

RFPA2355

Integrated Power Amplifier Module 2300MHz to 2400MHz

The RFPA2355 is a three-stage power amplifier (PA) designed for Small Cell Base Stations. Its broadband quadrature design has excellent output return loss and load tolerance. When used with DPD, the RFPA2355 delivers up to 28dBm LTE Downlink (CFR 8dB) with ACLR < -50dBc.



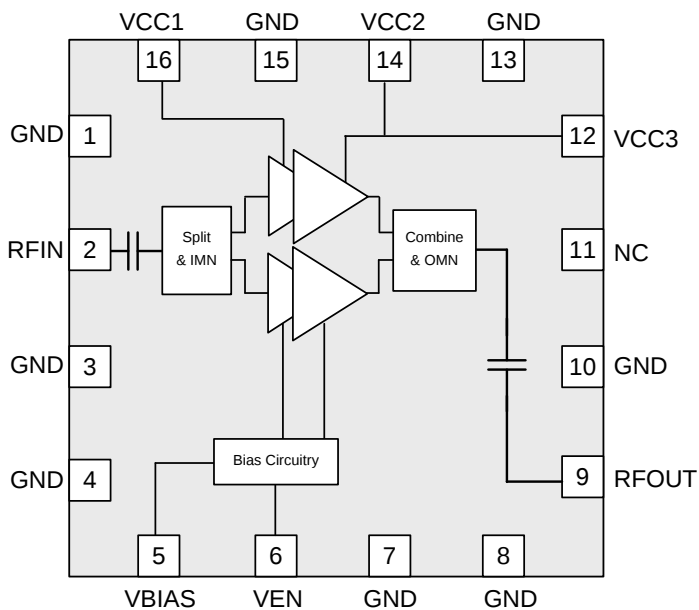
Package: Module, 16-pin,
5.0mm x 5.0mm x 1.175mm

Features

- $P_{OUT} = 28\text{dBm}$, 24.5% PAE, with 5.25V, 20MHz LTE DL, CFR 8dB
- ACLR < -50dBc with DPD
- 31dB Gain
- Integrated Matching to 50Ω
- Integrated DC Block Capacitors
- Broadband Quadrature Design
- Excellent Output Return Loss
- Covers 3GPP Downlink in Band 40
- VSWR Tolerant, Load Insensitive

Applications

- Small Cell Base Stations
- Data Cards with Terminals
- Customer Premise Equipment



Functional Block Diagram

Ordering Information

RFPA2355SQ	Sample bag with 25 pieces
RFPA2355SR	7" Reel with 100 pieces
RFPA2355TR13	13" Reel with 2500 pieces
RFPA2355PCK-410	2300MHz to 2400MHz PCBA with 5-piece sample bag

Absolute Maximum Ratings

Parameter	Rating	Unit
DC Supply Voltage, V_{CC} ($P_{OUT} < 29\text{dBm}$, $VSWR < 6:1$)	6	V_{DC}
Enable Control Logic, V_{EN}	+3.3	V_{DC}
Maximum CW RF Input Power into 50 Ω Load ($V_{CC} = 5.5\text{V}$)	+5	dBm
Operating Case Temperature	-40 to +85	$^{\circ}\text{C}$
Storage Temperature Range	-40 to +150	$^{\circ}\text{C}$
Moisture Sensitivity Level (260 $^{\circ}$ JEDEC J-STD-020)	MSL3	
Modulated (LTE-20MHz) Input Power 4.5:1 Output VSWR ($V_{CC} = 5.25\text{V}$)	-2	dBm
ESD Rating, All Pins, HBM, JESD22-A114	2000	V
ESD Rating, All Pins, CDM, JESD22-C101	1000	V



Caution! ESD sensitive device.



RFMD Green: RoHS status based on EU Directive 2011/65/EU (at time of this document revision), halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

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. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

