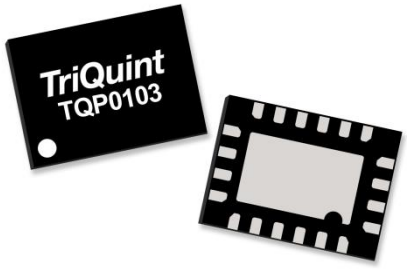
TQP0103

15 W, DC to 4 GHz, GaN Power Transistor

Applications

- W-CDMA / LTE
- Macrocell Base Station Driver
- Microcell Base Station
- Small Cell
- Active Antenna
- General Purpose Applications

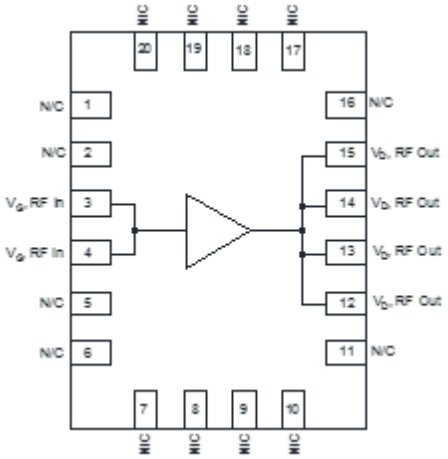


20 Pin 3x4mm QFN

Product Features

- Operating Frequency Range: DC to 4 GHz
- Output Power (P_{SAT}): 15 W
- Drain Efficiency: 64%
- Linear Gain: 19 dB
- Package Dimensions: 3 x 4 x 0.85 mm

Functional Block Diagram



General Description

The TQP0103 is a wide band over-molded QFN discrete power amplifier. The device is a single stage unmatched power amplifier transistor.

The TQP0103 can be used in Doherty architecture for the final stage of a base station power amplifier for small cell, microcell, and active antenna systems. The TQP0103 can also be used as a driver in a macrocell base station power amplifier.

The wide bandwidth of the TQP0103 makes it suitable for many difference applications from DC to 4 GHz. TQP0103 can deliver P_{SAT} of 15 W at 28 to 32 V operation.

Lead-free and ROHS compliant.

Pin Configuration

Pin No.	Label
1-2, 5-11, 16-20	N/C
3-4	RF IN, V_G
12-15	RF OUT, V_D
Backside Paddle	RF/DC GND

Ordering Information

Part No.	ECCN	Description
TQP0103	EAR99	15 W, DC to 4 GHz, GaN PA
TQP0103-PCB	EAR99	2.5-2.7 GHz Evaluation Board

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Absolute Maximum Ratings

Parameter	Rating
Gate Voltage (V_G)	−6 V
Drain Voltage (V_D)	+40 V
Peak RF Input Power	32 dBm
VSWR Mismatch, P1dB Pulse (20% duty cycle, 100 µs width), T = 25°C	10:1
Storage Temperature	−65 to +150°C

