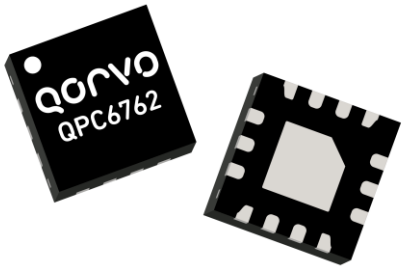
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# QPC6762

## 75Ω SP6T Switch 5MHz to 2000MHz

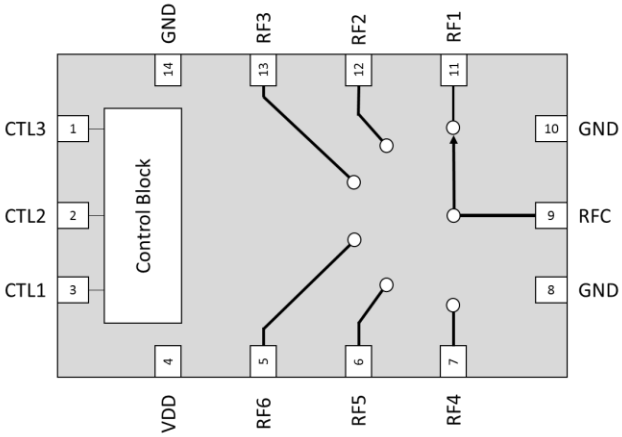
## Product Overview

The QPC6762 is a 75Ω Silicon on Insulator (SOI) single-pole, six throw (SP6T) switch designed for use in CATV, satellite set top, and other high-performance communications systems. It offers a high isolation symmetric topology with excellent linearity and power handling capability. No blocking caps are necessary on the RF ports. QPC6762 is packaged in a convenient 2.0mm x 2.0mm QFN package




14 Pin 2.0 x 2.0mm QFN Package

## Functional Block Diagram




Top View

## Key Features

- 5MHz to 2000MHz Operation
- Low Insertion Loss: 0.4dB at 800MHz
- No Blocking Caps Required Unless Voltage on RF Line
- High Isolation: 34dB at 800MHz
- High Input IP3: 75dBm at 850MHz
- 2kV ESD
- +1.8V Logic Compatible
- 3V to 5V Operation

## Applications

- MDU Amplifiers
- Point To Point
- Optical Nodes
- Set Top Box
- PCTV
- Multi-tuner DVR

## Ordering Information

| Part No. | Description |
|---|---|
| QPC6762SQ | Sample bag with 25 pieces |
| QPC6762SR | 7" Reel with 100 pieces |
| QPC6762TR13 | 13" Reel with 2500 pieces |
| QPC6762PCK | 5 – 2000MHz PCBA with 5 pc. sample bag |

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## Absolute Maximum Ratings

| Parameter | Rating |
|---|---|
| Control Voltage ($V_{CTL}$) | 3.0V |
| Supply Voltage ($V_{DD}$) | 6.0V |
| Maximum CW Input Power at 25°C | 32dBm |
| Max Input Power During Active Switching | 24dBm |
| Storage Temperature Range | -40 to +150°C |

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Recommended Operating Conditions

| Parameter | Min | Typ | Max | Units |
|---|---|---|---|---|
| Supply Voltage, $V_{DD}$ | 2.7 | 5 | 5.5 | V |
| Temperature Range | -40 | | 85 | °C |

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

## Electrical Specifications

| Parameter | Conditions [1] | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Frequency Range | | 5 | | 2000 | MHz |
| Insertion Loss (RFC to RFx) | 5MHz | | 0.28 | | dB |
| | 50MHz | | 0.32 | | |
| | 800MHz | | 0.40 | | |
| | 1.2GHz | | 0.43 | | |
| | 2GHz | | 0.52 | | |
| Isolation (RFC to RFx) | 5MHz | | 50 | | dB |
| | 50MHz | | 60 | | |
| | 800MHz | | 34 | | |
| | 1.2GHz | | 28 | | |
| | 2GHz | | 23 | | |
| Isolation (RFx) | 5MHz | | 55 | | dB |
| | 50MHz | | 53 | | |
| | 800MHz | | 24 | | |
| | 1.2GHz | | 25 | | |
| | 2GHz | | 17 | | |
| Return Loss (RFC) | 5MHz | | 48 | | dB |
| | 50MHz | | 36 | | |
| | 800MHz | | 19 | | |
| | 1.2GHz | | 23 | | |
| | 2GHz | | 15 | | |

Notes:

1. Test Conditions Unless Otherwise Specified: $T_A$ = +25°C, $V_{DD}$ = +5V, $V_{CTL}$ = 0/+2.5V, 75Ω system.

## Electrical Specifications (cont'd.)

| Parameter | Conditions [1] | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input IP3 | 850MHz +12dBm input power per tone, 30MHz tone spacing | | 75 | | dBm |
| Input IP2 | 850MHz +12dBm input power per tone, 30MHz tone spacing | | 121 | | |
| Input 1dB Compression Point | 850MHz | | 37 | | |
| Input 0.1dB Compression Point | 850MHz | | 33 | | |
| MER | 75dBmV composite at 885MHz | | 41.1 | | dB |
| CCN | 75dBmV composite at 885MHz | | 55.8 | | |
| Switching Speed | 10/90% RF | | 0.35 | | µs |
| Switching Speed | 50% control to 10/90% RF | | 1.8 | | |
| Turn On Time | Time for VDD = 0V to part ON and RF = 90% | | 20 | | |
| NVG Spurs | 5 - 30MHz | | -117 | | dBm |
| Harmonics-2nd | 5 MHz | | -72 | | dBc |
| | 50MHz | | -76 | | |
| | 850MHz | | -130 | | |
| | 1800MHz | | -110 | | |
| Harmonics-3rd | 5MHz | | -93 | | dBc |
| | 50MHz | | -102 | | |
| | 850MHz | | -117 | | |
| | 1800MHz | | -106 | | |

Notes:

1. Test Conditions Unless Otherwise Specified: $T_A$ = +25°C, $V_{DD}$ = +5V, $V_{CTL}$ = 0/+2.5V, 75Ω system. Drive RFC, RFx output.