Recommended Operating Condition

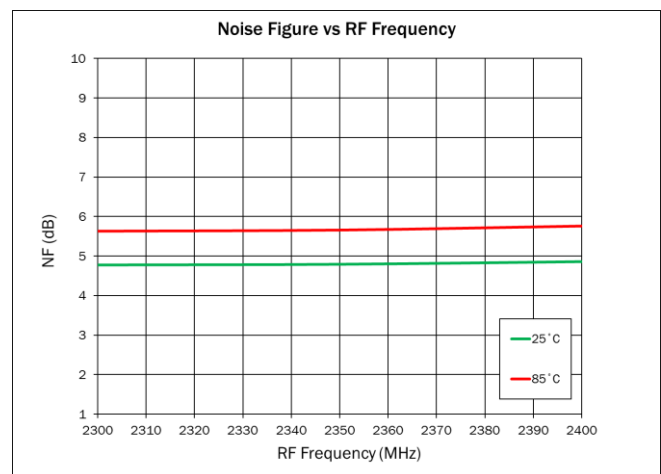
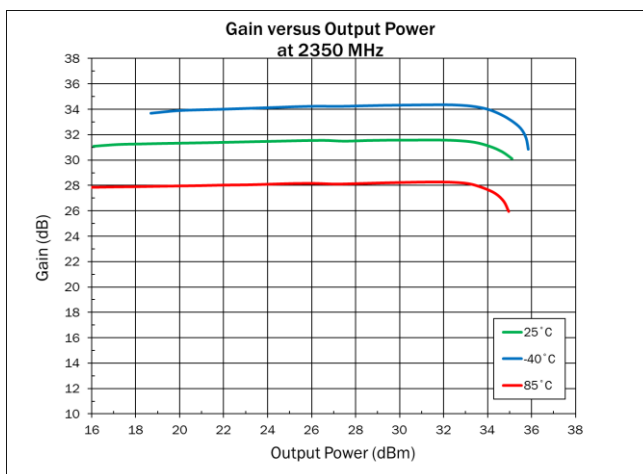
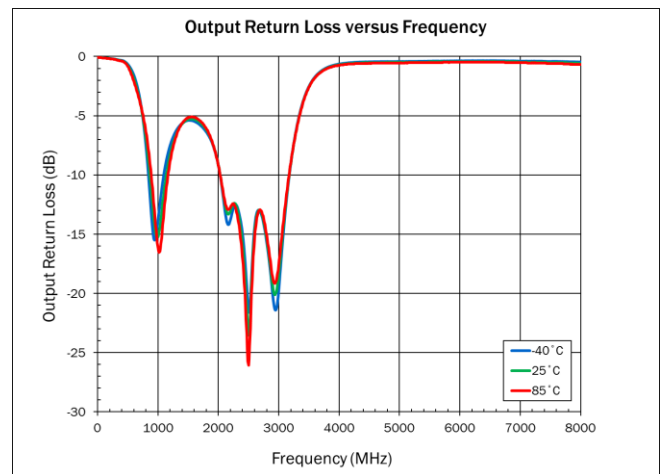
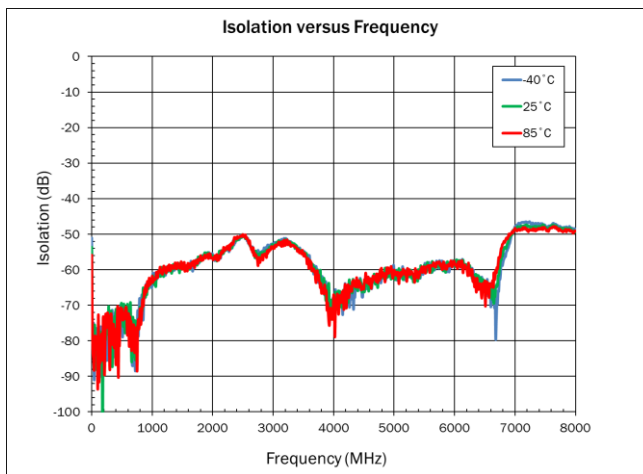
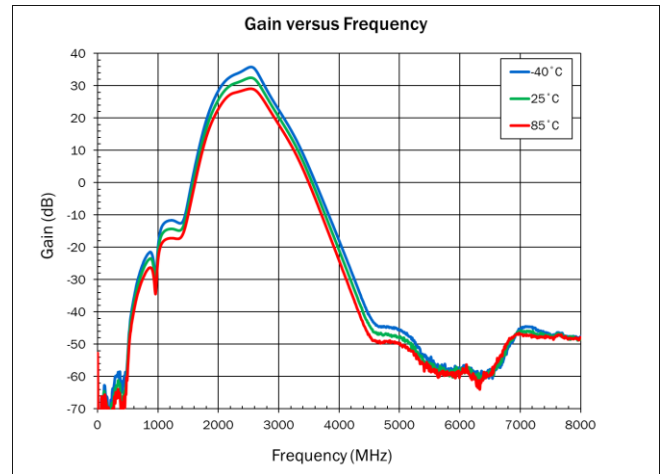