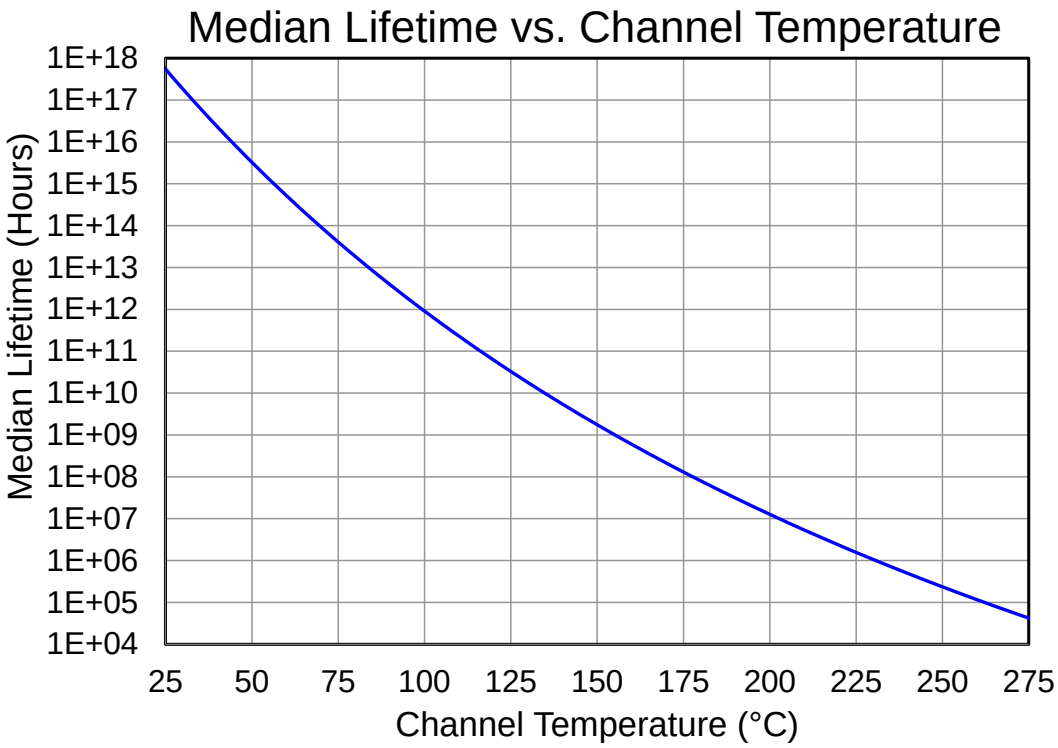
Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Operating Temperature	−40		+105	°C
Gate Voltage (V_G)		−2.9		V
Drain Voltage (V_D)		32		V
Quiescent Current (I_{CQ})		70		mA
T_{CH} for >10^6 hours MTTF			225	°C

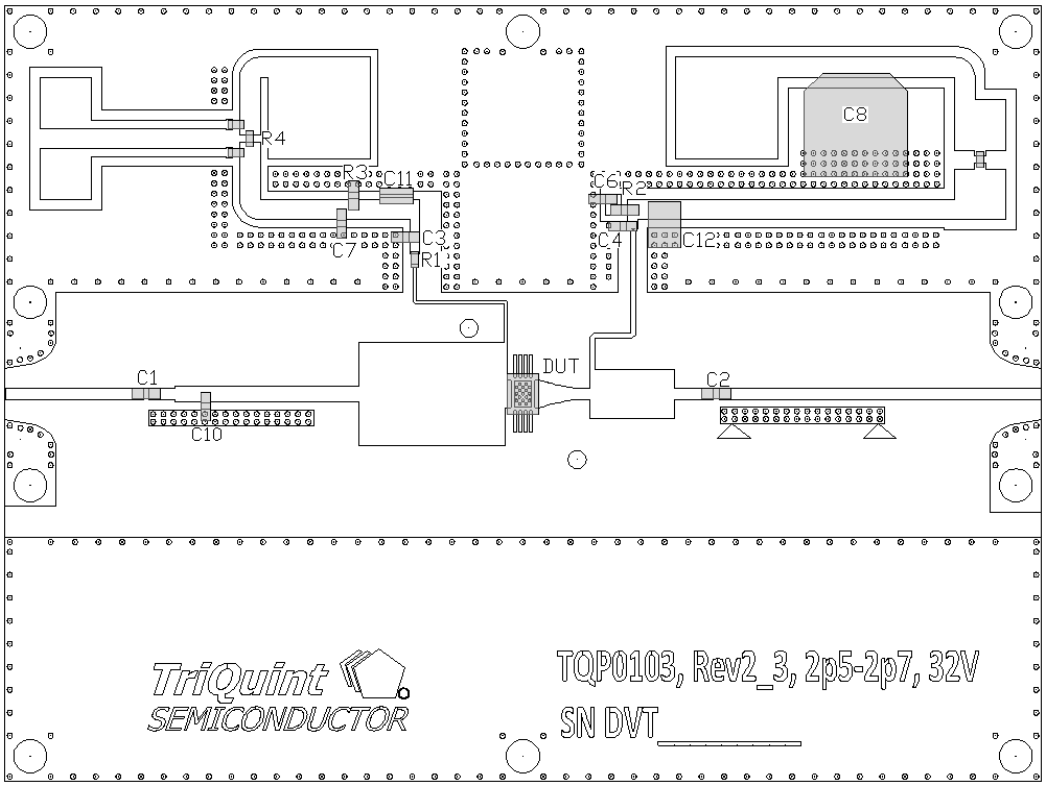
Electrical performance is measured under conditions noted in the electrical specifications table. Specifications are not guaranteed over all recommended operating conditions.

