

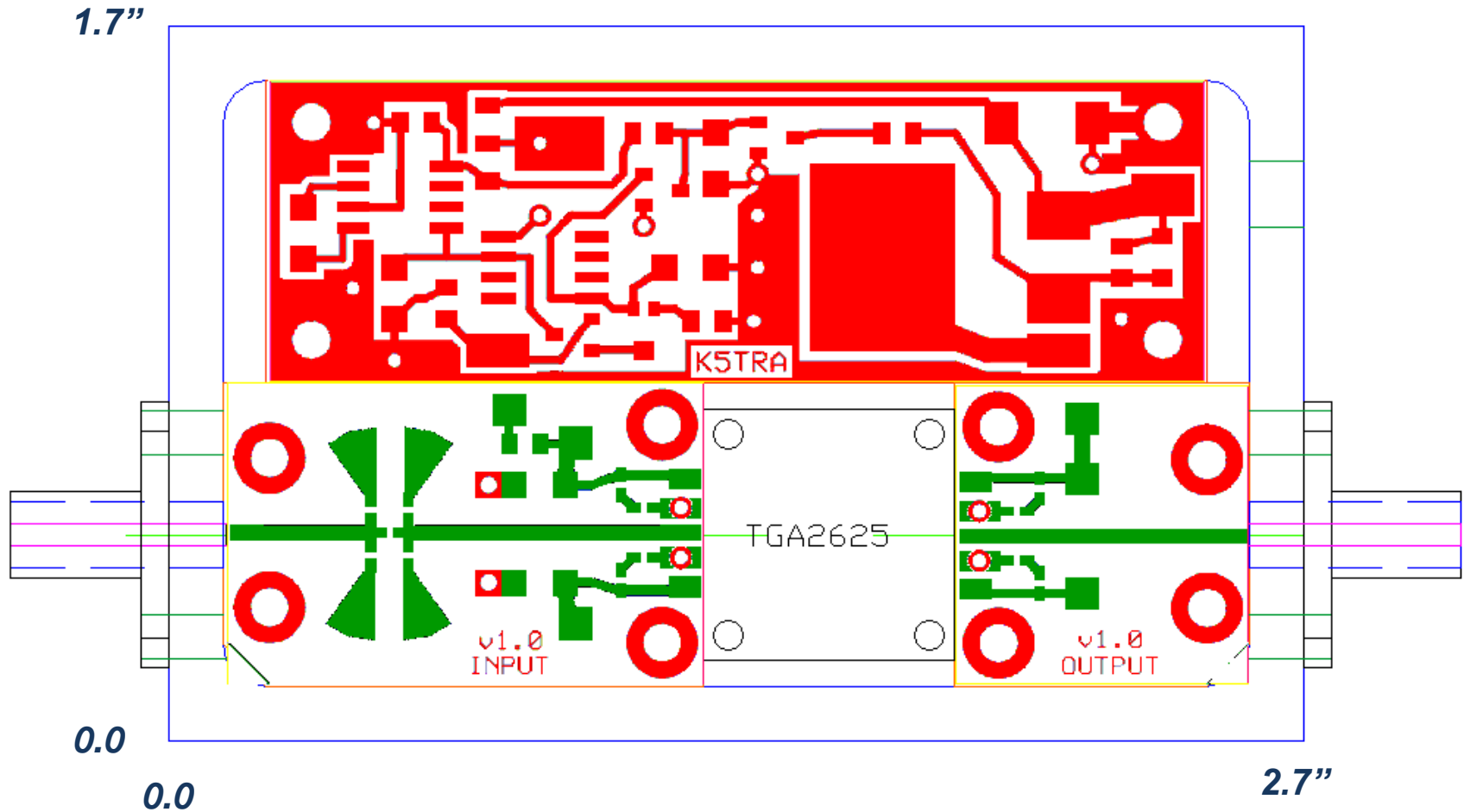
10 GHz PA

DESIGN DETAILS

PA Details

- TGA-2625-CP GaN MMIC from Triquint / Qorvo
- Milled Aluminum 2.7" x 1.7" x 0.75" housing
- Sequenced negative before positive bias circuit
- 12 W linear power output
- +28 V power supply
- Thermal design provides $< 147^{\circ}\text{C}$ channel temp.

