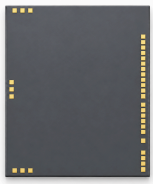
8000–12000 MHz GaAs MMIC Amplitude and Phase Control RF Front-End Die

LCI-APC-8000-12000-D-G7p5MIN is a GaAs pHEMT bare die for 8000–12000 MHz, integrating switching, amplification and 6-bit phase and attenuation control for transmit and receive paths.

Phase step: 5.625 °; Attenuation range: 0–31.5 dB; Output 1 dB compression power: 11 dBm (minimum) / 13 dBm (typical). Die dimensions: 3.8 × 4.7 × 0.1 mm.



RF characteristics

TA = +25 °C; f(Typ) = 10000 MHz; f(Min/Max) = 8000–12000 MHz

Parameter	Symbol	Minimum	Typical	Maximum	Value	Unit
Operating frequency	-	8000	-	12000	-	MHz
Small-signal gain	-	7.5	-	10	TX / RX	dB
Isolation	-	35	-	-	-	dB
Attenuation range	-	-	-	-	0–31.5	dB
RMS attenuation error	-	-	-	0.5	-	dB
Phase shift range	-	-	-	-	0–354.375	°
Phase step	-	-	-	-	5.625	°
Attenuation step	-	-	-	-	0.5	dB
Output 1 dB compression power	-	11	13	-	-	dBm
Switching time	-	-	30	-	-	ns

DC bias and current

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Positive supply voltage [1]	-	2.5	3.3	-	V
Negative supply voltage [2]	-	-3.5	-3.3	-2.5	V
Digital negative supply voltage [3]	-	-	-3.3	-	V

[1] VDN; VD1 / VD2 / VD3

[2] VSN

[3] VSS

Absolute limits

TA = +25 °C

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Maximum input power	-	-	-	25	dBm
Storage temperature	-	-55	-	150	°C

Bond-pad assignments

Pins	Symbol	Function	Notes
RX_IN	RX_IN	RF input	RX
TX_OUT	TX_OUT	RF output	TX
COM	COM	Common RF port	RX / TX
STBRX / STBTX	STBRX / STBTX	Standby	RX / TX
DOUT	DOUT	Serial data output	-
DIN	DIN	Serial data input	-
VSN / VSS	VSN / VSS	Power supply	-
VD1 / VD2 / VD3 / VDN	VD1 / VD2 / VD3 / VDN	Power supply	-
T/R	T/R	Switch control	TX / RX
CS / CLK / LE / CLR	CS / CLK / LE / CLR	Control input	+5 V
AT1	AT1	Gain control	-
GND	GND	Ground	-

Control truth table (BIT)

Pins	Symbol	Function	Notes
BIT0	STBRX	Receive	Standby
BIT1	TX	Phase control	5.625°
BIT2	TX	Phase control	11.25°
BIT3	TX	Phase control	22.5°
BIT4	TX	Phase control	45°
BIT5	TX	Phase control	90°
BIT6	TX	Phase control	180°
BIT7	RX	Phase control	5.625°
BIT8	RX	Phase control	11.25°
BIT9	RX	Phase control	22.5°
BIT10	RX	Phase control	45°
BIT11	RX	Phase control	90°
BIT12	RX	Phase control	180°
BIT19	TX	Attenuation control	0.5 dB

