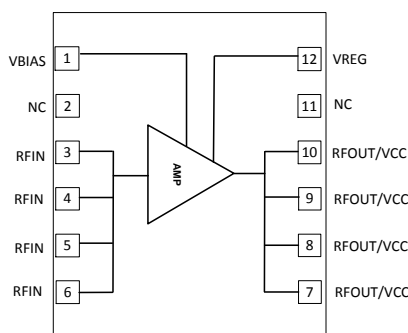


RFPA2545

Broadband 4W GaAs HBT Power Amplifier 1400MHz to 2700MHz

The RFPA2545 is a broadband GaAs HBT power amplifier specifically designed for wireless infrastructure applications. Using a highly reliable GaAs HBT technology, this high performance single stage amplifier achieves higher gain and ultra-high linearity over a broad frequency range. It exhibits excellent back-off characteristics making it ideal for ultra-linear applications. RFPA2545 can also be optimized for use as a small-cell PA output stage. External matching and bias control allows RFPA2545 to be utilized across various radio platforms within 1400MHz to 2700MHz.



Functional Block Diagram



Package: DFN, 12-pin,
4.0mm x 5.0mm x 0.85mm

Features

- 1400MHz to 2700MHz Operation
- P1dB = 34.9dBm at 2140MHz
- ACP = -52dBc at P_{OUT} = 25dBm, 2140MHz
- High Linearity OIP3 = 52.3dBm at 2140MHz
- DC Power 5V, 800mA

Applications

- GaAs Pre-driver for Base Station Amplifiers
- Small Cell Output Stage
- PA Stage for Commercial Wireless Infrastructure

Ordering Information

RFPA2545SQ	Sample bag with 25 pieces
RFPA2545SR	7" Reel with 100 pieces
RFPA2545TR13	13" Reel with 2500 pieces
RFPA2545PCK-411	2110MHz to 2170MHz PCBA with 5-piece sample bag
RFPA2545PCK-412	2590MHz to 2690MHz PCBA with 5-piece sample bag

Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage (V_{CC} and V_{BIAS})	7.0	V
Device Current	2500	mA
V_{REG} Current	6.0	mA
V_{REG} Device Voltage	3.8	V
CW Input Power, 50 Ω Load, 2140MHz Band	39	dBm
CW Input Power, 50 Ω Load, 2640MHz Band	41	dBm
Modulated (WCDMA) Input Power, 6:1 Output VSWR, 2140MHz Band	27	dBm
Modulated (WCDMA) Input Power, 6:1 Output VSWR, 2640MHz Band	34	dBm
Storage Temperature Range	-40 to +150	°C
ESD Rating – Human Body Model (HBM)	500	V
ESD Rating – Charge Device Model (CDM)	1000	V
Moisture Sensitivity Level	MSL1	

Notes:

1. The maximum ratings must all be met simultaneously
2. $P_{DISS} = P_{DC} + P_{RFIN} - P_{ROUT}$
3. $T_J = T_L + P_{DISS} \cdot R_{TH}$



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

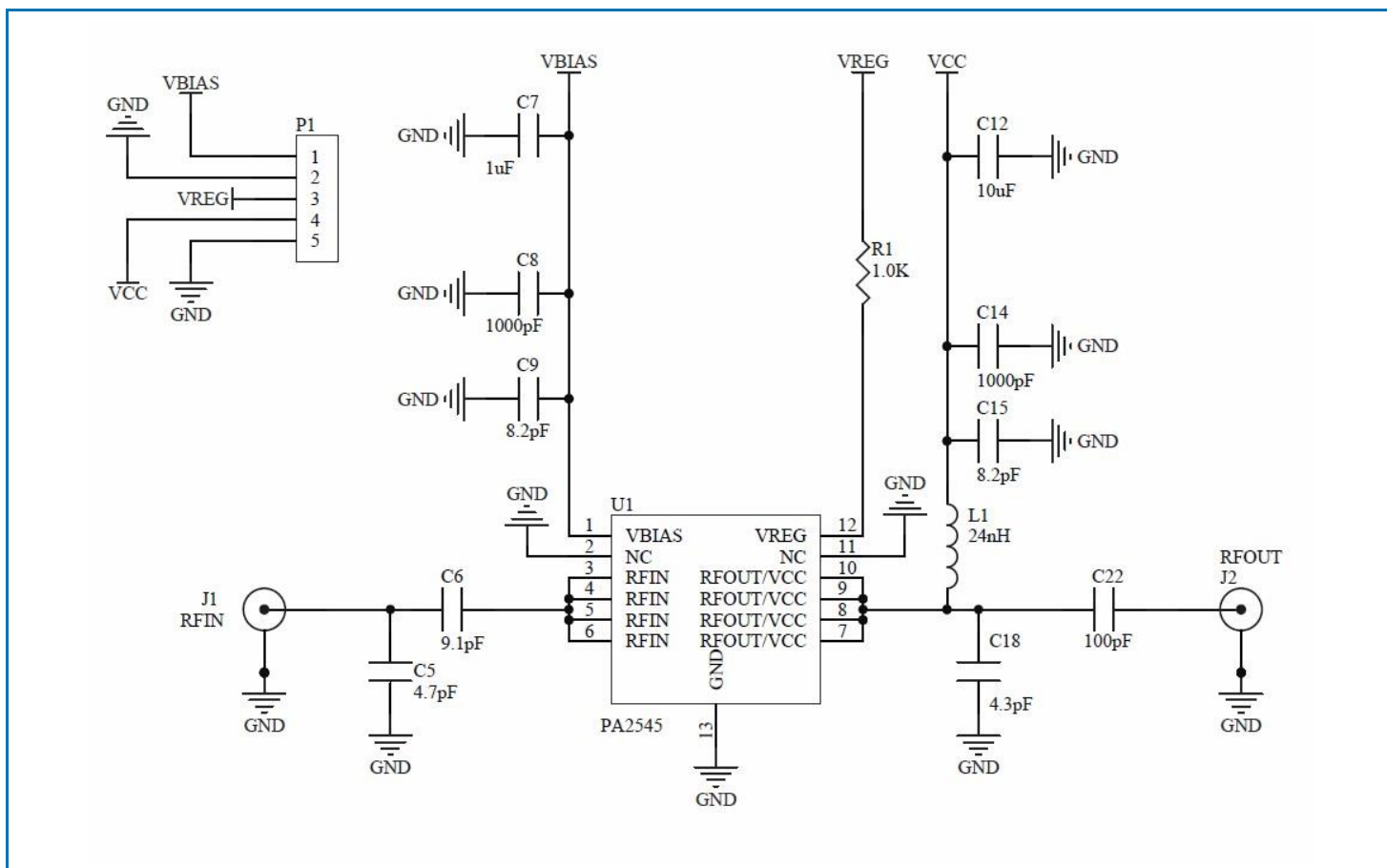
Parameter	Specification			Unit
	Min	Typ	Max	
Operating Temperature Range	-40	25	+105	°C
Operating Junction Temperature			160	°C
Operating Voltage V_{CC}	4.75	5	5.25	V