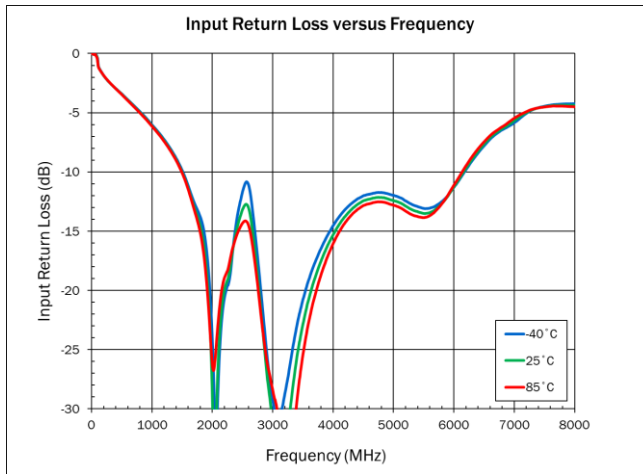
Parameter	Specification			Unit
	Min	Typ	Max	
Operating Temperature Range	-40		+85	$^{\circ}\text{C}$
Operating Junction Temperature			165	$^{\circ}\text{C}$
Power Supply V_{CC1} , V_{CC2} , V_{BIAS}	5.0	5.25	5.5	V

