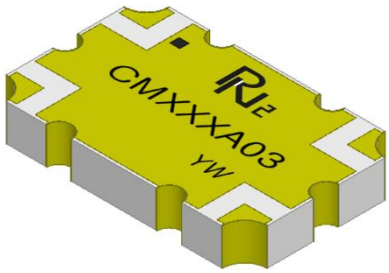
3dB, 90°, Hybrid Coupler
with High-Power Capacity and Stable Performance based on RN2 LTCC Multilayer Technology
Model Name: CMX03A03

KEY FEATURES
- Excellent high-power capacity up to average 200 watts
- Excellent stable performance at different temperatures
- Low insertion loss based on a LTCC base (Er = 5.95), high conductivity metal conductor (Ag), and gold (Au) plating
- Surface mount type
- RoHS compliance (Pb-Free)



APPLICATIONS
- Applications using GSM, UMTS, and LTE
- RF amplifiers
- Communications equipment

GENERAL DESCRIPTIONS
The CMX03A03 is a 3dB, 90° hybrid coupler with high-power capacity and stable performance in different temperatures. The LTCC, high conductivity metal conductor (Ag), and gold (Au) plating enable the CMX03A03 to minimize insertion loss and improve durability for thermal stabilization and electricity.

The CMX03A03 is suited for applications using GSM, UMTS, and LTE and communications equipment, requiring low insertion loss and high power.

The CMX03A03 supports up to average 200 watts. It is a SMD type product enabling Pb-Free solder and meets RoHS-6.

ELECTRICAL SPECIFICATIONS

Frequency (MHz)	Amplitude Balance Max.(dB)	Insertion Loss Max.(dB)	Return Loss Min.(dB)
250 – 470	± 0.80	0.30	20.8
250 – 300	± 0.50	0.20	26.4
300 – 450	± 0.50	0.25	20.8
450 – 470	± 0.80	0.30	20.8
Isolation Min.(dB)	**Phase Balance (Degree)**	**Power Capacity Avg.(Watt)**	**Operating Temperature(℃)**
20	90 ± 3.0	200	-55 ~ 125
25	90 ± 2.0		
20	90 ± 3.0		
20	90 ± 3.0		

NOTE: These electrical specifications are measured by using a RN2 test board.
Specifications subject to change without notice.

PORT CONFIGURATIONS

Figure 1 shows the locations of the CMX03A03 ports. The orientation marker is included to represent port 1.

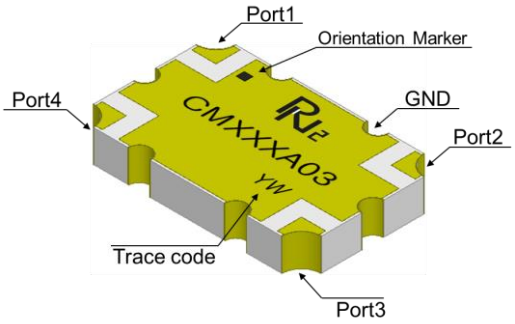


Figure 1. CMX03A03 (Top View)

Table 1 describes the CMX03A03 port configurations depending on how input signals are split. The Case 1, Case 2, Case 3, and Case 4 configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically.

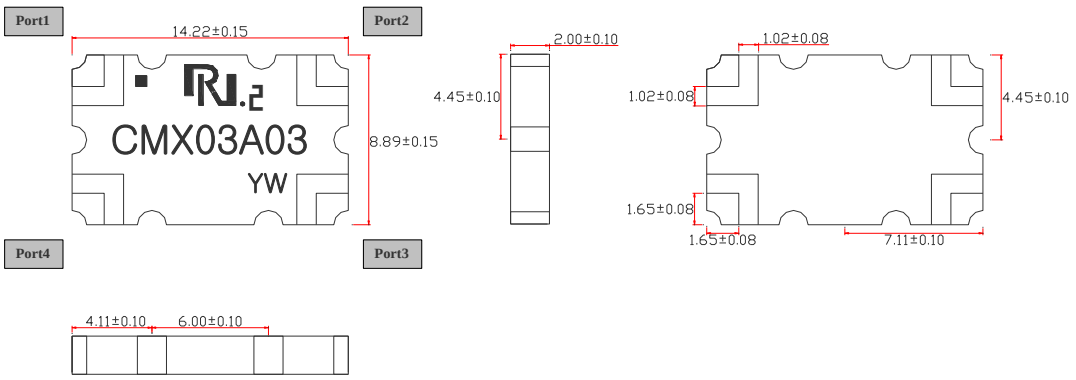
Table 1. CMX03A03 Port Configurations

Configuration	Port 1	Port 2	Port 3	Port 4
Case 1.	Input	Isolated	Output -3dB, -90˚	Coupling -3dB, 0˚
Case 2.	Isolated	Input	Coupling -3dB, 0˚	Output -3dB, -90˚
Case 3.	Output -3dB, -90˚	Coupling -3dB, 0˚	Input	Isolated
Case 4.	Coupling -3dB, 0˚	Output -3dB, -90˚	Isolated	Input