Nominal Operating Parameters

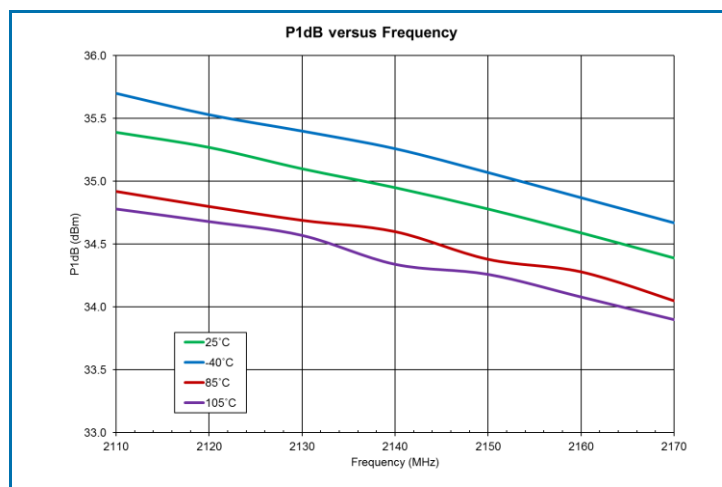
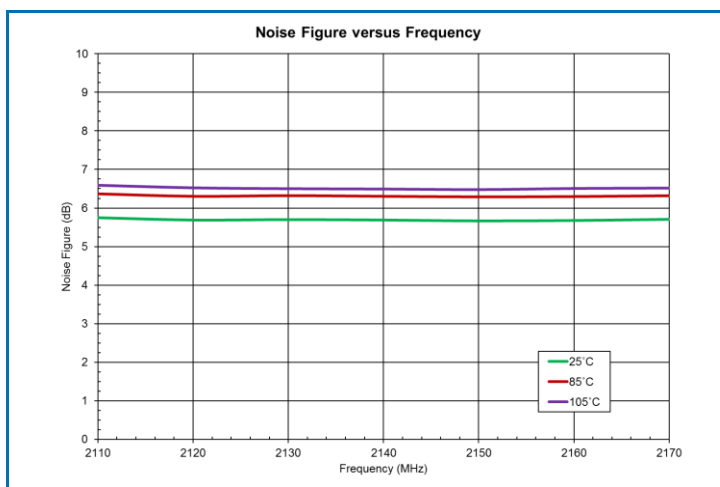
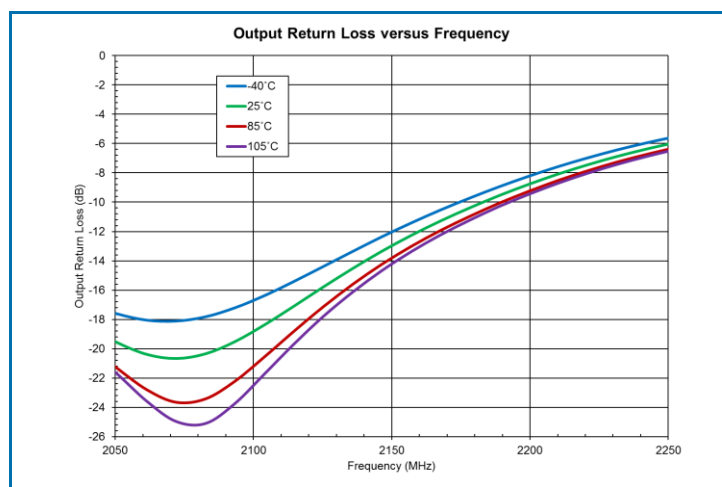
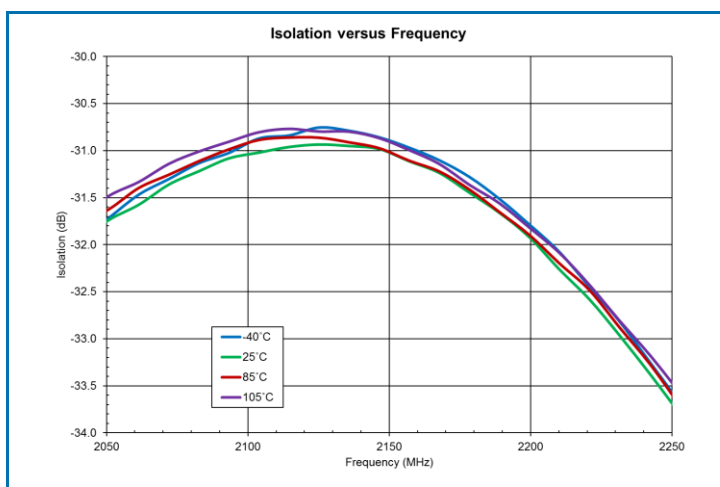
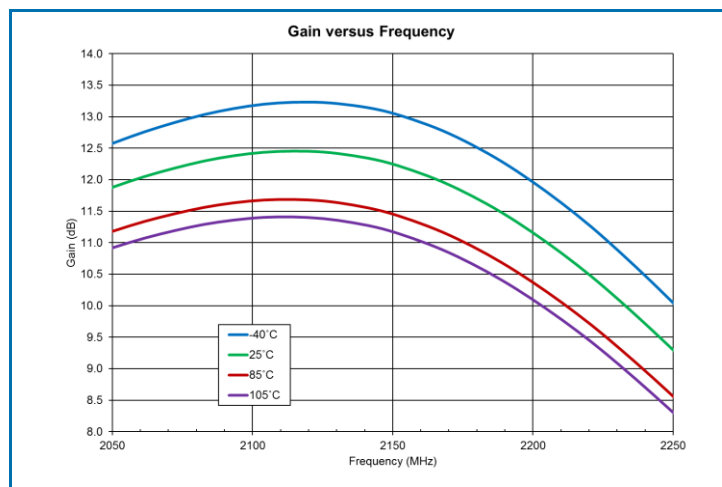
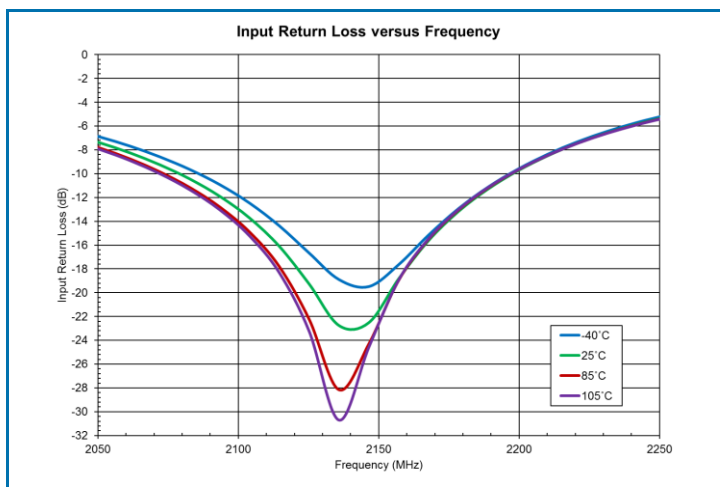
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
2110MHz to 2170MHz					$V_{CC} = V_{BIAS} = V_{REG} = 5V$, Temp = 25°C, Optimized for ACPR at Rated Power
Frequency		2140		MHz	
Gain		12.3		dB	
Output IP3		52.3		dBm	P_{OUT} 18dBm per tone, 1MHz spacing
ACPR		-52		dBc	RF Output power = 25dBm, WCDMA 3GPP 3.5, test model 1, 64 DPCH
P1dB		34.9		dBm	
Input Return Loss		-20		dB	Small signal S11
Output Return Loss		-13.7		dB	Small signal S22

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
2110MHz to 2170MHz – Continued					$V_{CC} = V_{BIAS} = V_{REG} = 5V$, Temp = 25°C, Optimized for ACPR at Rated Power
Noise Figure		5.7		dB	
Input Power (P_{IN})			19	dBm	Max recommended continuous P_{IN} , $V_{CC} = V_{BIAS} = 5V$, Load VSWR = 2:1
2590MHz to 2690MHz					$V_{CC} = V_{BIAS} = V_{REG} = 5V$, Temp = 25°C, Optimized for ACPR at Rated Power
Frequency		2640		MHz	
Gain		11.8		dB	
Output IP3		48.1		dBm	P_{OUT} 18dBm per tone, 1MHz spacing
ACPR		-51.9		dBc	RF Output power = 25dBm, WCDMA 3GPP 3.5, test model 1, 64 DPCCH
P1dB		35.6		dBm	
Input Return Loss		-21		dB	Small signal S11
Output Return Loss		-25		dB	Small signal S22
Noise Figure		5.9		dB	
Input Power (P_{IN})			20	dBm	Max recommended continuous P_{IN} , $V_{CC} = V_{BIAS} = 5V$, Load VSWR = 2:1
Power Supply					
Operating Current (Quiescent)		800		mA	At $V_{CC} = V_{BIAS} = 5V$, $V_{REG} = 5V$
Thermal Resistance		8		°C/W	Junction-to-back side of IC, at $V_{CC} = V_{BIAS} = V_{REG} = 5V$, reference Temp = 85°C, No RF
Shutdown Leakage Current		10		μA	At $V_{CC} = V_{BIAS} = 5V$, $V_{REG} = 5V$

