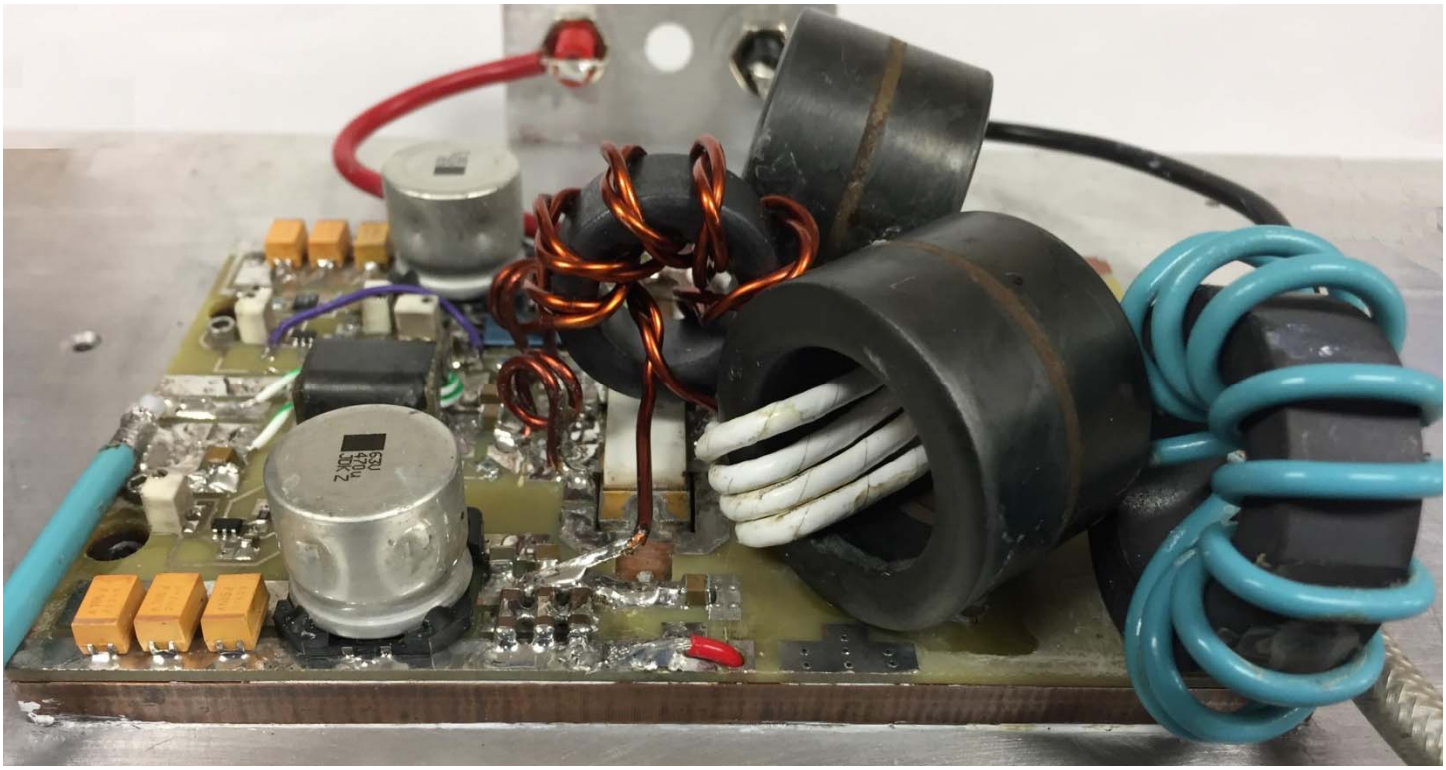
polyfet rf devices

TB273

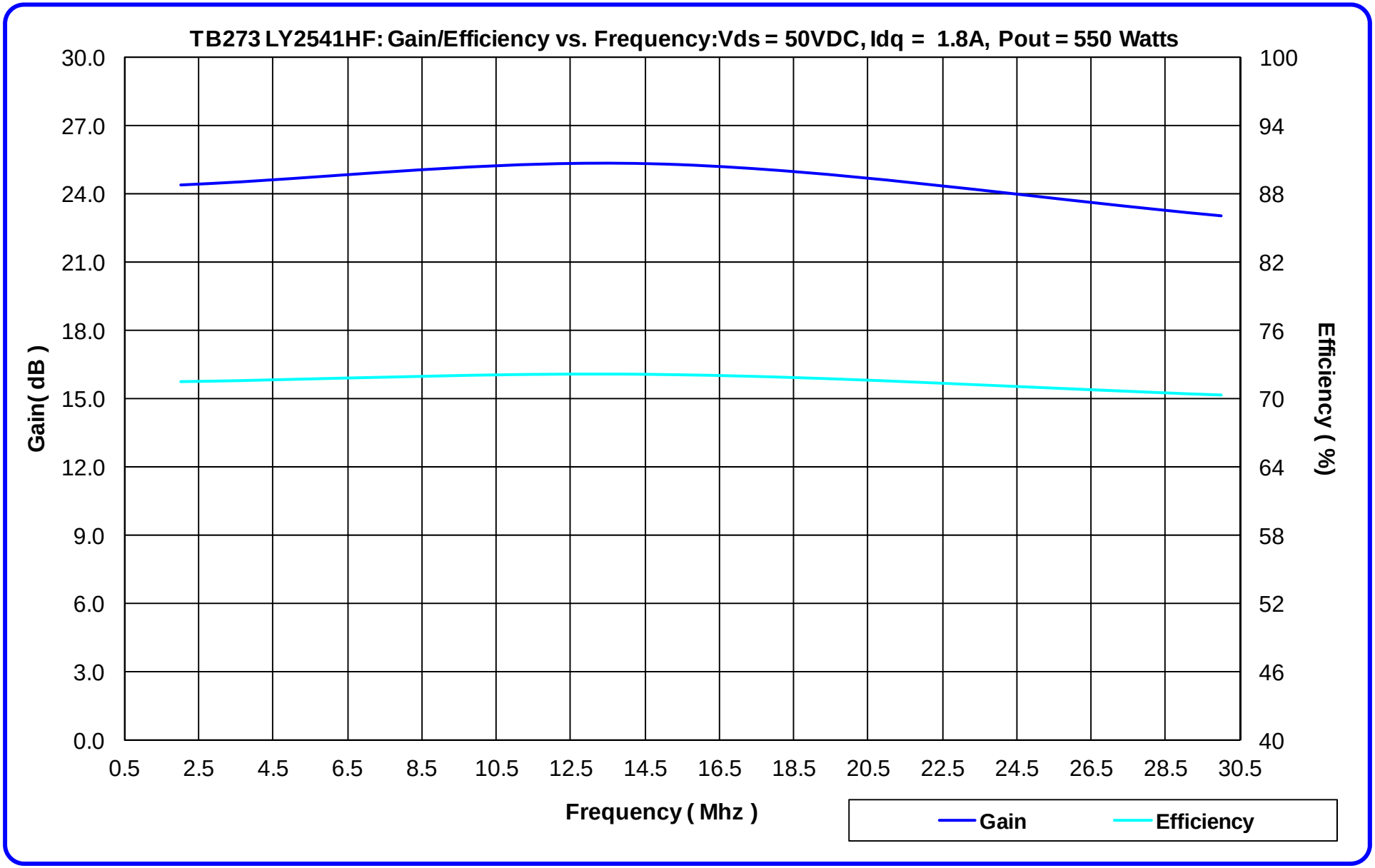
LY2541HF

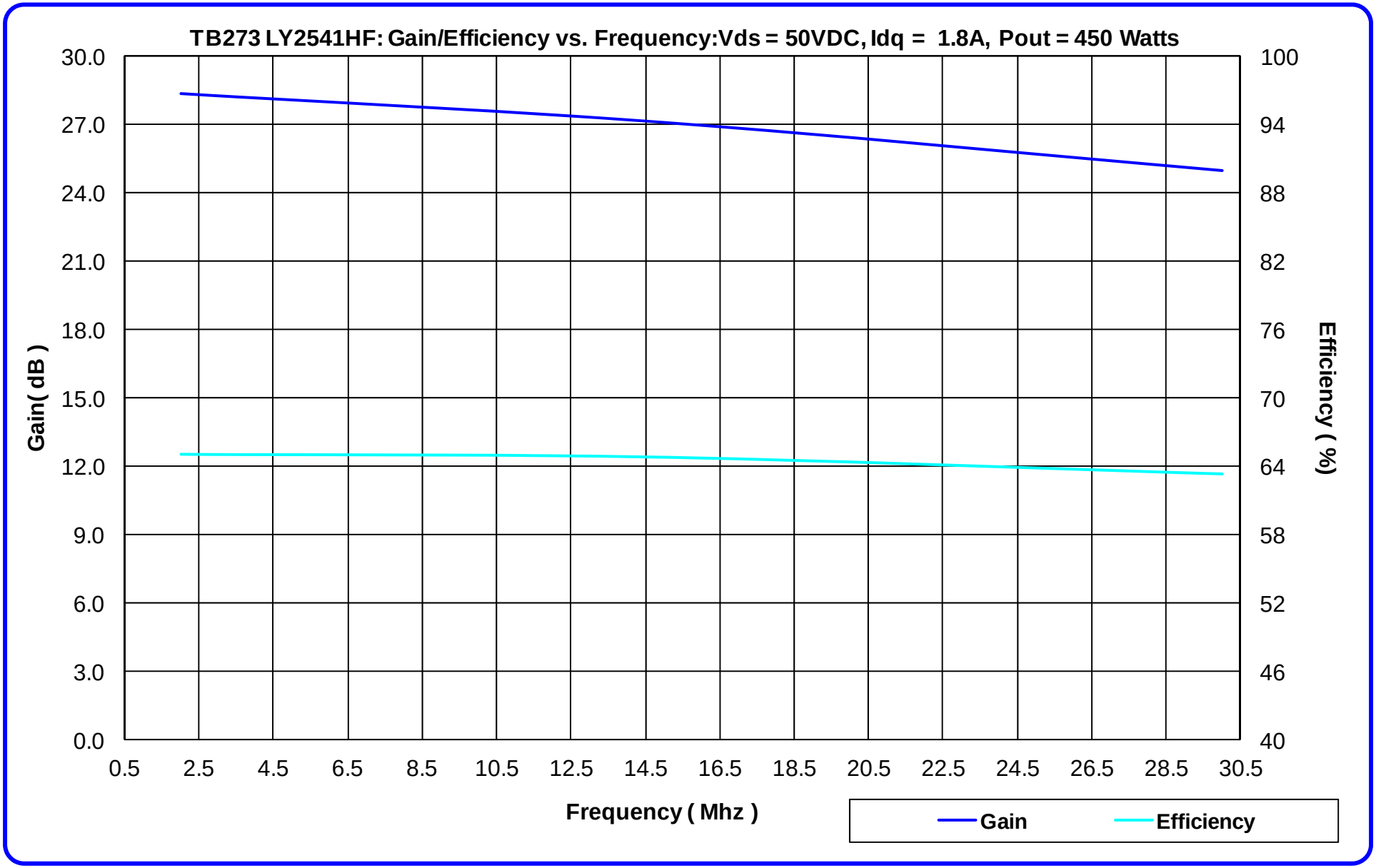
Frequency = 2-30MHz
Pout = 57.4dBm
Gain (avg) = 24dB +/- 0.85dB
Vds = 50VDC
Idq = 1.8A
Efficiency (avg) = 71% +/- 2.0%