## Electrical Specifications - Power Supply

| Parameter | Conditions [1] | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Supply Current ($I_{DD}$) | $V_{DD}$ = +5.0V | | 65 | 120 | µA |
| Control Current | CTL1, CTL2, CTL3 | | | 5 | µA |
| Control Voltage High | | 1.3 | | 2.7 | V |
| Control Voltage Low | | 0 | | 0.45 | V |

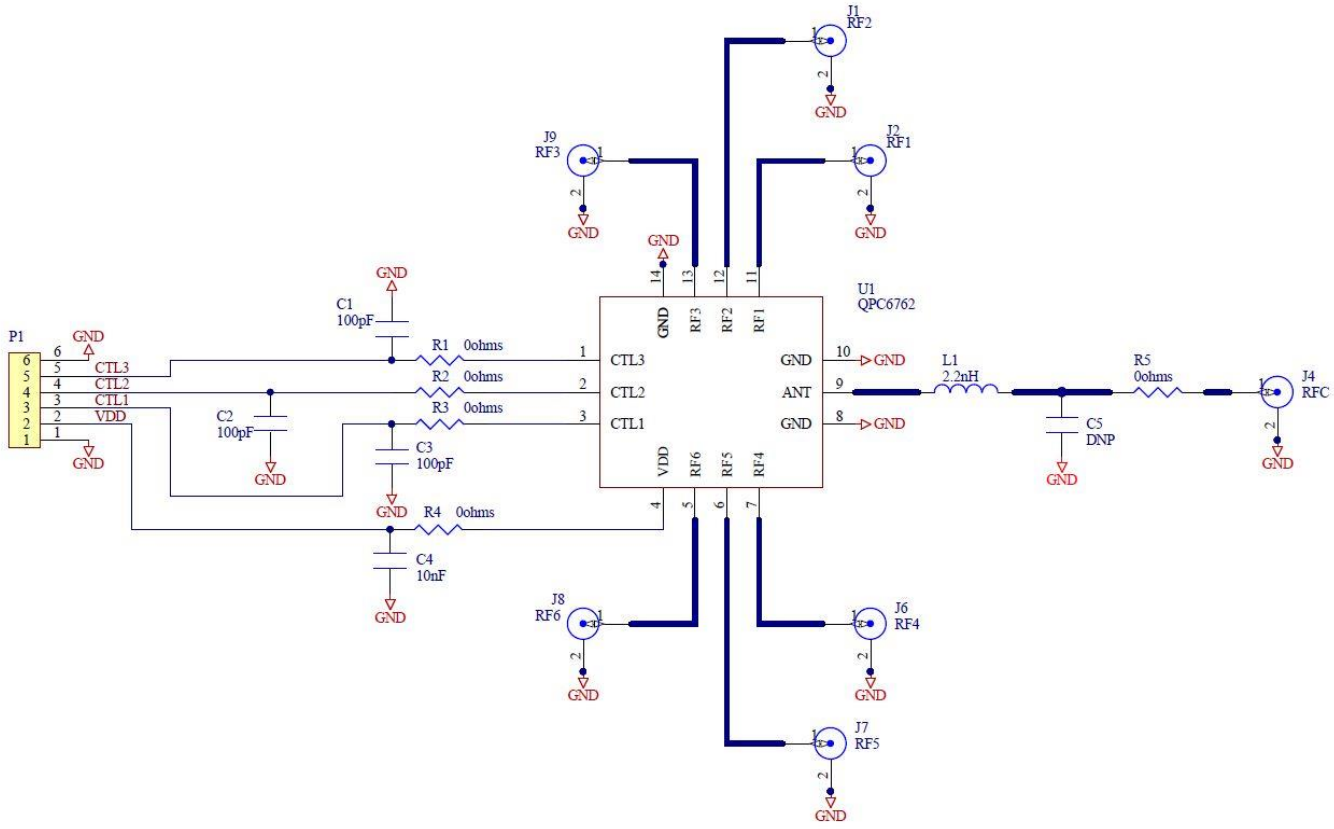
## Power Supply Sequencing Requirements

| Condition | Sequence |
|---|---|
| Power Up | Turn on VDD, then CTL1, CTL2, and CTL3 then (20µs or greater), apply RF signal |
| Power Down | Turn off RF signal, then CTL1, CTL2, and CTL3, then turn off VDD |
| Switching Ports | Turn off RF signal, then change CTL1, CTL2, and CTL3 state, then (5µs or greater). Turn on RF signal |