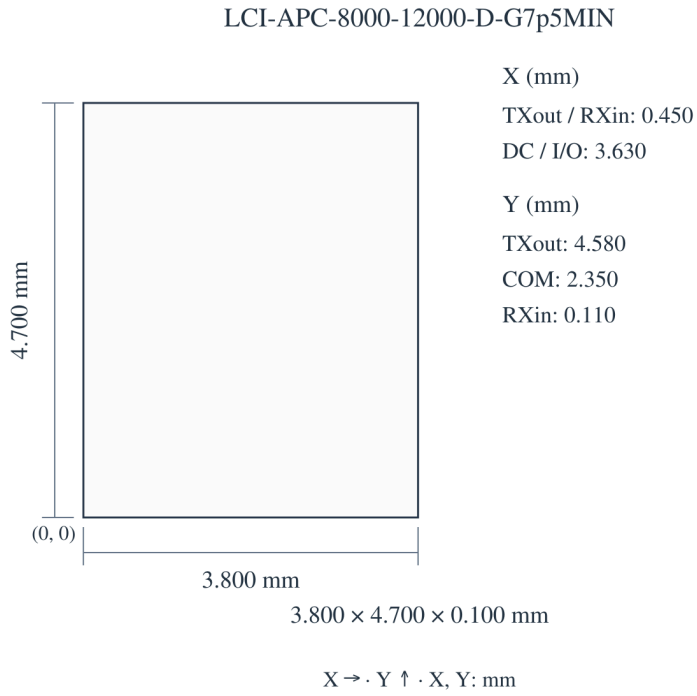
Control truth table (BIT)

Pins	Symbol	Function	Notes
BIT20	TX	Attenuation control	1 dB
BIT21	TX	Attenuation control	2 dB
BIT22	TX	Attenuation control	4 dB
BIT23	TX	Attenuation control	8 dB
BIT24	TX	Attenuation control	16 dB
BIT25	STBTX	Transmit	Standby

Die dimensions

Parameter	Value	Unit
Die dimensions	3.8 × 4.7 × 0.1	mm

Partial dimensional reference in mm. Fabrication and wire bonding require complete drawings.



Current publication record · 1.6 · 2026-11-12. Product description or editorial content updated. Replaces revision 1.5.

Die integration and bias sequencing

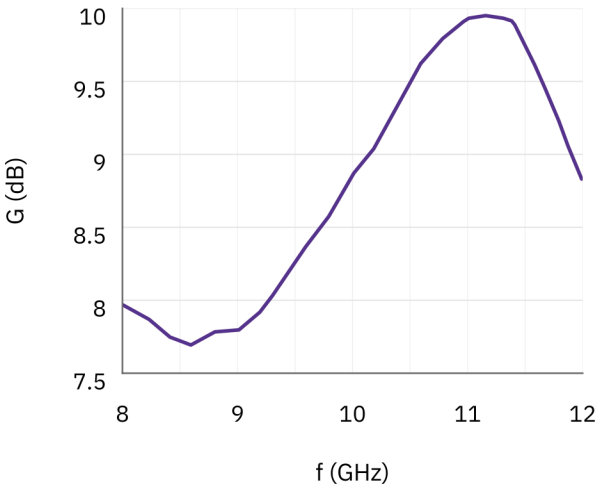
Control interface: Serial control. Apply the negative supply before the positive supply; remove the positive supply before the negative supply.

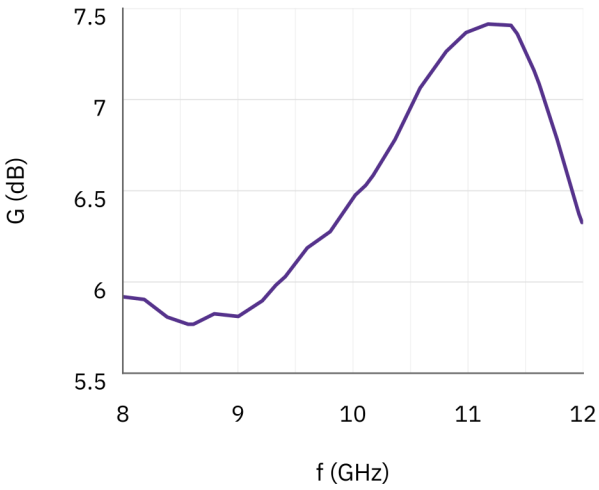
Performance curves

Each performance plot applies to its stated operating conditions.

Small-signal gain. Before and after AT adjustment.