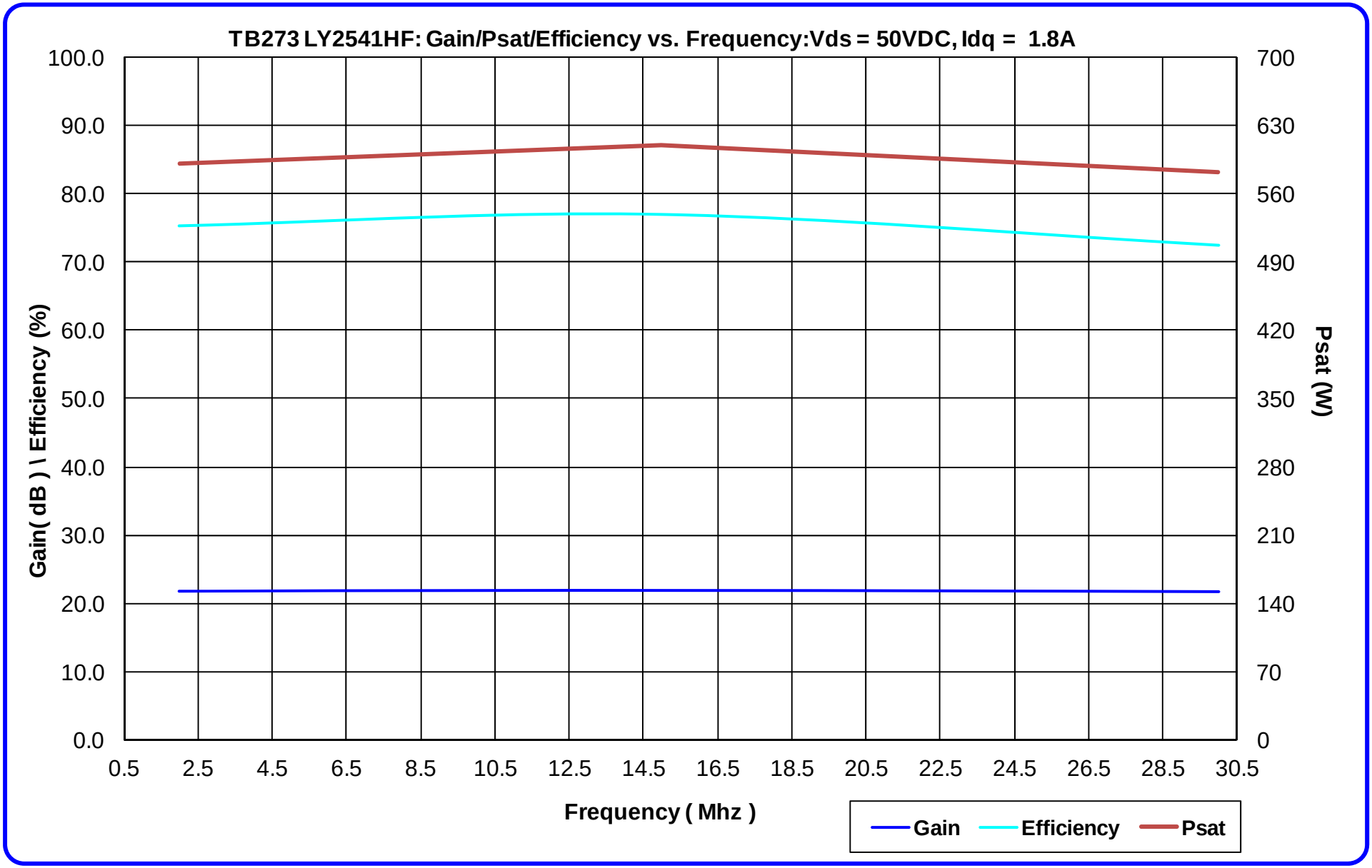


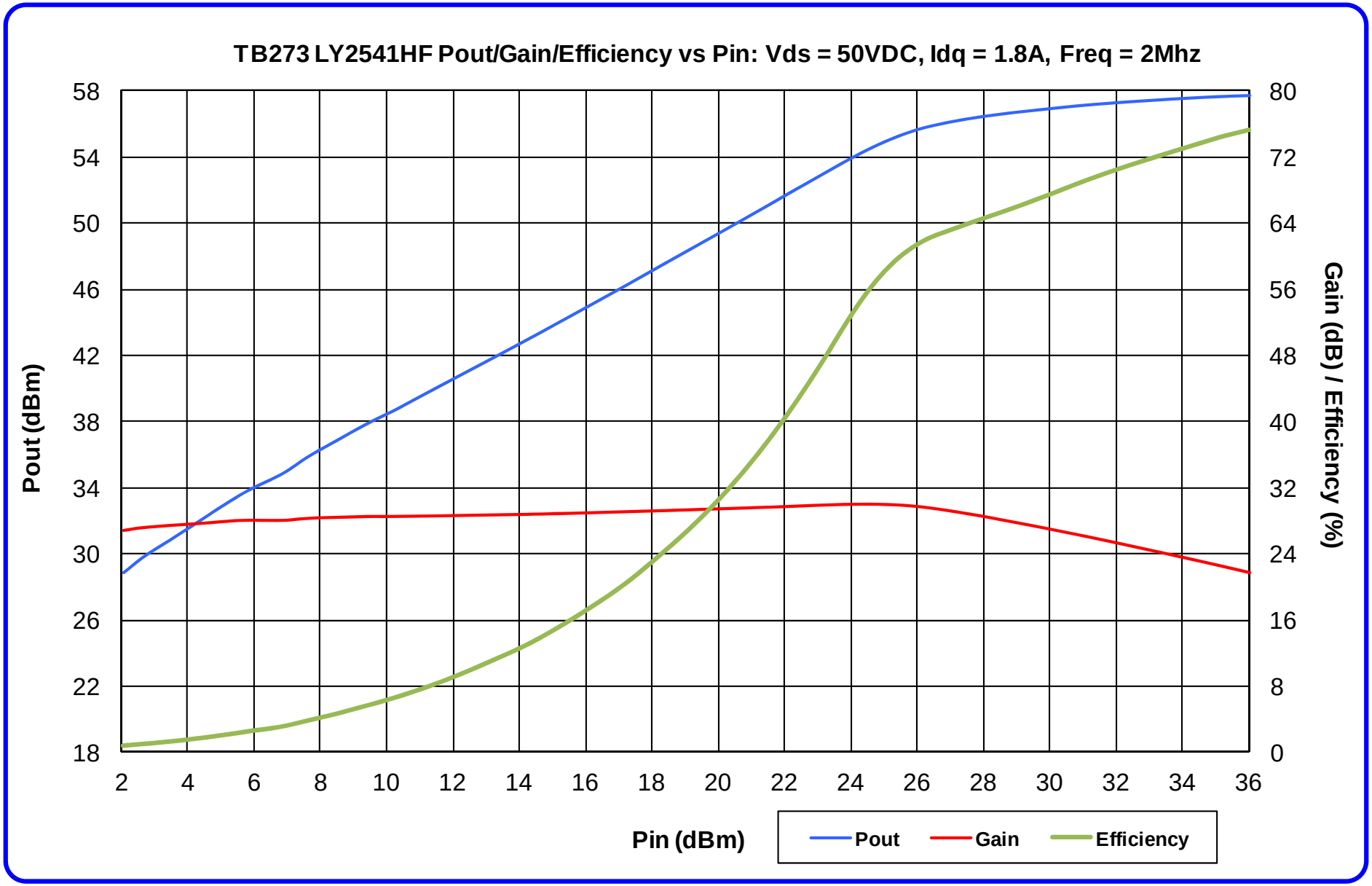
Order of Operations:

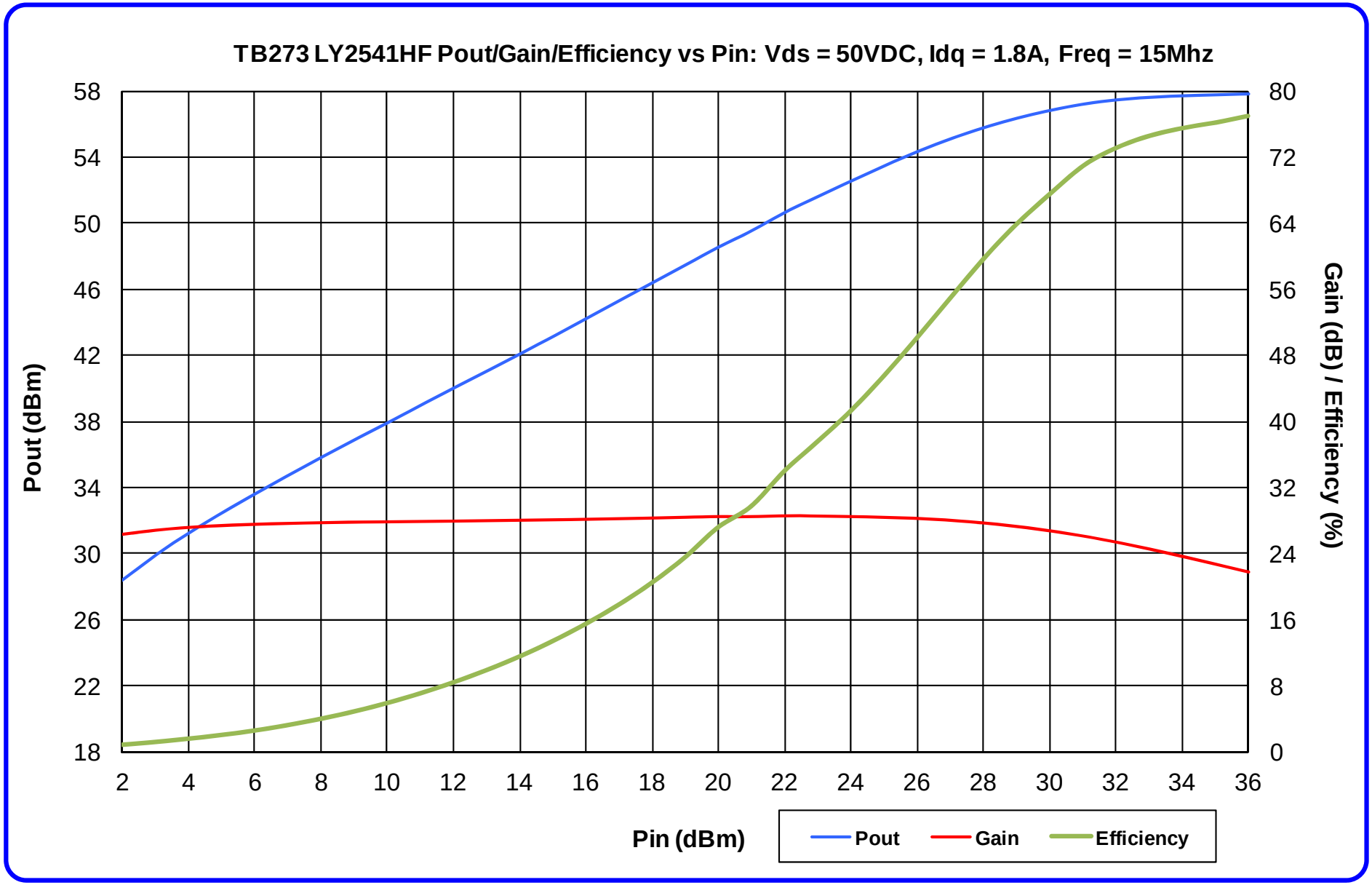
1. Review amplifier's performance curves in the data package to learn its RF power limitations.
2. Terminate the RF In/Out connectors to 50 ohm source and load impedance.
3. Connect Ground and Vds power supply to TB273.
4. Apply Vds voltage and verify Idq is as stated in this data package.
5. Apply RF drive signal (refer to curves in data package to avoid overdrive).
6. Avoid allowing the heat sink to reach 85 deg C. Use of a 55.3CFM fan required for long-term use.