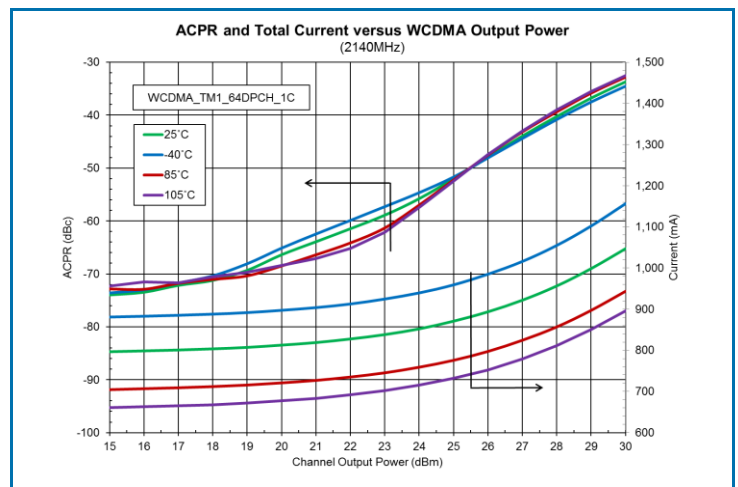
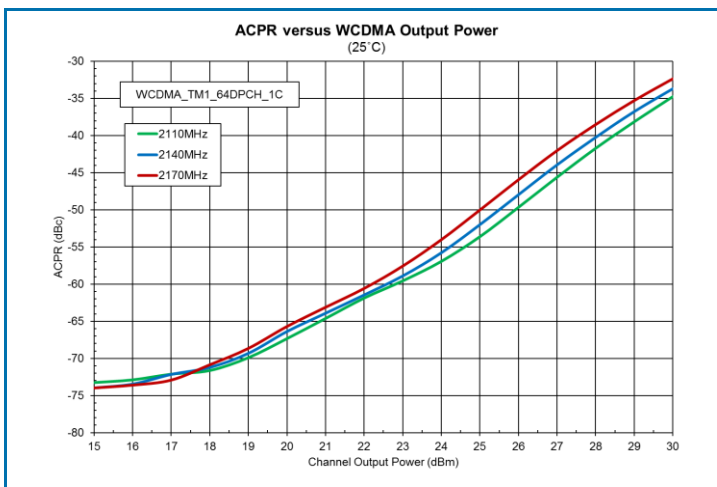
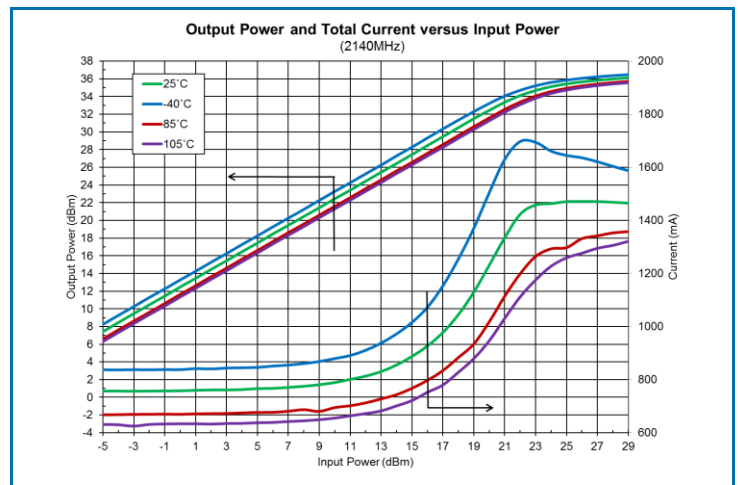
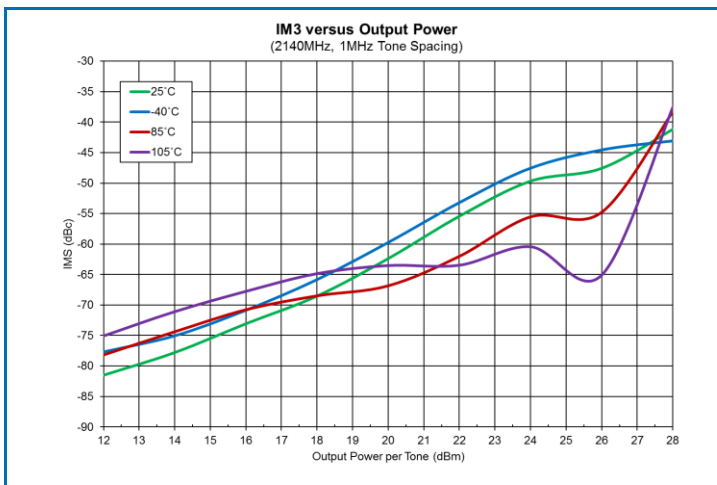
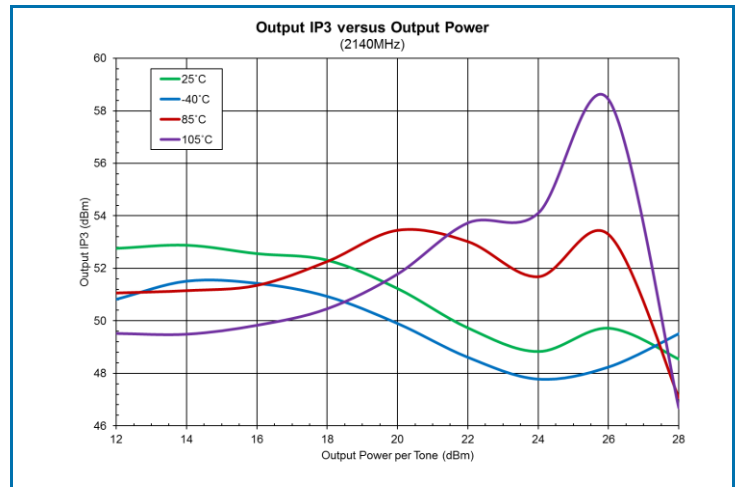
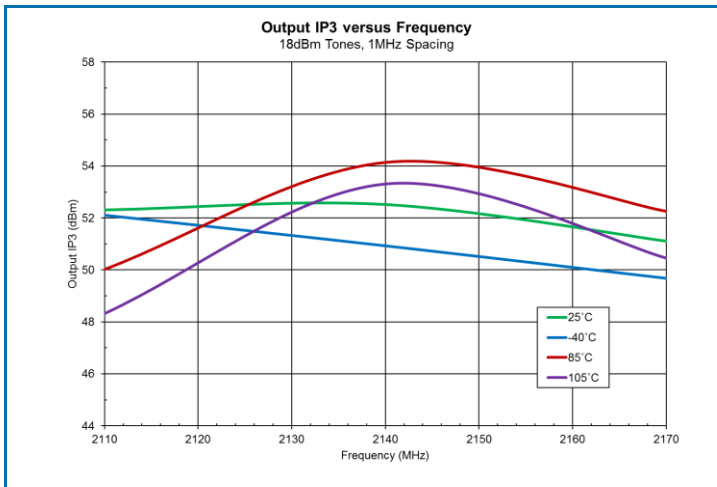
Typical Application Schematic 2110MHz to 2170MHz Application Circuit

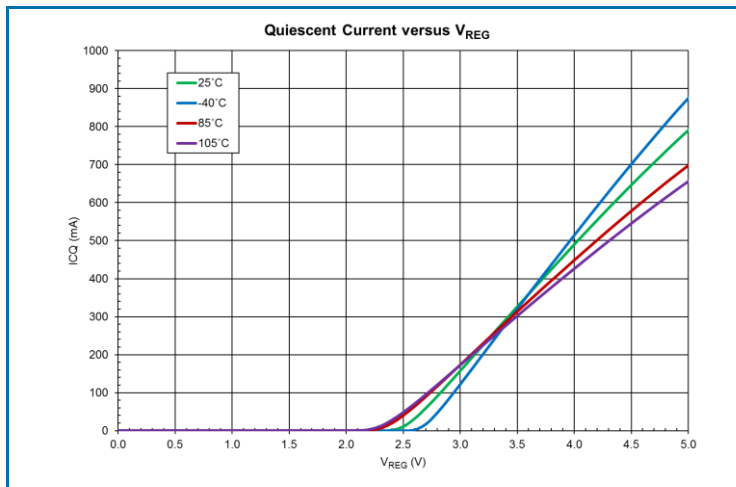


Typical Performance: $V_{CC} = V_{BIAS} = V_{REG} = 5V$ 2110MHz to 2170MHz Application Circuit