## Truth Table

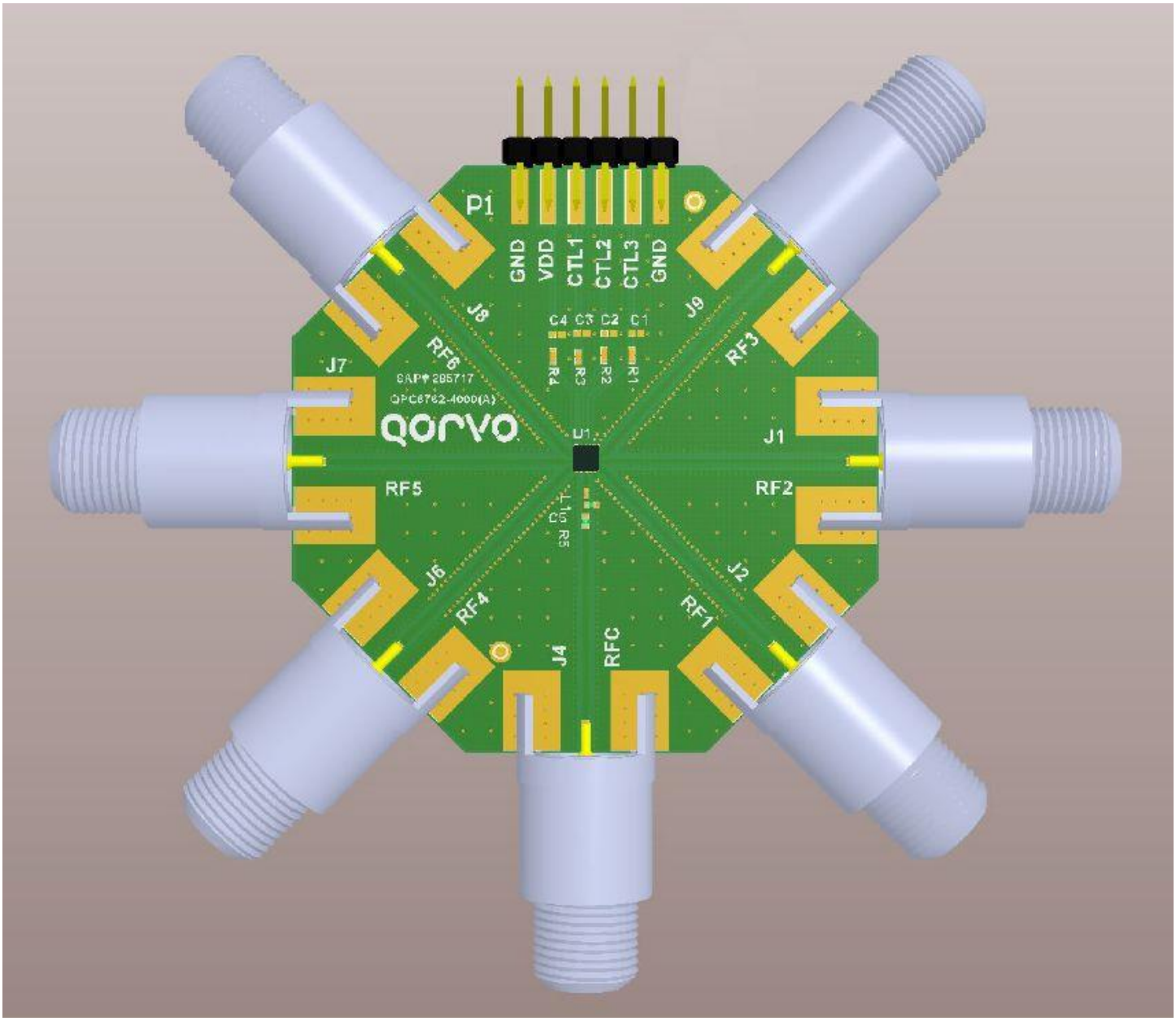
| Mode | Control Signals | | |
|---|---|---|---|
| | CTL1 | CTL2 | CTL3 |
| RFC to RF1 | High | Low | Low |
| RFC to RF2 | Low | High | Low |
| RFC to RF3 | High | High | Low |
| RFC to RF4 | Low | Low | High |
| RFC to RF5 | High | Low | High |
| RFC to RF6 | Low | High | High |

## 5-2000 MHz Evaluation Board Schematic (QPC6762PCK)



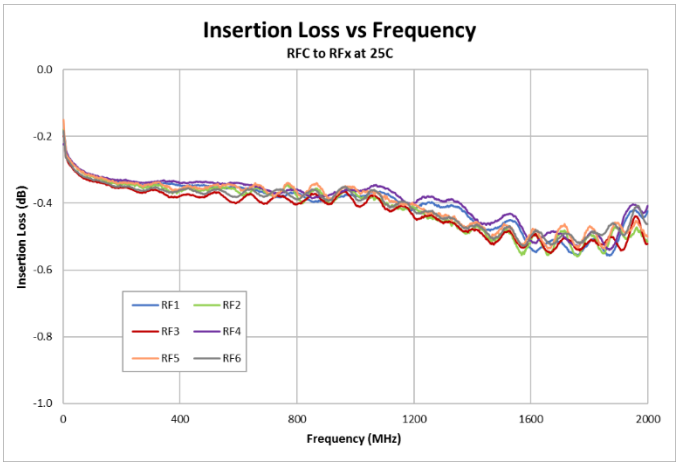

| Ref. Designator | Description | Manufacturer | Part Number |
|---|---|---|---|
| PCB | Evaluation Board PCB | Viasystems | QPC6762-4000 |
| U1 | 75ohm SP6T Switch | Qorvo | QPC6762SB |
| J1, J2, J4, J6, J7, J8, J9 | F Connector, Edge Mount, 75 Ω, 0.065" | Genesis Technology | GT20-300204 |
| R1, R2, R3, R4 | 0 Ω RES, 0402 | Kamaya, Inc | RMC1/16SJPTH |
| R5 | 0 Ω RES, 50mohm max, 0402 | KOA Speer Electronics | RK73Z1ETTP |
| P1 | CONN, HDR, ST, PLRZD, 6-PIN, 0.100" | AMP | 640454-6 |
| C1, C2, C3 | CAP, 100pF, 5%, 50V, C0G, 0402 | Murata | GRM1555C1H101JA01D |
| C4 | CAP, 10nF, 10%, 25V, X7R, 0402 | Murata | GRM155R71E103KA01D |
| L1 | IND, 2.2nH, +/-0.1nH, M/L, Hi-Q, 0201 | Taiyo Uden | LG HKQ0603W2N2B-T |
| C5 | DNP | N/A | N/A |

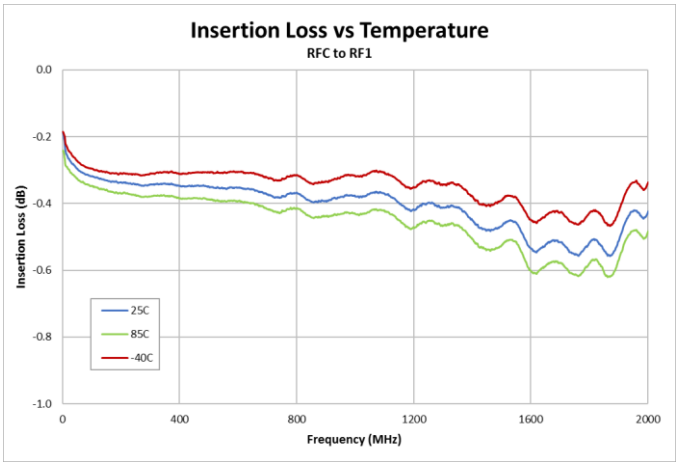
## Evaluation Board Assembly (QPC6762PCK)