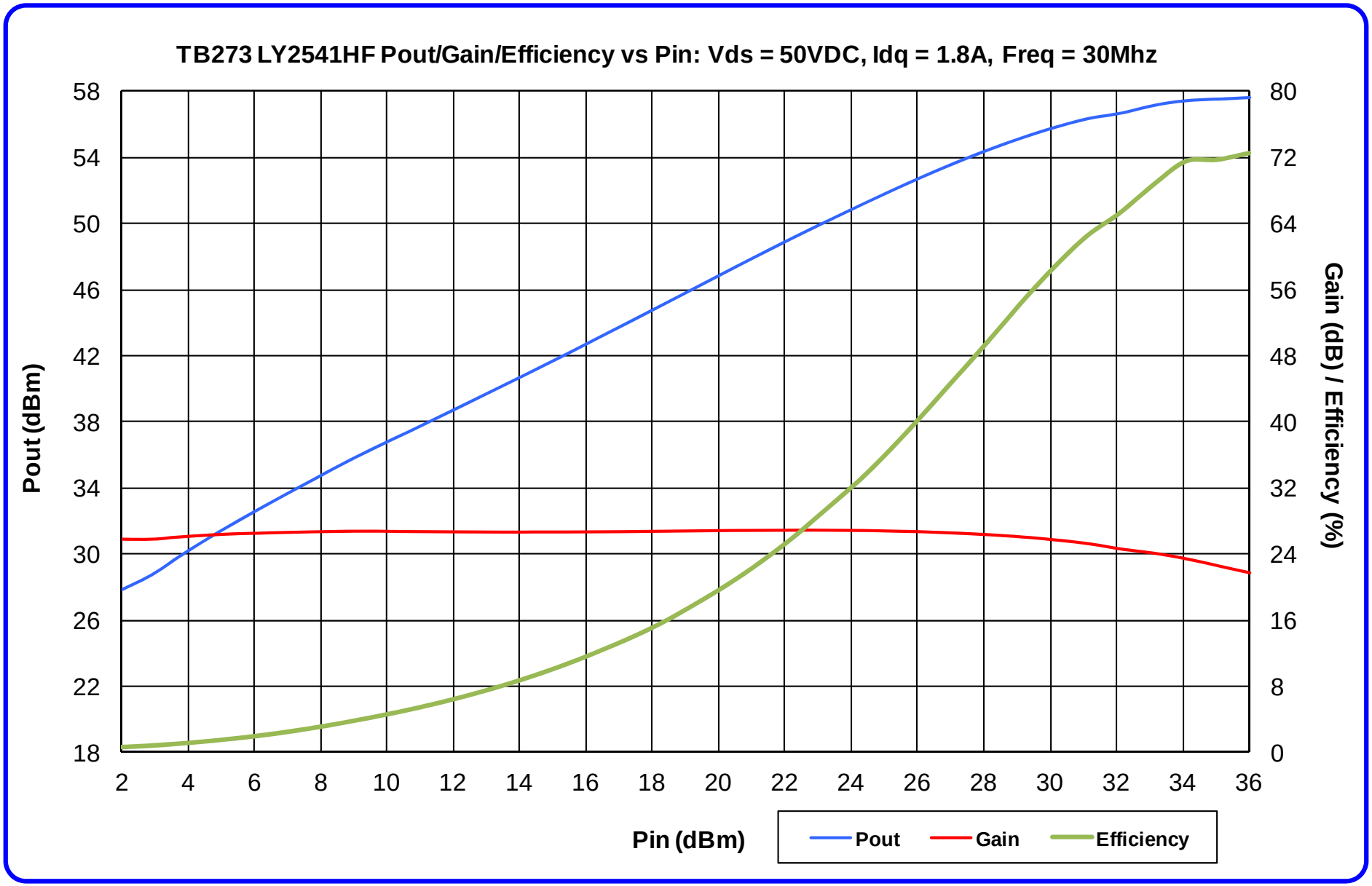

TB273 LY2541HF: Gain/Efficiency vs. Frequency:Vds = 50VDC, Idq = 1.8A, Pout = 550 Watts
Gain(dB)
Efficiency (%)
Frequency (Mhz)
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
100
94
88
82
76
70
64
58
52
46
40
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
26.5
28.5
30.5
Gain
Efficiency