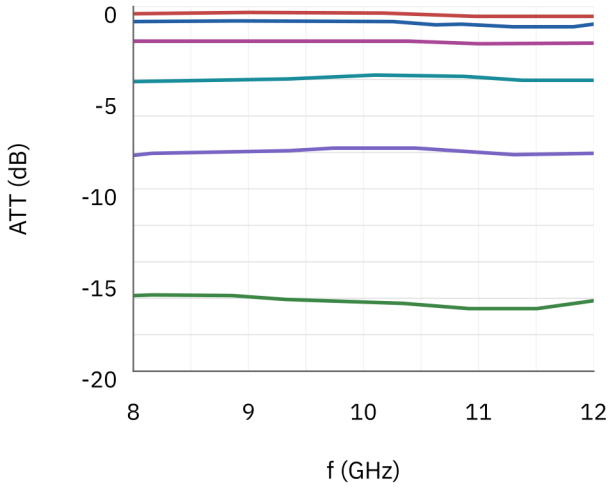
Figure notes: TA = +25 °C; input port; rated source voltage; 0.5 nH input/output inductors. Readings are approximate. The first plot is before AT adjustment and the second is after it; no numeric AT setting or minimum/maximum attenuation state is assigned.

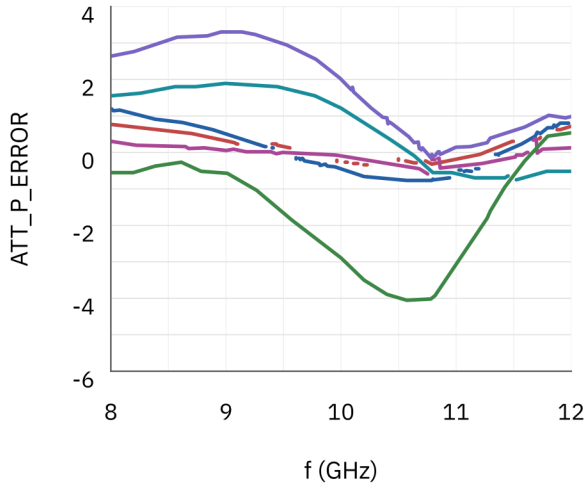


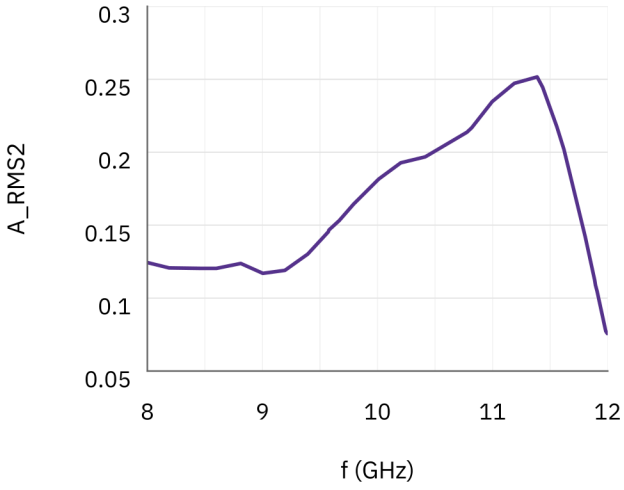


ATT (dB); ATT_P_ERROR; A_RMS2.

Figure notes: TA = +25 °C; input port; rated source voltage; 0.5 nH input/output inductors. Readings are approximate. Axis units for ATT_P_ERROR / A_RMS2 are unspecified. The colored traces have no specified bit or state assignments.