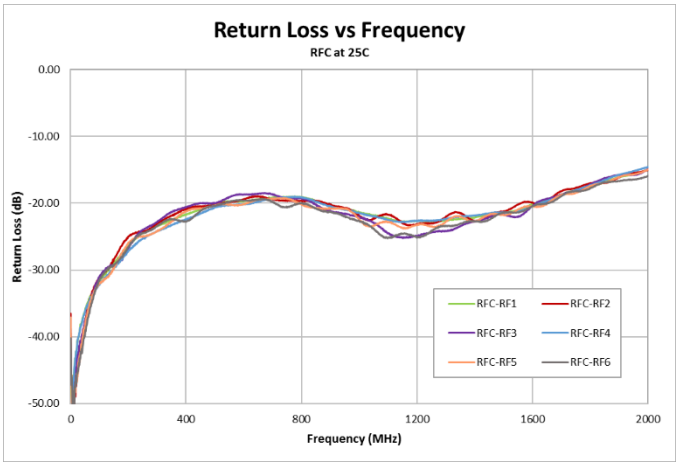


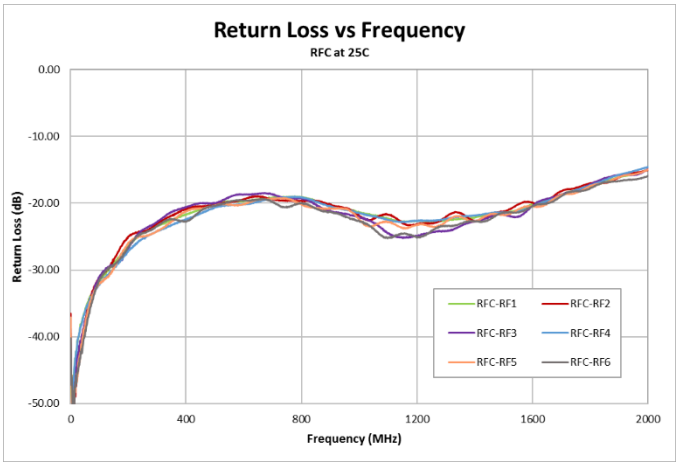
## Performance Plots

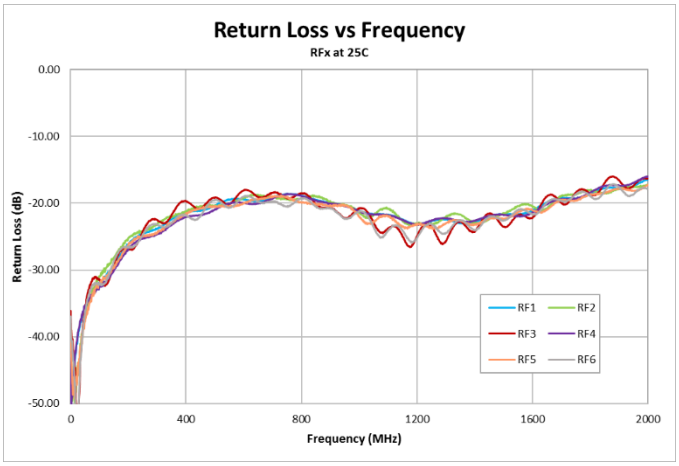
Test conditions unless otherwise noted: $V_{DD}$ =+5V, $V_{CTL}$ =0 / 2.5V, Temp= +25°C, $Z_o$ = 75Ω