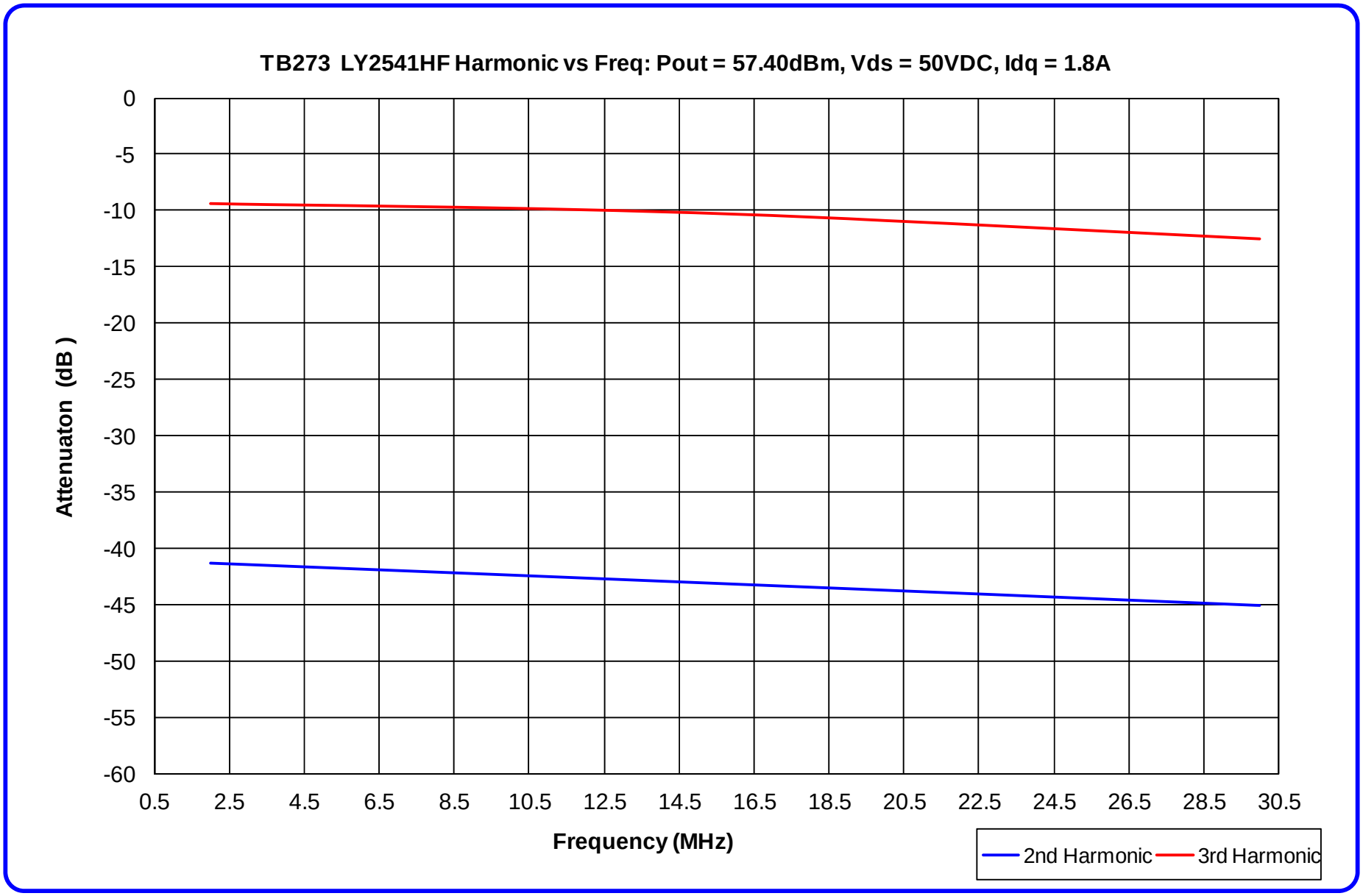

TB273 LY2541HF: Gain/Efficiency vs. Frequency:Vds = 50VDC, Idq = 1.8A, Pout = 450 Watts
Gain(dB)
Efficiency (%)
Frequency (Mhz)
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
100
94
88
82
76
70
64
58
52
46
40
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
26.5
28.5
30.5
Gain
Efficiency

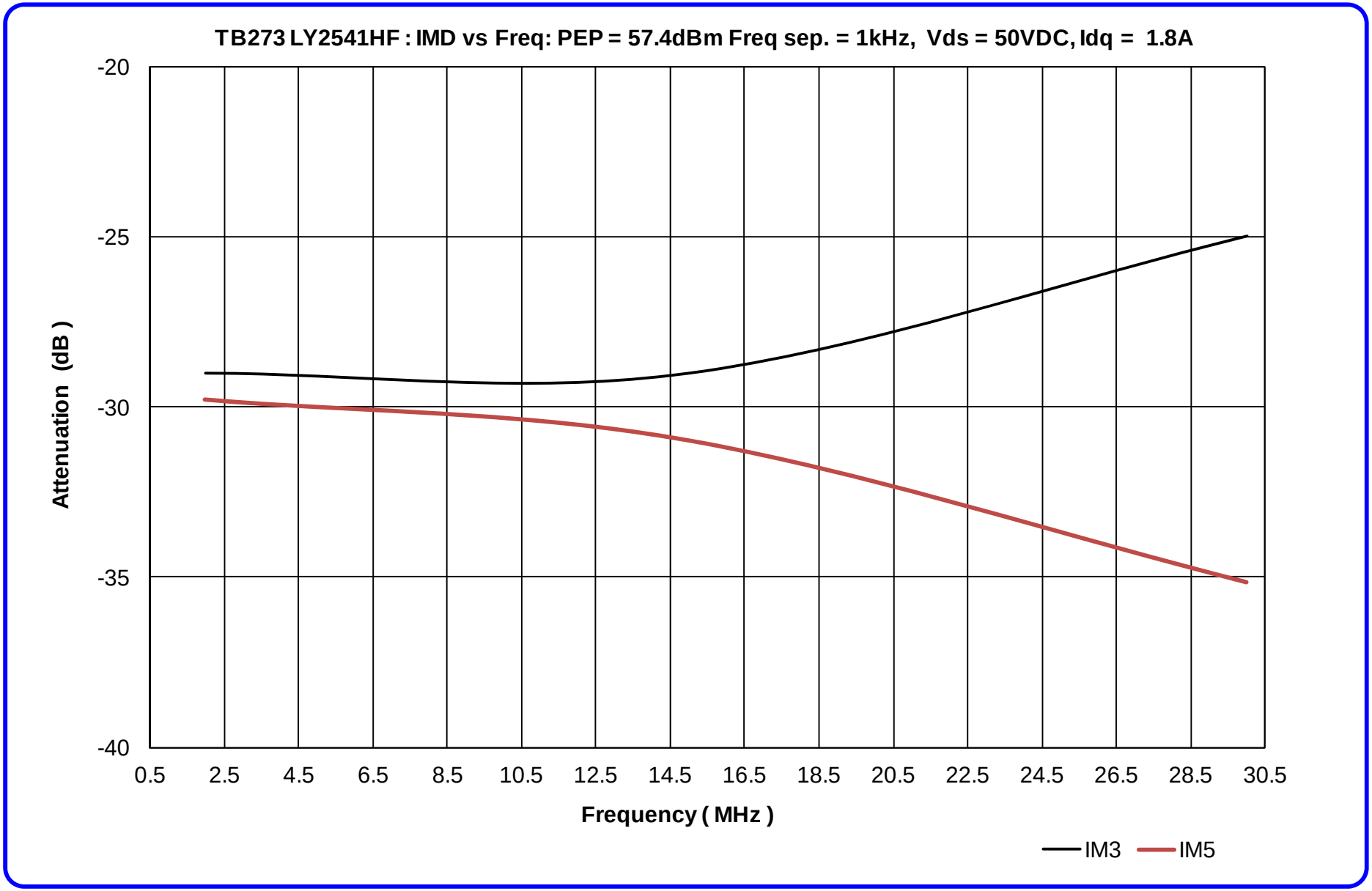

TB273 LY2541HF: Gain/Psat/Efficiency vs. Frequency:Vds = 50VDC, Idq = 1.8A
Gain(dB) \ Efficiency (%)
Psat (W)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
700
630
560
490
420
350
280
210
140
70
0
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
26.5
28.5
30.5
Frequency (Mhz)
Gain
Efficiency
Psat

