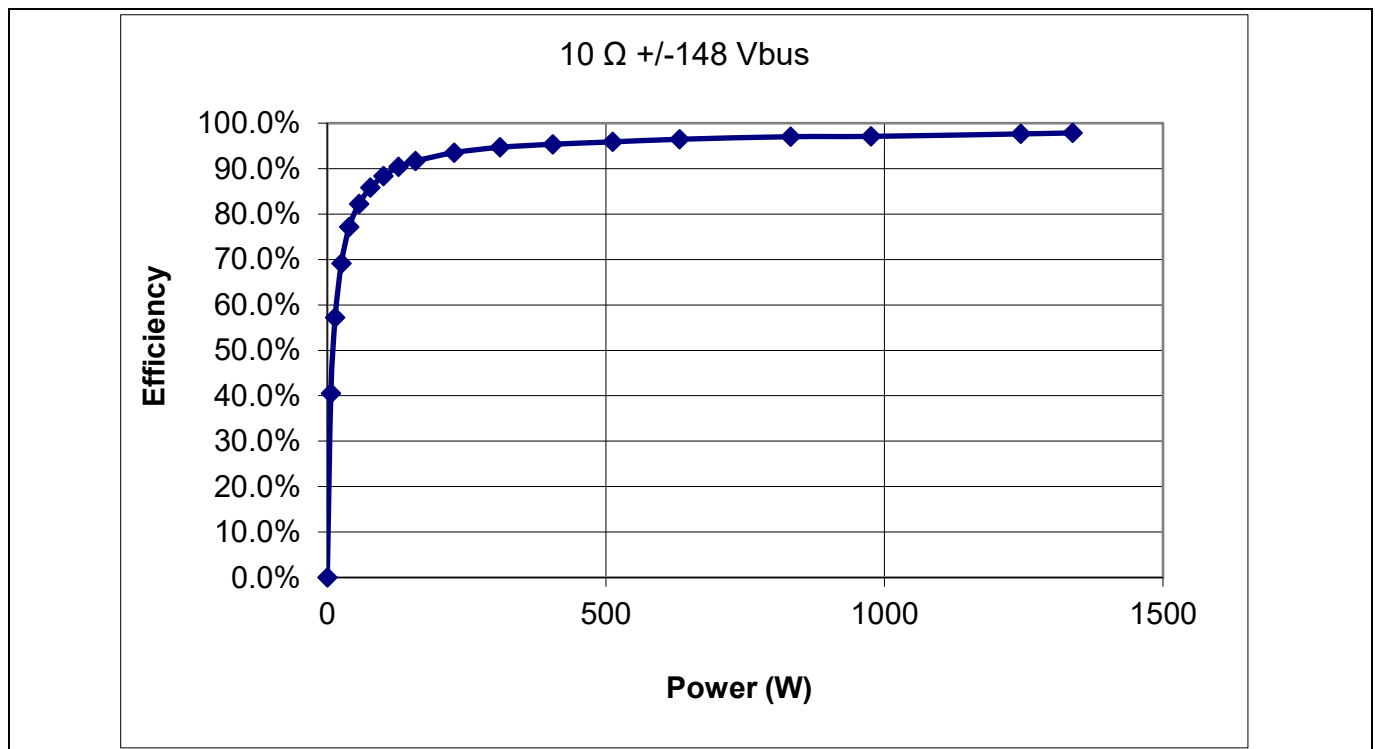


Figure 17 Channel efficiency with 10 Ω load

Efficiency

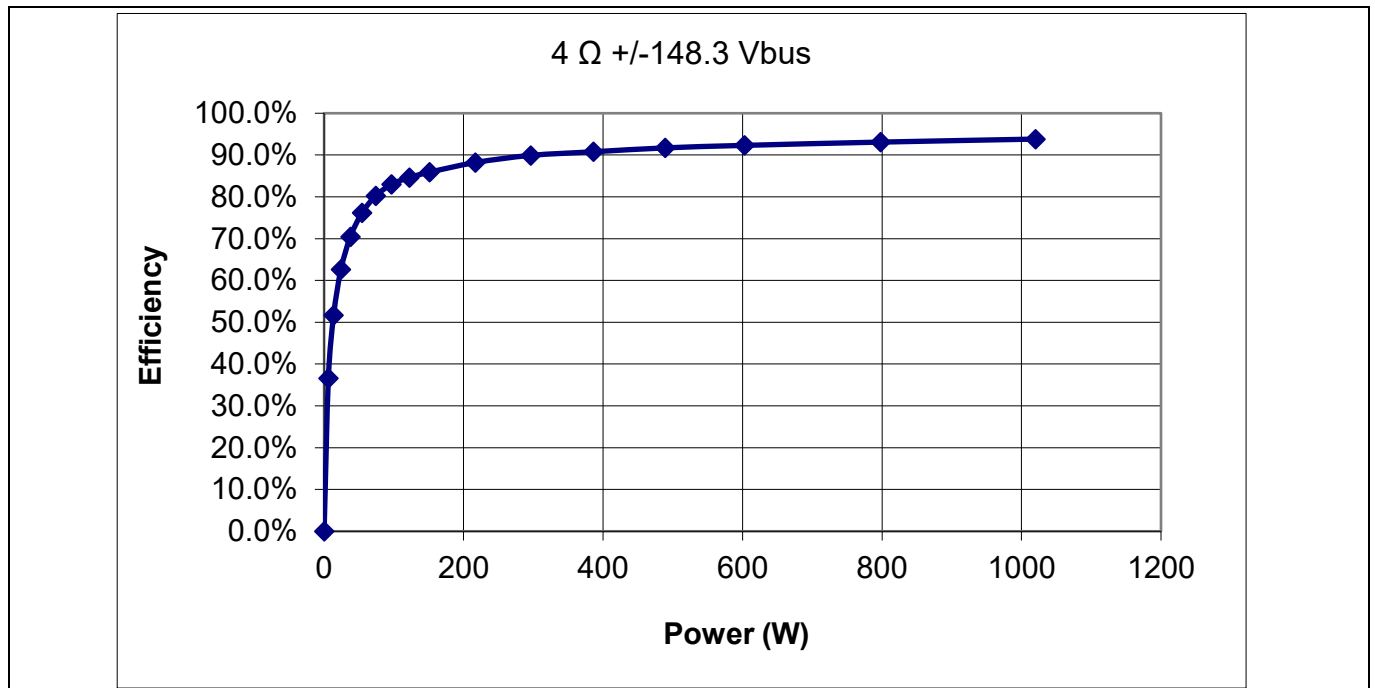


Figure 18 Channel efficiency with 4 Ω load

Test conditions:

- $V_{BUS} = \pm 101\text{ V}$
- Input signal = 1 kHz
- Load impedance = 5 Ω
- $F_{PWM} = 325\text{ kHz}$

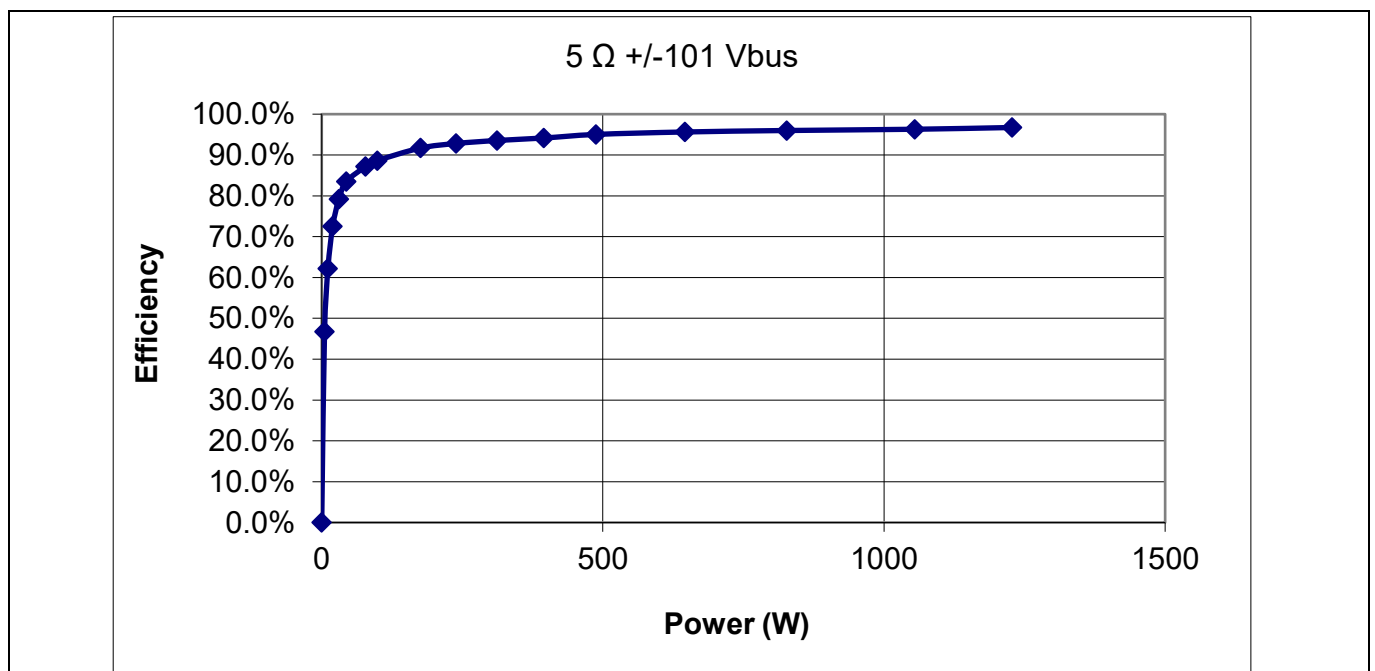


Figure 19 Channel efficiency with 5 Ω load

Efficiency

Test conditions:

- $V_{BUS} = \pm 97\text{ V}$
- Input signal = 1 kHz
- Load impedance = $4\ \Omega$
- $F_{PWM} = 325\text{ kHz}$

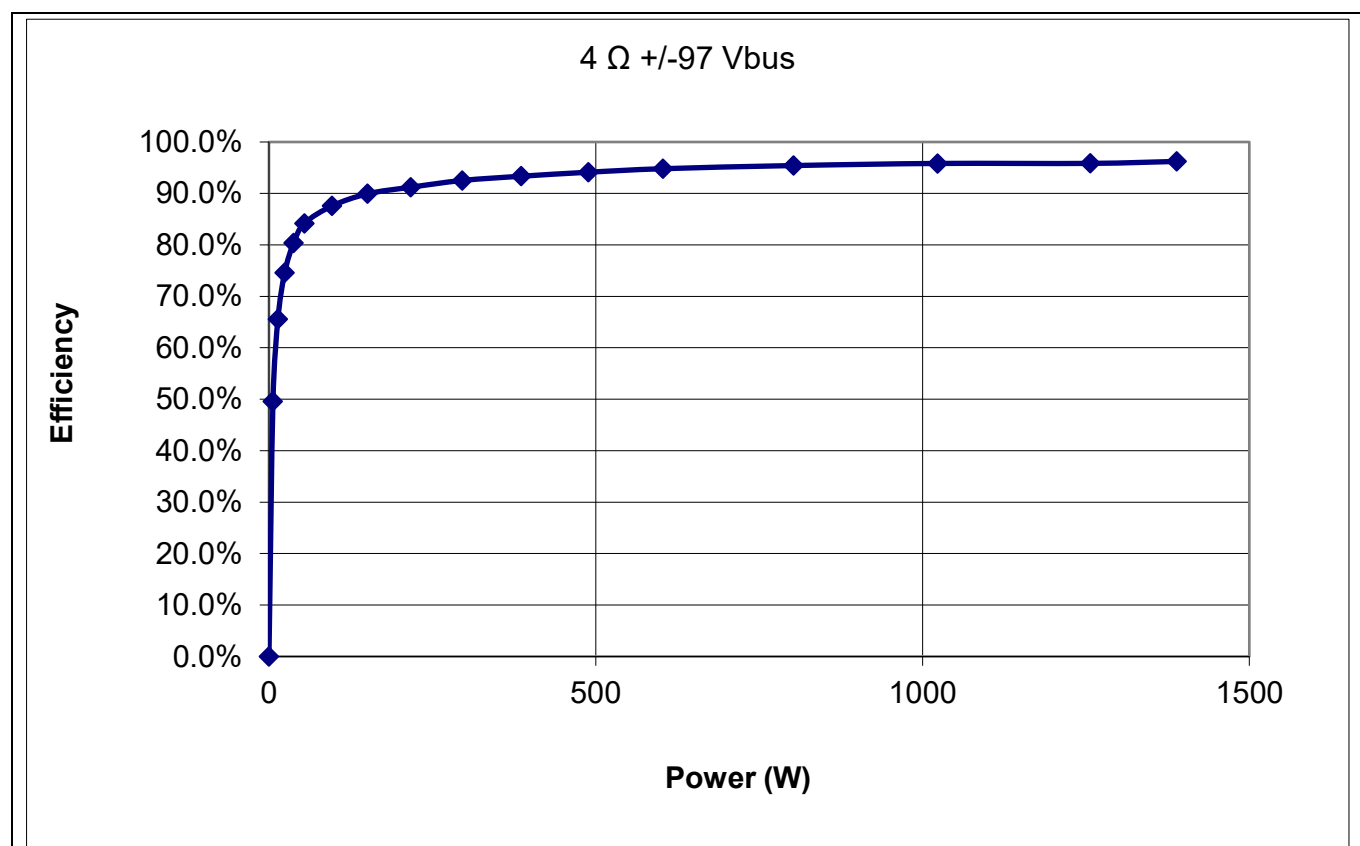


Figure 20 Channel efficiency with $4\ \Omega$ load

Efficiency

Test conditions:

- $V_{BUS} = \pm 70\text{ V}$
- Input signal = 1 kHz
- Load impedance = $2\ \Omega$
- $F_{PWM} = 325\text{ kHz}$

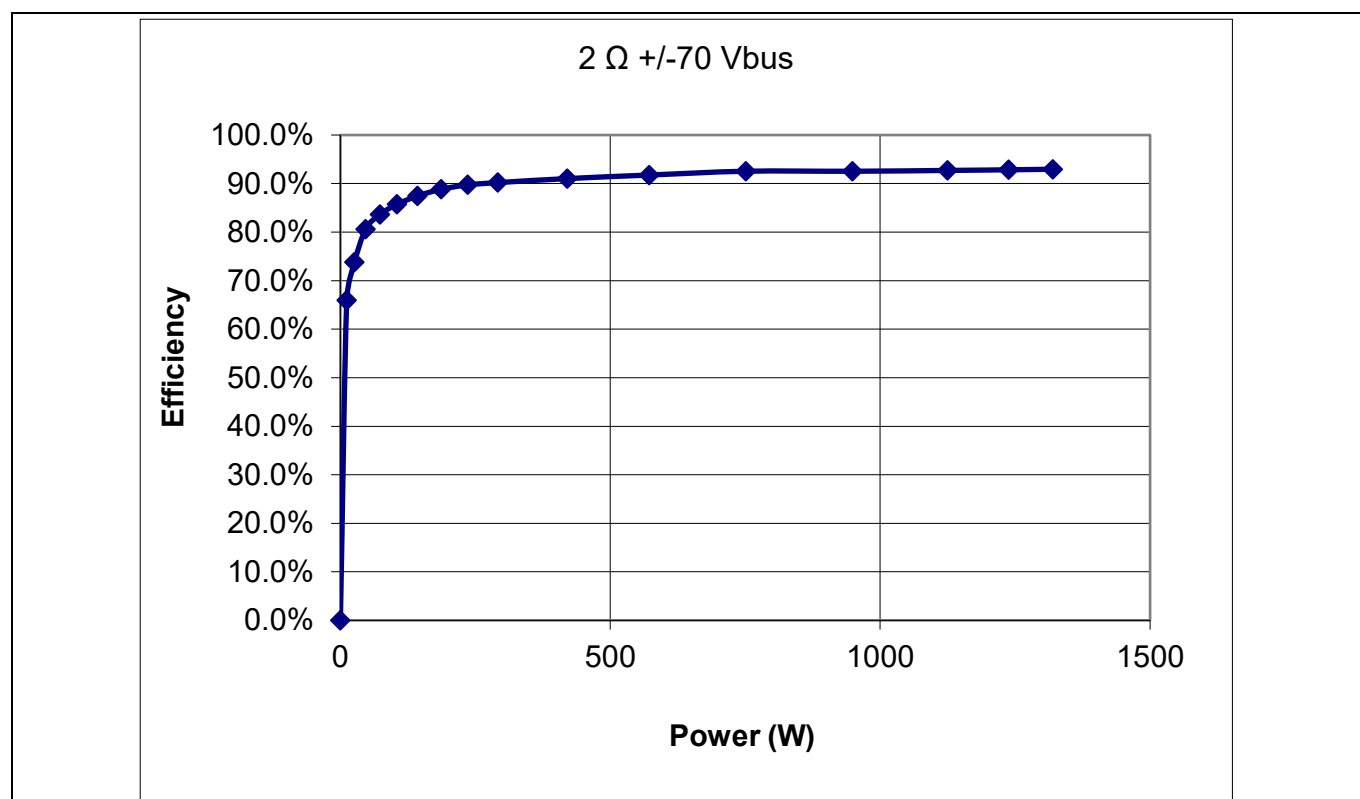


Figure 21 Total channel power efficiency with $2\ \Omega$ load

7 Thermal testing TOLT package

7.1 Thermal performance

Test conditions:

