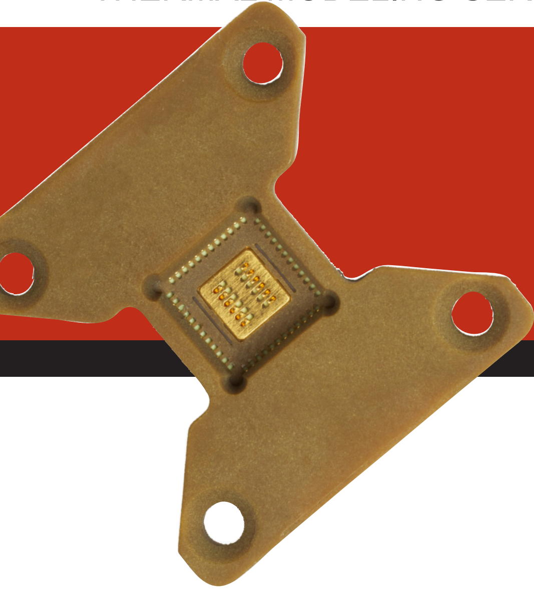


Thermal Modeling Services

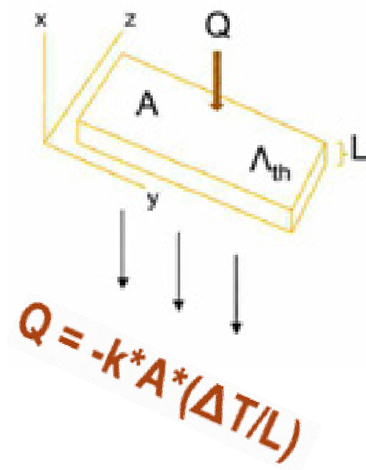
Your Contact for Highest Test Performance

The Challenge: Control heat dissipation in high current applications such as cellular devices.

The Solution: Model thermal control solutions before they impact packaging and manufacturing.

Developing high dB gain amps or high frequency RF Designs? Maybe you're creating the next generation of FETS, IGBTs, or other high current power devices. Or high speed DACs/ADCs. Check with us. We'll help take the heat off of you.

$$(\partial^2 T/\partial x^2) = (c^*\rho/\Lambda_{th})^*(\partial T/\partial t)$$



$$Q = -k^*A^*(\Delta T/L)$$

As high-performance device technology such as cell phones become more sophisticated, thermal issues associated with heat generation and transfer consume an increasing percentage of engineering time and effort. Failure to adequately dissipate excess heat dramatically affects overall device performance. Modeling and implementing thermal control solutions before they arise in package considerations means ATE test fixturing can result in significant time and cost savings for the test development engineer -- as well as on the manufacturing floor.

Johnstech offers consulting services that provide comprehensive system thermal analysis for die-package, package - Contactor, Contactor - load board, and system-to-ambient. With a complete understanding of the thermal theory and proven modeling success, the Johnstech team integrates reality with theory to achieve success. Our customers enjoy reliable product

launches, tighter guard bands, quicker time-to-market, and higher first pass yields, ensuring maximum profitability. Whether you are in the pre-development or production stage, Johnstech's thermal consulting services will make certain your product is not unduly 'taking the heat.'

Each situation is unique, with a myriad of device, package, contactor and load board characteristics. Our knowledgeable, experienced and professional thermal engineering staff works closely with you, carefully analyzing each application to ensure that you meet or exceed the device/package thermal limitations.

Johnstech's Thermal Analytical services is just one of a family offered by the industry's recognized leader in high-performance contacting.

Your Contact for Higher Performance

Johnstech®

Part Number	Service	Service Description	Min Hrs
900017-0001	Steady State	Basic level of analysis, involves formatting, setup and analysis of a thermal model for a combination DUT-Contactor-LB system with a 100% duty cycle application leading to the final temperature of the junction of the die in the DUT.	10
900017-0002	Pulsed	Builds on the steady-state level and includes a thermal model and analysis for a DUT-Contactor-LB system with pulsed current applications and a duty cycle less than 100%. The final temperature of the junction of the die in the DUT is the result. Note: Includes steady state analysis	20
900017-0003	Transient	Builds on the steady-state level and includes a thermal model and analysis for a DUT-Contactor-LB system with pulsed current applications and a duty cycle less than 100%. The final temperature of the junction of the die in the DUT is the result. Note: Includes steady state analysis	20
900017-0004	Auxiliary	A standard DUT-Contactor-LB system setup is limited in the amount of heat that can be safely dissipated to the environment under ambient conditions. If the heat load exceeds these conditions, then auxiliary cooling methods must be employed. This can involve the use of heat sinks, forced-air, liquid cooling, cold plates, thermal stream machines, etc. In many cases the customer will provide the necessary additional cooling, based on the advice of Johnstech's thermal experts. Each case is evaluated on an individual basis. Note: Includes steady state analysis	30

Information Required for a Typical Analysis

1. Power dissipated as heat and duty cycle of the operating device.
2. Pulsed applications require complete characterization of the pulse train specific on and off times, quantity of applied pulses and repeat rate.
3. What is the total test time with normal applied, peak and average power?
4. What type of device is being tested: RF, analog, digital, combination of both or all?
5. Specific function of the device (e.g., modulator, amplifier, memory, etc.).
6. Electrical efficiency of the DUT.
7. RDSON in Ohms.
8. Device thermal characteristics: maximum allowable die temperature, thermal resistance, junction-to-case, thermal resistance, junction-to-ambient.
9. Product data sheet and package drawing, are there multiple die in the package?
10. Temperature range over which device will be tested (e.g., -40°C to +125°C), ambient range?
11. A footprint drawing of the device with numerics: show size of thermal and/or ground pad(s), is the center pad(s): ground, thermal, combination of both.
12. What auxiliary cooling can be applied to the DUT if external cooling is required?

The information requested has shown to be adequate for a thermal analysis. In some instances, not all of the requested info can be supplied. In those cases estimates (based on experience, models, tables etc.) will be used for the missing information as needed.

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