Median Lifetime



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Evaluation Board Layout



Bill of Materials

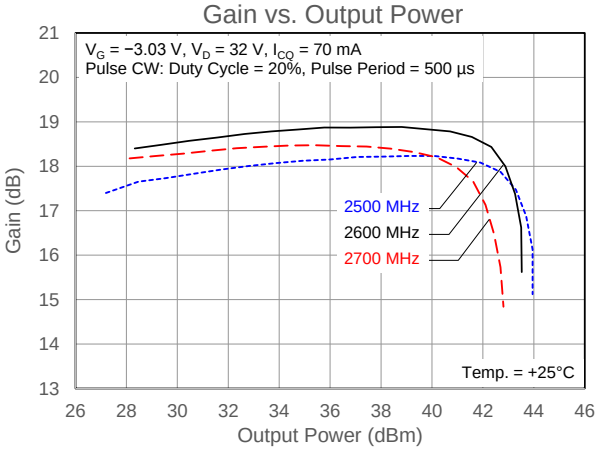
Reference Des.	Value	Description	Manuf.	Part Number
C1, C3, C4	10.0 pF	Capacitor	ATC	600S
C2	22.0 pF	Capacitor	ATC	600S
C9	0.5 pF	Capacitor (DNP)		
R1	20 Ω	Resistor	Venkel	0603-8 LCR
C5, C6	1000 pF	Capacitor	various	
R2	10 Ω	Resistor	Venkel	0603-8 LCR
R3	1000 Ω	Resistor	Venkel	0603-8 LCR
R4	0 Ω	Jumper	Venkel	0603-8 LCR
C8	220 µF	Capacitor, Electrolytic	various	
C10	1.0 pF	Capacitor	ATC	600S
C11	10 µF	Capacitor, X7R Ceramic		
C12	1 µF	Capacitor	AVX	1C105K

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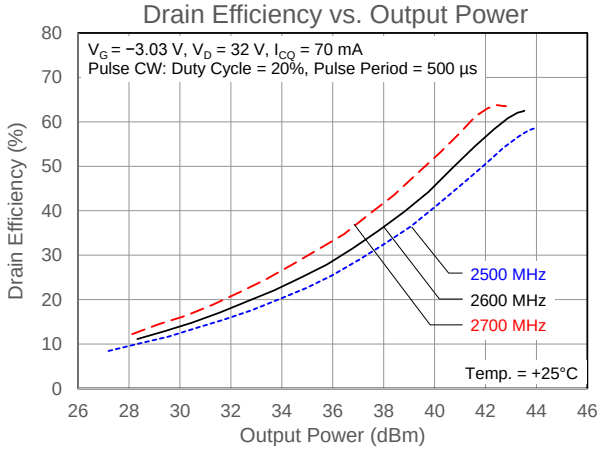
Performance Plots

Test conditions unless otherwise noted: V_D = 32 V, I_{CQ} = 70 mA, T = 25°C, 2.6 GHz single-ended application circuit