- Input signal = 1 kHz
- Load = 10 Ω , 5 Ω , 4 Ω , 2 Ω
- $F_{PWM} = 325$ kHz

Table 6 Peak power

Load (Ω)	$\pm V_{BUS}$ (V)	10% THD+N power	T_{case} Max ($^{\circ}C$)	Duration (minutes)
10	148.3	1350 W x 2 ch	59	1
5	101	1200 W x 2 ch	70.9	1
4	97	1400 W x 2 ch	95.4	1
2	70	1350 W x 2 ch	175.6	1

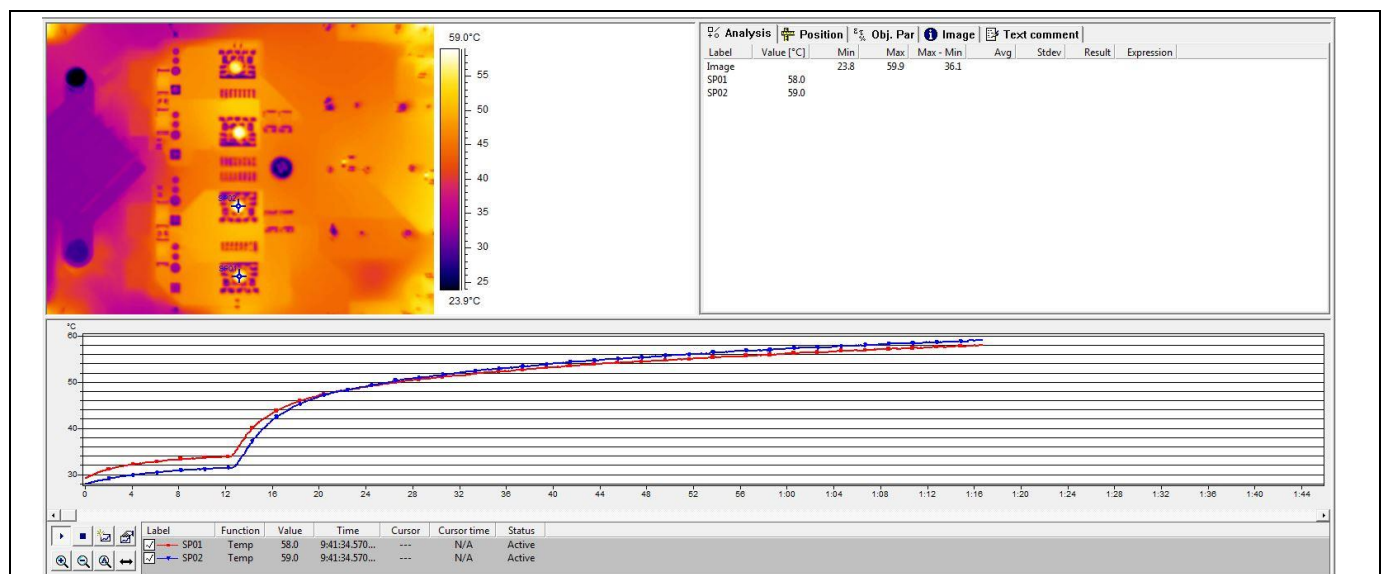


Figure 22 Peak power 1350 W x 2 Ch with 10 Ω load, ± 148.3 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

Thermal testing TOLT package

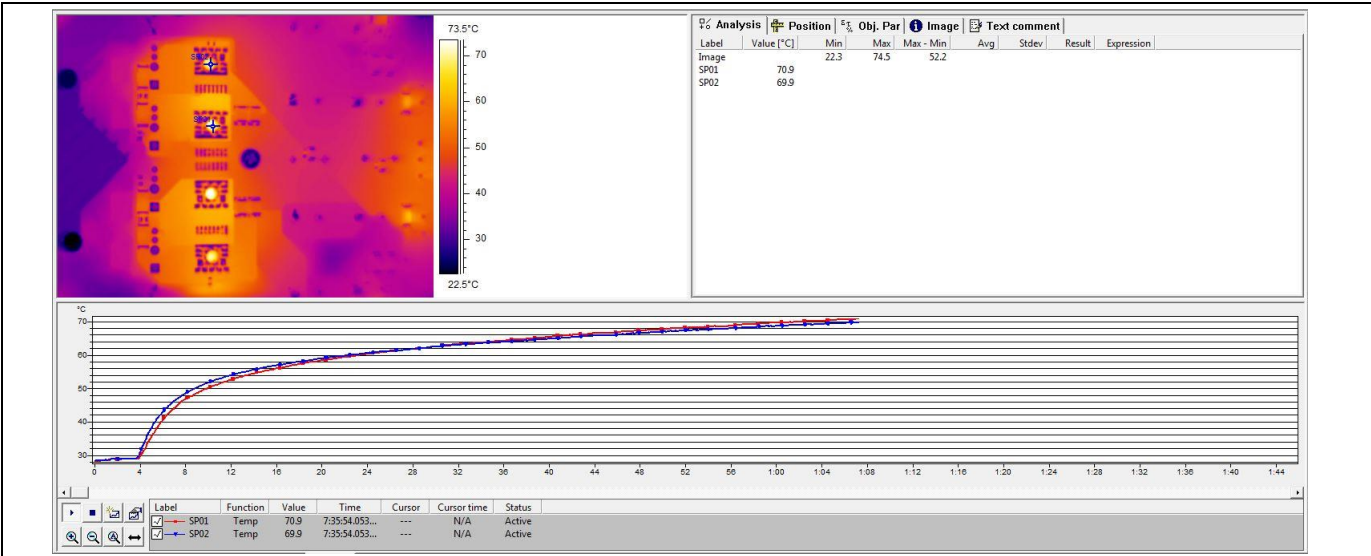


Figure 23 Peak power – 1200 W x 2 Ch with 5 Ω load, ±101 V

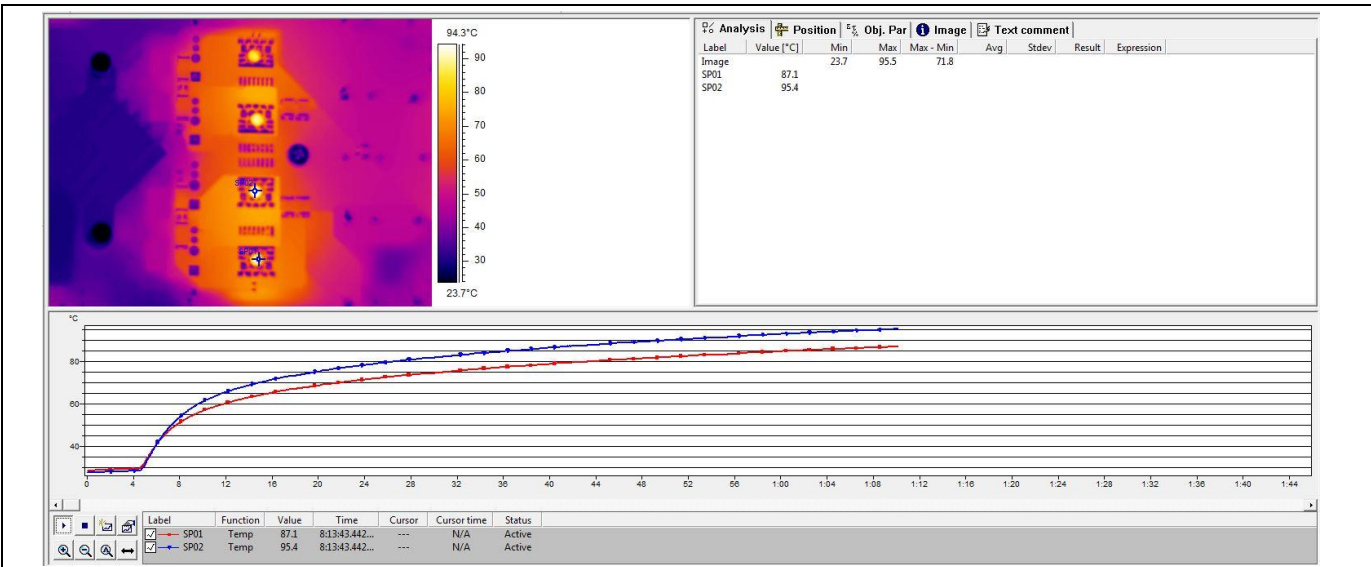


Figure 24 Peak power – 1400 W x 2 Ch with 4 Ω load, ±97 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

Thermal testing TOLT package

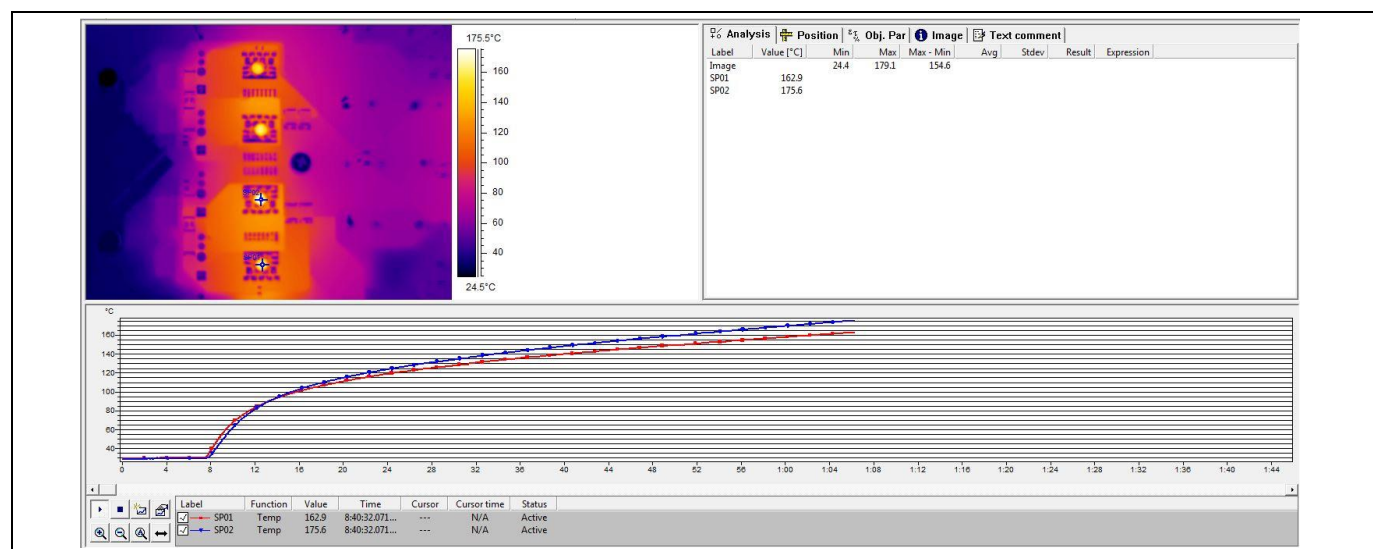


Figure 25 Peak power – 1350 W x 2 Ch with 2 Ω load, ±70 V

Table 7 Rated power

Load (Ω)	±V _{BUS} (V)	Rated power	T _{case} max (°C)	Duration (minutes)
10	148.3	1000 W x 2 ch	62.8	1
4	148.3	1000 W x 2 ch	137	
5	101	1000 W x 2 ch	68.2	
4	97	1000 W x 2 ch	91.7	
2	70	1000 W x 2 ch	140.1	

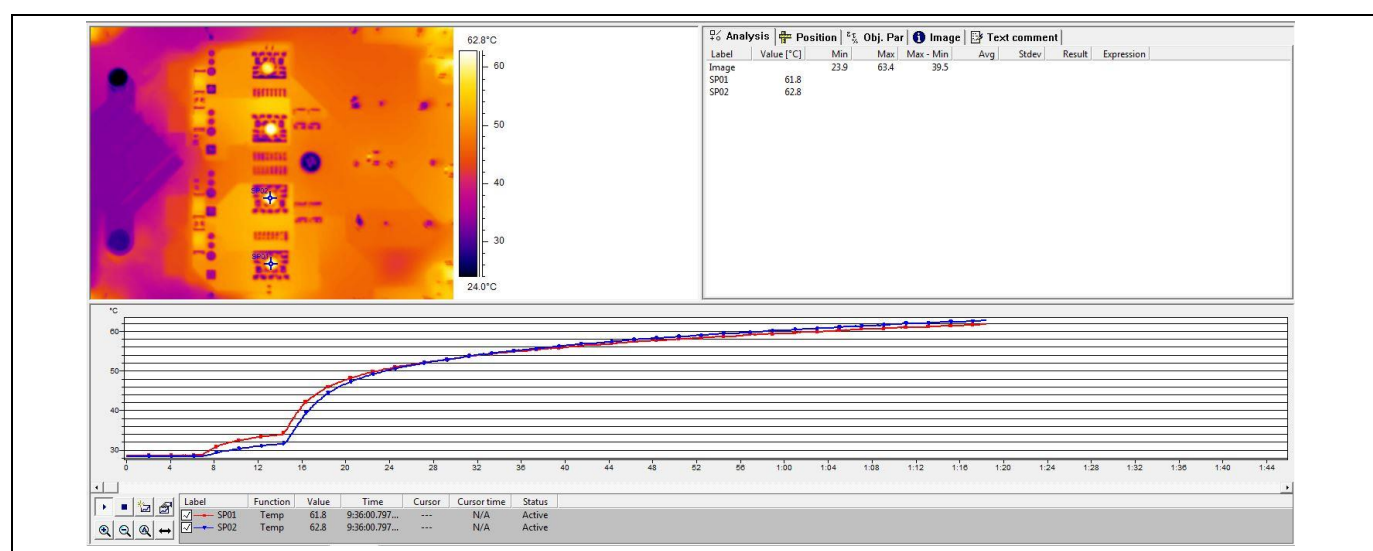


Figure 26 Rated power - 1000 W x 2 Ch with 10 Ω load, ±148.3 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TOLT package