***NOTE**: 0˚ is an actual phase or amplitude of the frequency specified at all ports.

MECHANICAL SPECIFICATIONS

Top View **Bottom View**



- Unit: mm
- Weight: 0.7 grams
- Camber specifications: Less than 0.08 mm

POWER DERATING CURVE

Figure 2 shows the maximum allowable average power (Maximum input power, CW) of the CMX03A03 depending on base PCB temperature changes. The maximum allowable average power of the CMX03A03 is limited by the following power derating curve.

The CMX03A03 factors that determine the power derating curve are as follows:

- Internal circuit
- Thickness
- Thermal conductivity of materials
- Insertion loss
- Operating temperature
- Mounting interface temperature between the CMX03A03 and the base PCB

The maximum operating temperature of the CMX03A03 is 125 ºC. Therefore, when the base PCB temperature is over 125 ºC, the CMX03A03 operates stably by decreasing its durable average input power. When the base PCB temperature reaches 200 ºC, the maximum allowable average power decreases to 0 watt.

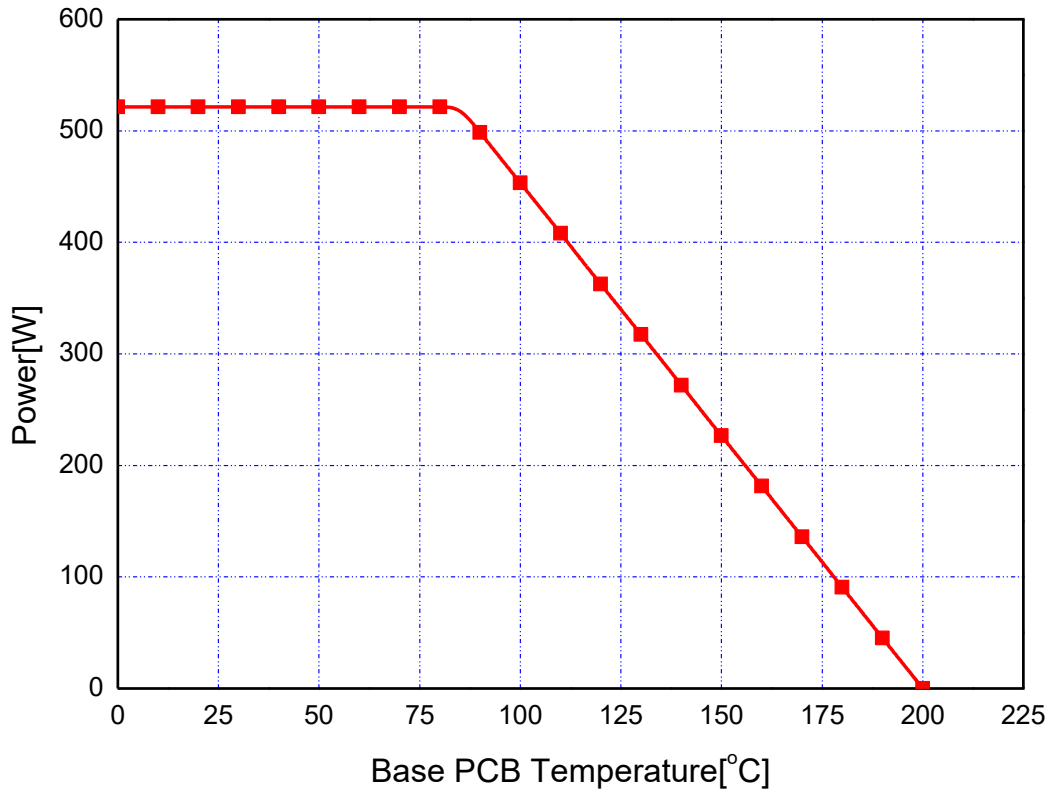


Figure 2. Power Derating Curve

RF PERFORMANCE CURVES: Return Loss (-55 ºC, 25 ºC, and 125 ºC)

Figure 3 shows the test plots of the return loss for the CMX03A03. There are few variations for the specified frequencies and temperatures.