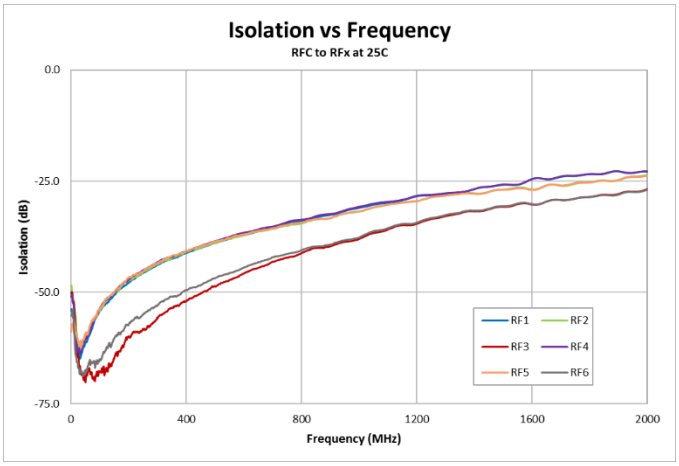


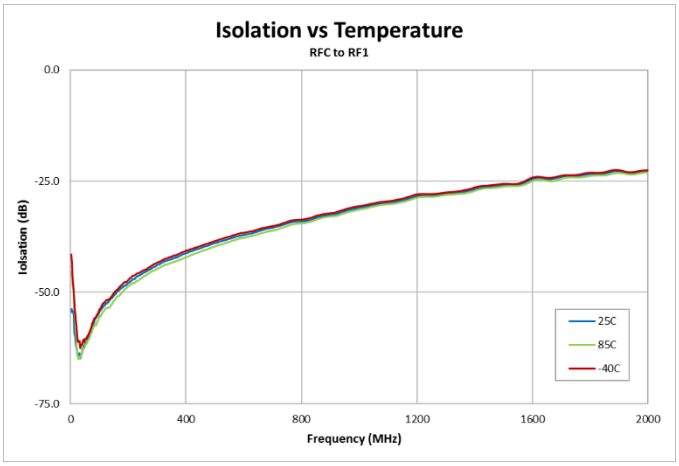



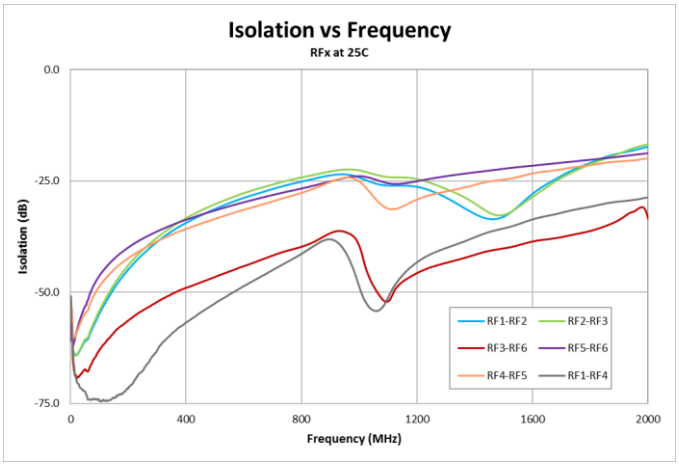

Notes:

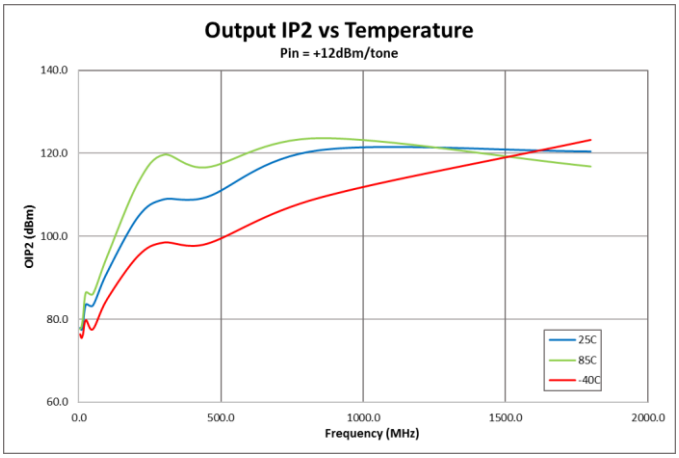
1. Insertion Loss plots are loss compensated to remove effects of EVB.

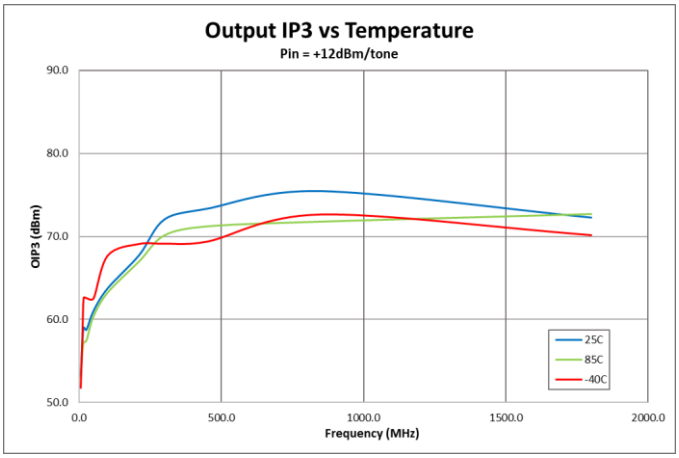
## Performance Plots (cont'd.)

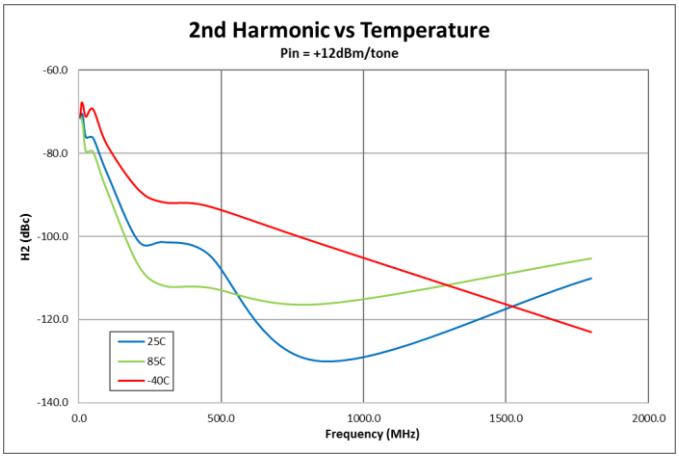
Test conditions unless otherwise noted: $V_{DD}$ =+5V, $V_{CTL}$ =0 / 2.5V, Temp= +25°C, $Z_o$ = 75Ω