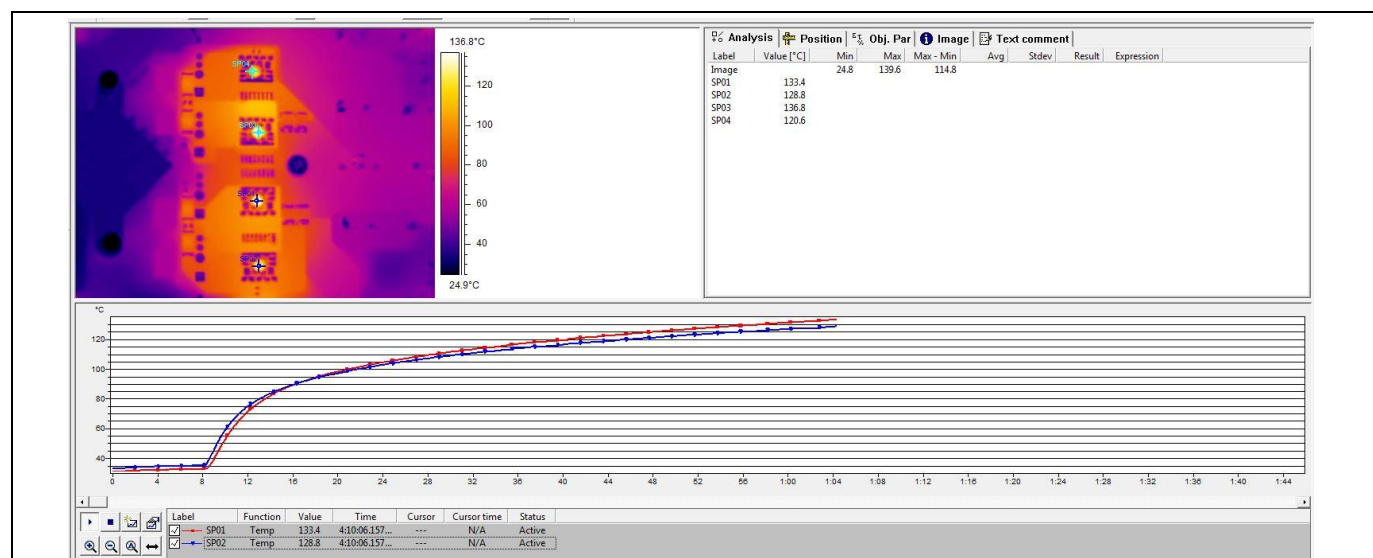


Figure 27 Rated power – 1000 W x 2 Ch with 4 Ω load, ± 148.3 V

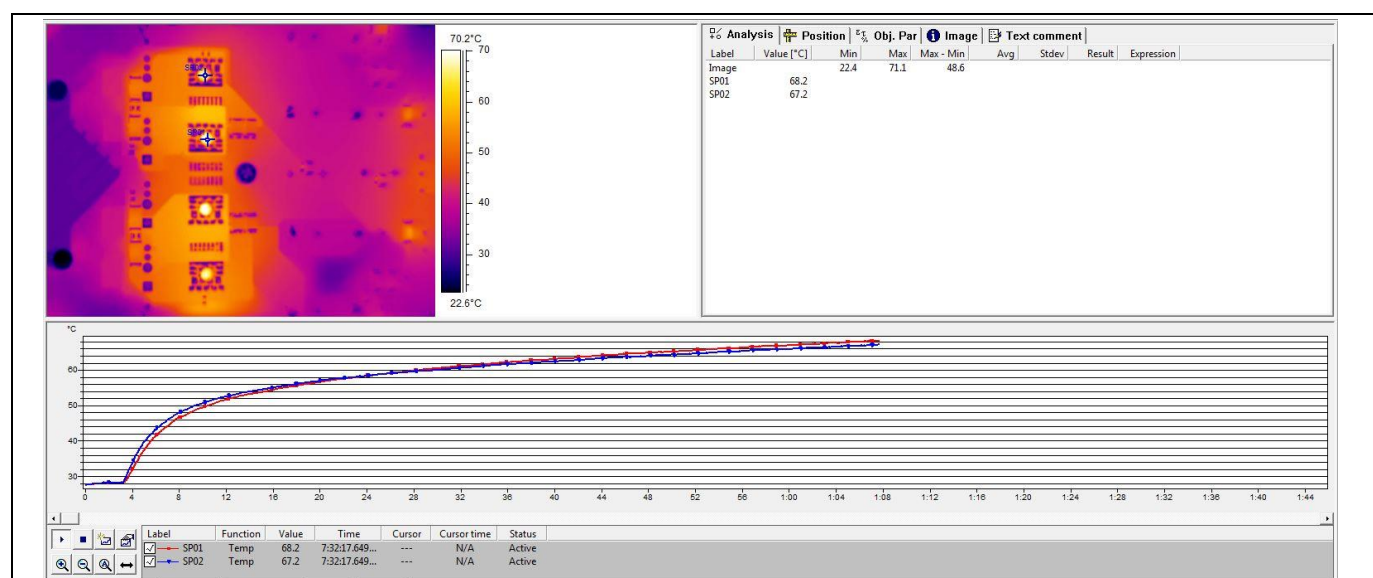


Figure 28 Rated power – 1000 W x 2 Ch with 5 Ω load, ± 101 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TOLT package

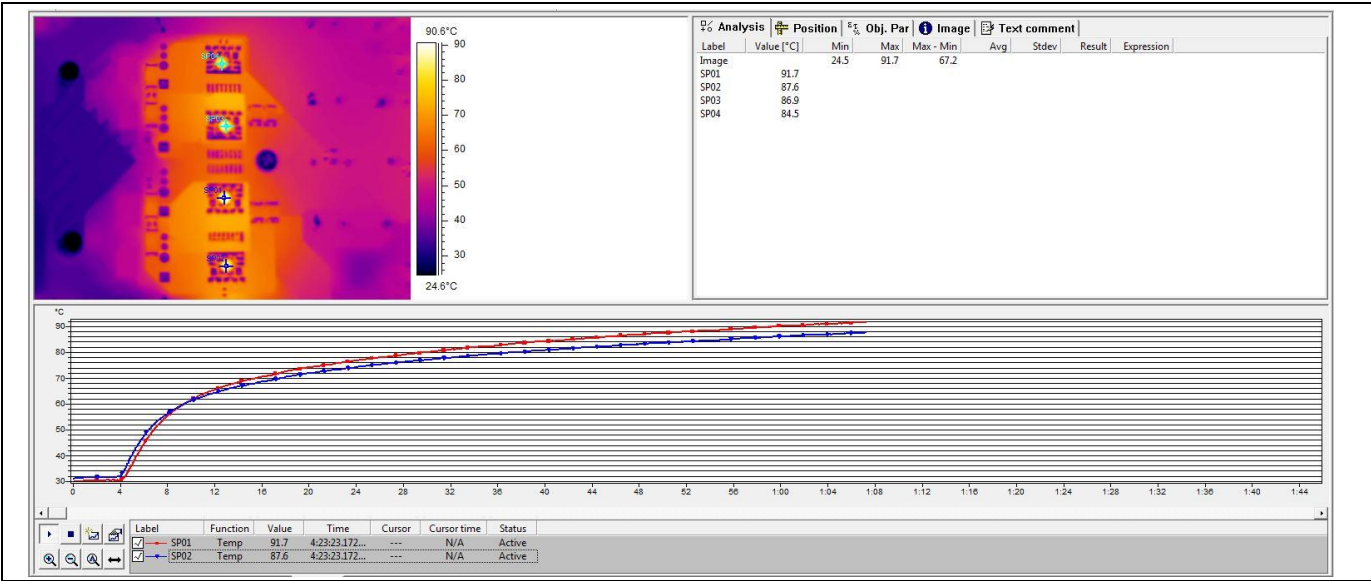


Figure 29 Rated power – 1000 W x 2 Ch with 4 Ω load, ±97 V

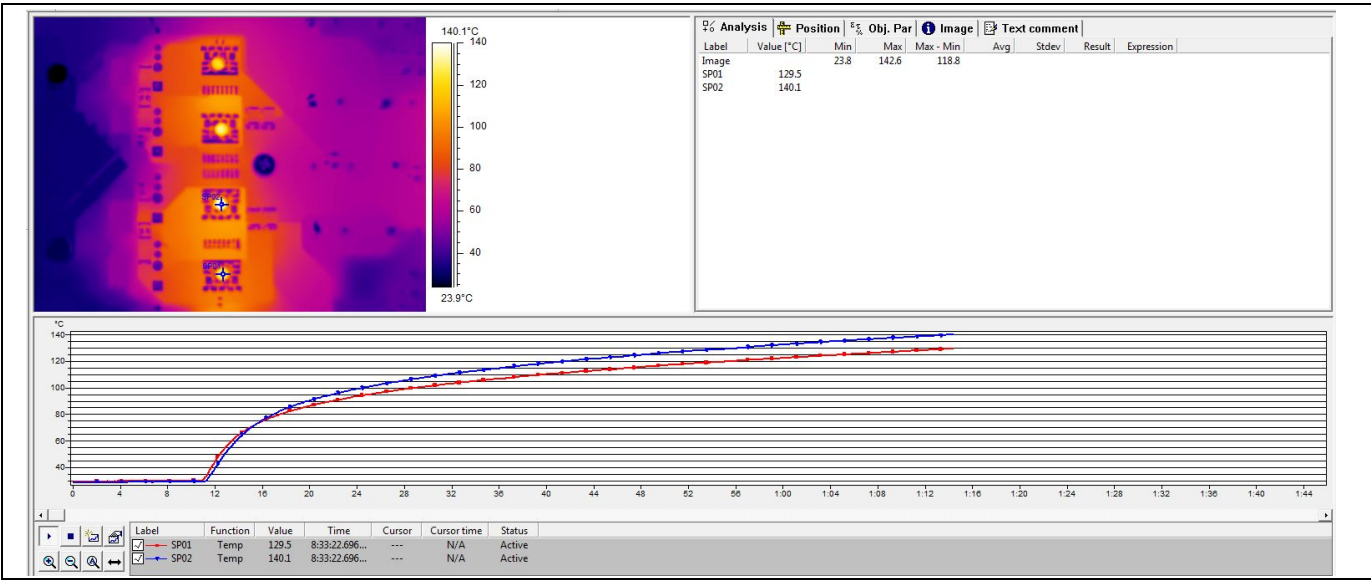


Figure 30 Rated power – 1000 W x 2 Ch with 2 Ω load, ±70 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TOLT package

Table 8 **1/8 power**

Load (Ω)	$\pm V_{BUS}$ (V)	1/8 rated power	T_{pcb} rise ($^{\circ}\text{C}$)	Duration (minutes)
10	148.3	125 W x 2 Ch	30.5	30
4	148.3	125 W x 2 Ch	50	
2	70	125 W x 2 Ch	46.5	

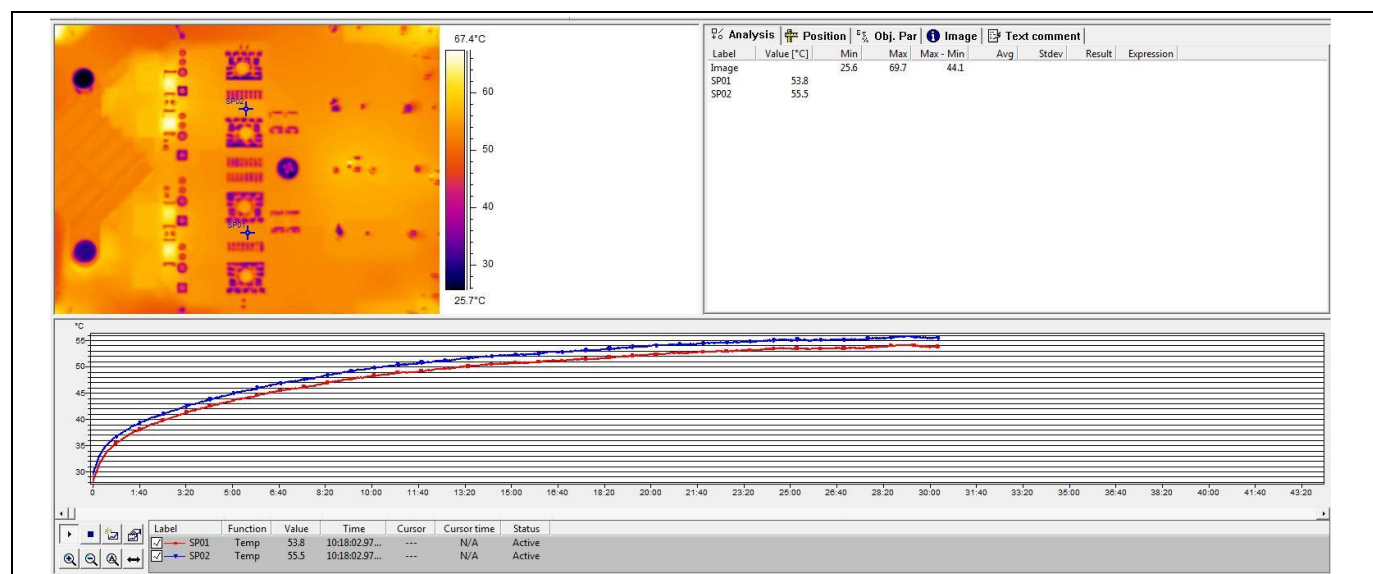


Figure 31 **1/8 power – 125 W x 2 Ch with 10 Ω load, ± 148.3 V**

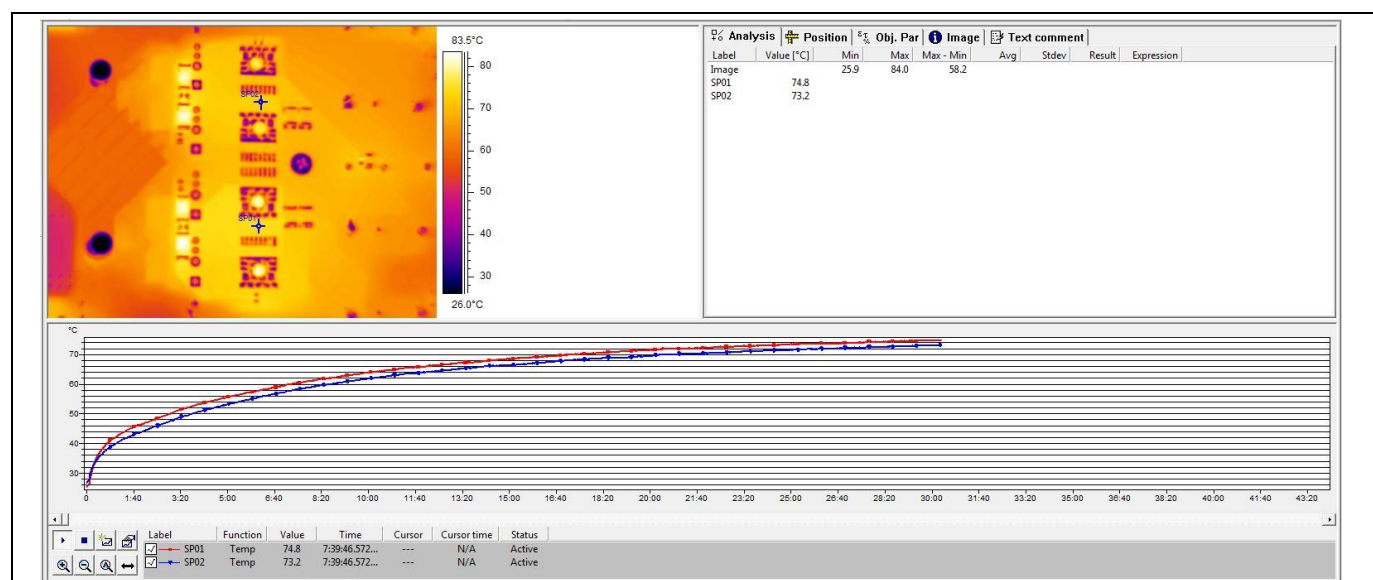


Figure 32 **1/8 power – 125 W x 2 Ch with 4 Ω load, ± 148.3 V**

Class D audio reference board with CoolSiC™ 400 V transistors and
MERUSTM IRS2452BM audio IC



Thermal testing TOLT package

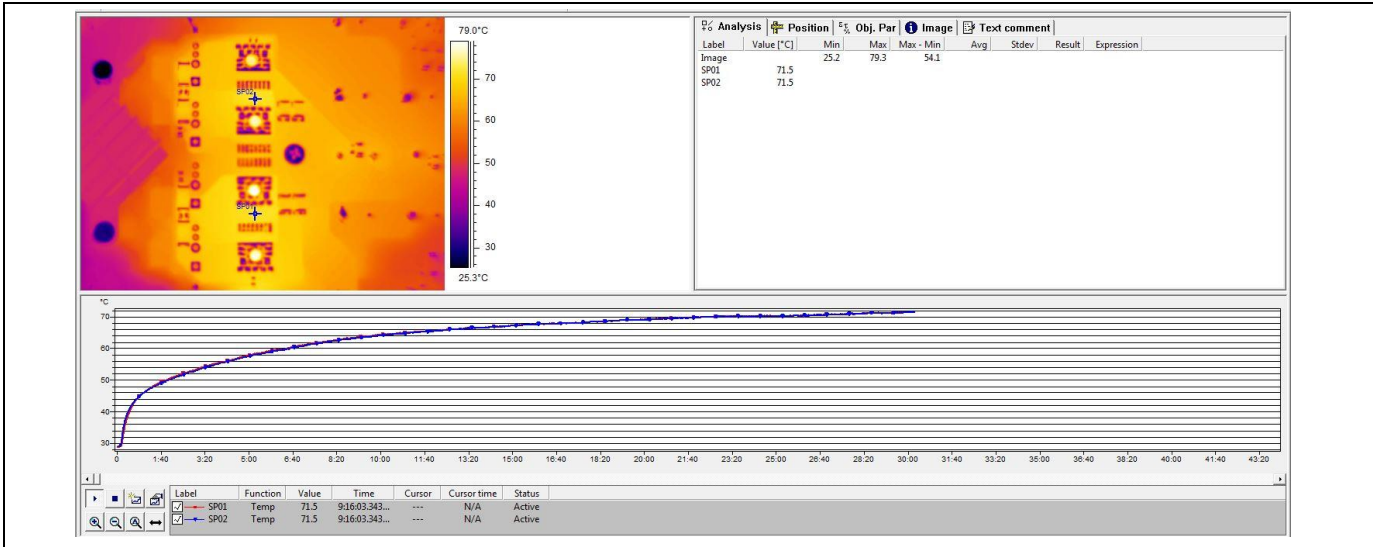


Figure 33 1/8 power – 125 W x 2 Ch with 2 Ω load, ±70 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

TO-247/TOLL variants of REF_AUDIO_SiC_2kW

8 TO-247/TOLL variants of REF_AUDIO_SiC_2kW

The REF_AUDIO_SiC_2kW reference design PCB is compatible with three CoolSiC™ 400 V packages: TOLT, TO-247, and TOLL. The evaluation board is built from the factory with TOLT devices, but it can be modified to use the other CoolSiC™ 400 V package offerings with minor electromechanical changes. Specifications called out in [Table 2](#) through [Table 3](#) apply to both TOLL and TO-247 package variants.