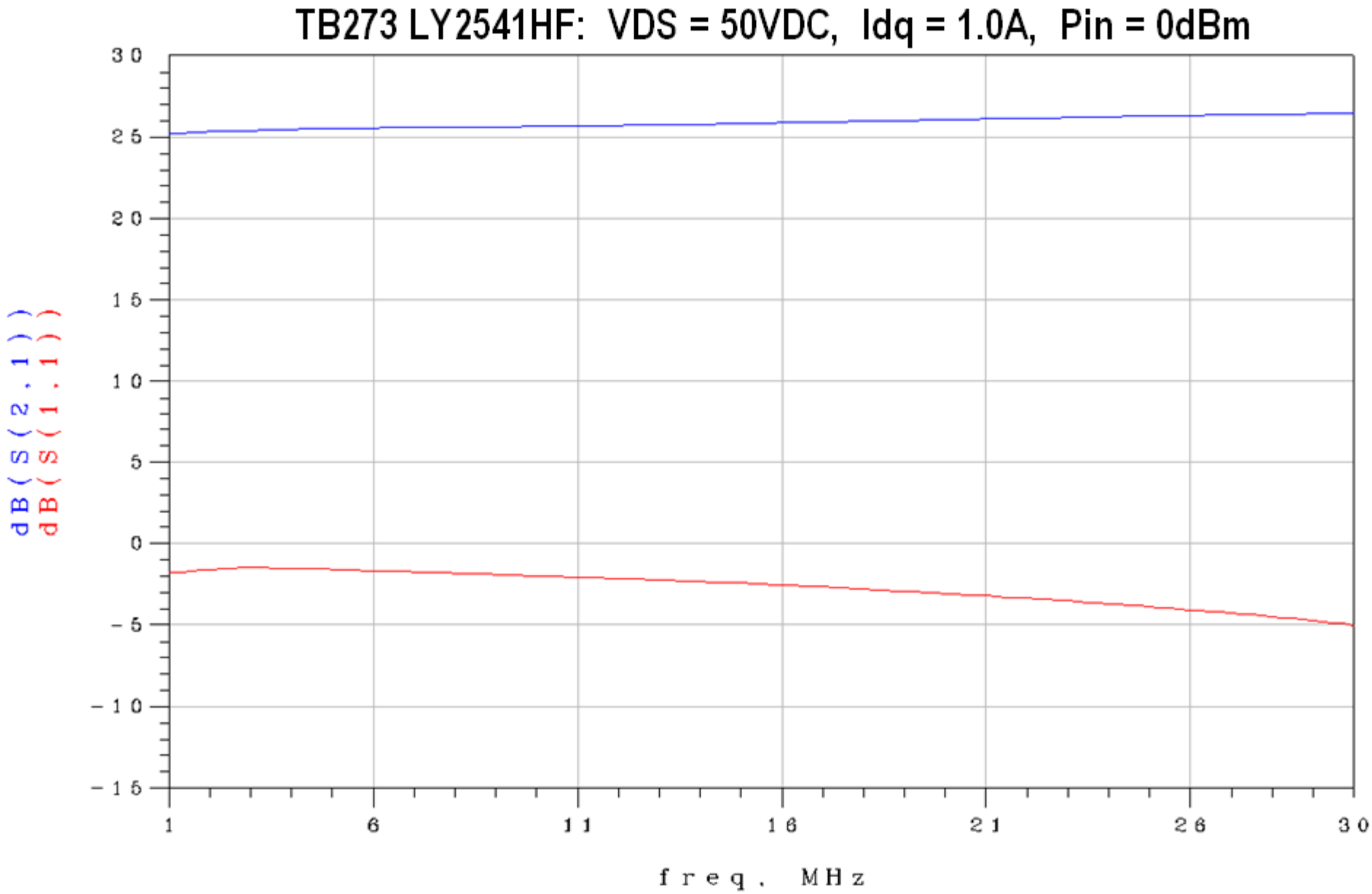

TB273 LY2541HF Pout/Gain/Efficiency vs Pin: Vds = 50VDC, Idq = 1.8A, Freq = 2Mhz
Pout (dBm)
Gain (dB) / Efficiency (%)
Pin (dBm)
Pout
Gain
Efficiency
58
54
50
46
42
38
34
30
26
22
18
80
72
64
56
48
40
32
24
16
8
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36

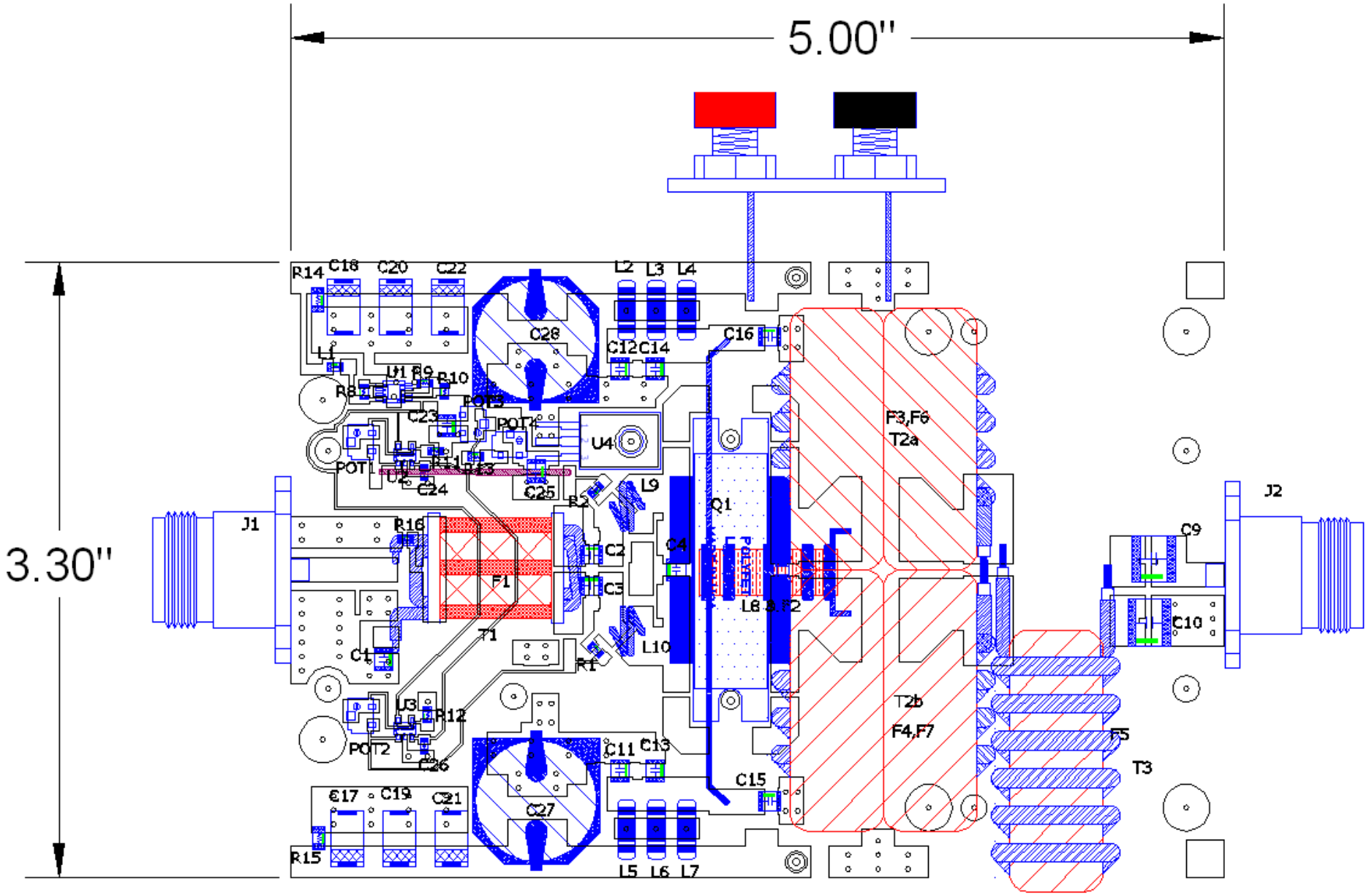

TB273 LY2541HF Pout/Gain/Efficiency vs Pin: Vds = 50VDC, Idq = 1.8A, Freq = 15Mhz
Pout (dBm)
Gain (dB) / Efficiency (%)
Pin (dBm)
Pout
Gain
Efficiency
58
54
50
46
42
38
34
30
26
22
18
80
72
64
56
48
40
32
24
16
8
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36