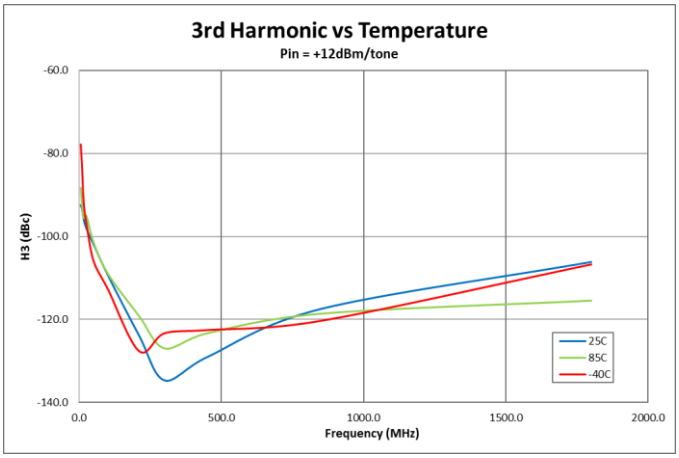


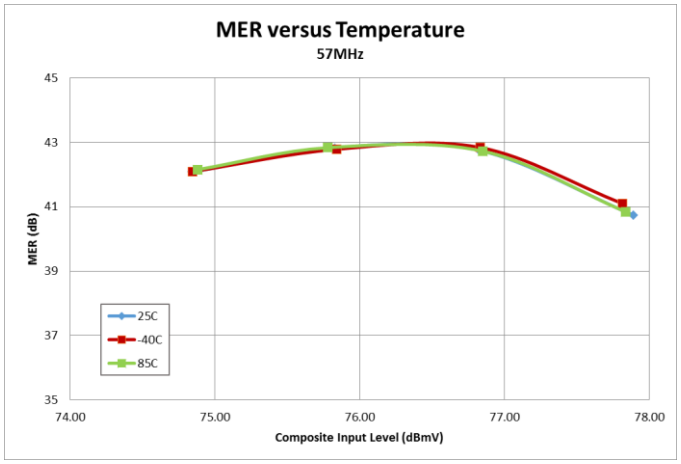



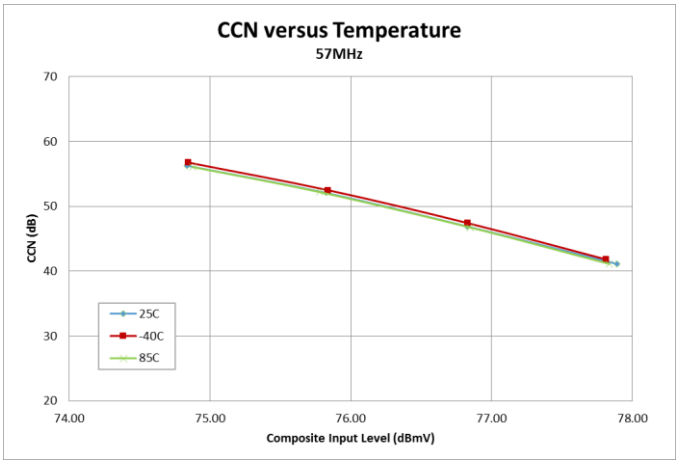



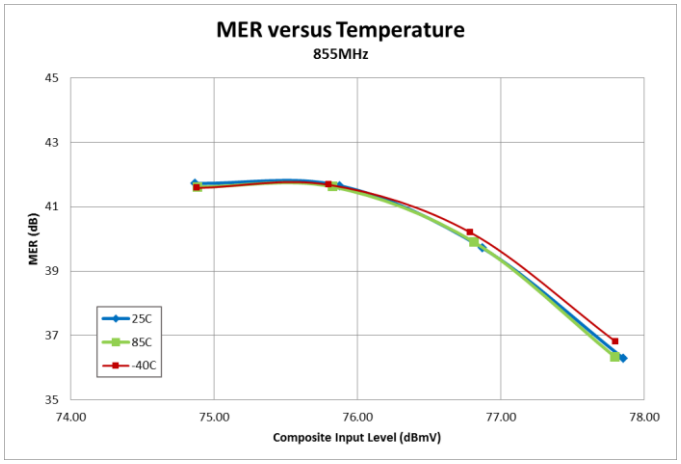



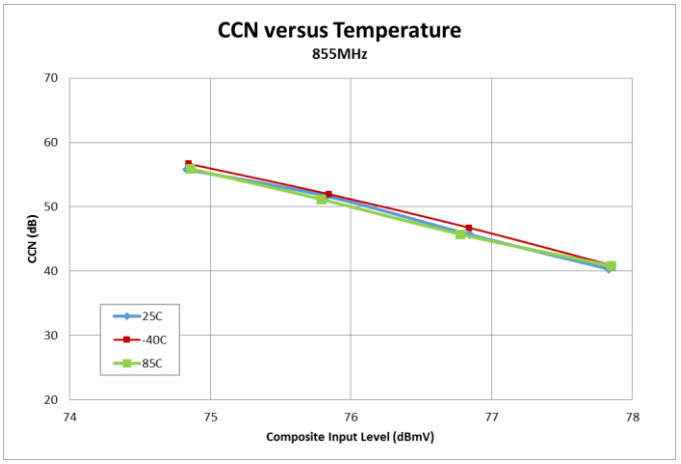
## Performance Plots (cont'd.)

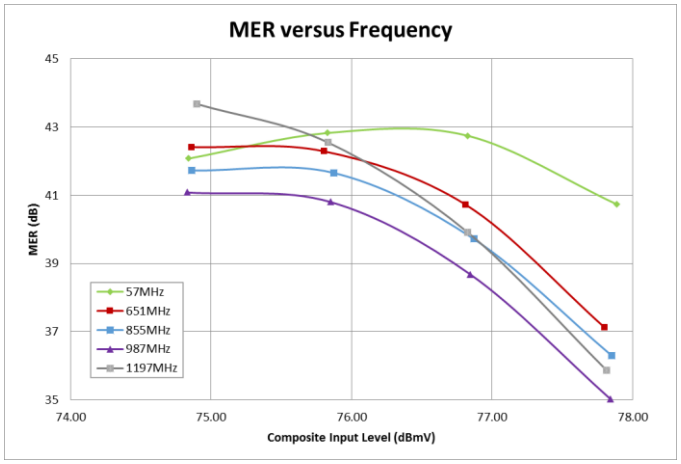
Test conditions unless otherwise noted: $V_{DD}$ =+5V, $V_{CTL}$ =0 / 2.5V, Temp= +25°C, $Z_o$ = 75Ω