- TOLL part number IMT40R045M2H
- TO-247 part number IMZA40R045M2H

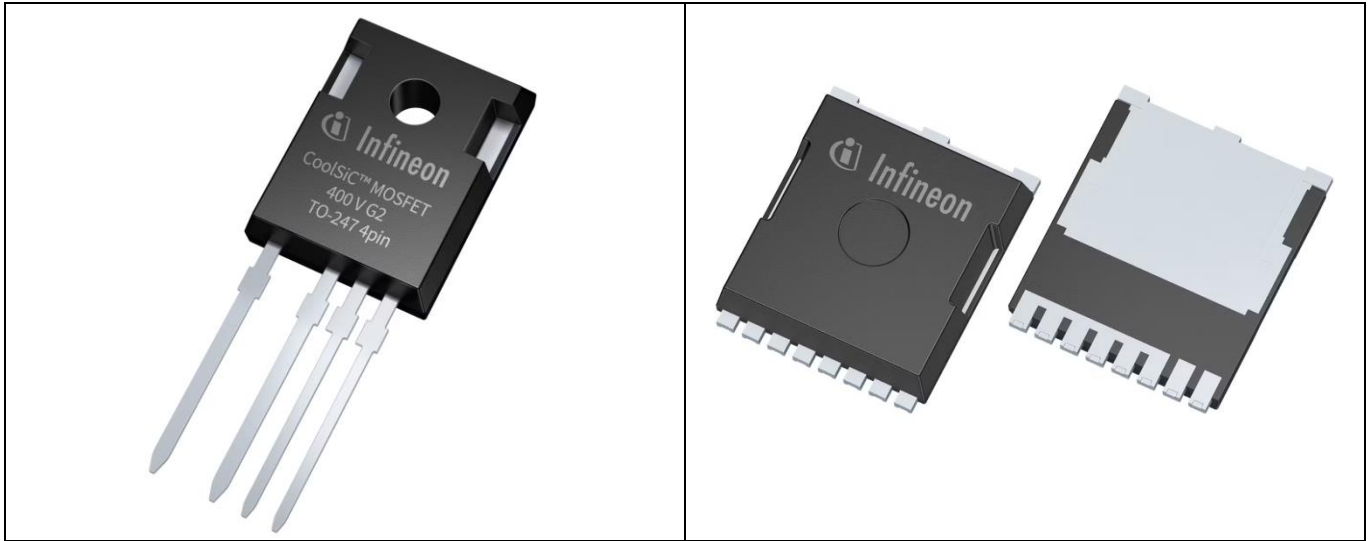


Figure 34 TO-247, TOLL packages

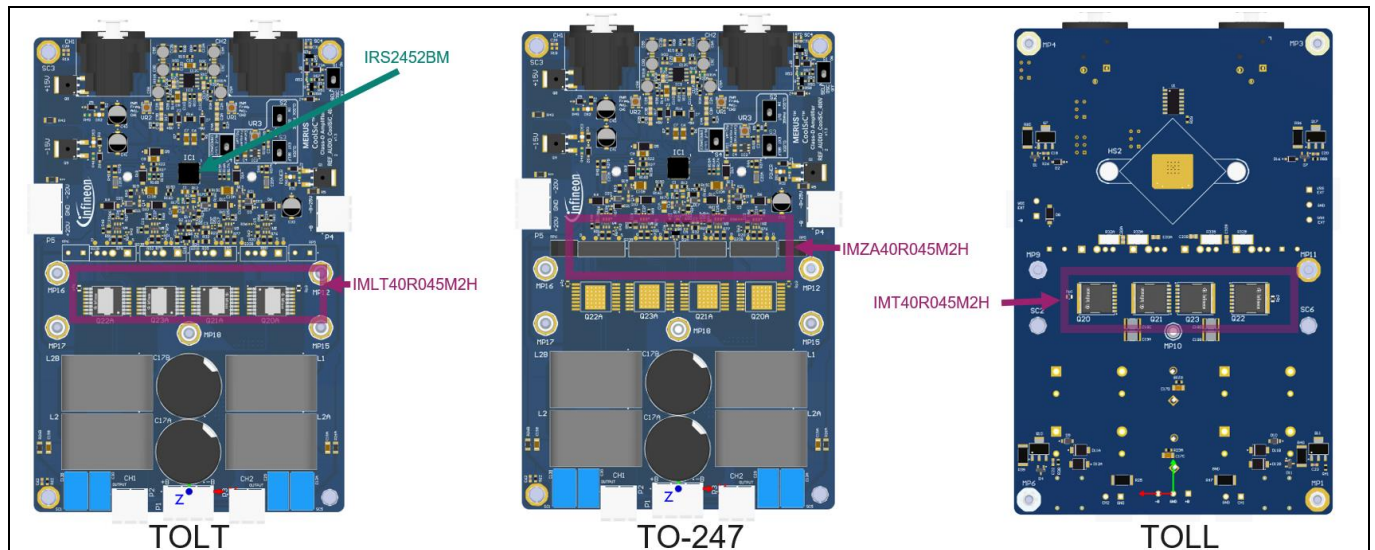


Figure 35 TOLT, TOLL, TO-247 package variations

8.1 Rework instructions to convert to TO-247

1. Remove TOLT heatsink by removing the five bottom-side fasteners

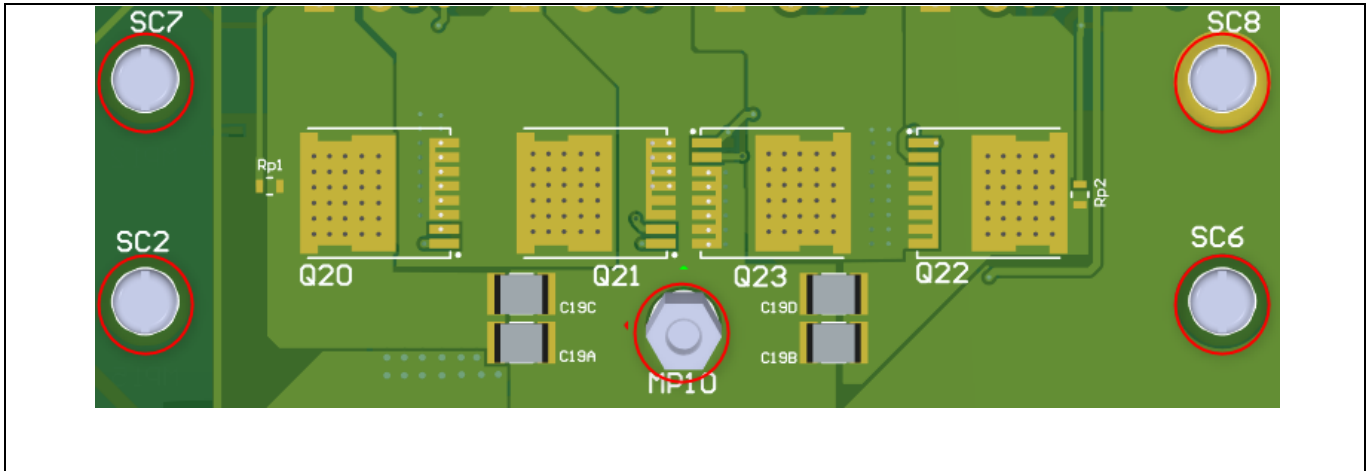


Figure 36 Removing bottom-side fasteners

2. Remove TOLT devices and SMT thermistors (Rp4, Rp3)

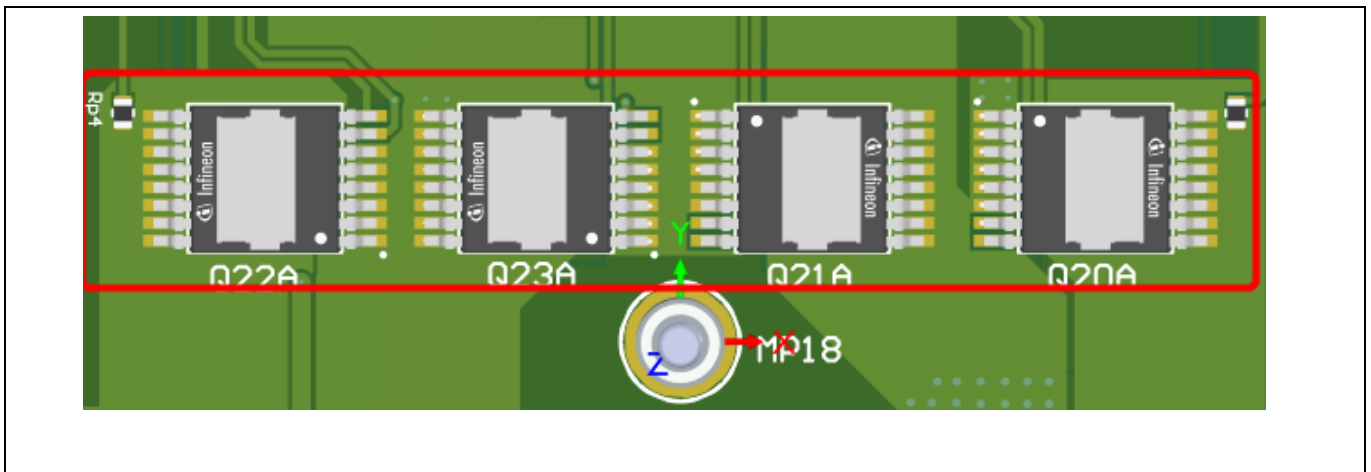


Figure 37 Removing TOLT devices and SMT thermistors

3. Remove the five topside SMT heatsink standoffs

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

TO-247/TOLL variants of REF_AUDIO_SiC_2kW

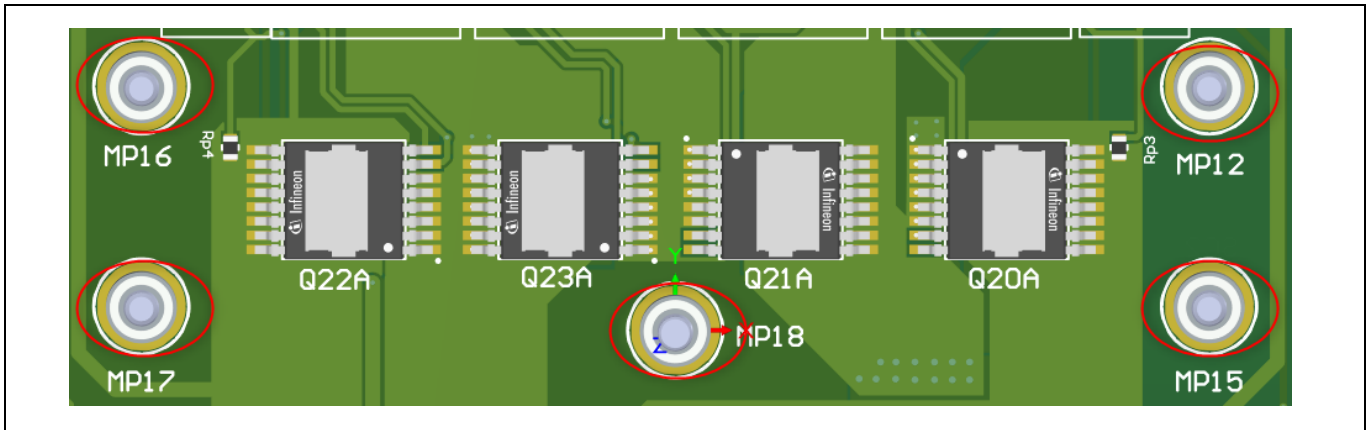


Figure 38 Removing topside SMT heatsink standoffs

- Place four TO-247 IMZA40R045M2H devices and thermostats Rp5, Rp6 (Digikey P/N: 317-1008-ND)

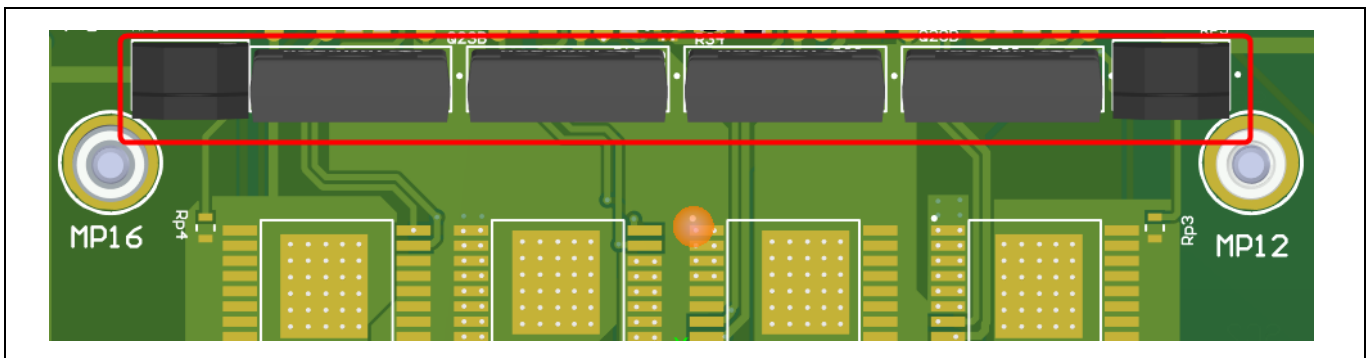


Figure 39 Placing TO-247 IMZA40R045M2H and Rp5, Rp6 thermostats

- Apply four Sil-Pads to the back of TO-247 packages (DigiKey P/N: BER178-ND) or equivalent

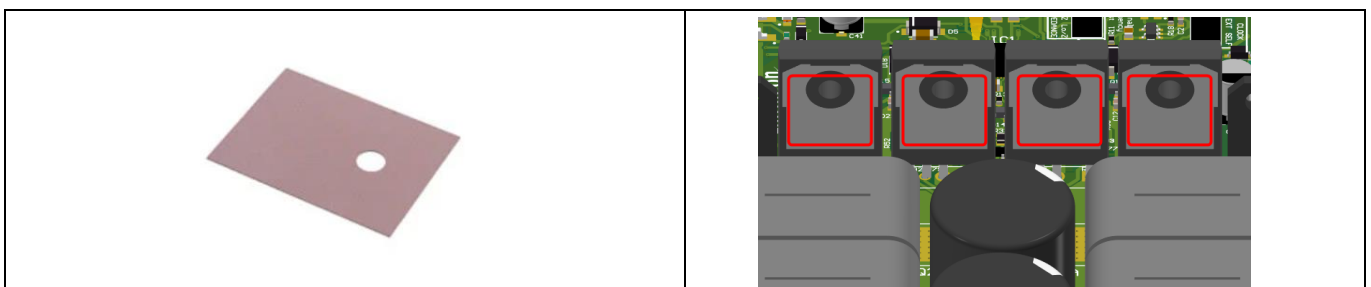


Figure 40 Applying Sil-Pads to TO-247s

- Place the TO-247 heatsink (DigiKey P/N: 5496-SK702100SA-ND). Reuse TOLT screws at locations SC7, SC8. Use the four retaining springs to clamp TO-247s (Digikey P/N: 5496-THFU6TO247-ND)

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

TO-247/TOLL variants of REF_AUDIO_SiC_2kW

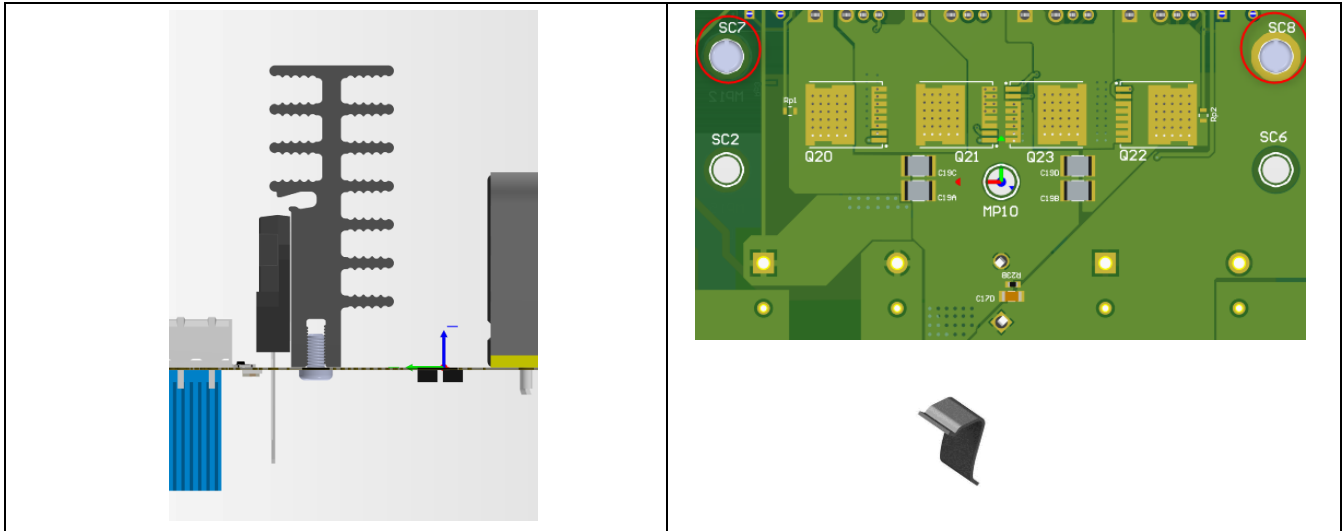


Figure 41 Placing TO-247 heatsink (a) applying TOLT screws and 4 springs to clamp TO-247s