TB273 LY2541HF Pout/Gain/Efficiency vs Pin: Vds = 50VDC, Idq = 1.8A, Freq = 30Mhz
Pout (dBm)
Gain (dB) / Efficiency (%)
Pin (dBm)
58
54
50
46
42
38
34
30
26
22
18
80
72
64
56
48
40
32
24
16
8
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
Pout
Gain
Efficiency

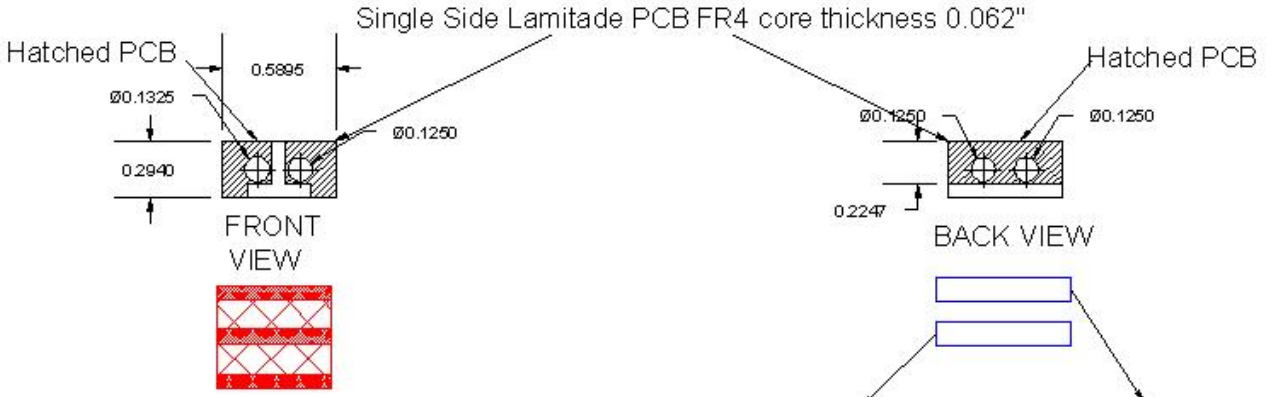

TB273 LY2541HF Harmonic vs Freq: Pout = 57.40dBm, Vds = 50VDC, Idq = 1.8A
Attenuaton (dB)
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
26.5
28.5
30.5
Frequency (MHz)
2nd Harmonic
3rd Harmonic


TB273 LY2541HF : IMD vs Freq: PEP = 57.4dBm Freq sep. = 1kHz, Vds = 50VDC, Idq = 1.8A
-20
-25
-30
-35
-40
Attenuation (dB)
0.5
2.5
4.5
6.5
8.5
10.5
12.5
14.5
16.5
18.5
20.5
22.5
24.5
26.5
28.5
30.5
Frequency (MHz)
IM3
IM5


TB273 LY2541HF: VDS = 50VDC, Idq = 1.0A, Pin = 0dBm
dB(S(2,1))
dB(S(1,1))
30
25
20
15
10
5
0
-5
-10
-15
1
6
11
16
21
26
30
freq, MHz


5.00"
3.30"
R14
C18
C20
C22
L2
L3
L4
C28
C12
C14
C16
L1
U1
R9
R10
R8
POT3
C23
POT4
U4
F3,F6
T2a
POT1
R11
R13
C24
C25
L9
J2
J1
R16
Q1
C9
C2
C4
F1
C3
C10
T1
C1
L10
R1
L8
L7
L6
L5
L3
R12
POT2
C26
C11
C13
C15
T2b
F4,F7
F5
T3
C17
C19
C21
C27
R15

T1 Materials



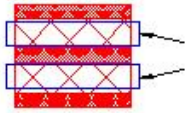
Fair-Rite 2873000202 (Mouser or Newark Element 14 or Digikey)

Two Ultra-Formable 260 Brass, Round Tube, 0.7" Long, 0.014" Wall Thickness, 1/8" OD

OR

Outer Conductor of Semi-Rigid Coaxial Cable O.D. 0.085"

STEP 1

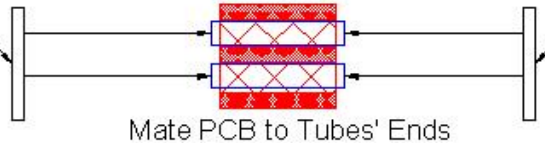


Insert Tubes to Ferrite

STEP 2

PCB Trace Face Side

LEFT SIDE VIEW

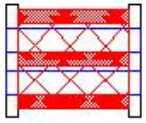


PCB Trace Face side

RIGHT SIDE VIEW

Mate PCB to Tubes' Ends

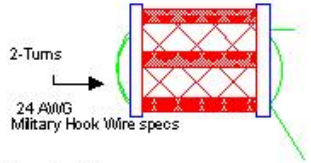
STEP 3



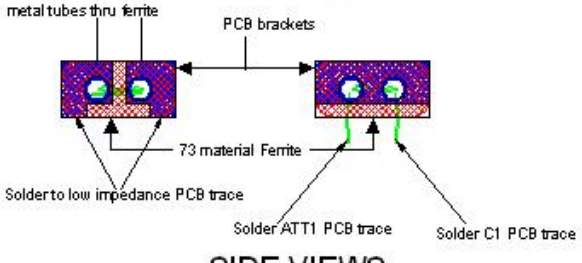
Insert tubes' ends into PCB and solder together maintaining alignment.

IMPORTANT: Keep tubes' ends flush with PCB brackets.

