AD-017 Nitronex NPT1010 GaN HEMT Power Transistors Application Board Tuned for 500 to 1000 MHz

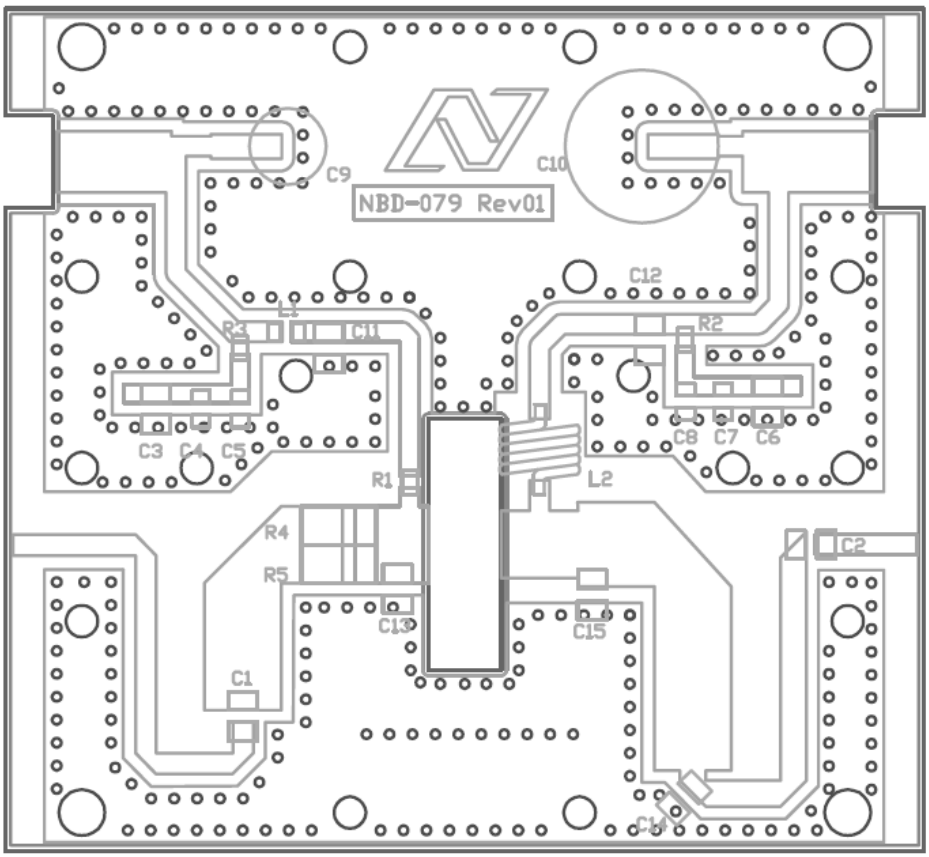
Application board AD-017 with a Nitronex NPT1010 GaN HEMT device outputs approximately 60-100 Watts of CW power with approximately 14.5-17.0 dB gain, 50+% drain efficiency. All measurements were collected from 500 to 1000MHz with a drain bias of V_{DS}=+28.0V.

Caution: Do not operate the device with greater than 36 volts of drain-source potential and I_{DQ} >2000mA. Note, the gate bias is negative and is fully pinched off at approximately –2.0V. It is highly recommended to provide some active cooling in order to maintain the test board at room temperature during testing. The device needs to have thermal grease applied to the source lead (package bottom) prior to placement in the test fixture.

Caution: Do not exceed 5 dB of gain compression with a single tone signal or expose the device to a strong reversal of the gate leakage current – from negative to positive. Note: Device saturation is reached when the polarity of the gate current turns positive, a small positive gate current of +30 ma will not harm the device but once the current turns positive it will grow exponentially with additional RF driver level.

Biasing sequence: GaN HEMTs are depletion mode devices, therefore set the gate voltage to –3.0V, bring drain voltage up to 28VDC, adjust gate to obtain desired I_{DQ}, and then enable RF. Turn off device in the reverse sequence

AD-017 NPT1010 Application Board/Layout/BOM



Name	Value	Tolerance	Size	Vendor	Vendor Number
C1	100pF	5%	.11"X.11"	ATC	ATC100B101J
C2	100pF	5%	.11"X.11"	ATC	ATC100B101J
C3, C6	1uF	10%	1812	DigiKey	1812C105KAT2A
C4, C7	.1uF	10%	1206	DigiKey	C1206C104K1RACTU
C5, C8	.01uF	1%	1206	DigiKey	12061C103KAT2A
C9	150uF	20%	3216(EIA)	Nichicon	UPW1C151MED
C10	270uF	20%	10mm(dia)	United Chmi-Con	ELXY 630ELL271MK25S
C11, C12	56pF	1%	.11"X.11"	ATC	ATC100B560J
C14, C15	4.7pF	1%	.11"X.11"	ATC	ATC100B4R7J
R1	10	5%	805	DigiKey	ERJ-6ENF10R0V
R2, R3	0.33	1%	805	DigiKey	ERJ-6RQFR33V
R4, R5	7.5	1%	2512	DigiKey	RHC 2512 10 1% R
L1	12nH	5%	805	Coilcraft	0805CS-120XJB
L2	4 Turn, 16G, 0.2"ID Copper Wire				
nbd-079_Rev1				Alberta Printed Circuits	Rogers 6010LM 25mil, 1oz
Copper Heatsink					
BNC Connectors				Tyco Electronics	1052566-1
N Connector				Amphenol	172195
Metric 18-8 SS Socket head Cap Screw M2.5 Thread, 8mm Length, 0.45mm Pitch				McMaster Carr	91292A012

CW Data Collected on Board: AD-017