8.2 Rework instructions to convert TOLL

1. Complete steps 1 through 3
2. Place the four bottom-side IMT40R045M2H TOLL devices and thermostats Rp1, Rp2 (Reuse Rp4, Rp3 from TOLT assembly)

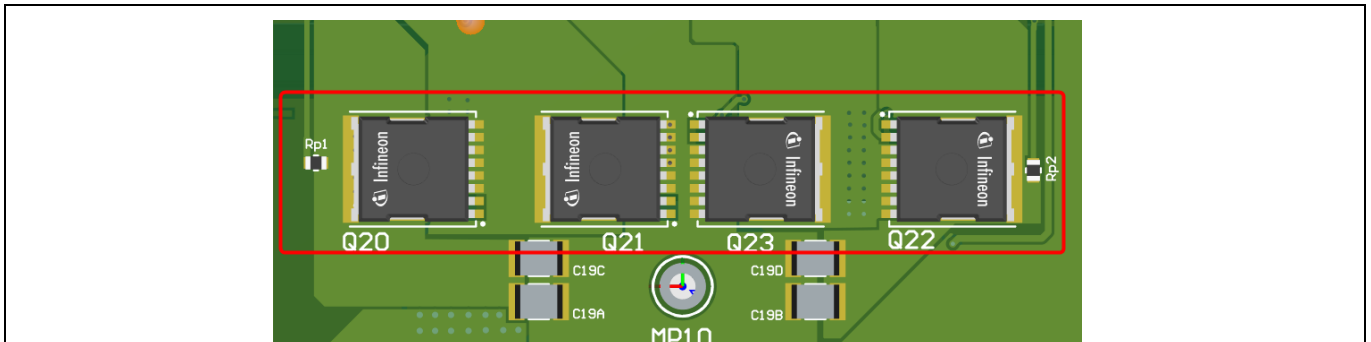


Figure 42 Placing bottom-side TOLL devices and thermostats

3. Place Sil-Pad top-side (DigiKey P/N 1168-1942-ND) or equivalent. Cut to the shape of the heatsink

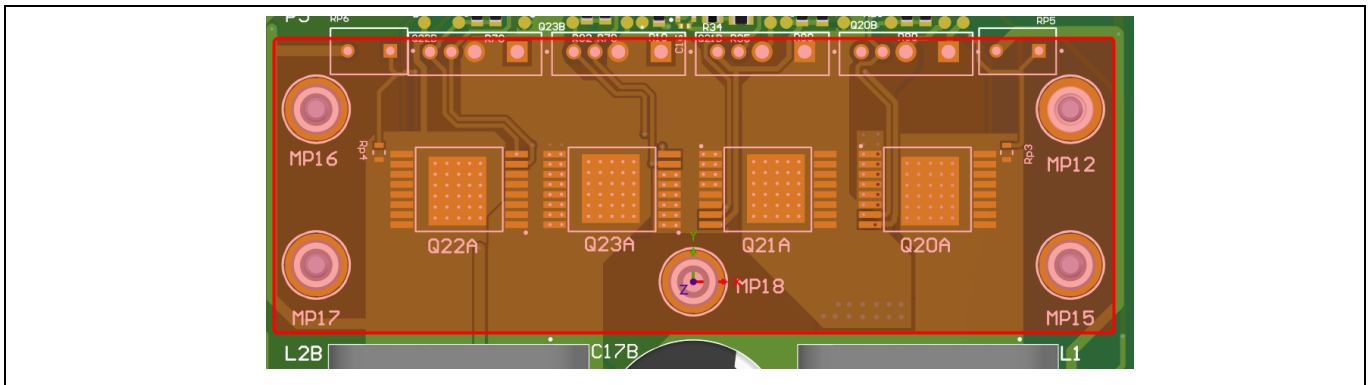


Figure 43 Placing Sil-Pad top-side

4. Place the heatsink (reuse the TOLT heatsink). Reuse the bottom-side TOLT heatsink fasteners in five locations

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

TO-247/TOLL variants of REF_AUDIO_SiC_2kW

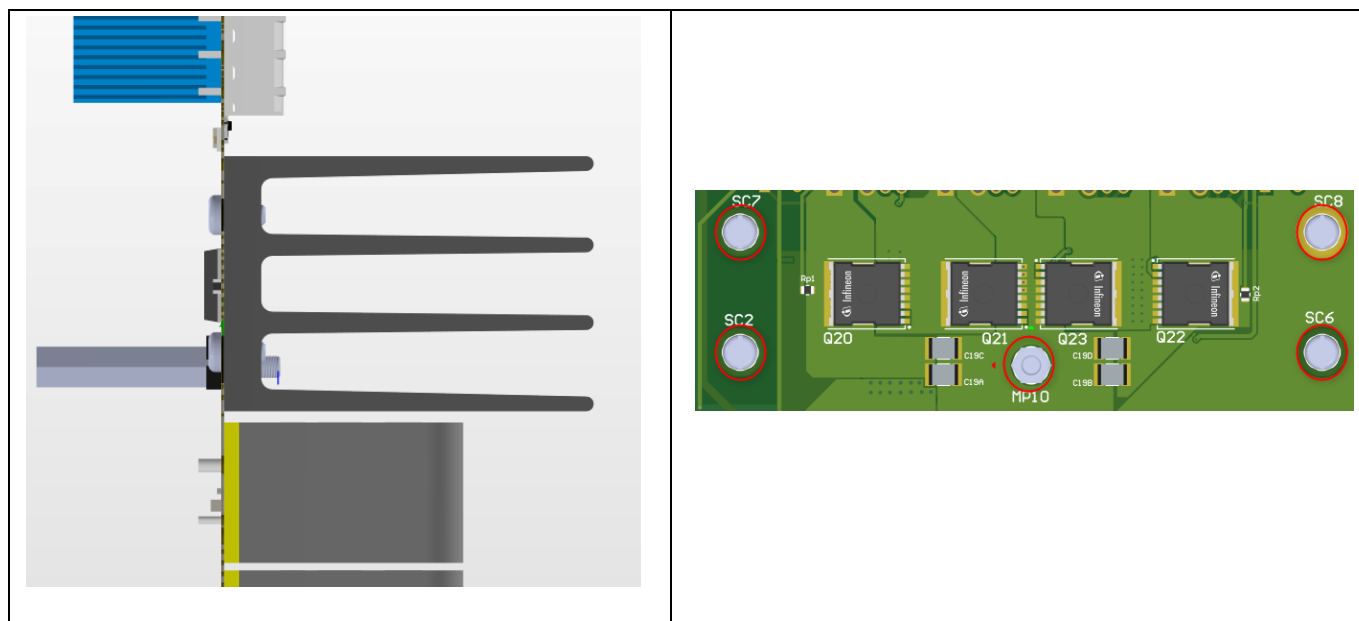


Figure 44 **Placing the heatsink**

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

9 Thermal testing TO-247 and TOLL packages

9.1 Thermal performance TO-247

Test conditions:

- Input signal = 1 kHz
- Load = 10 Ω – 4 Ω
- F_{PWM} = 325 kHz

Table 9 Peak power 10% THD+N

Load (Ω)	$\pm V_{BUS}$ (V)	10% THD+N power	T_{case} Max ($^{\circ}C$)	Duration (minutes)
10	148.3	1350 W x 2ch	42.7	1
4	97	1400 W x 2ch	55.4	

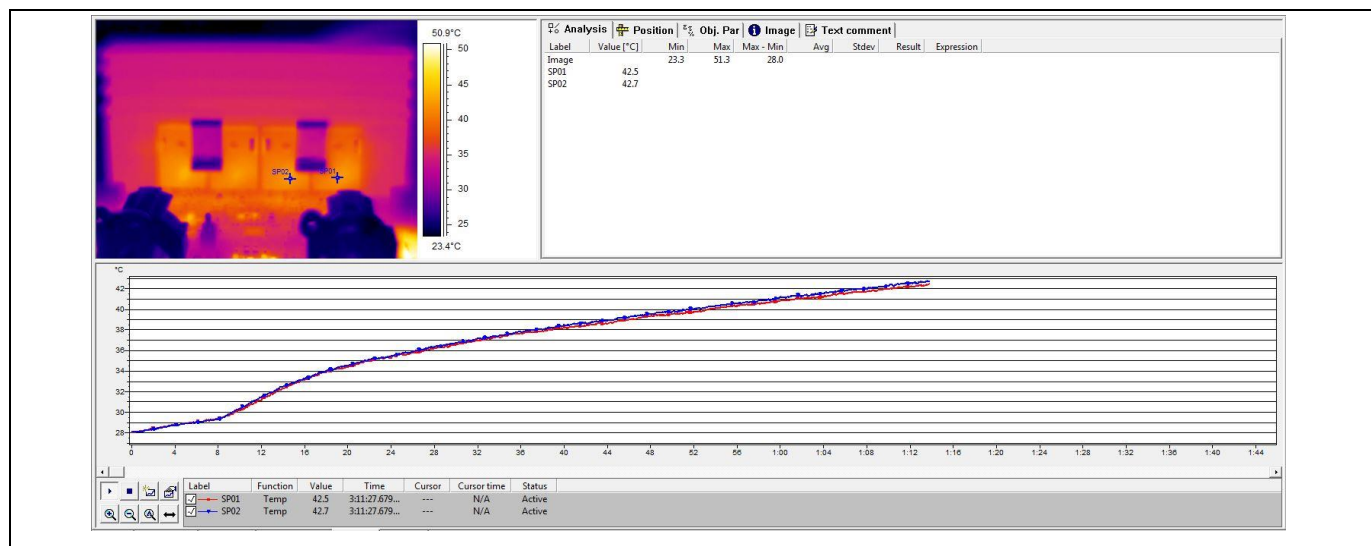


Figure 45 Peak power - 1350 W x 2 Ch with 10 Ω load, ± 148.3 V

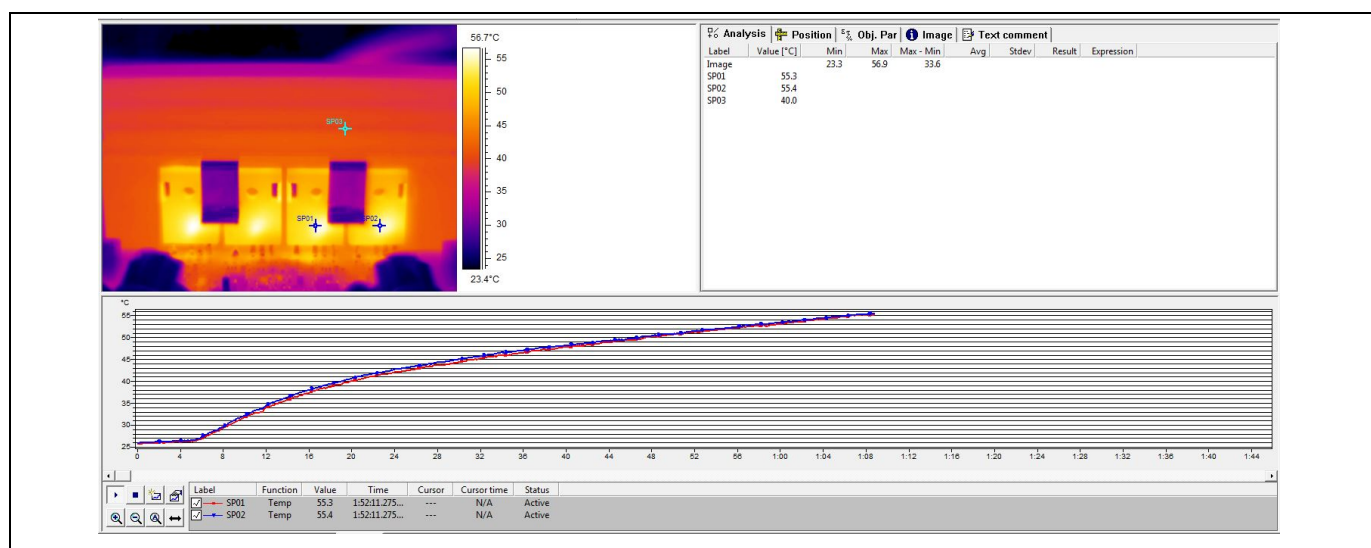


Figure 46 Peak power - 1400 W x 2 Ch with 4 Ω load, ± 97 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

Table 10 **Rated power**

Load (Ω)	$\pm V_{BUS}$ (V)	Rated power	T_{pcb} rise ($^{\circ}\text{C}$)	Duration (minutes)
10	148.3	1000 W x 2 Ch	44.4	1
4	148.3	1000 W x 2 Ch	73.4	

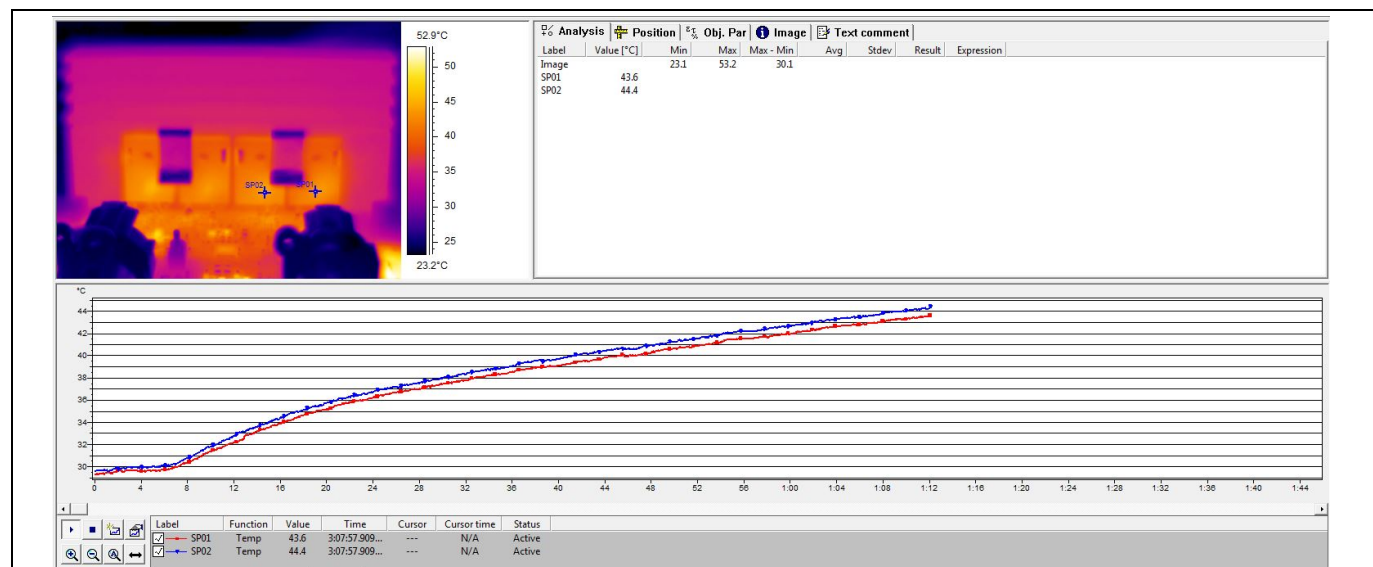


Figure 47 **Rated power - 1000 W x 2 Ch with 10 Ω load, ± 148.3 V**

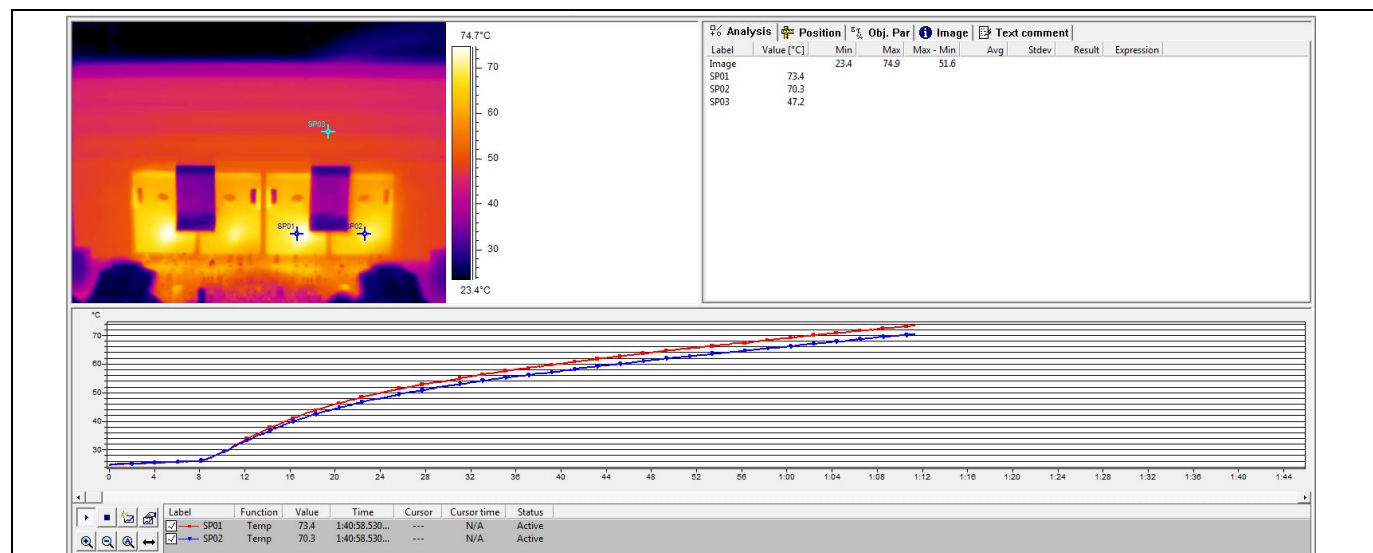


Figure 48 **Rated power - 1000 W x 2 Ch with 4 Ω load, ± 148.3 V**

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

Table 11 1/8 rated power

Load (Ω)	$\pm V_{bus}$ (V)	1/8 rated power	T_{pcb} rise ($^{\circ}\text{C}$)	Duration (minutes)
4	148.3	125 W x 2 Ch	57.2	30