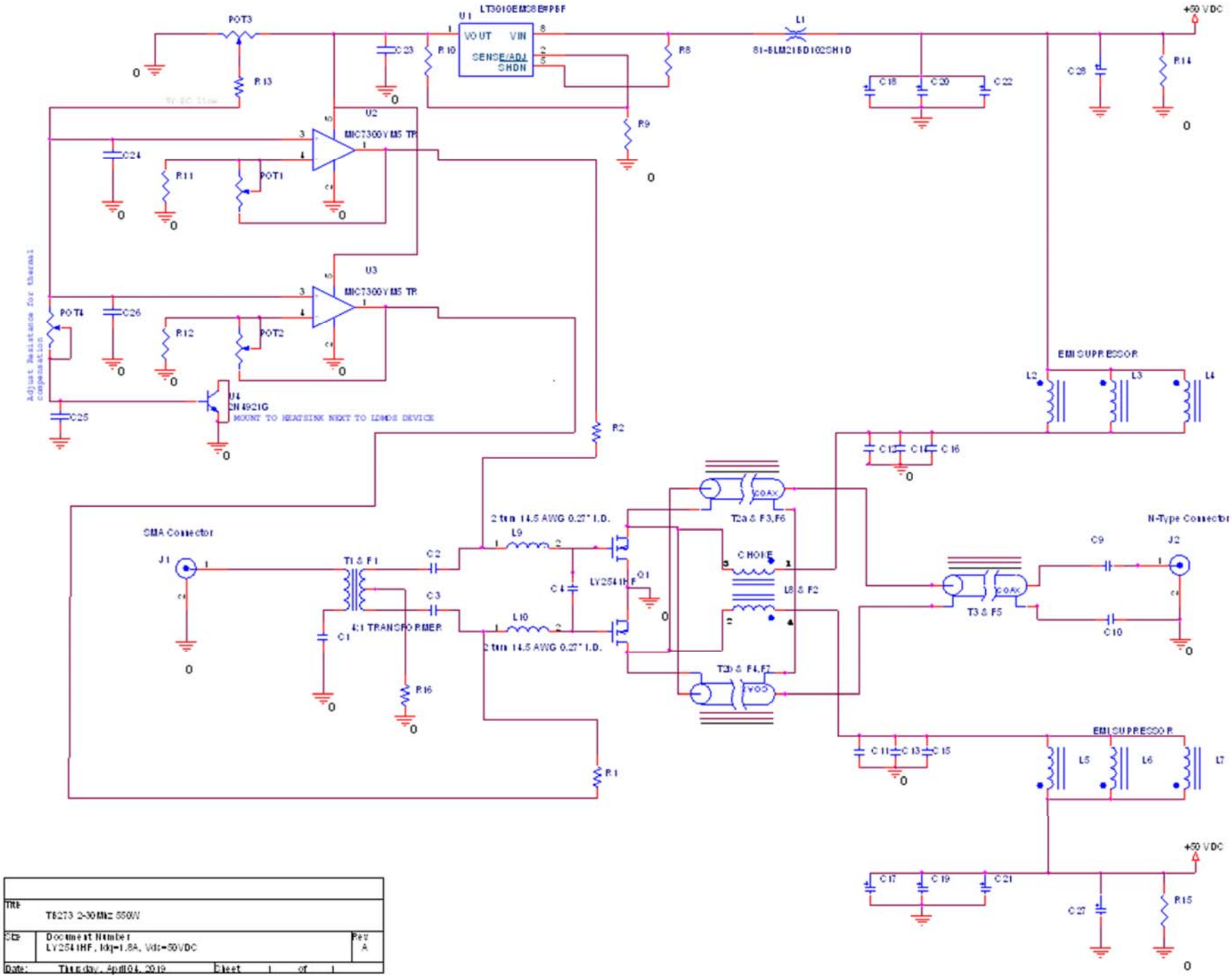
STEP 4



TOP VIEW



SIDE VIEWS


POT3
R13
C23
U1
LT3010EMS8EPBF
VOUT
VIN
SENSE/ADJ
SHDN
R10
R8
L1
81-BLM21BD102SH1D
+50 VDC
C18
C20
C22
C28
R14
R9
U2
MIC7300YM5 TR
C24
R11
POT1
U3
MIC7300YM5 TR
POT4
C26
R12
POT2
Adjust Resistance for thermal compensation
U4
CN4921G
MOUNT TO HEATSINK NEXT TO LDMOS DEVICE
C25
R2
EMI SUPPRESSOR
L2
L3
L4
C12
C14
C16
SMA Connector
J1
T1 & F1
C2
C3
C1
4:1 TRANSFORMER
R16
2 turn 14.5 AWG 0.27" I.D.
L9
L10
C4
LY2541HF
Q1
T2a & F3,F6
T3b & F4,F7
CHOKE
L8 & F2
T3 & F5
COAX
N-Type Connector
C9
J2
C10
C11
C13
C15
EMI SUPPRESSOR
L5
L6
L7
C17
C19
C21
C27
R15
R1
Title
T5273 2-30MHz 550W
Size
Document Number
LY2541HF, Idq=1.8A, Vds=50VDC
Rev
A
Date:
Thursday, April 04, 2019
Sheet
1
of
1

	TB273		
NOMENCLATURE	**DESCRIPTION**	**VENDER**	**VENDER PART #**
C1,C2,C3 C15, C16, C23,C30	100,000pF +/-10% RF By-Pass Capacitors,1111X	Passive Plus, Inc	111X104KW500
C4	33pF +/-2% Ultra-low ESR, Microwave Cap., 1111N	Passive Plus, Inc	1111N330GW500
C9,C10	470000pF +/-20% High Q, 150V	Passive Plus, Inc	2225X474MW151X
C11,C13	1000pF +/-2% Ultra-low ESR, Microwave Cap., 1111N	Passive Plus, Inc	1111N102GW500
C12,C14	10,000pF +/-10% RF By-Pass Capacitors,1111X	Passive Plus, Inc	111X103KW500
C17,C18	6.8uF 63V 20% ERS=100Ohms Tantalum Capacitors SMD	AVX	TCJE685M063R0100
C19,C20	10uF 63V 20% ERS=100Ohms Tantalum Capacitors SMD	AVX	TCJE106M063R0100
C21,C22	15uF 63V 20% ERS=150Ohms Tantalum Capacitors SMD	Kemet	T521X156M063ATE150
C24,C26	10uF 10%TAMCERAM HIGH CAP. SMD 805	Johanson Dielectrics	100r15x106kv4e
C27,C28	470uF 80V Panasonic Aluminum Electrolytic Cap. SMD	Panasonic Electronic Components	EEE-TK1K471AM
R1,R2,R8,R9	10K 1/8W 0805 SMD	Rohm Semiconductor	MCR10EZHJ103
R10	56K 1/8W 0805 SMD	Rohm Semiconductor	MCR10EZPJ563
R11,R12	2.2K 1/8W 0805 SMD	Rohm Semiconductor	MCR10EZPJ222
R13	390 1/8W 0805 SMD	Rohm Semiconductor	MCR10EZPJ391
R14,R15	RES 10K OHM 1/4W 5% 1206 SMD	Rohm Semiconductor	MCR18EZPJ103
R16	RES 200 OHM 1/4W 5% 1206 SMD	Rohm Semiconductor	MCR18EZPJ201
POT1,POT2,POT3	Trimmer Resistors - 10K OHM 0.25W SMD	Murata Electronics North America	PVG5A103C03R00
POT4	Trimmer Resistors - 100 OHM 0.25W SMD	Murata Electronics North America	PVG5A101C03R00
L1	0805 1kohms HiSpeed EMI Filter Beads,Chokes & Arrays	Murata Electronics North America	81-BLM21BD102SH1D
L2,L3,L4,L5,L6,.L7	EMI/RFI Suppressors & Ferrites 1000pF 100Volts@125C	Tusonix	4700-005LF
L8	Magnetic Wire"W2",Twisted, 6-turns around "F2"	----------	----------
L9,L10	270mil I.D 2 turn aircoil	----------	----------
W1	Military Hook-Wire specs 24awg 19 strand	Allied Wire & Cable, INC	M16878/4BEE9
W2	Magnetic Wire,14.5AWG	www.electromechanicsonline.com	MW145HARD
U1	IC REG LDO ADJ 50mA 8-MSOP	Linear Technology	LT3010EMS8E#PBF
U2.U3	Operational Amplifiers - Op Amps SGL RRIO OP AMP	Texas Instruments	LM7321MF/NOPB
U4	Transistors Bipolar - BJT 3A 40V 30W NPN	ON Semiconductor	2N4921G
F1	Binocular Ferrite 73	Mouser Electronics	2873000202
F2	Toroid Ferrite 43 Material	Amidon	FT-100B-43
F3,F4,F6,F7	77material Toroid	mouser	623-5977002701
F5	Toroid Ferrite 61 Material	Amidon	5961002701
T1	wire "W1" 2 turns around "F1"	----------	----------
T2a,T2b	21 ohm coaxial cable, 9 turns around each ferrite F3/F6 and F4/F7	Belden	83307E-009 - MIL-W-16878/4 (Type E)
T3	50 ohm coaxial cable, 9 turns around F5	Amawave	UT-085C-FORM-F
Q1	LDMOS	Polyfet RF Devices	LY2541HF
J1,J2	PE4328 N Female; 4 Hole Panel Mount	Pasternack	PE4328
PCB	185HR 0.059", 1oz/1oz er+4.01	Isola	185HR