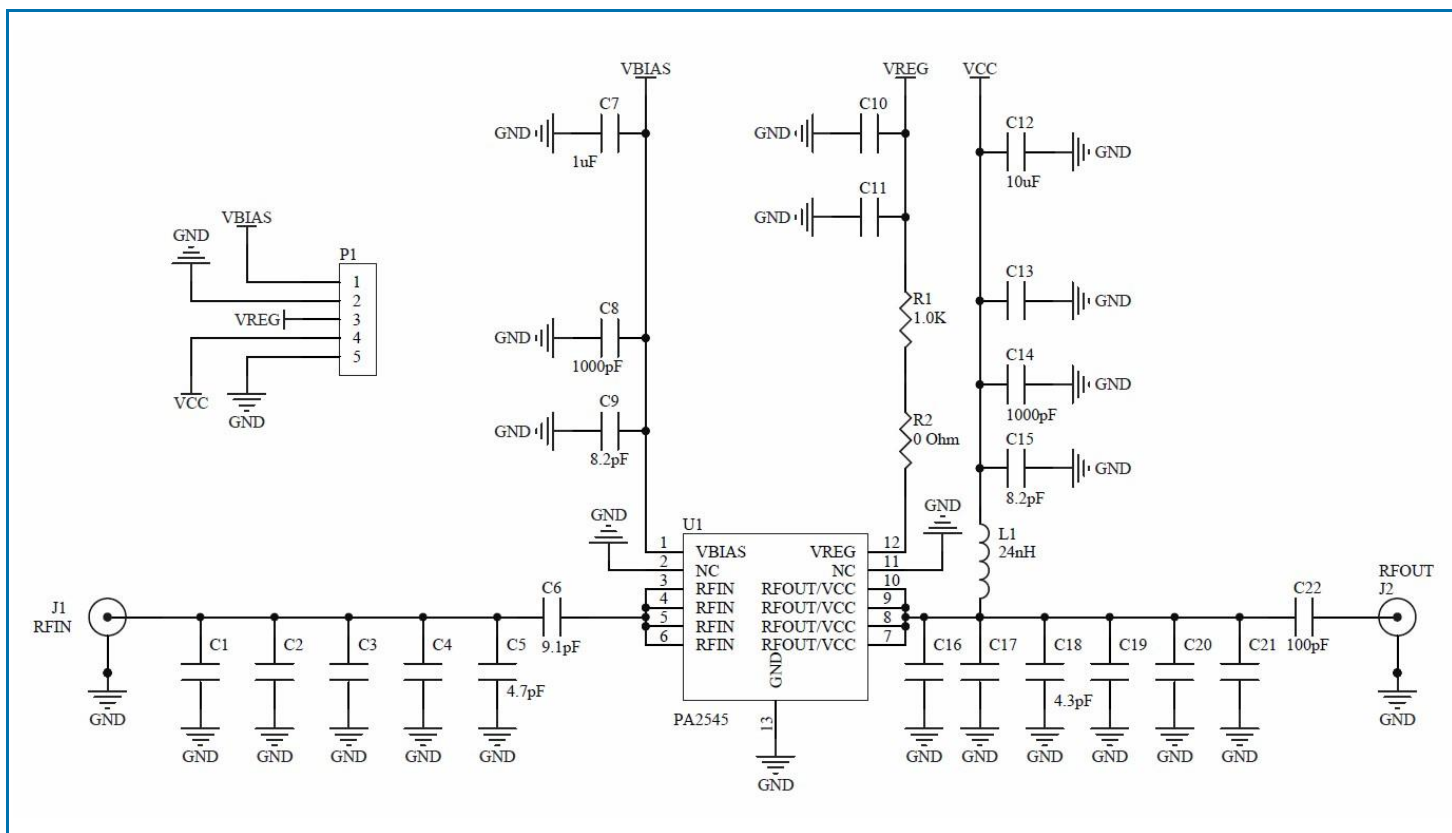


Typical Performance: $V_{CC} = V_{BIAS} = V_{REG} = 5V$ 2110MHz to 2170MHz Application Circuit



Typical Performance: $V_{CC} = V_{BIAS} = V_{REG} = 5V$ 2110MHz to 2170MHz Application Circuit

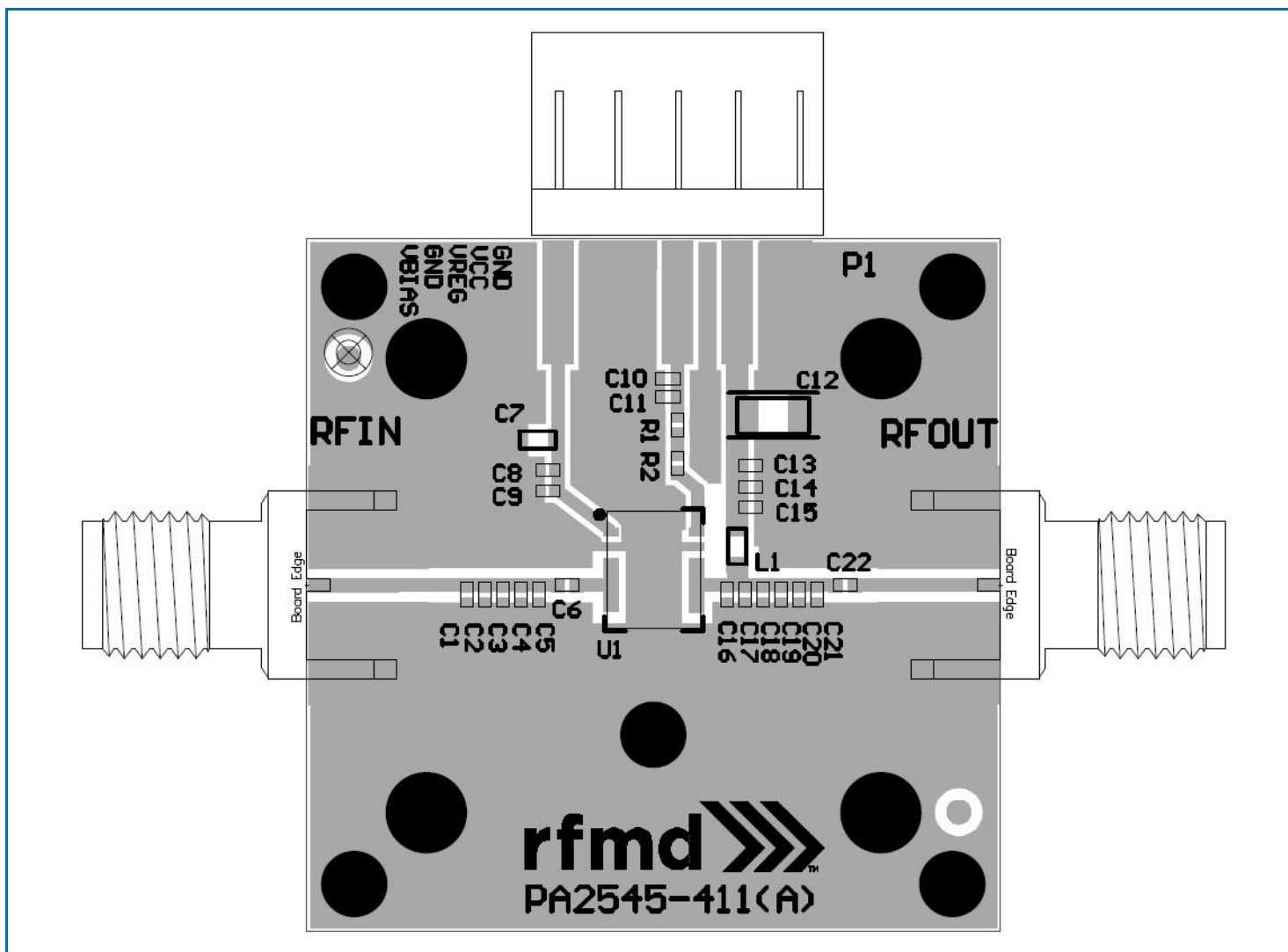
Evaluation Board Schematic 2110MHz to 2170MHz Application Circuit