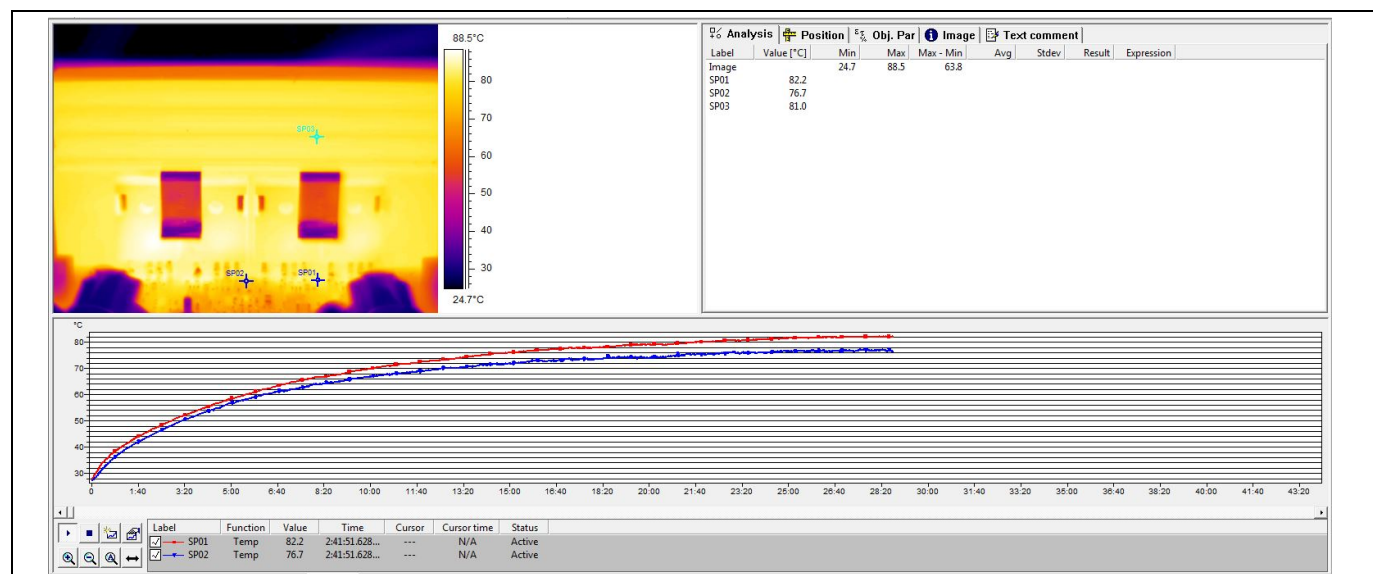


Figure 49 1/8 rated power - 125 W x 2 Ch with 4 Ω load, ± 148.3 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

9.2 Thermal performance TOLL

Test conditions:

- Input signal = 1 kHz
- Load = 4 Ω – 5 Ω
- F_{PWM} = 325 kHz

Table 12 Peak Power 10% THD+N

Load (Ω)	$\pm V_{BUS}$ (V)	10% THD+N power	T_{pcb} rise ($^{\circ}\text{C}$)	Duration (minutes)
5	101	1200 W x 2 Ch	79.1	1
4	97	1400 W x 2 Ch	98.3	

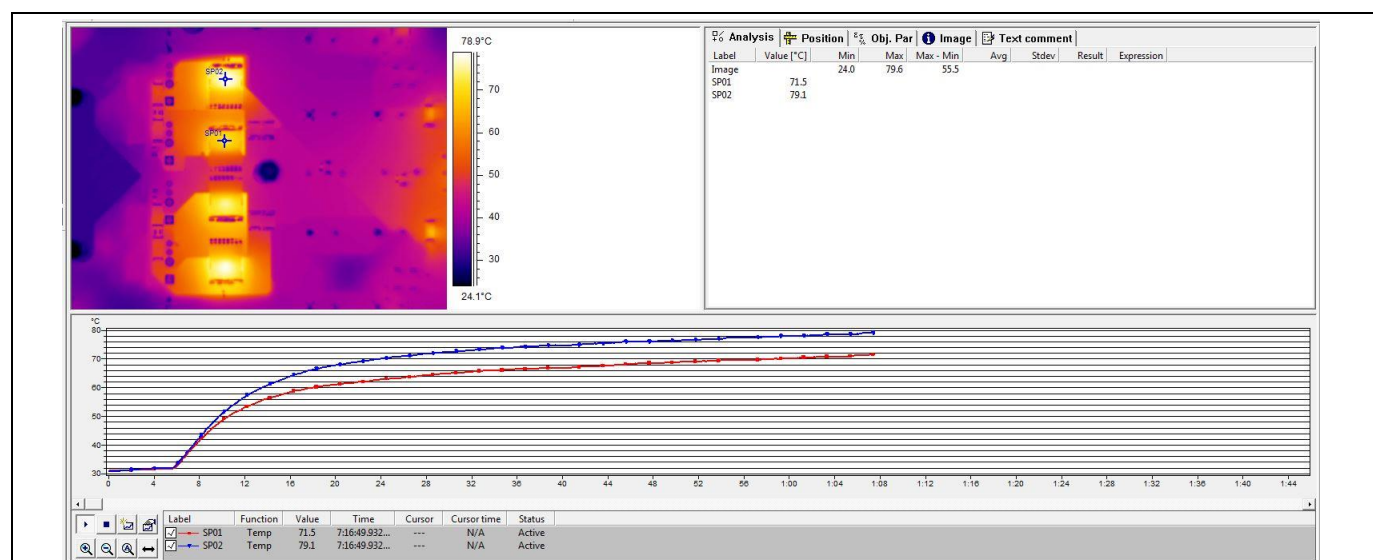


Figure 50 Peak power – 1200 W x 2 Ch with 5 Ω load, ± 101 V

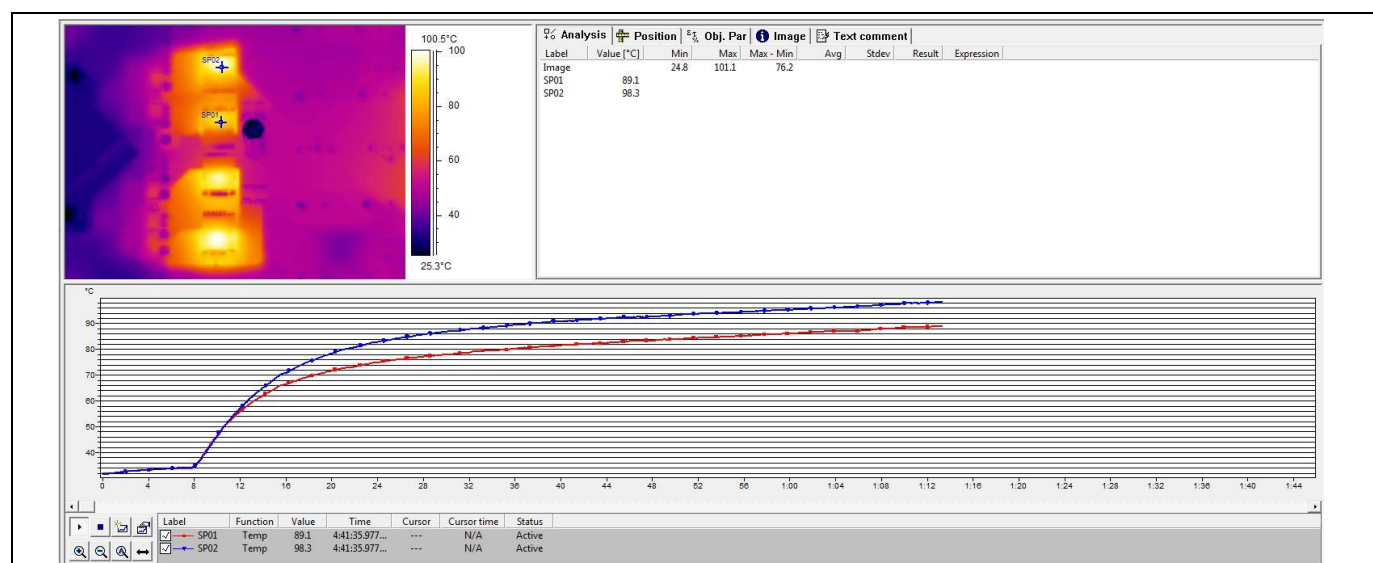


Figure 51 Peak power – 1400 W x 2 Ch with 4 Ω load, ± 97 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

Table 13 **Rated power**

Load (Ω)	$\pm V_{BUS}$ (V)	Rated power	T_{pcb} rise ($^{\circ}\text{C}$)	Duration (minutes)
5	101	1000 W x 2 Ch	74.8	1
4	97	1000 W x 2 Ch	87.5	
4	148.3	1000 W x 2 Ch	127.8	

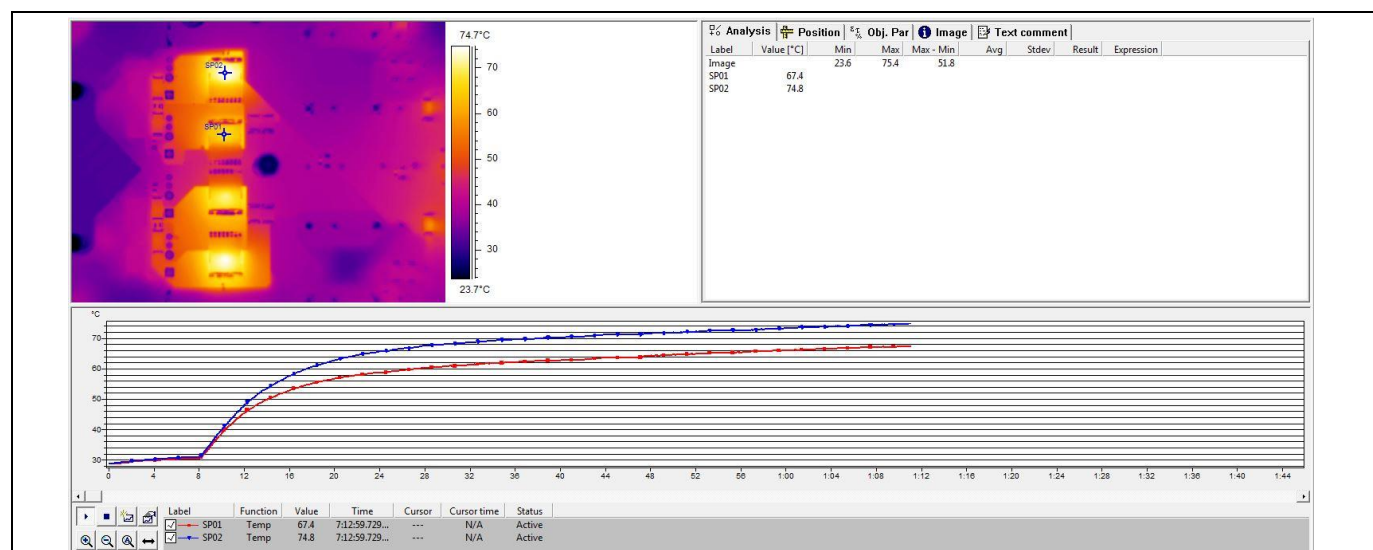


Figure 52 **Rated power – 1000 W x 2 Ch with 5 Ω load, ± 101 V**

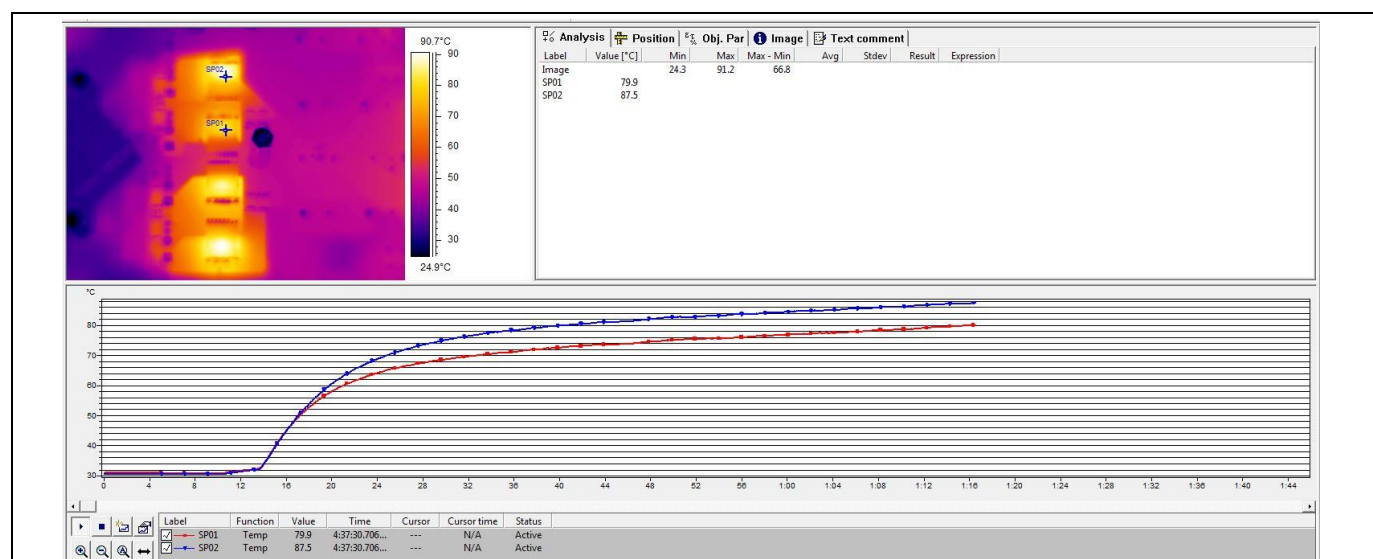


Figure 53 **Rated power – 1000 W x 2 Ch with 4 Ω load, ± 97 V**

Class D audio reference board with CoolSiC™ 400 V transistors and MERUSTM IRS2452BM audio IC