Nominal Operating Parameters

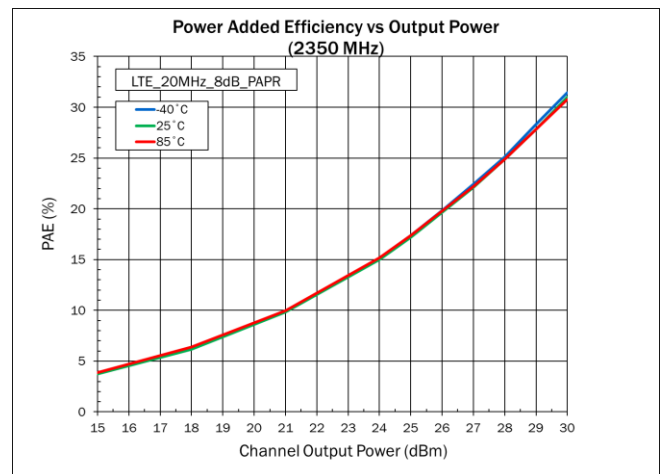
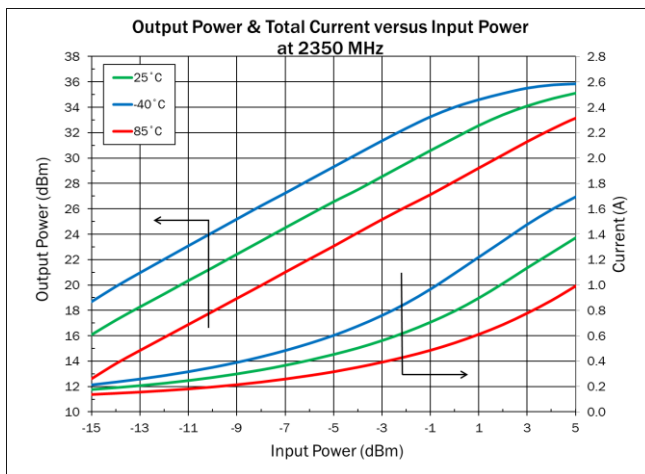
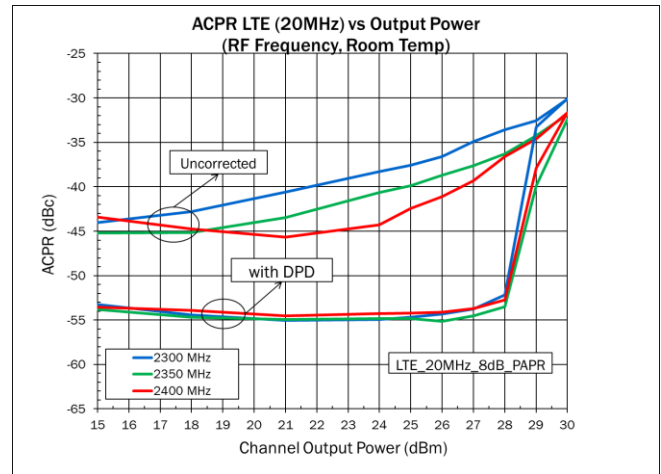
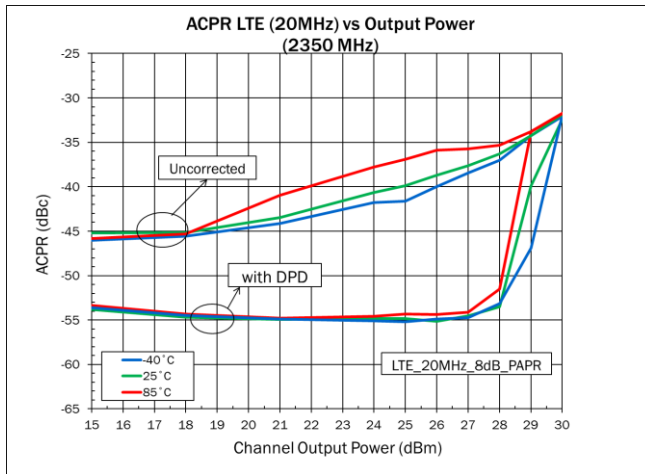
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
General Performance					
Operating Frequency Range	2300		2400	MHz	
Power Supply V _{CC1} , V _{CC2}		5.25		V	
Bias Supply V _{BIAS}		5.25		V	
V _{EN} Range (Logic Low)	0		0.4	V	
V _{EN} Range (Logic High)	1.4		3.0	V	
V _{EN} Enable Current			0.2	mA	V _{EN} = 1.8V
Total Idle Current (I _{CQ})		120		mA	DC only, V _{CC1} = V _{CC2} = V _{BIAS} = 5.25V, V _{EN} = 1.8V
V _{BIAS} Current		3		mA	DC only, V _{EN} = 1.8V
DC Enable Time			7	μs	DC only, time from V _{EN} = high to stable idle current (90% of steady state value)
RF Rise / Fall Time			2	μs	P _{OUT} ≤ 28dBm, 90% of target, DC settled prior to RF
Thermal Resistance (R _{TH})		30		°C/W	Junction-to-backside of IC