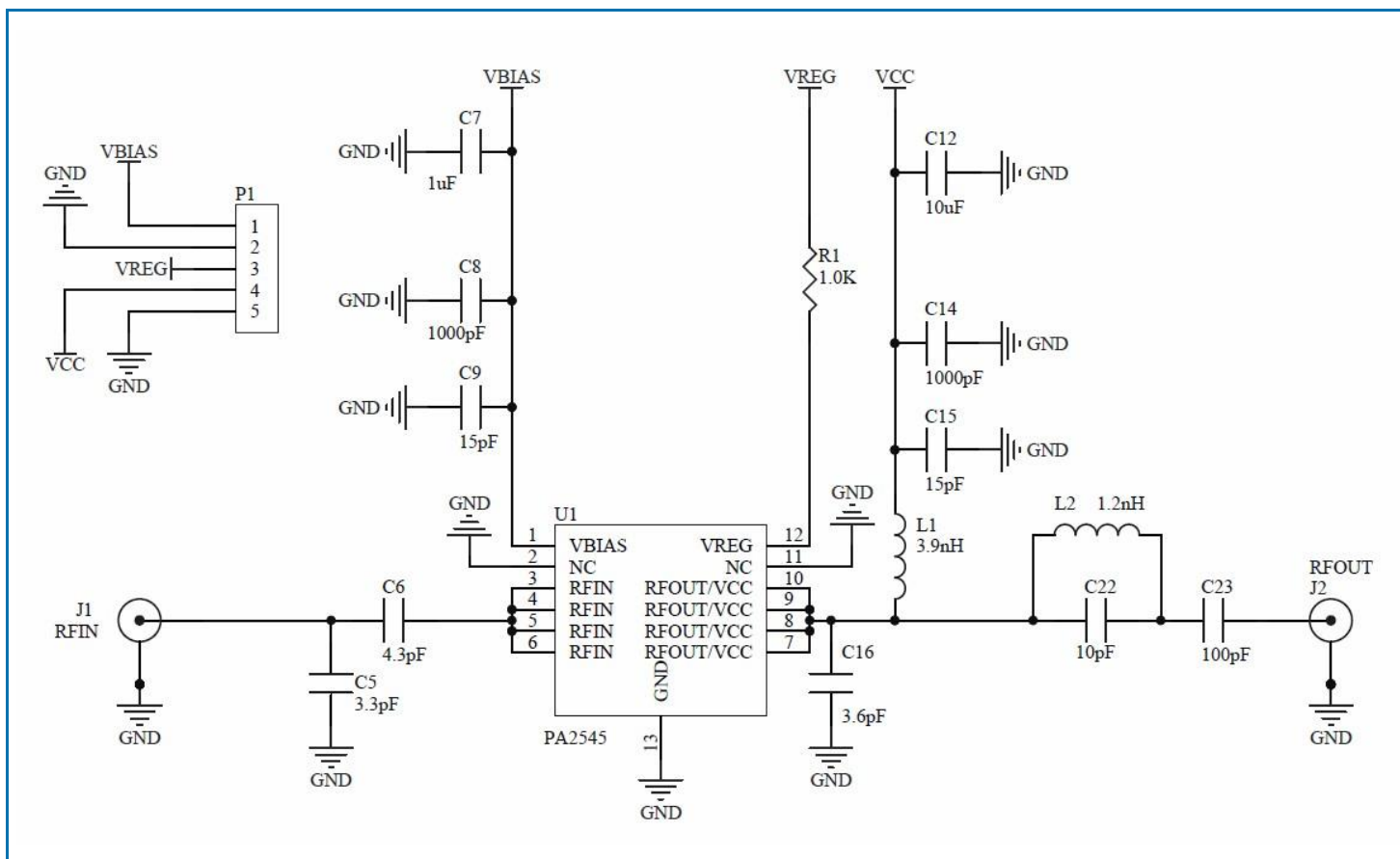
Evaluation Board Bill of Materials (BOM) 2110MHz to 2170MHz Application Circuit

Description	Reference Designator	Manufacturer	Manufacturer's P/N
RFPA2545 Evaluation Board			PA2545-411(A)
RFPA2545	U1	RFMD	RFPA2545
CAP, 4.7pF, $\pm 0.1\text{pF}$, 50V, HI-Q, 0402	C5	Murata Electronics	GJM1555C1H4R7BB01D
CAP, 9.1pF, $\pm 0.25\text{pF}$, 50V, HI-Q, 0402	C6	Murata Electronics	GJM1555C1H9R1CB01D
CAP, 1 μF , 10%, 16V, X7R, 0805	C7	Murata Electronics	GRM21BR71C105KA01K
CAP, 1000pF, 10%, 50V, X7R, 0402	C8, C14	Murata Electronics	GRM155R71H102KA01D
CAP, 8.2pF, $\pm 0.5\text{pF}$, 50V, C0G, 0402	C9, C15	Taiyo Yuden (USA), Inc.	RM UMK105 CG8R2DV-F
CAP, 10 μF , 10%, 25V, X7R, 1206	C12	Taiyo Yuden (USA), Inc.	TMK316AB7106KL-T
CAP, 4.3pF, $\pm 0.1\text{pF}$, 50V, HI-Q, 0402	C18	Murata Electronics	GJM1555C1H4R3BB01D
CAP, 100pF, 5%, 50V, C0G, 0402	C22	Murata Electronics	GRM1555C1H101JA01D
IND, 24nH, 5%, W/W, 0603	L1	Coilcraft, Inc.	0603HC-24NXJLW
RES, 1K, 5%, 1/16W, 0402	R1	Kamaya, Inc.	RMC1/16S-102JTH
RES, 0 Ω , 0402 KAMAYA	R2	Kamaya, Inc.	RMC1/16SJPTH
CONN, SMA, END LNCH, RND PIN, 0.039"	J1-J2	GIGALANE CO., LTD.	PSF-S01-002
CONN, HDR, ST, PLRZD, 5-PIN, 0.100"	P1	ITW Pancon	MPSS100-5-C
HEATSINK BLOCK, 1.16 SQ I		Robert S. Wells	EEF-102059
SCREW, 2-56 x 3/16", SOCKET HEAD	S1-S5	McMaster-Carr Supply Co.	92196A076
DNP	C1-C4, C10-C11, C13, C16-C17, C19-C21		

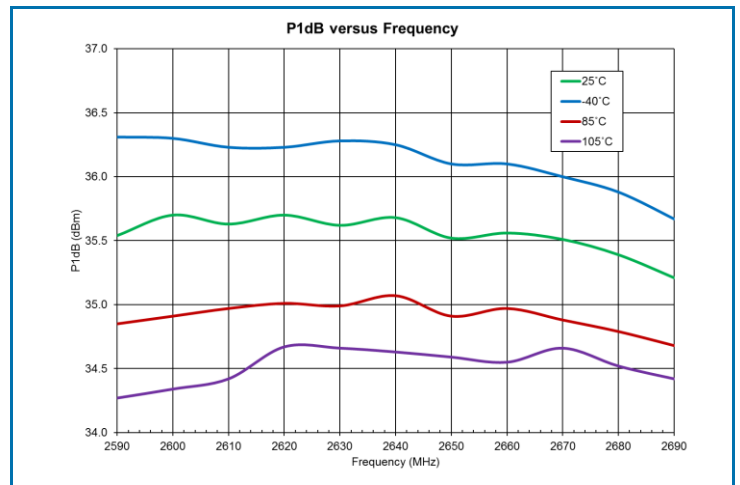
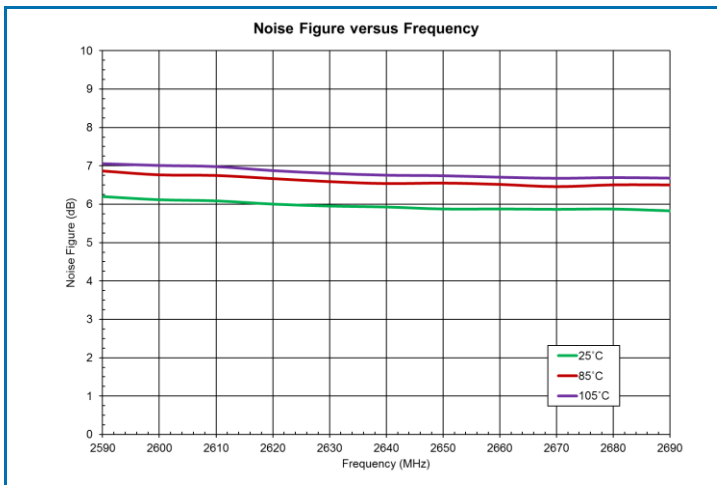
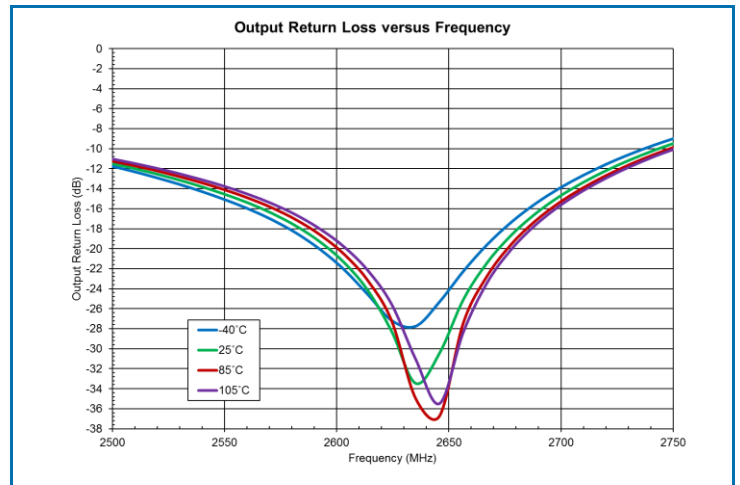
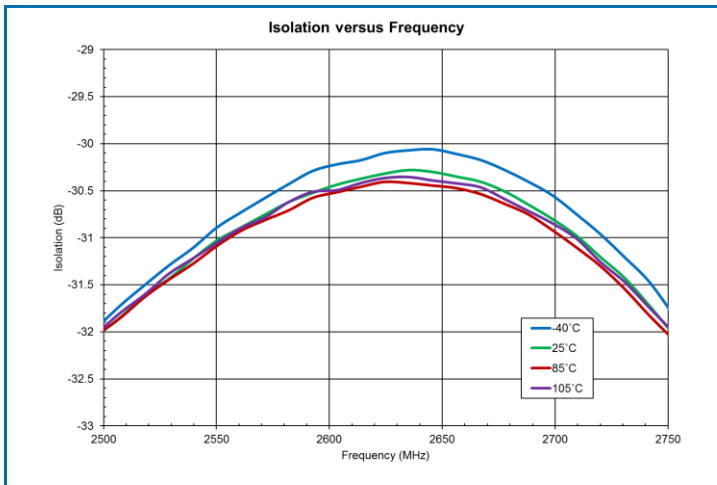
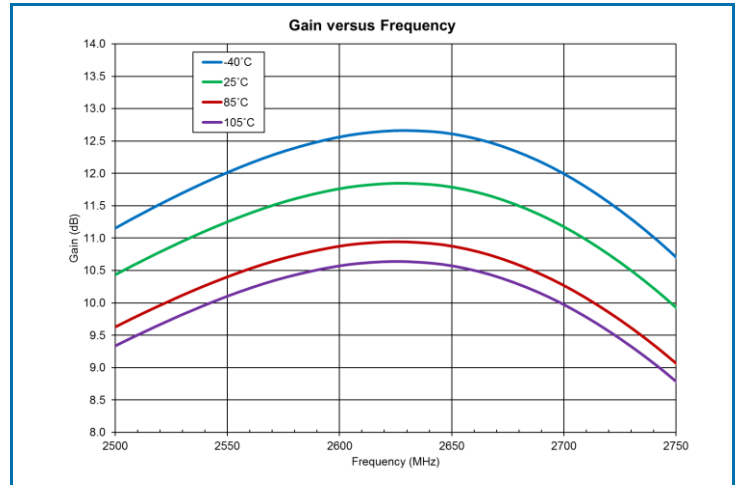
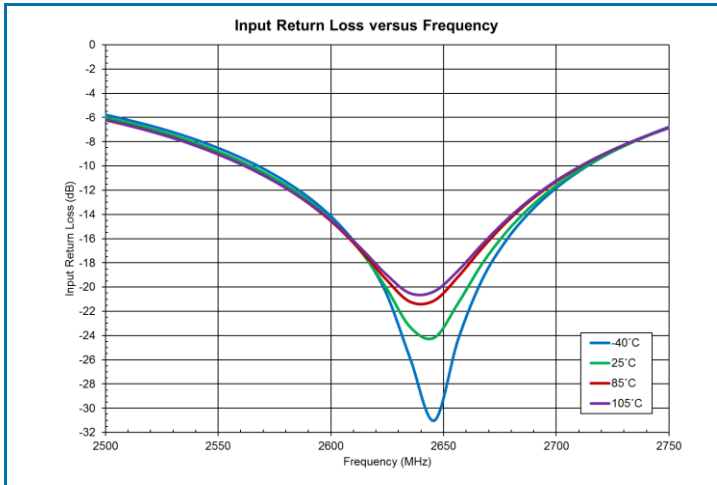
Evaluation Board Assembly Drawing 2110MHz to 2170MHz Application Circuit