Thermal testing TO-247 and TOLL packages

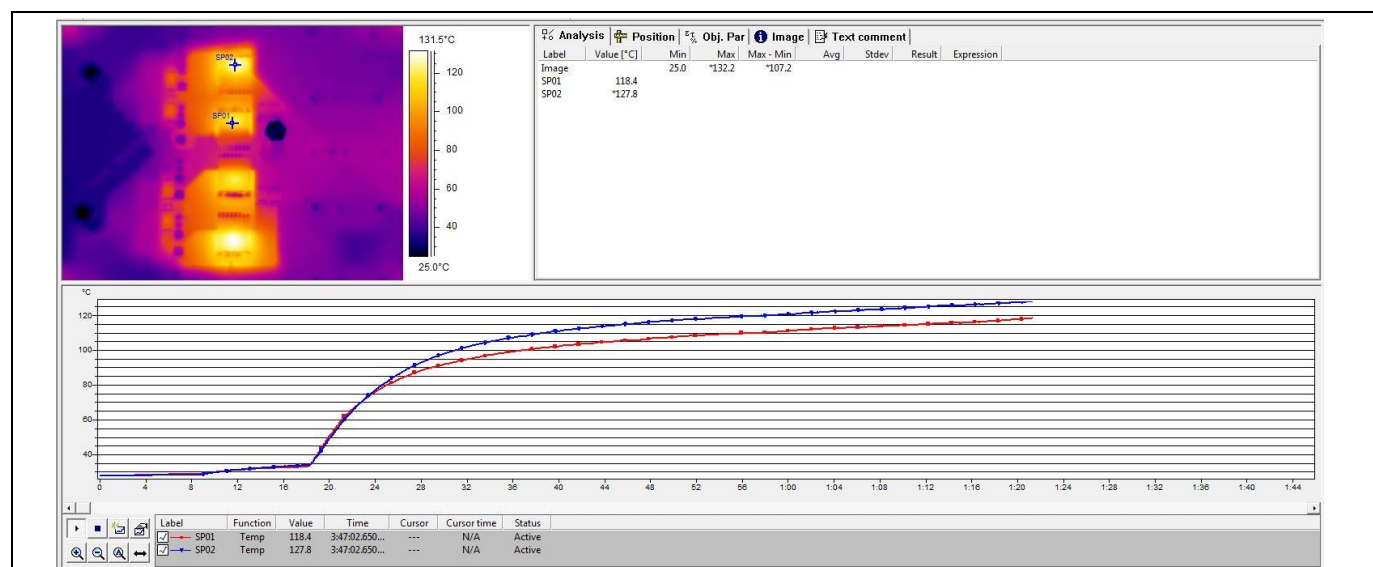


Figure 54 Rated Power - 1000 W x 2 Ch with 4 Ω load, ±148.3 V

Table 14 1/8 rated power

Load (Ω)	±V _{BUS} (V)	1/8 rated power	T _{pcb} rise (°C)	Duration (minutes)
4	148.3	125 W x 2 Ch	50.5	30

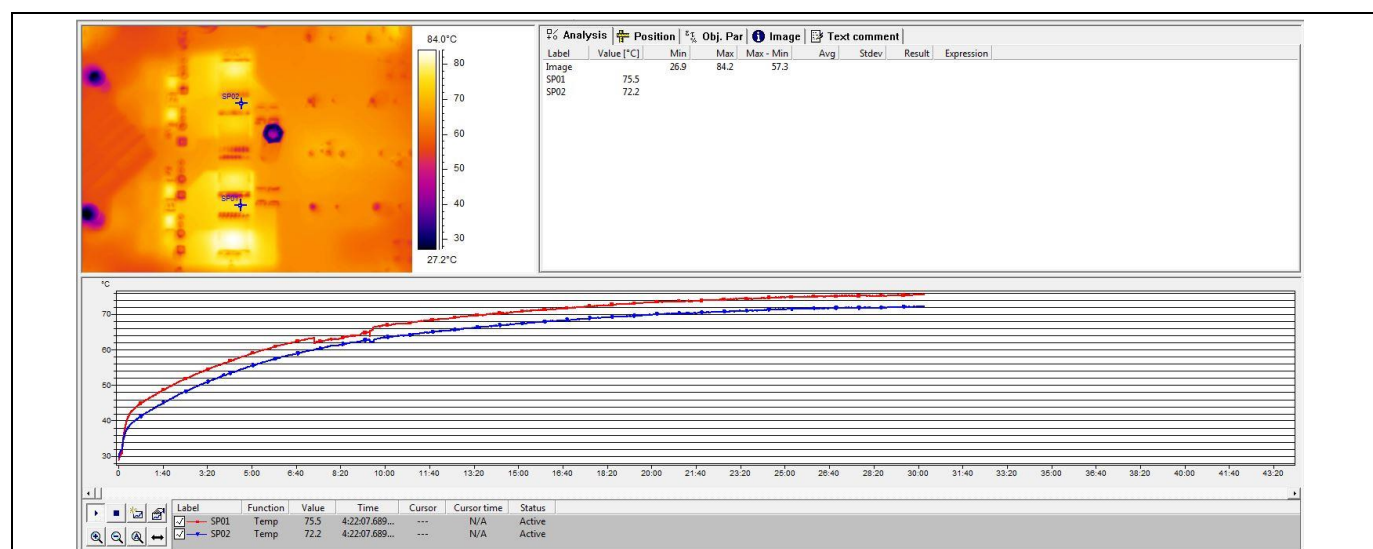


Figure 55 1/8 rated power - 125 W x 2 Ch with 4 Ω load, ±148.3 V

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC

Schematic

10 Schematic

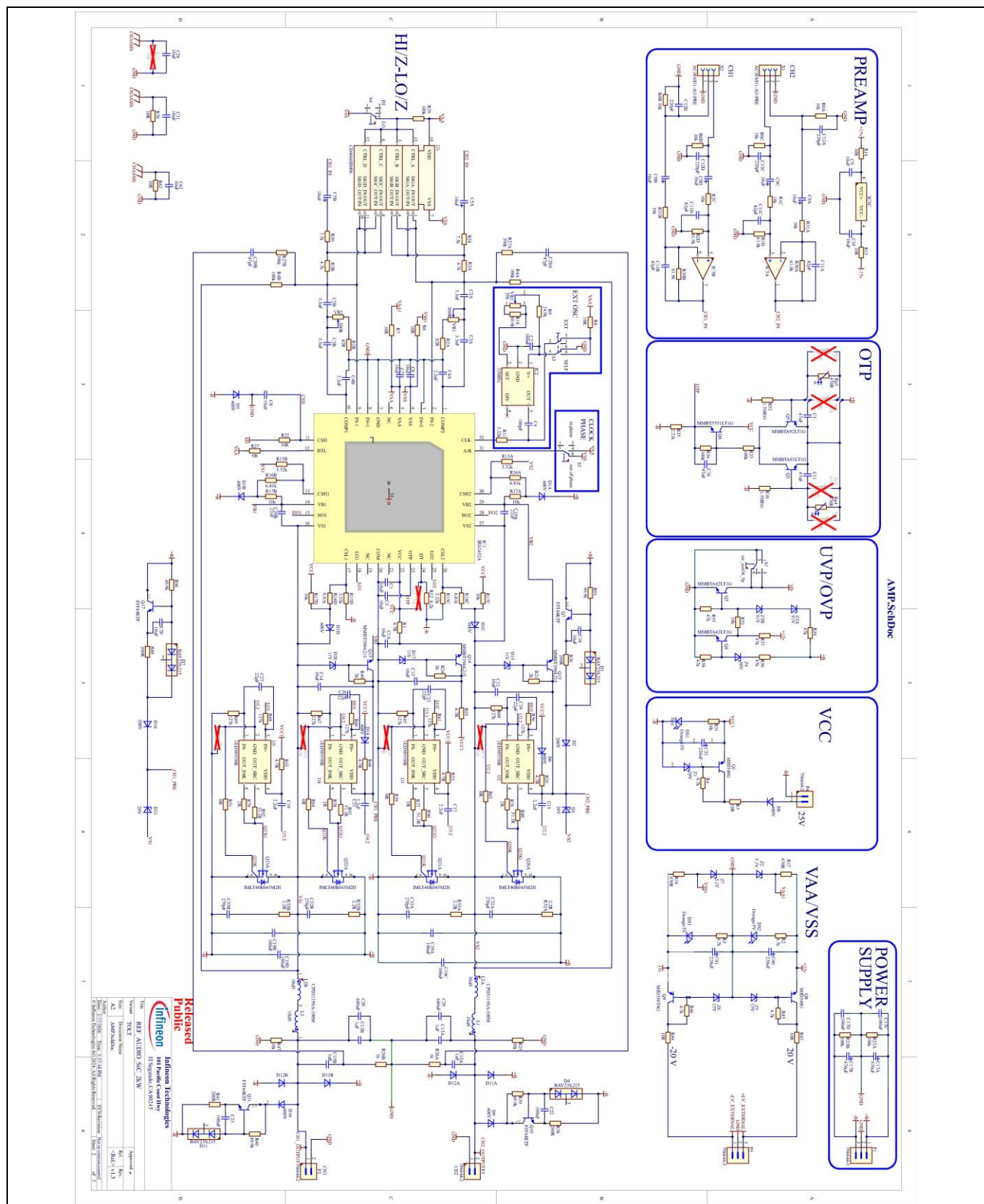


Figure 56 Schematic

11 PCB specification and layout

11.1 PCB specification

- Fabricate per IPC-601x series, Class 2, and inspect per IPC-A-600 Class 2
- UL rating: 94 V - 0 minimum
- FR4, per IPC4101, final thickness to be 1.6 mm +/- 10%
- 2 oz. Finished min all layers
- Control all conductor width and spacing to +/- 20%
- Thieving is acceptable on all copper layers maintaining a clearance of 0.125" from all pads, etches, and planes. Vendors may use whatever patterns fit their process
- Printed wiring board should comply with the requirements of J-STD-003 method 1 (edge dip test) with no evidence of measling or delamination
- All (pth) to have a tolerance of +/- 0.004"
- Plating finish should be immersion silver, silver plating thickness should be no less than 0.15 microns thick
- Solder mask: LPI solder mask (lpi) both sides
- Material should meet all the requirements of IPC-SM-840 Class 2, color blue
- Silkscreen legend to be applied per Gerber file on the primary or secondary side, or both, using white non-conductive epoxy ink

11.2 Layout

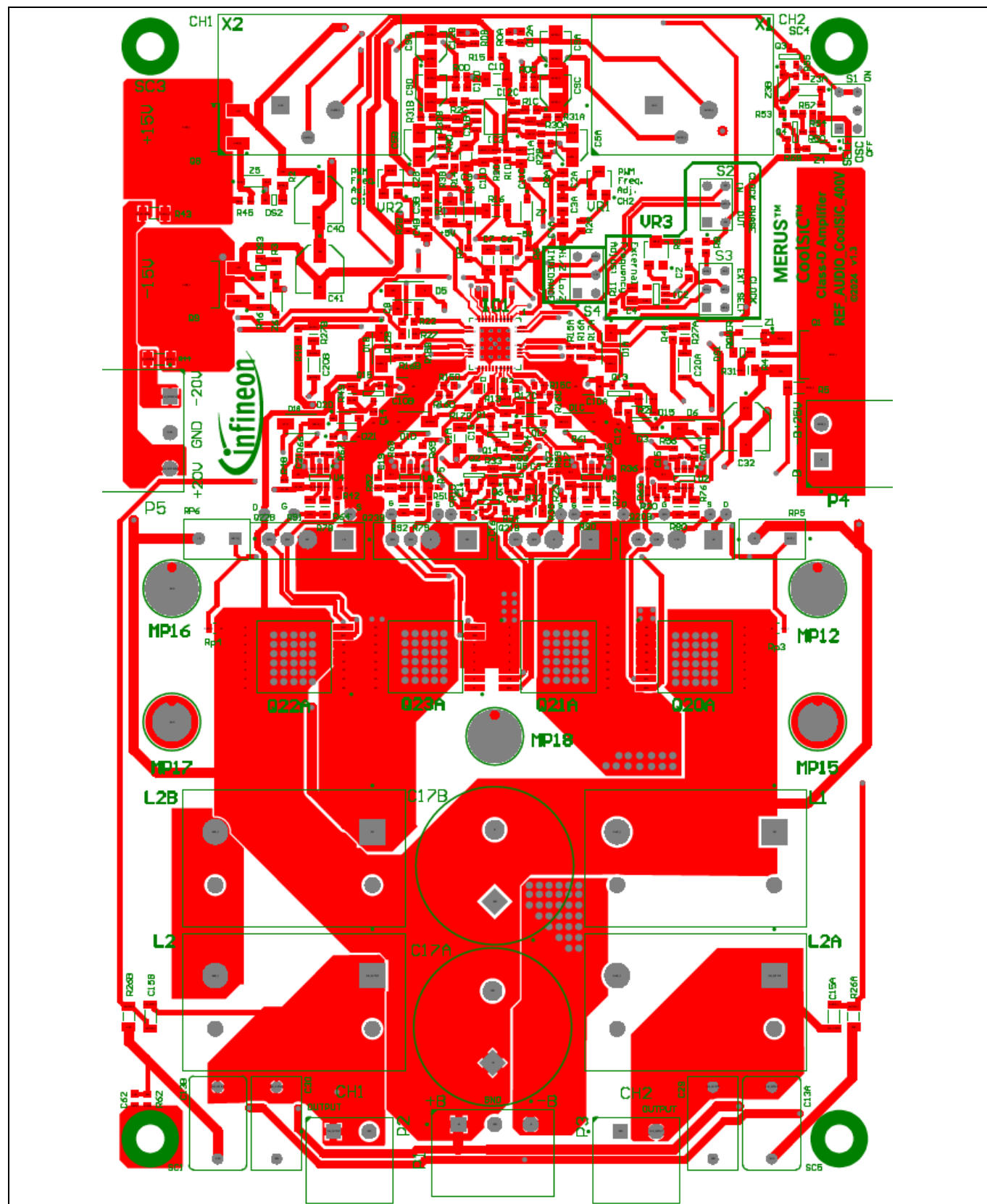
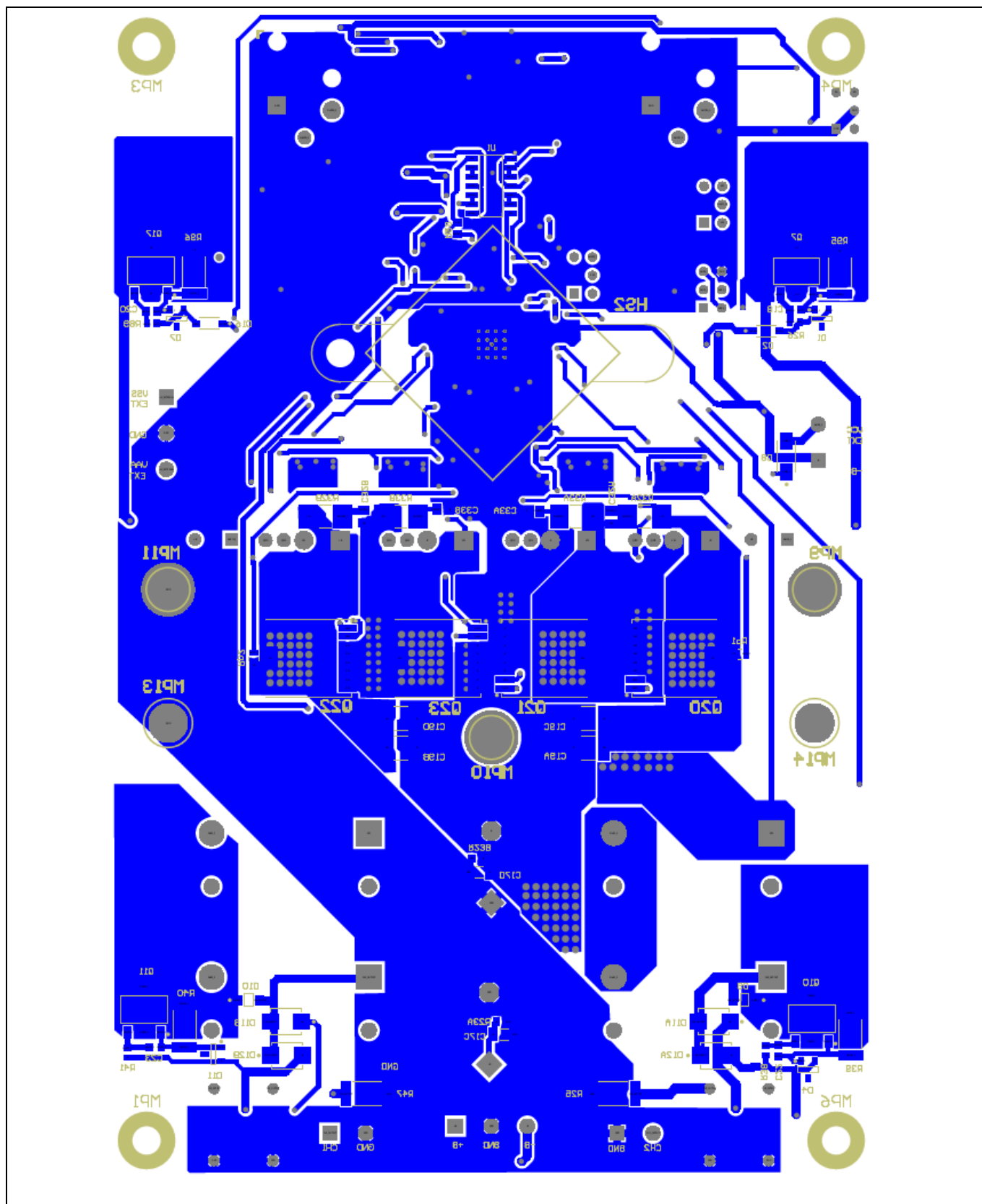