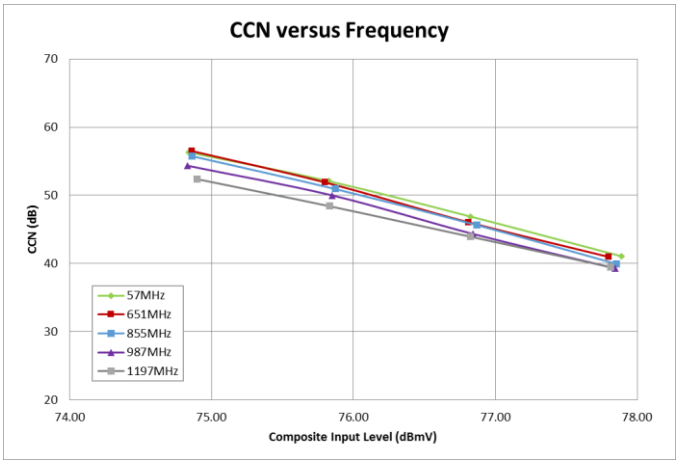


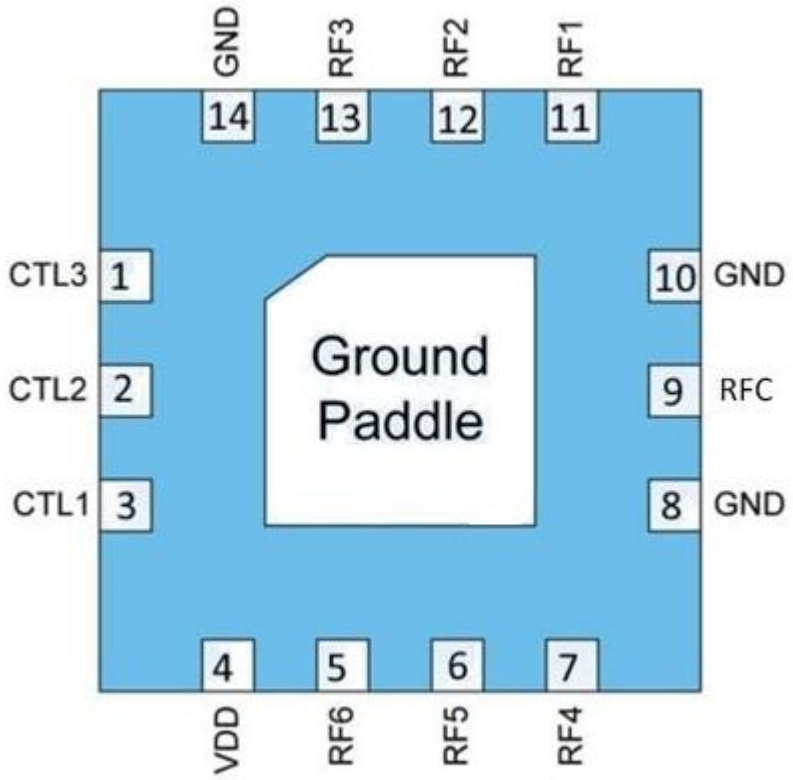




MER/CCN Test Conditions:

1. 190 QAM256 Channels, 57-1215MHz, ITU-T J.83, Annex B
2. CCN test procedure according to ANSI/SCTE 17. System BW 5.36MHz.

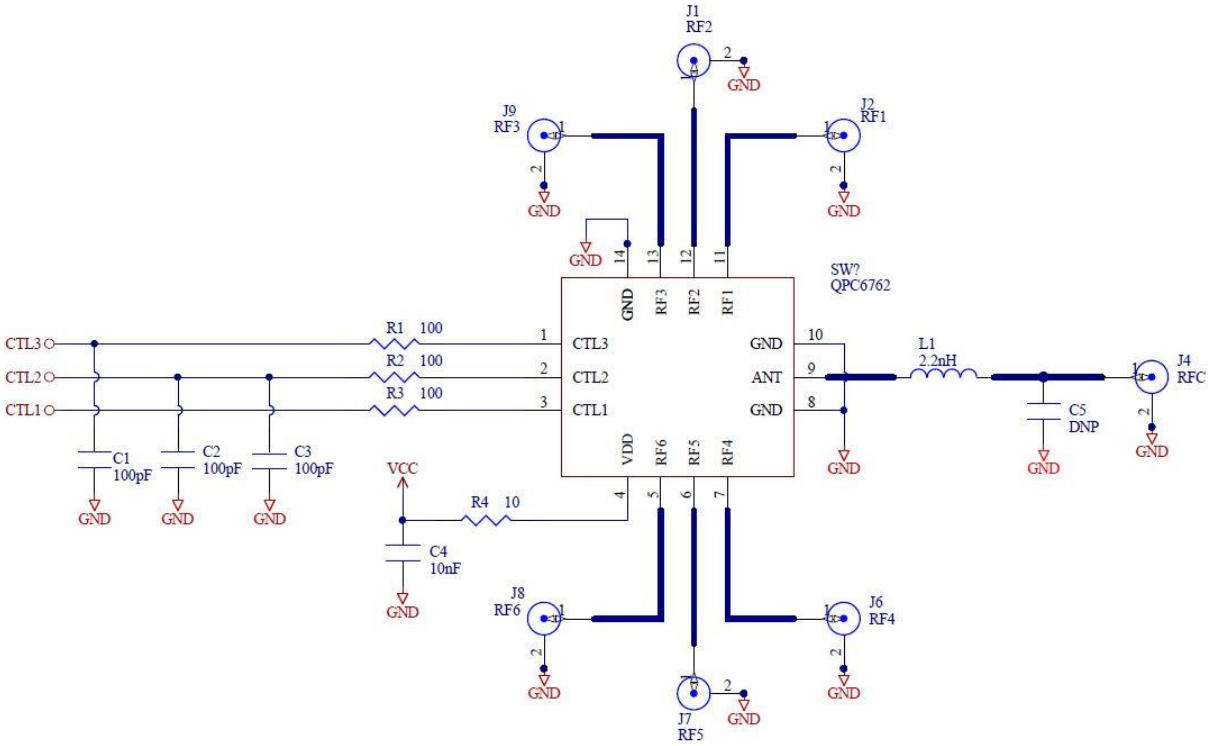
## Pin Configuration and Description




Top View

| Pad No. | Label | Description |
|---|---|---|
| 1 | CTL3 | Switch Logic Control 3 |
| 2 | CTL2 | Switch Logic Control 2 |
| 3 | CTL1 | Switch Logic Control 1 |
| 4 | VDD | Supply Voltage |
| 5 | RF6 | RF Output Port |
| 6 | RF5 | RF Output Port |
| 7 | RF4 | RF Output Port |
| 8 | GND | Ground |
| 9 | RFC | RF Input Port |
| 10 | GND | Ground |
| 11 | RF1 | RF Output Port |
| 12 | RF2 | RF Output Port |
| 13 | RF3 | RF Output Port |
| 14 | GND | Ground |