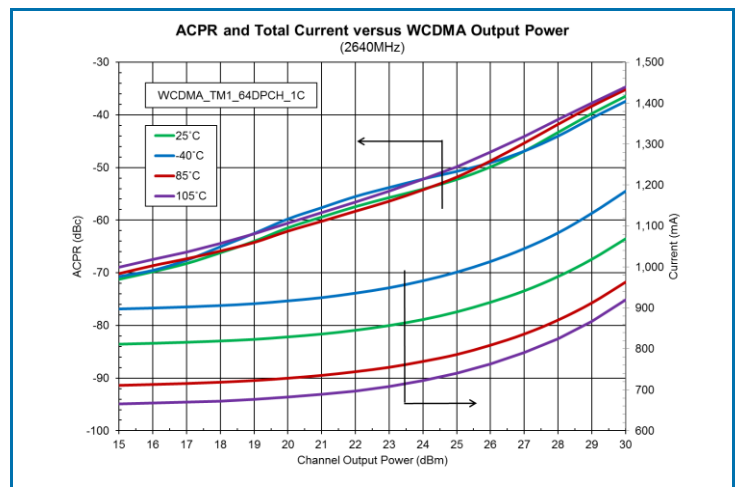
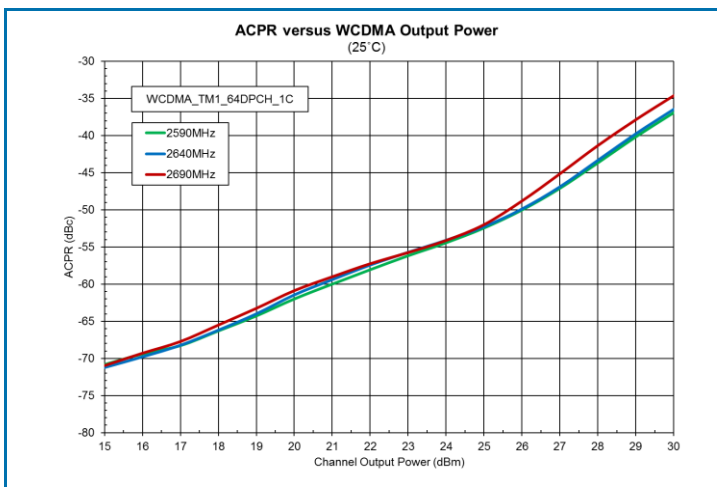
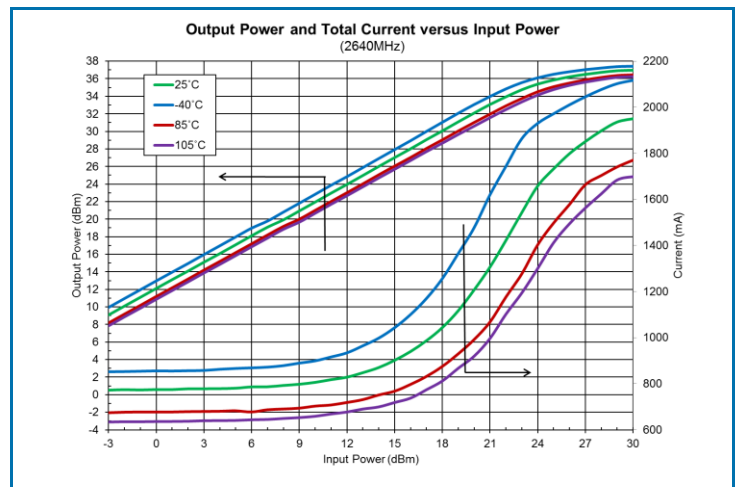
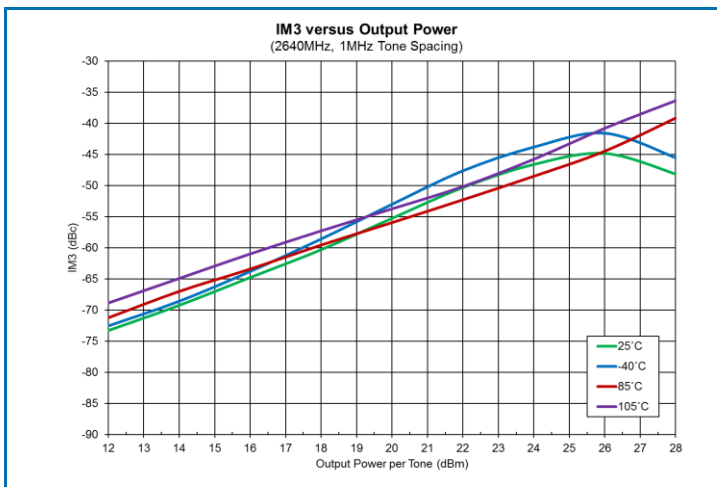
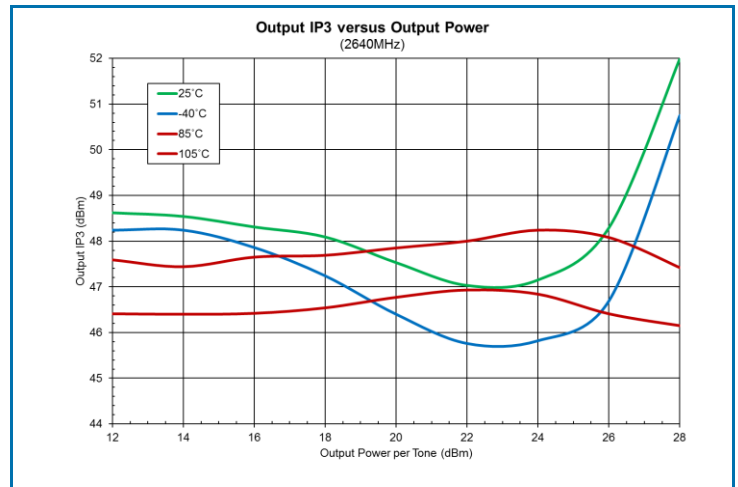
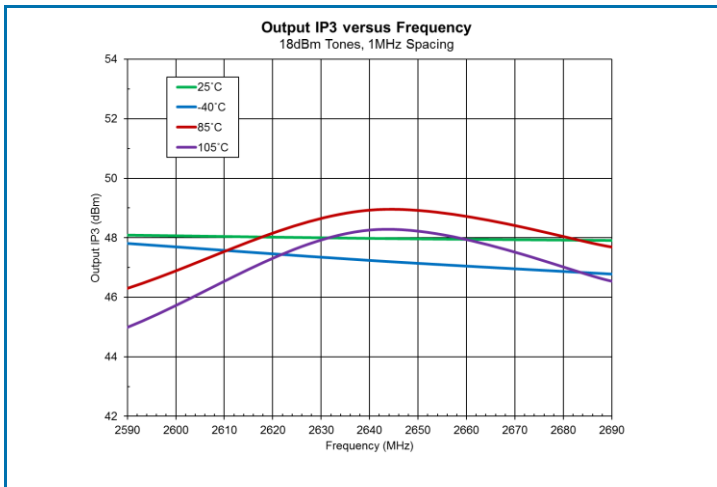
Typical Application Schematic 2590MHz to 2690MHz Application Circuit