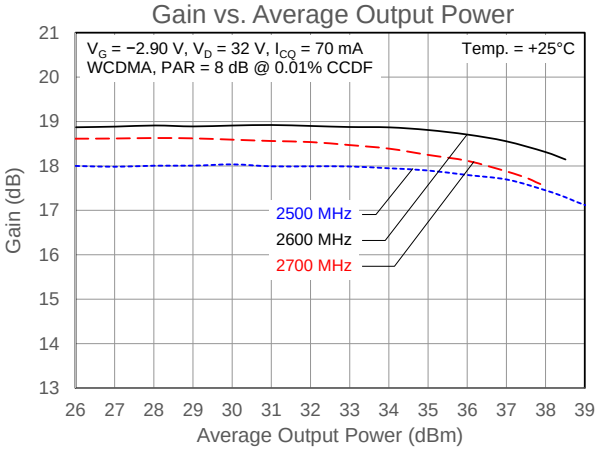
Gain vs. Output Power



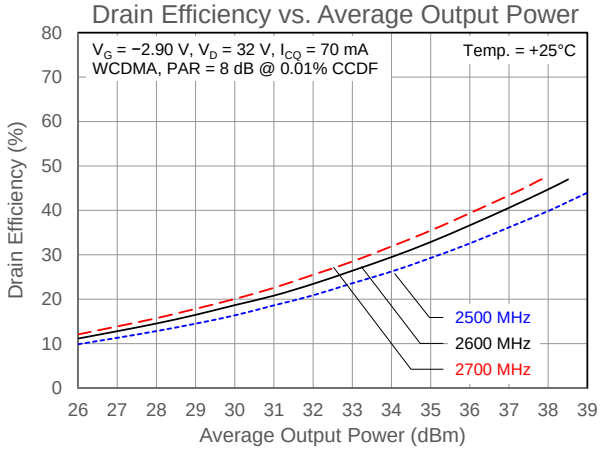
Drain Efficiency vs. Output Power



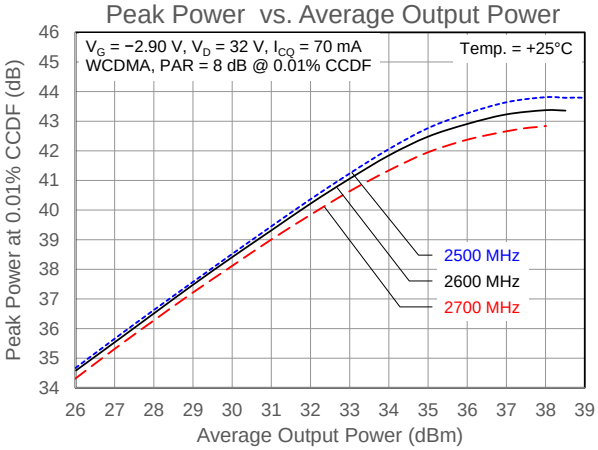
Gain vs. Average Output Power



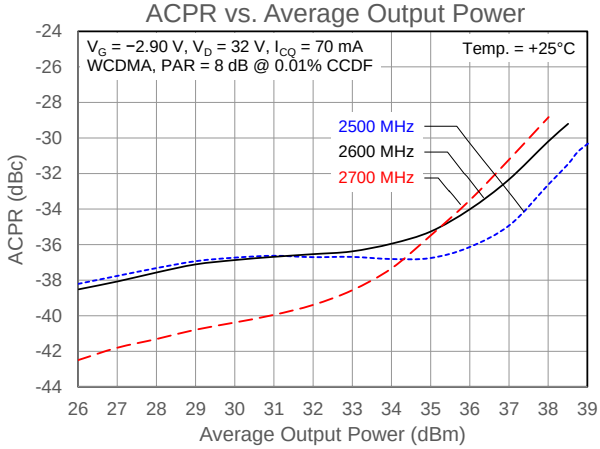
Drain Efficiency vs. Average Output Power



Peak Power vs. Average Output Power



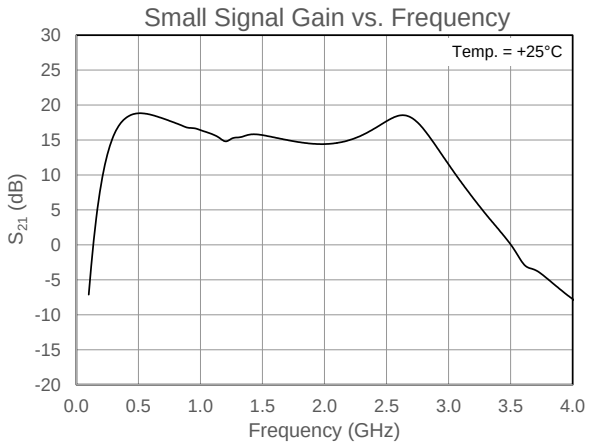
ACPR vs. Average Output Power

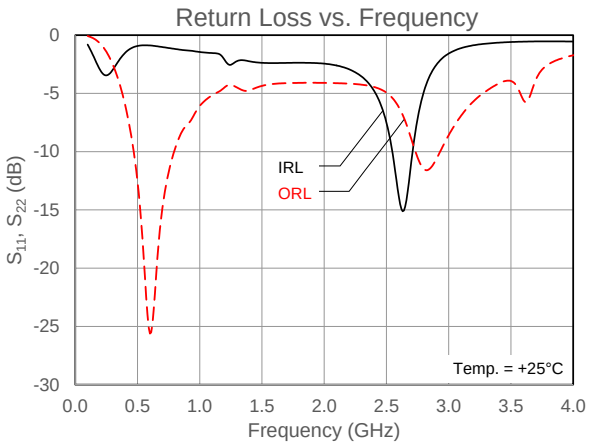


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Performance Plots

Test conditions unless otherwise noted: V_D = 32 V, I_{CQ} = 70 mA, T = 25°C, 2.6 GHz single-ended application circuit