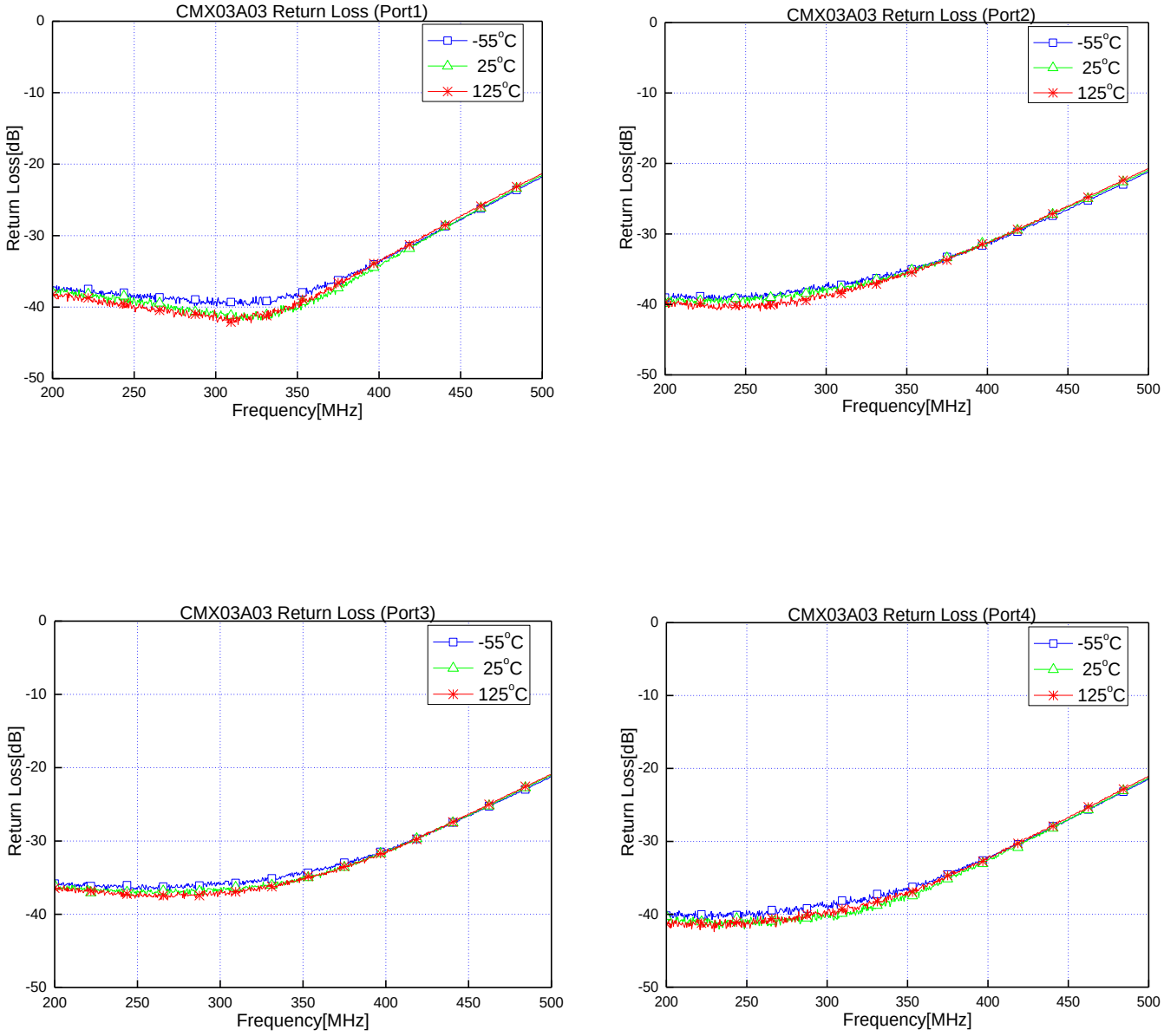


Figure 3. Test Plots of Return Loss (-55 ºC, 25 ºC, and 125 ºC)

RF PERFORMANCE CURVES: Coupling and Transmission, Insertion Loss, Isolation, and Phase Balance (-55 ºC, 25 ºC, and 125 ºC)

Figure 4 shows the test plots of the coupling and transmission loss, insertion loss, isolation, and phase balance for the CMX03A03. There are few variations for the specified frequencies and temperatures. These test plots result from the Case 1 configuration in *'Table 1. CMX03A03 Port Configurations'*. See *'PORT CONFIGURATIONS'* for more details.