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Electrical Performance: Band 40 – Continued					Unless Otherwise Specified; Temp = +25°C, V_{CC} = +5.25V, V_{EN} = +1.8V, P_{OUT} = 28dBm, 2300MHz < F < 2400MHz, 50Ω system, 20MHz LTE DL with CFR 8dB
Gain		31		dB	
ACLR1 – Adjacent Channel		-36		dBc	Without DPD
ACLR2 – Alternate Channel		-54		dBc	Without DPD
ACLR1_DPD		-53		dBc	With DPD
ACLR2_DPD		-58		dBc	With DPD
PA Current Drain		485		mA	
PAE		24.5		%	With DPD
Input Return Loss		-16		dB	Small signal S11, no external matching
Output Return Loss		-13		dB	Small signal S22, no external matching
Harmonics 2f0		-35		dBm	
Harmonics 3f0		-50		dBm	
Noise Figure		4.86		dB	Temp = +25°C, V _{CC} = +5.25V, V _{EN} = +1.8V

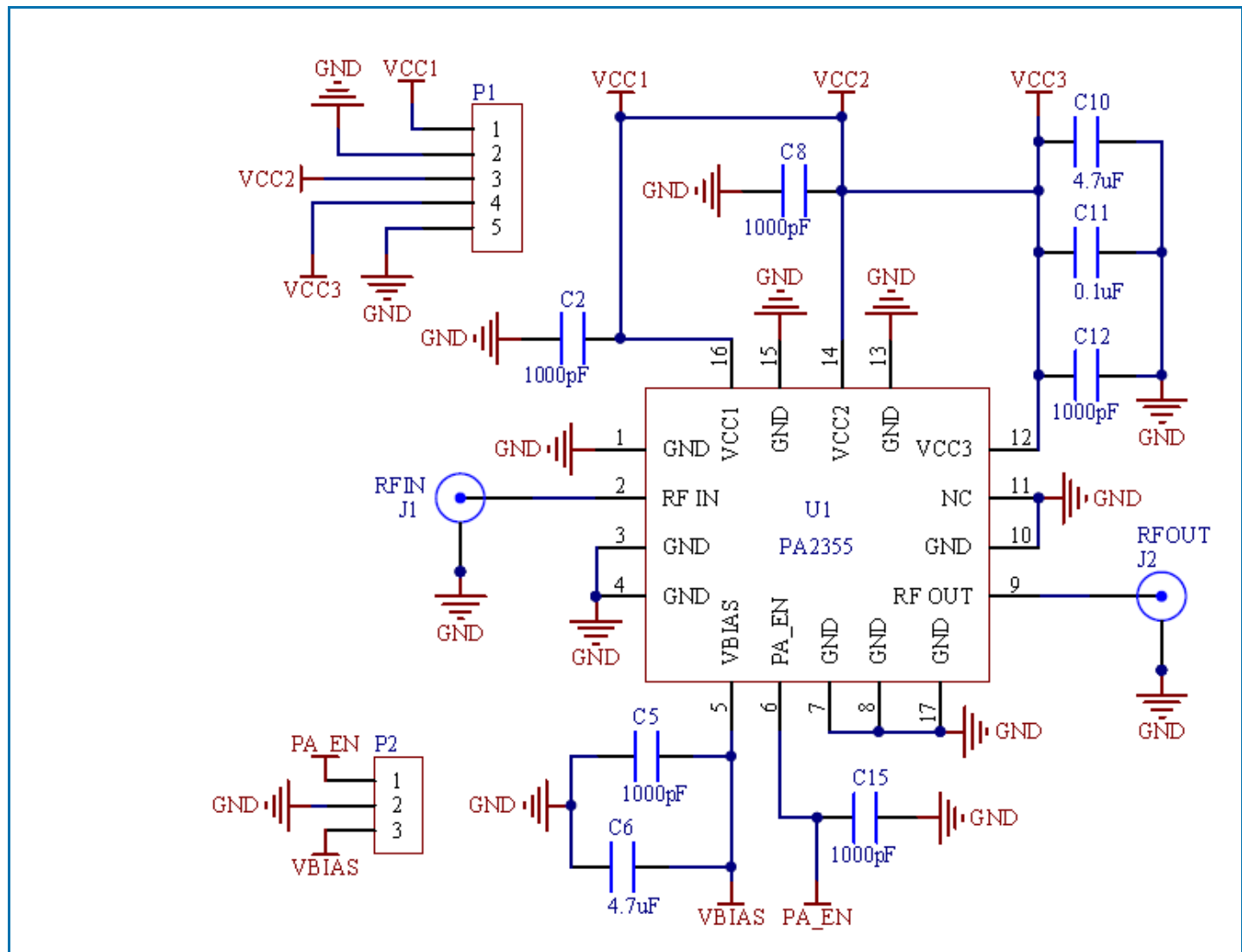
Typical Performance: $V_{CC1} = V_{CC2} = V_{BIAS} = 5.25V$, $V_{EN} = 1.8V$ unless otherwise noted