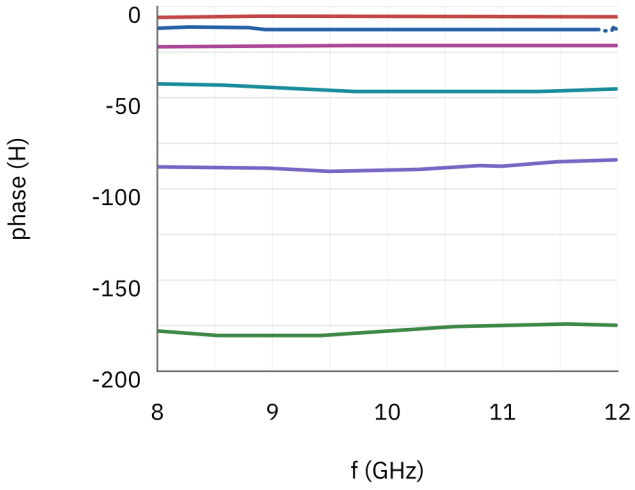


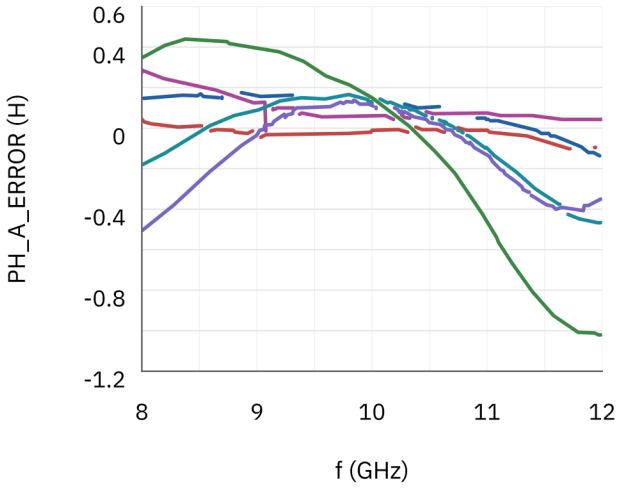


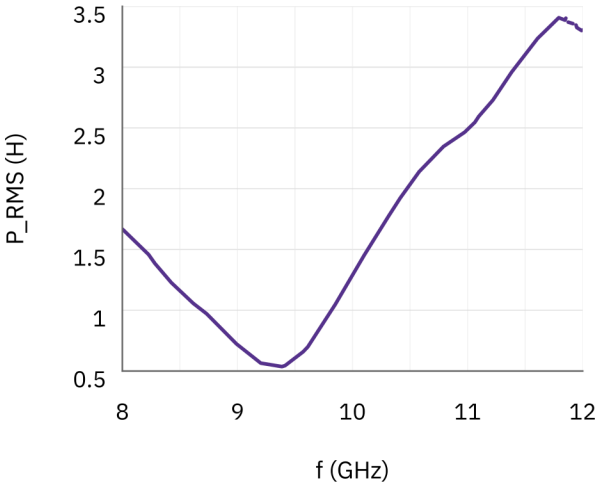


phase(H); PH_A_ERROR(H); P_RMS(H).

Figure notes: TA = +25 °C; input port; rated source voltage; 0.5 nH input/output inductors. Readings are approximate. H is undefined. Its values are not specified in degrees. The colored traces have no specified bit or state assignments.

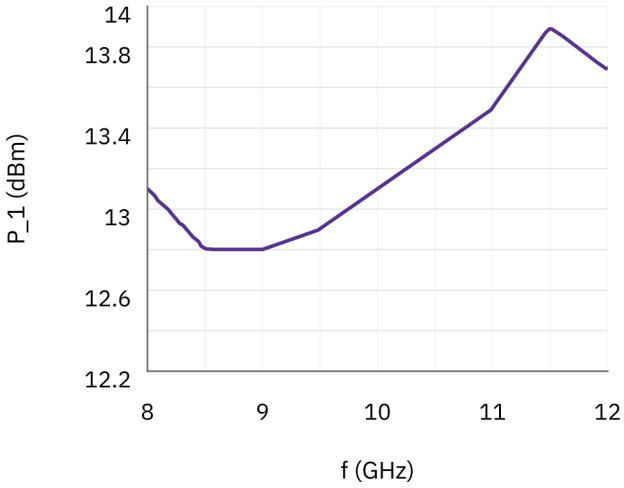


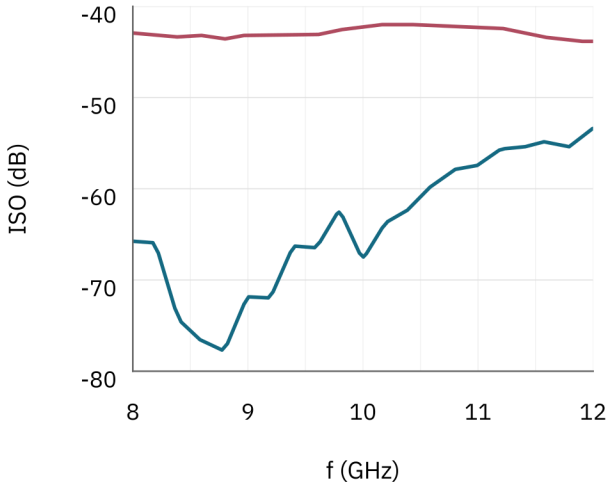




Output power at compression (Rx); Isolation.