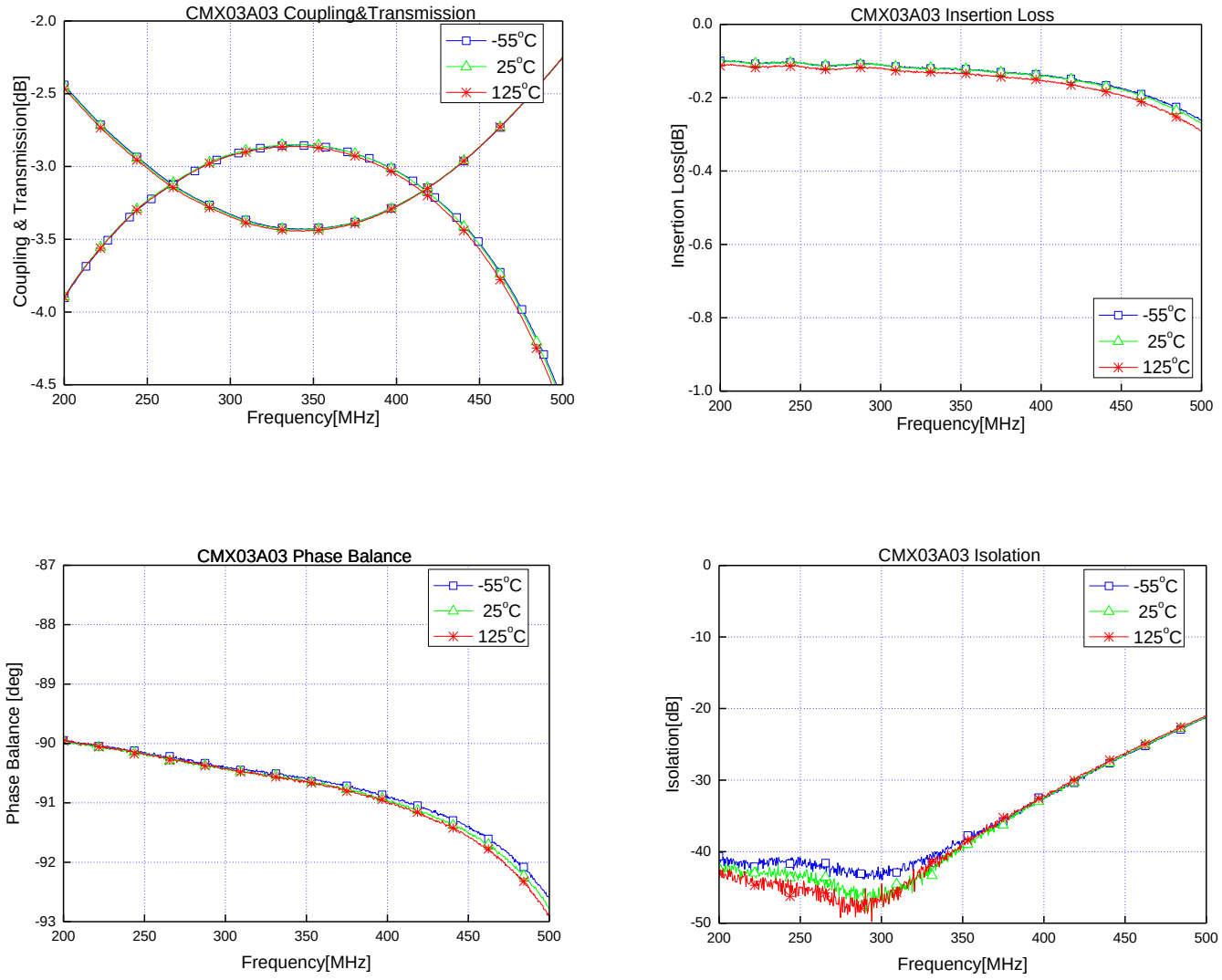


Figure 4. Test Plots of Coupling and Transmission Loss, Insertion Loss, Isolation, and Phase Balance (-55 ºC, 25 ºC, and 125 ºC)