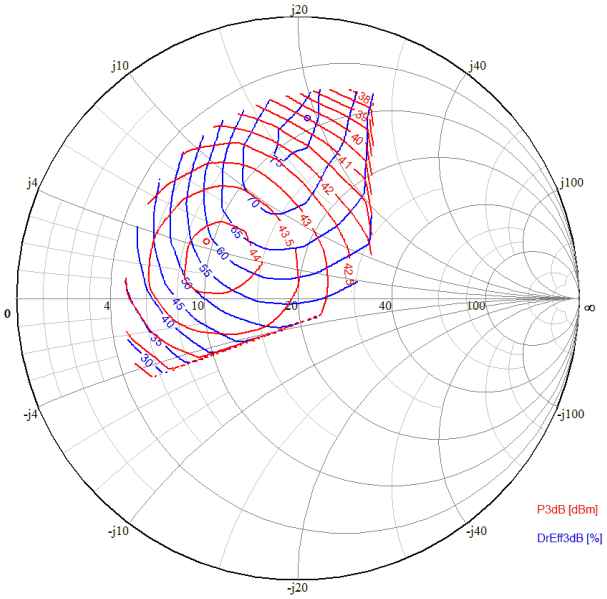


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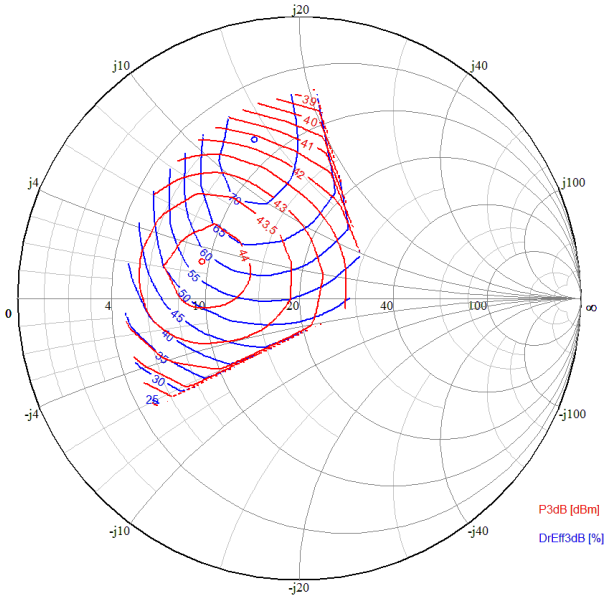
Load Pull Plots

Test conditions unless otherwise noted: V_D = 32 V, I_{CQ} = 70 mA, T = 25°C, Pulse CW (duty cycle = 20%, pulse period = 500 µs)