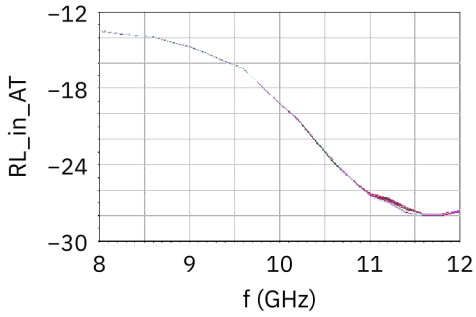
Figure notes: TA = +25 °C; input port; rated source voltage; 0.5 nH input/output inductors. Readings are approximate. P_1_RX (dBm); ISO (dB). The colored traces have no specified bit or state assignments.

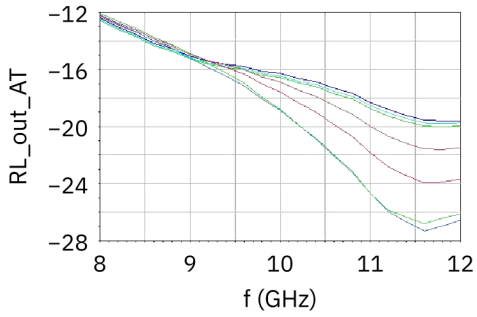


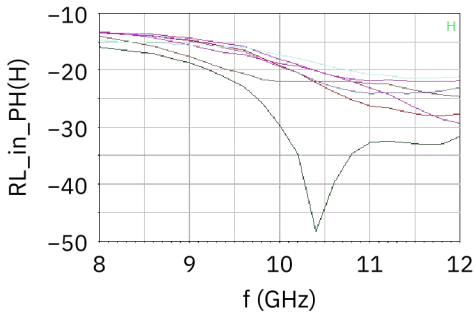


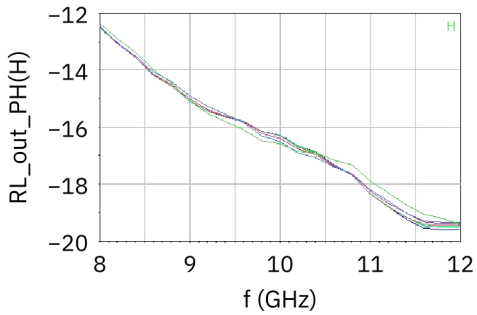
RL_in_AT; RL_out_AT; RL_in_PH(H); RL_out_PH(H); RL_TX_OFF(H).

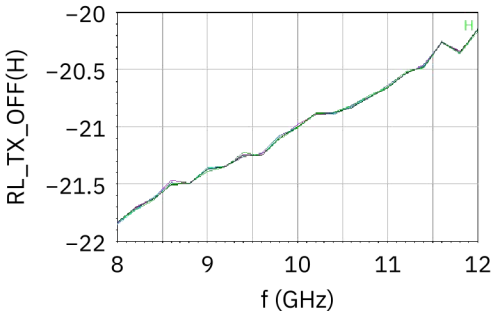
Figure notes: TA = +25 °C; input port; rated source voltage; 0.5 nH input/output inductors. Axis units for RL_in_AT / RL_out_AT / RL_in_PH(H) / RL_out_PH(H) / RL_TX_OFF(H) are unspecified. H is undefined. Its values are not specified in degrees.











Document notice

Specifications are subject to revision. Before design release, confirm the current document revision and product-specific requirements with LCRF. The approved quotation and order documentation define the supplied configuration.