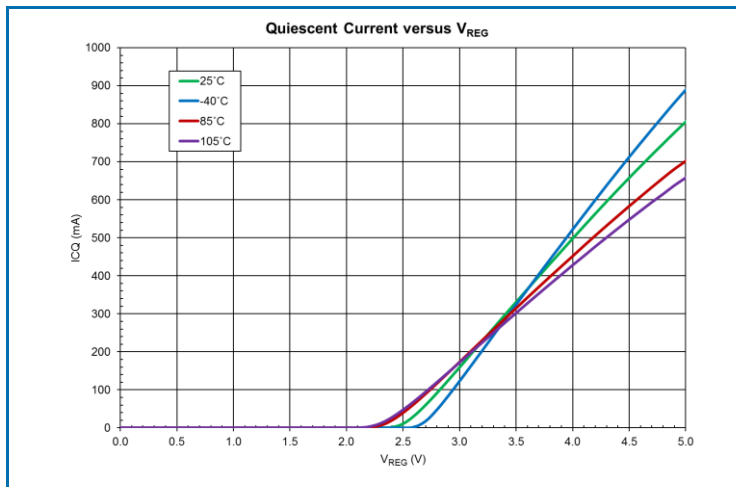
Typical Performance: $V_{CC} = V_{BIAS} = V_{REG} = 5V$ 2590MHz to 2690MHz Application Circuit



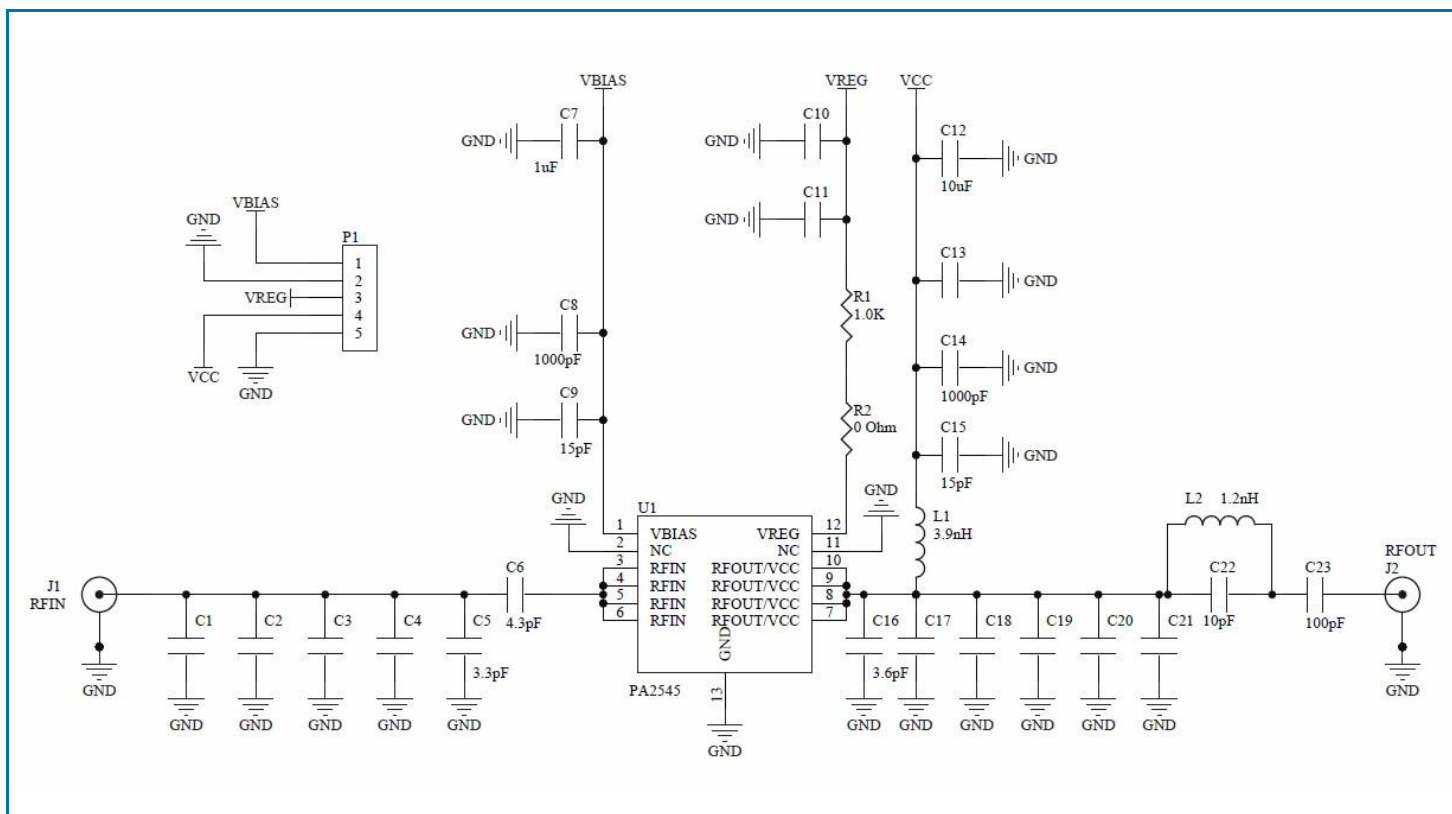
Typical Performance: $V_{CC} = V_{BIAS} = V_{REG} = 5V$ 2590MHz to 2690MHz Application Circuit



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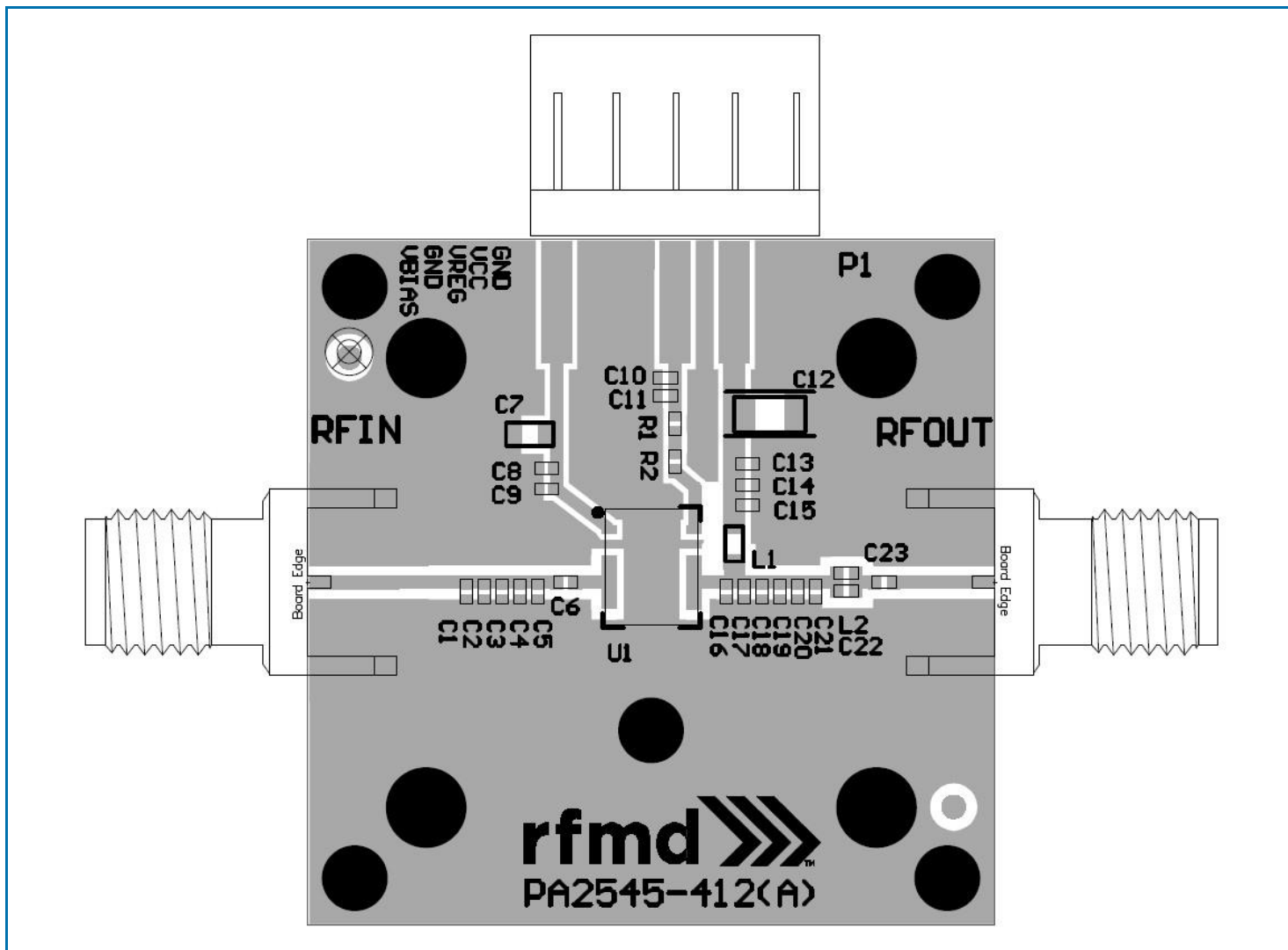
Evaluation Board Schematic 2590MHz to 2690MHz Application Circuit