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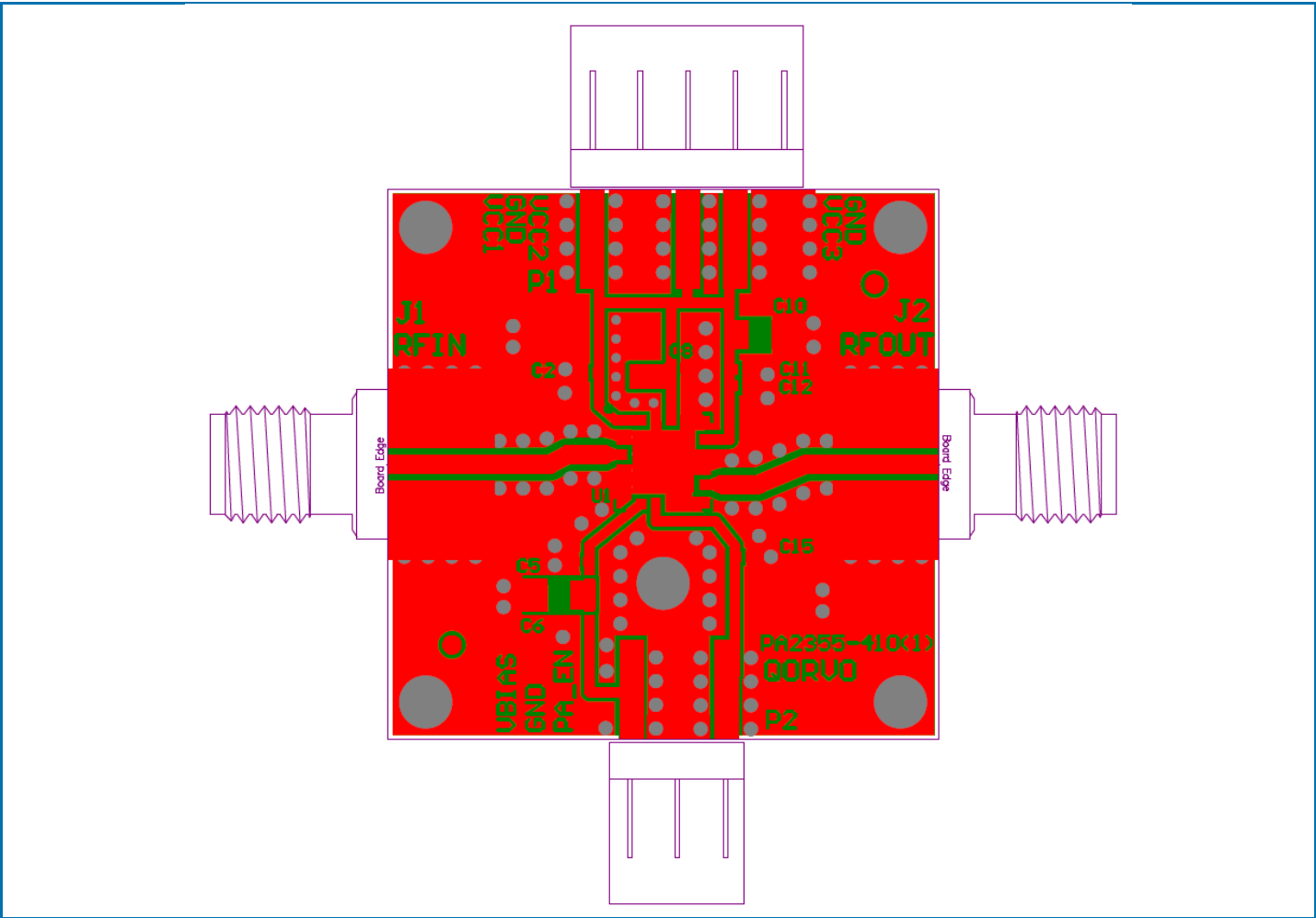
Evaluation Board Schematic: 2300MHz to 2400MHz (Band 40) Application Circuit



Evaluation Board Bill of Materials (BOM) 2300MHz to 2400MHz (Band 40) Application Circuit

Description	Reference Designator	Manufacturer	Manufacturer's P/N
RFPA2355 Evaluation Board		Dynamic Details (DDI) Toronto	PA2355-410(A)
2300MHz to 2400MHz Integrated PA Module	U1	RFMD	RFPA2355
CAP, 4.7µF, 20%, 10V, X7R, 1206	C6, C10	Taiyo Yuden (USA), Inc.	CE LMK316 B7475ML-T
CAP, 1000pF, 10%, 50V, X7R, 0402	C2, C5, C8, C12, C15	Murata Electronics	GRM155R71H102KA01D
CAP, 0.1µF, 10%, 16V, X7R, 0402	C11	Murata Electronics	GRM155R71C104KA88D
CONN, SMA, END, LAUNCH, 0.068"	J1-J2	Gigalane Co., LTD.	PA-S05-008
CONN, HDR, ST, PLRZD, 5-PIN, 0.100"	P1	ITW Pancon	MPSS100-5-C
CONN, HDR, ST, PLRZD, 3-PIN, 0.100"	P2	ITW Pancon	MPSS100-3-C

Assembly Drawing



Pin Names and Descriptions

Pin	Name	Description
1	GND	Ground connection
2	RF _{IN}	RF Input; Internally matched to 50Ω
3	GND	Ground connection
4	GND	Ground connection
5	V _{BIAS}	Input Bias Voltage
6	V _{EN}	Enable
7	GND	Ground connection
8	GND	Ground connection
9	RF _{OUT}	RF Output; Internally matched to 50Ω
10	GND	Ground connection
11	NC	Not connected
12	V _{CC3}	Output stage collector supply voltage
13	GND	Ground connection
14	V _{CC2}	Output stage collector supply voltage
15	GND	Ground connection
16	V _{CC1}	Drive stage collector supply voltage
PKG BASE	GND	Ground connection; The back side of the package should be connected to the ground plane though as short of a connection as possible, PCB vias under the device are recommended.

Package Outline (Dimensions in millimeters)