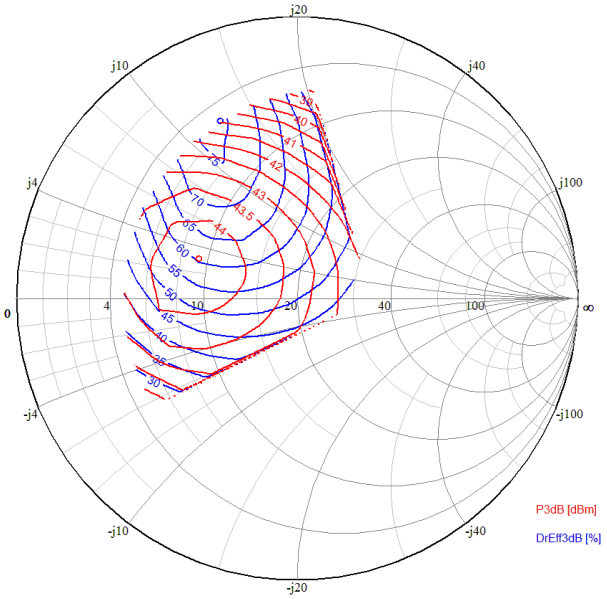
Load Pull at 1.8 GHz



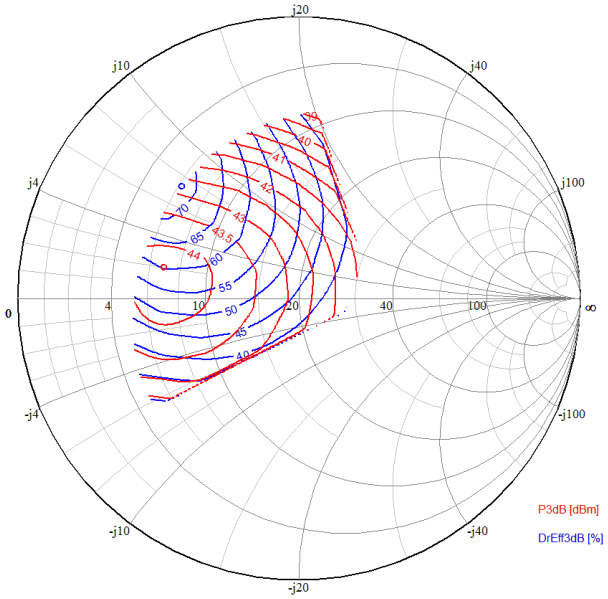
Load Pull at 2.1 GHz



Load Pull at 2.6 GHz

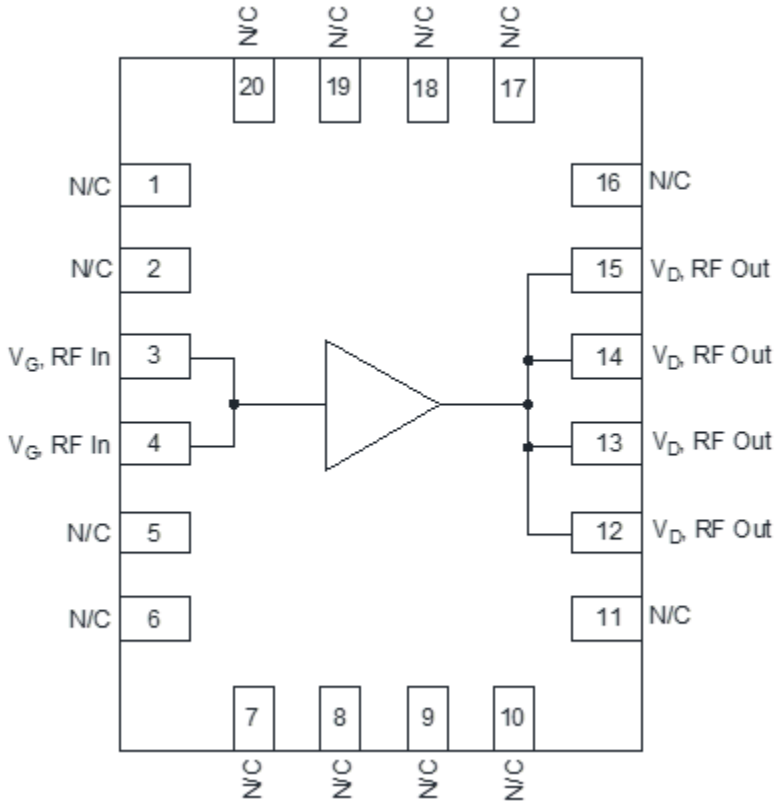


Load Pull at 3.5 GHz



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Pin Configuration and Description

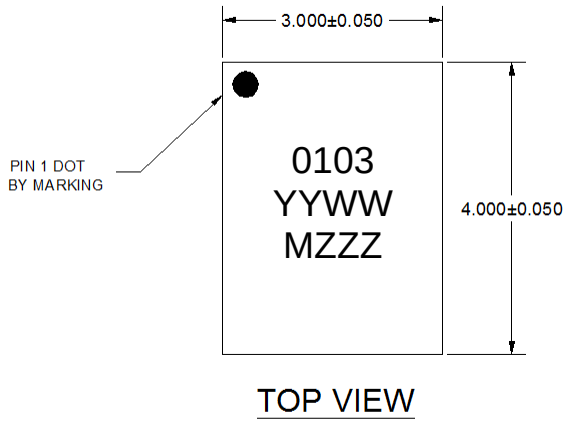


Pin No.	Label	Description
1, 2, 5, 6, 7, 8, 9, 10, 11, 16, 17, 18, 19, 20	N/C	No Connection
3, 4	RF IN, V_G	RF Input, Gate Bias
12, 13, 14, 15	RF OUT, V_D	RF Output, Drain Bias
Backside Paddle	RF/DC GND	RF/DC Ground