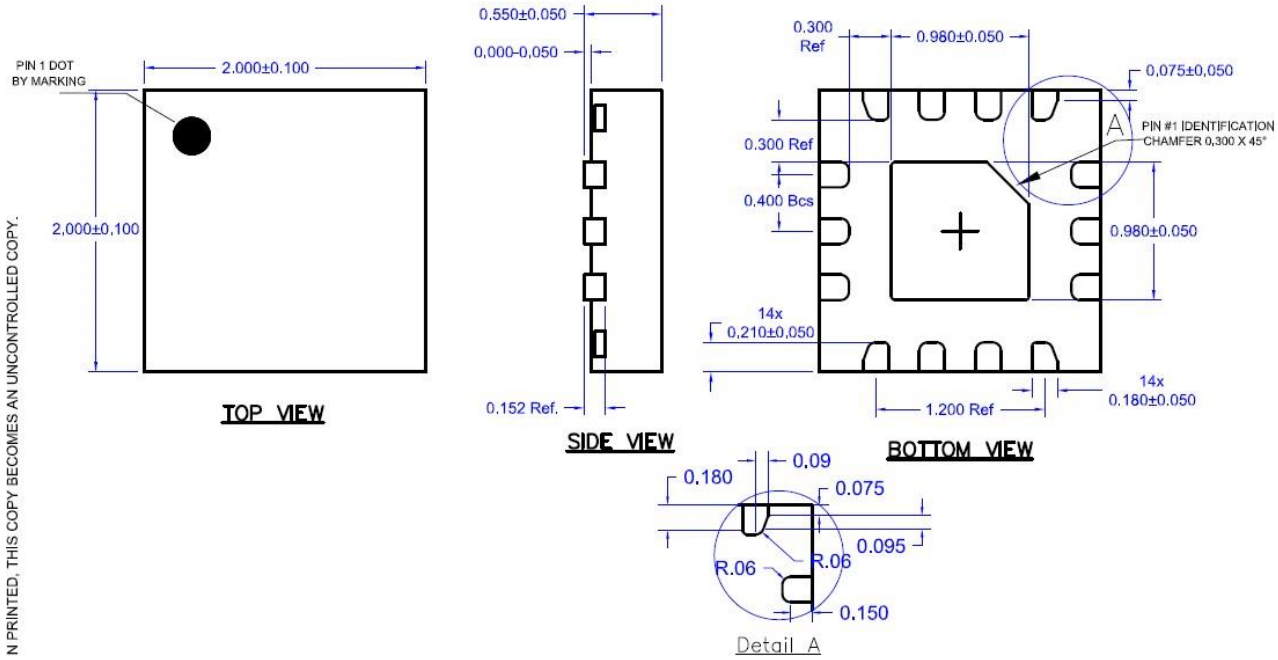
## Applications Schematic; 5-2000MHz




Notes:

1. R1-R4, C1-C4 optional for spurious or RFI suppression.
2. Isolation can be optimized by maximizing ground between RF Ports.
3. L1, C5 optional for improving high frequency return loss.

## Package Dimensions

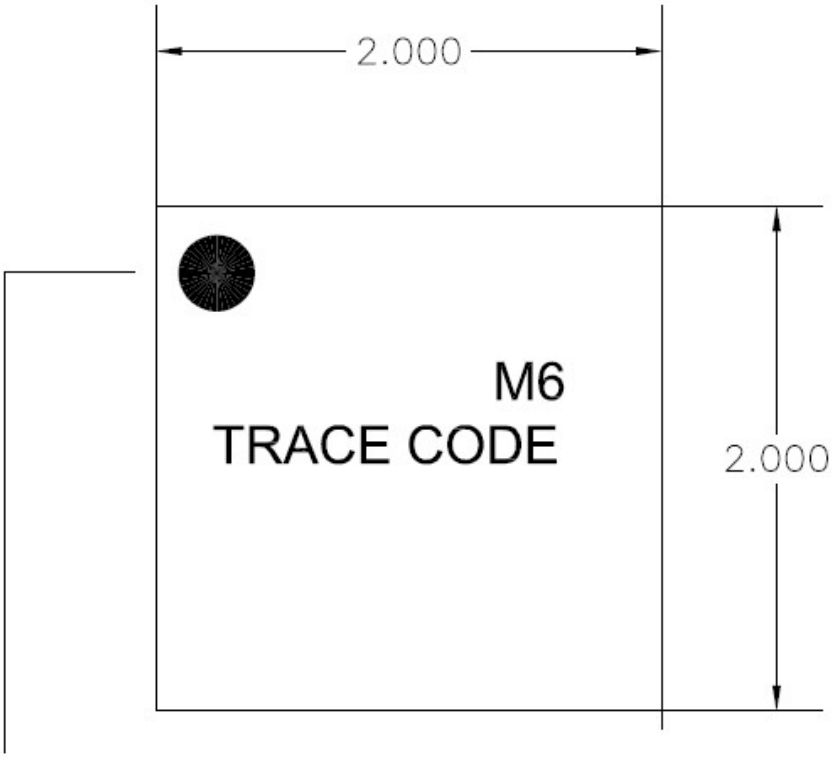



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Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.
3. Contact plating: NiPdAu

## Package Marking




Pin 1 Indicator
Trace Code to be assigned by SubCon

## Handling Precautions

| Parameter | Rating | Standard |
|---|---|---|
| ESD – Human Body Model (HBM) | Class 2 (2000V) | ANSI/ESD/JEDEC JS-001-2010 |
| ESD – Charged Device Model (CDM) | Class IV (1000V) | JESD22-C101 |
| MSL – Moisture Sensitivity Level | MSL3 | JEDEC J-STD-020 |



Caution!
ESD-Sensitive Device

## Solderability

Compatible with both lead-free (260°C max. reflow temp.) and tin/lead (245°C max. reflow temp.) soldering processes.
Solder profiles available upon request.

Contact plating: NiPdAu

## RoHS Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment). This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free
- Qorvo Green

## Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

**Tel: 1-844-890-8163**

**Web: www.qorvo.com**

**Email: customer.support@qorvo.com**

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