Figure 57 Layout layer 1 – Top



Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

12 Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
1	399-C0603C103K5RACTUCT-ND	C3, C12, C13, C14, C18, C20, C28, C31, C62	CAP CER 10000PF 50V X7R 0603	9	Digikey
2	311-1110-1-ND	C11A, C11B, C11C, C11D	CAP CER 82PF 50V C0G/NP0 0805	4	Digikey
3	445-2287-1-ND	C17C, C17D	CAP CER 0.1UF 250V X7R 1206	2	Digikey
4	10-EEE-FTE221XALCT-ND	C32, C40, C41	CAP ALUM 220UF 20% 25V SMD	3	Digikey
5	BAV23SFSCCT-ND	D1, D4, D7, D11	DIODE ARRAY GP 200V 225MA	4	Digikey
6	571-796644-2	P2, P3, P4	TERM BLOCK HDR 2POS 90DEG 5MM	3	Mouser
7	RMCF0603FT100KCT-ND	R4A, R4B, R23A, R23B, R29, R34	RES SMD 100K OHM 1% 1/10W 0603	6	Digikey
8	311-10.0KHRCT-ND	R17A, R17B, R17D, R53	RES SMD 10K OHM 1% 1/10W 0603	4	Digikey
9	311-0.0JRCT-ND	R51, R59, R63, R64	RES 0 OHM JUMPER 1/16W 0402	4	Digikey
10	3791688	P8, P9, P10	TERM BLOCK PLUG 2POS STR 5MM	3	Farnell
11	1727-5174-1-ND	Q13, Q14, Q15	TRANS NPN 40V 0.2A TO-236AB	3	Digikey
12	448-IMLT40R045M2HXTMA1-ND	Q20A, Q21A, Q22A, Q23A	400V SIC-MOS TOLT	4	Digikey
13	311-3.30KHRCT-ND	R11, R15A, R15B, R15C, R15D	RES SMD 3.3K OHM 1% 1/10W 0603	5	Digikey
14	445-7644-1-ND	C1	CAP CER 10UF 16V X5R 0805	1	DigiKey
15	445-7706-1-ND	C1A, C6, C7, C8, C9, C10	CAP CER 10UF 25V X7R 1206	6	DigiKey
16	490-8020-1-ND	C2, C22, C23	CAP CER 0.1UF 50V X7R 0603	3	DigiKey
17	445-15549-1-ND	C2A, C2B, C3A, C3B	CAP CER 3300PF 250V C0G 0805	4	DigiKey
18	399-C0805C101K5RACTUCT-ND	C4	CAP CER 100PF 50V X7R 0805	1	DigiKey
19	445-2327-1-ND	C4A, C4B	CAP CER 2200PF 250V C0G 0805	2	DigiKey

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
20	13-CC0402KPX7R6BB473CT-ND	C5, C11, C16	CAP CER 0.047UF 10V X7R 0402	3	DigiKey
21	493-17801-1-ND	C5A, C5B, C9A, C9B, C9C, C9D	CAP ALUM 10UF 20% 16V SMD	6	DigiKey
22	445-3945-1-ND	C10A, C10B	CAP CER 22UF 16V X7R 1210	2	DigiKey
23	399-C0603C221K5RACTUCT-ND	C12A, C12B, C12C, C12D	CAP CER 220PF 50V X7R 0603	4	DigiKey
24	495-4721-ND	C13A, C13B	CAP FILM 1UF 10% 450VDC RADIAL	2	DigiKey
25	732-7673-1-ND	C15, C17, C19, C21	CAP CER 2.2UF 25V X7R 0805	4	DigiKey
26	445-9274-1-ND	C15A, C15B	CAP CER 1000PF 500V C0G 1206	2	DigiKey
27	565-2731-ND	C17A, C17B	CAP ALUM 470UF 20% 200V SNAP TH	2	DigiKey
28	445-2300-1-ND	C19A, C19B, C19C, C19D	CAP CER 0.1UF 630V X7R 1812	4	DigiKey
29	399-C1206C470JCGACTUCT-ND	C20A, C20B	CAP CER 47PF 500V C0G/NP0 1206	2	DigiKey
30	478-600L220JT200T4KCT-ND	C24, C25, C26, C27	CAP CER 22PF 25V C0G/NP0 0402	4	DigiKey
31	495-4730-ND	C29, C30	CAP FILM 0.68UF 10% 450VDC RAD	2	DigiKey
32	399-C0805C271JCGACTUCT-ND	C32A, C32B, C33A, C33B	CAP CER 270PF 500V C0G/NP0 0805	4	DigiKey
33	MURA140T3GOSDKR-ND	D1A, D1B, D1C, D1D, D5, D6, D8, D18	DIODE GEN PURP 400V 2A SMA	8	DigiKey
34	BAV21W-FDICT-ND	D2, D16	DIODE STANDARD 200V 400MA SOD123	2	DigiKey
35	MMSZ5250BT1GOSCT-ND	D3, D21, Z1	DIODE ZENER 20V 500MW SOD123	3	DigiKey
36	US1GFACT-ND	D9, D10	DIODE STANDARD 400V 1A SOD123FL	2	DigiKey
37	MURS360BT3GOSCT-ND	D11A, D11B, D12A, D12B	DIODE GEN PURP 600V 3A SMB	4	DigiKey
38	SZMMSZ5241BT1GOSCT-ND	D15, D17, D20	DIODE ZENER 11V 500MW SOD123	3	DigiKey

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
39	160-1419-1-ND	DS1, DS2, DS3	LED ORANGE CLEAR SMD	3	DigiKey
40	ATS35913-ND	HS2	PushPIN Heat Sink Assembly	1	DigiKey
41	448-IRS2452BMCT-ND	IC1	IC AMP CLASS D STEREO 32MLPQ	1	DigiKey
42	LTC1799CS5#TRPBFCT-ND	IC2	IC OSC SILICON PROG TSOT23-5	1	DigiKey
43	296-17723-1-ND	IC3	IC OPAMP GP 2 CIRCUIT 8SOIC	1	DigiKey
44	4044-CPD3119SA-100M-ND	L1, L2, L2A, L2B	FIXED IND 10UH 17.7A 7.8 MOHM TH	4	DigiKey
45	36-24478-ND	MP1, MP3, MP4, MP6	HEX STANDOFF M3 SS 25MM	4	DigiKey
46	36-24300-ND	MP10	HEX STANDOFF M3 SS 25MM	1	DigiKey
47	732-7081-1-ND	MP12, MP15, MP16, MP17, MP18	ROUND SPACER STEEL 2.50MM	5	DigiKey
48	A98249-ND	P1, P5	TERM BLOCK HDR 3POS 90DEG 5MM	2	DigiKey
49	A98242-ND	P6, P7	TERM BLOCK PLUG 3POS STR 5MM	2	DigiKey
50	1168-TG-AL373-25-25-0.5-0-ND	PAD1	THERMAL PAD IC HEATSINK	1	DigiKey
51	ATS1910-ND	PIN1	HEATSINK BRASS PIN AND SPRING	1	DigiKey
52	MJD340T4GOSCT-ND	Q1, Q8	TRANS NPN 300V 0.5A DPAK	2	DigiKey
53	MMBTA92LT1GOSDKR-ND	Q2, Q5	TRANS PNP 300V 0.5A SOT23-3	2	DigiKey
54	MMBTA42LT1GOSCT-ND	Q3, Q4	TRANS NPN 300V 0.5A SOT23-3	2	DigiKey
55	MMBT5551LT1GOSDKR-ND	Q6	TRANS NPN 160V 0.6A SOT23-3	1	DigiKey
56	FJT44KTFCT-ND	Q7, Q10, Q11, Q17	TRANS NPN 400V 0.3A SOT-223-4	4	DigiKey
57	NJVMJD350T4GOSCT-ND	Q9	TRANS PNP 300V 0.5A DPAK	1	DigiKey
58	541-10.0KHCT-ND	R0A, R0B, R0C, R0D	RES 10K OHM 1% 1/4W 0603	4	DigiKey

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
59	P4.7AHCT-ND	R1, R20, R23, R48, R52, R93	RES 4.7 OHM 5% 1/10W 0603	6	DigiKey
60	P10KDBDKR-ND	R1C, R2C, R31A, R31B	RES SMD 10K OHM 0.1 1/10W 0603	4	DigiKey
61	P61.9KDBCT-ND	R1D, R2D, R30A, R30B	RES 61.9K OHM 0.1% 1/10W 0603	4	DigiKey
62	P16073TR-ND	R2, R3	RES SMD 4.7K OHM 5% 1/8W 0805	2	DigiKey
63	P82.0HCT-ND	R2A, R2B	RES SMD 82 OHM 1% 1/10W 0603	2	DigiKey
64	311-4.70KHRCT-ND	R3A, R3B	RES 4.7K OHM 1% 1/10W 0603	2	DigiKey
65	RMCF0603FT4K70DKR-ND	R4, R45, R46	RES SMD 4.7K OHM 5% 1/10W 0603	3	DigiKey
66	P10.0FCT-ND	R5, R43, R44	RES SMD 10 OHM 1% 1W 1206	3	DigiKey
67	13-AF0603FR-0710RLCT-ND	R6, R7, R8, R14, R15, R22, R62, R70	RES 10 OHM 1% 1/10W 0603	8	DigiKey
68	P24.9KHCT-ND	R9	RES 24.9K OHM 1% 1/8W 0603	1	DigiKey
69	311-1.5MARCT-ND	R10, R32	RES 1.5M OHM 5% 1/8W 0805	2	DigiKey
70	311-8.20KHRCT-ND	R12	RES SMD 8.2K OHM 5% 1/10W 0603	1	DigiKey
71	P470ECT-ND	R16, R17	RES SMD 470 OHM 5% 1/4W 1206	2	DigiKey
72	P6.81KHCT-ND	R16A, R16B, R16C, R16D	RES SMD 6.81K OHM 1% 1/10W 0603	4	DigiKey
73	311-10.0KFRCT-ND	R17C	RES 10K OHM 1% 1/4W 1206	1	DigiKey
74	2019-RK73H1JTDD6042FCT-ND	R18	Resistor; Single; Standard; 2 Pins	1	DigiKey
75	P2.00KCCT-ND	R21, R24, R49	RES SMD 2K OHM 1% 1/8W 0805	3	DigiKey
76	RMCF2512JT10K0CT-ND	R25, R47	RES 10K OHM 5% 1W 2512	2	DigiKey
77	RHM200ADCT-ND	R26, R38, R41, R89	RES 200 OHM 1% 1/3W 0603	4	DigiKey
78	RNCP1206FTD1K00DKR-ND	R26A, R26B	RES 1K OHM 1% 1/2W 1206	2	DigiKey

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
79	13-AF0805JR-070RLCT-ND	R27	RES 0 OHM JUMPER 1/8W 0805	1	DigiKey
80	P390KACT-ND	R27A, R27B	RES SMD 390K OHM 5% 1/8W 0805	2	DigiKey
81	2019-RK73H1JRRTD7501FCT-ND	R28, R30	RES 7.5K OHM 1% 1/10W 0603	2	DigiKey
82	RMCF0805JT10K0CT-ND	R31	RES 10K OHM 5% 1/8W 0805	1	DigiKey
83	CRM2512-JW-2R2ELFCT-ND	R32A, R32B, R33A, R33B	RES SMD 2.2 OHM 5% 2W 2512	4	DigiKey
84	311-100KCRCT-ND	R33	RES SMD 100K OHM 1% 1/10W 0805	1	DigiKey
85	2019-RK73H2ATTD2211FCT-ND	R35	RES SMD 2.21K OHM 1% 1/8W 0805	1	DigiKey
86	RMCF2512FT49K9CT-ND	R39, R40, R95, R96	RES 49.9K OHM 1% 1W 2512	4	DigiKey
87	311-47KGRCT-ND	R50, R54, R55, R57, R58	RES 47K OHM 5% 1/10W 0603	5	DigiKey
88	P12.7KDBCT-ND	R56, R60, R61, R65, R66, R67, R68, R69	RES SMD 127K OHM 0.1% 1/10W 0603	8	DigiKey
89	118-CR0805-J/-2R0ELFCT-ND	R76, R77, R78, R79	RES SMD 2 OHM 5% 1/8W 0805	4	DigiKey
90	RNCP0805FTD51R1CT-ND	R80, R90, R91, R92	RES 51.1 OHM 1% 1/4W 0805	4	DigiKey
91	490-8500-1-ND	Rp3, Rp4	SENSOR PTC 470 OHM 50% 0603	2	DigiKey
92	360-1758-ND	S1, S2, S4	SWITCH TOGGLE SPDT 0.4VA 28V	3	DigiKey
93	360-2791-ND	S3	SWITCH TOGGLE DPDT 0.4VA 28V	1	DigiKey
94	296-14475-1-ND	U1	CMOS Quad Bilateral Switch	1	DigiKey
95	448-1EDN9550BXTSA1CT-ND	U2, U3, U4, U5	IC GATE DRVR HI/LOW SIDE SOT23-6	4	DigiKey
96	563-ST-32ETA201CT-ND	VR1, VR2	TRIMMER 200OHM 0.125W J LEAD TOP	2	DigiKey
97	563-ST-32ETA203CT-ND	VR3	TRIMMER 20KOHM 0.125W J LEAD TOP	1	DigiKey

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Bill of materials

#	Part Number	Designator	Description	Quantity	Vendor
98	889-AC3FAH1-AU-PRE-ND	X1, X2	CONN PLUG FEMALE XLR 3P GOLD SLDR	2	DigiKey
99	MMSZ5231BT1GOSCT-ND	Z2, Z7	DIODE ZENER 5.1V 500MW SOD123	2	DigiKey
100	MMSZ5270BT1GOSCT-ND	Z3A, Z3B	DIODE ZENER 91V 500MW SOD123	2	DigiKey
101	SZMMSZ4713T1GOSCT-ND	Z4	DIODE ZENER 30V 500MW SOD123	1	DigiKey
102	BZT52C15-13-FDICT-ND	Z5, Z6	DIODE ZENER 15V 500MW SOD123	2	DigiKey
103	92148A150	MP2, MP5, MP7, MP8, MP9, MP11, MP19, MP20	WASHER SPLIT LOCK M3 STEEL	8	MCMaster CARR
104	SK 134 100 SA	HS1	Extruded Heatsink	1	DigiKey
105	TG-A2200-10-10-1.5	PAD2, PAD8, PAD9, PAD10	THERMAL PAD TOLT	4	DigiKey
106	92000A118	SC1, SC3, SC4, SC5	MACH SCREW PAN HEAD PHILLIPS M3 8MM	4	MCMaster CARR
107	92000A122	SC2, SC6, SC7, SC8	MACH SCREW PAN HEAD PHILLIPS M3 12MM	4	MCMaster CARR

Summary

13 Summary

REF_AUDIO_SiC_2kW is a high-performance Class D audio amplifier reference board developed by Infineon. It combines 400 V CoolSiC™ MOSFETs with MERUS™ IRS2452BM audio controller IC to showcase the superior efficiency, power density, and audio quality achievable with CoolSiC™ technology in demanding audio applications.

Key features include a self-oscillating second-order sigma-delta PWM topology, comprehensive protection mechanisms (OCP, OVP, UVP, OTP), and support for external clock synchronization. The inherently low $R_{DS(on)}$ and parasitic capacitances of CoolSiC™ MOSFETs enable the design to support both high-impedance constant voltage distribution systems and low-impedance systems – a capability not practical with conventional silicon MOSFETs. Channel efficiency of up to 97.9% and THD+N as low as 0.03% demonstrate the performance achievable with this technology combination.

Summary

References

- [1] Infineon Technologies AG: *CoolSiC™ IMLT40R045M2H*; [Available online](#)
- [2] Infineon Technologies AG: *MERUS™ class D IC –IRS2452BM*; [Available online](#)
- [3] Infineon Technologies AG: *EiceDRIVER™ – 1EDN9550B*; [Available online](#)

Class D audio reference board with CoolSiC™ 400 V transistors and MERUS™ IRS2452BM audio IC



Revision history

Revision history

Document revision	Date	Description of changes
V 1.0	2026-05-13	Initial release

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Customer shall check the Evaluation Board for any physical damage which may have occurred during transport. If customer detects any damages or defects in the Evaluation Board, customer shall not connect the Evaluation Board to a power source. Customer shall contact Infineon for further support. If customer observes unusual operating behavior during the evaluation process, customer shall immediately shut off the power supply to the Evaluation Board and consult Infineon for support. Customer shall not touch the Evaluation Board during operation and keep a safe distance.

Customer shall not touch the Evaluation Board after disconnecting the power supply, several components may still store electrical voltage and can discharge through physical contact. Several parts, like heat sinks and transformers, may still be very hot. Allow the components to cool before touching or servicing.

The electrical installation must be completed in accordance with the appropriate safety requirements.