Evaluation Board Bill of Materials (BOM) 2590MHz to 2690MHz Application Circuit

Description	Reference Designator	Manufacturer	Manufacturer's P/N
RFPA2545 Evaluation Board			RFPA2545-412(A)
RFPA2545	U1	RFMD	RFPA2545
CAP, 3.3pF, ± 0.1 pF, 50V, HI-Q, 0402	C5	Murata Electronics	GJM1555C1H3R3BB01D
CAP, 4.3pF, ± 0.1 pF, 50V, HI-Q, 0402	C6	Murata Electronics	GJM1555C1H4R3BB01D
CAP, 1 μ F, 10%, 16V, X7R, 0805	C7	Murata Electronics	GRM21BR71C105KA01K
CAP, 1000pF, 10%, 50V, X7R, 0402	C8, C14	Murata Electronics	GRM155R71H102KA01D
CAP, 15pF, 5%, 50V, C0G, 0402	C9, C15	Murata Electronics	GRM1555C1H150JA01D
CAP, 10 μ F, 10%, 25V, X7R, 1206	C12	Taiyo Yuden (USA), Inc.	TMK316AB7106KL-T
CAP, 3.6pF, ± 0.1 pF, 50V, HI-Q, 0402	C16	Murata Electronics	GJM1555C1H3R6BB01D
CAP, 10pF, 1%, 50V, HI-Q, 0402	C22	Murata Electronics	GJM1555C1H100FB01D
CAP, 100pF, 5%, 50V, C0G, 0402	C23	Murata Electronics	GRM1555C1H101JA01D
IND, 3.9nH, 5%, WW, 0603	L1	Coilcraft, Inc.	0603HC-3N9XJLW
IND, 1.2nH, 5%, W/W, 0402	L2	Coilcraft, Inc.	0402CS-1N2XJLW
RES, 1K, 5%, 1/16W, 0402	R1	Kamaya, Inc.	RMC1/16S-102JTH
RES, 0 Ω , 0402	R2	Kamaya, Inc.	RMC1/16SJPTH
CONN, SMA, END LNCH, RND PIN, 0.039"	J1-J2	GIGALANE CO., LTD.	PSF-S01-002
CONN, HDR, ST, PLRZD, 5-PIN, 0.100"	P1	ITW Pancon	MPSS100-5-C
HEATSINK BLOCK, 1.16 SQ I		Robert S. Wells	EEF-102059
SCREW, 2-56 x 3/16", SOCKET HEAD	S1-S5	McMaster-Carr Supply Co.	92196A076
DNP	C1-C4, C10-C11, C13, C17-C21		

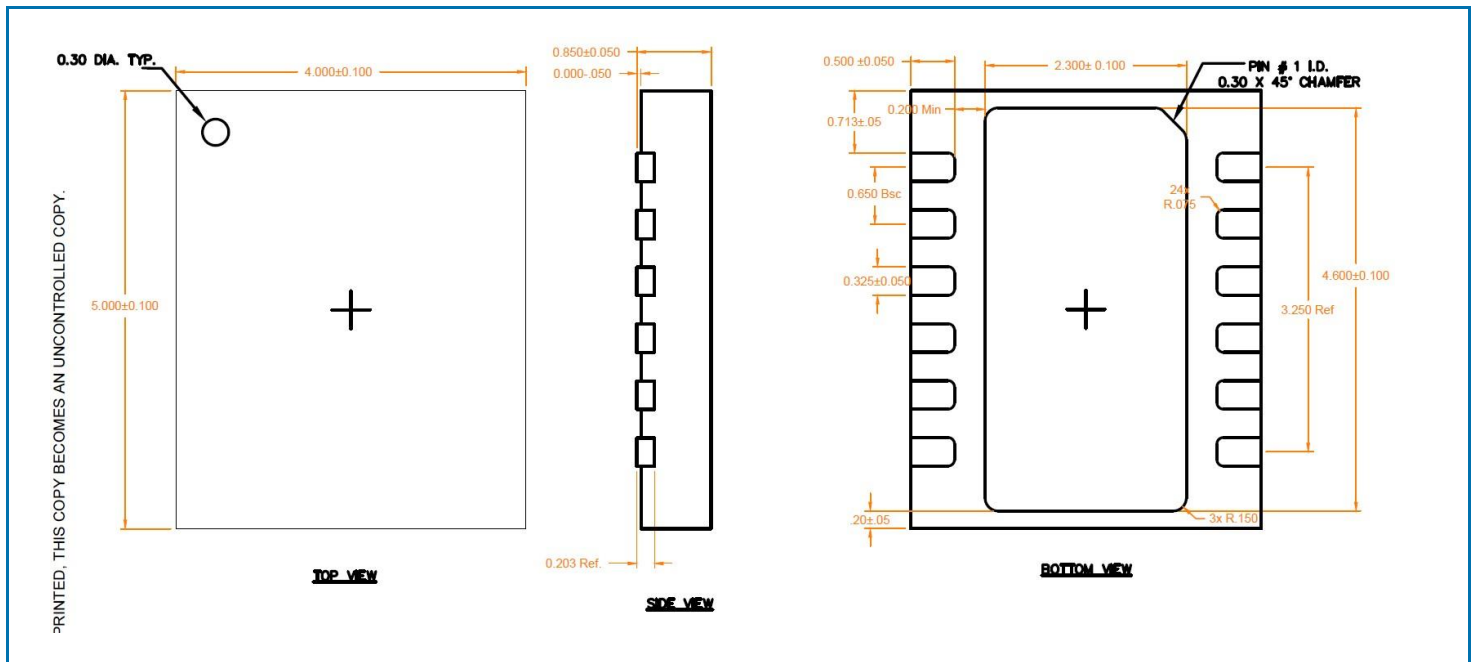
Evaluation Board Assembly Drawing 2590MHz to 2690MHz Application Circuit



Pin Names and Descriptions

Pin	Name	Description
1	VBIAS	VCC Supply to Active Bias Circuit
2	NC	No Internal Connection
3	RFIN	RF Input; Must be DC blocked
4	RFIN	RF Input; Must be DC blocked
5	RFIN	RF Input; Must be DC blocked
6	RFIN	RF Input; Must be DC blocked
7	RFOUT/VCC	RF Output and Collector Supply
8	RFOUT/VCC	RF Output and Collector Supply
9	RFOUT/VCC	RF Output and Collector Supply
10	RFOUT/VCC	RF Output and Collector Supply
11	NC	No Internal Connection
12	VREG	Current Adjust / Shutdown Control
EPAD	GND	DC and RF Ground; Must be soldered to EVB ground plane over a bed of vias for thermal and RF performance. Solder/epoxy voids under the EPAD will result in excessive junction temperatures causing permanent damage.

Package Outline (Dimensions in millimeters)



Branding Diagram