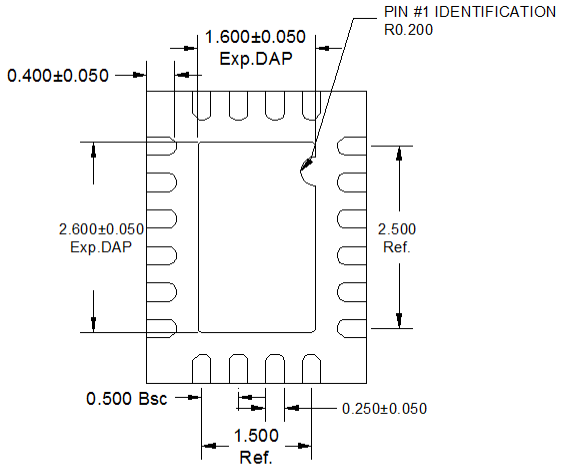
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Package Marking and Dimensions

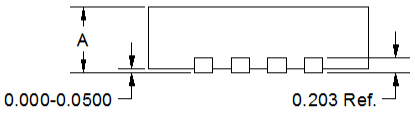
Marking: Part ID – 0103
Year/Workweek – YYWW
"M" + Lot Number – MZZZ



TOP VIEW



BOTTOM VIEW

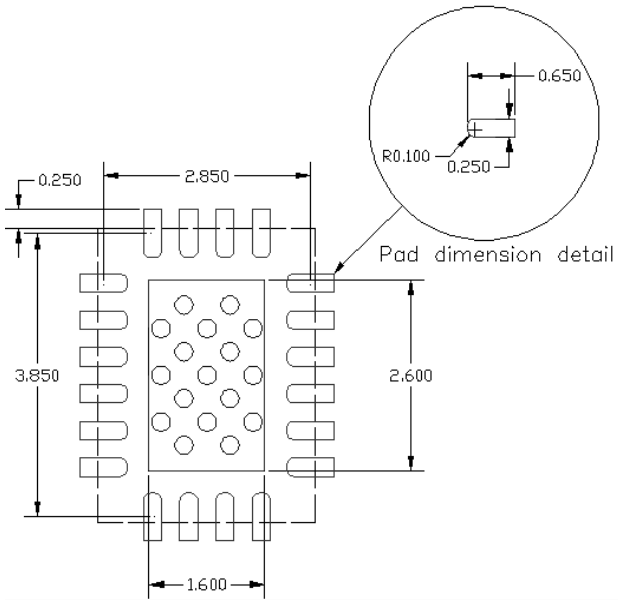


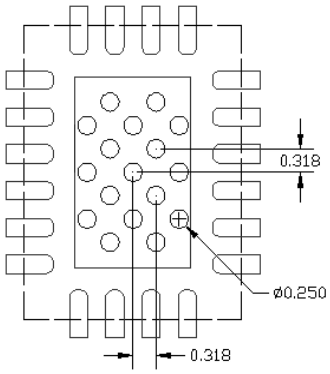
SIDE VIEW

		QFN
A	MAX.	0.900
	NOM.	0.850
	MIN.	0.800

Notes:
1. All dimensions are in millimeters. Angles are in degrees.

PCB Mounting Pattern





Notes:

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1. All dimensions are in millimeters. Angles are in degrees.

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Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating:	Class 1B
Value:	Passes ≥ 600 V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JS-001-2012

ESD Rating:	Class C3
Value:	Passes ≥ 1000 V
Test:	Charged Device Model (CDM)
Standard:	JEDEC Standard JESD22-C101F

MSL Rating

MSL Rating:	Level 3
Test:	260°C convection reflow
Standard:	JEDEC Standard IPC/JEDEC J-STD-020D.1

ECCN

US Department of Commerce EAR99

Solderability

Compatible with both lead-free (260°C maximum reflow temperature) and tin/lead (245°C maximum reflow temperature) soldering processes.

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

Contact Information

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

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Email: info-sales@triquint.com **Fax:** +1.972.994.8504

For technical questions and application information: **Email:** btsapplications@tqs.com

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