PA Module Floor Plan



Packaged MMIC



TGA2625-CP

10 to 11 GHz, 17 W GaN Power Amplifier

Applications

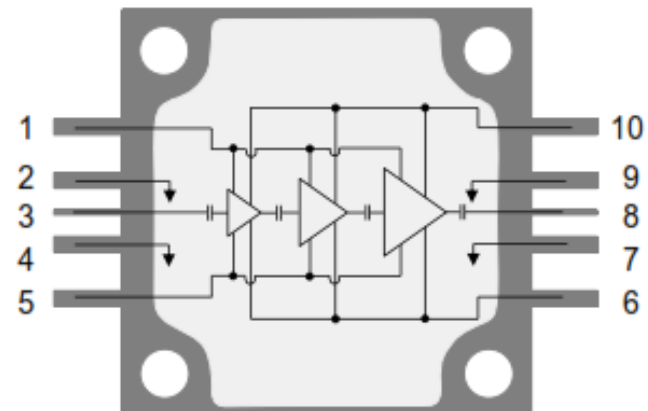
- Radar
- Communications



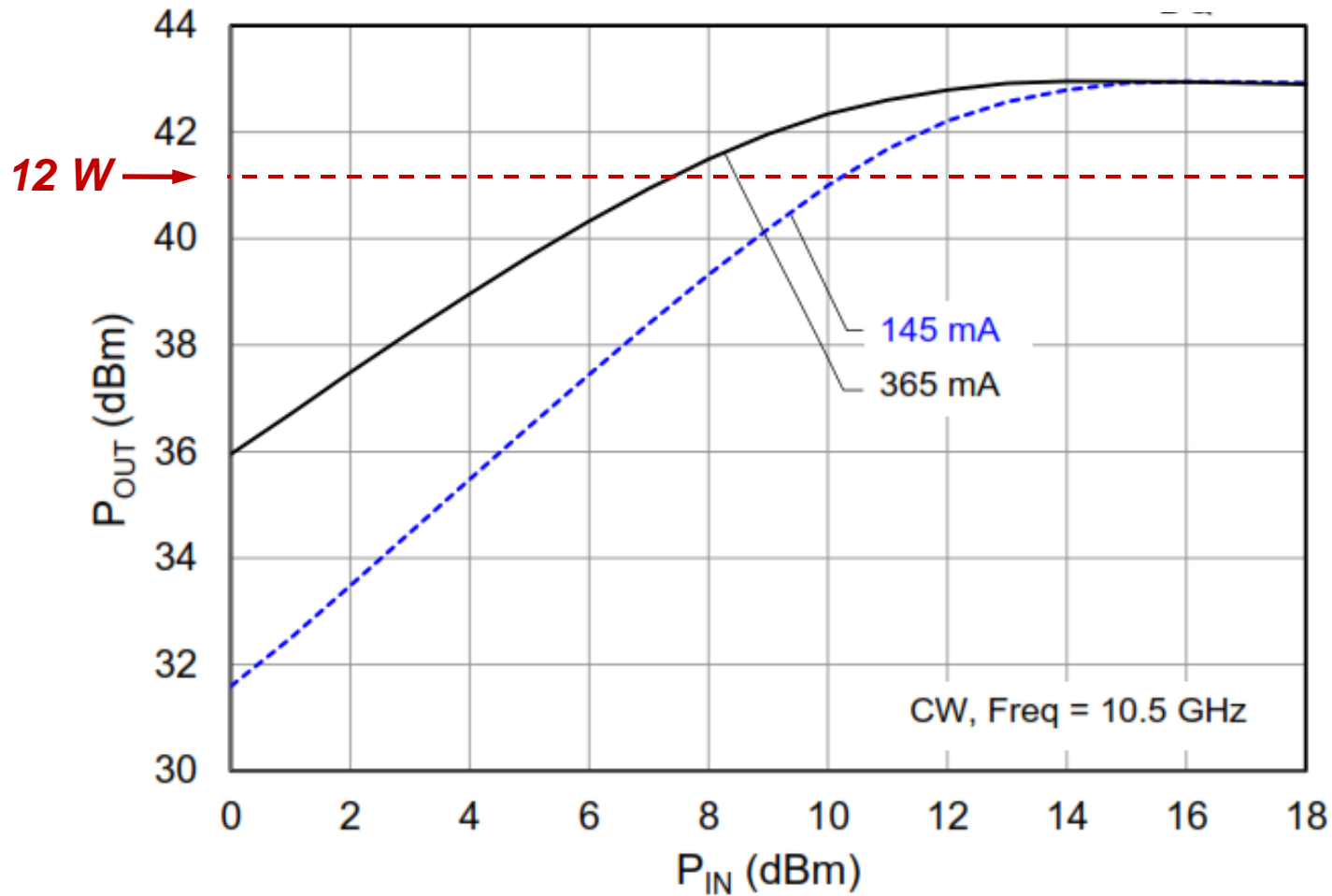
Product Features

- Frequency Range: 10 – 11 GHz
- Pout: 42.5 dBm (at $P_{IN} = 15$ dBm)
- PAE: > 40 %
- Power Gain: 28 dB (at $P_{IN} = 15$ dBm)
- Bias: $V_D = 28$ V, $I_{DQ} = 365$ mA, $V_G = -2.6$ V typical, pulsed (PW = 100 μ s, DC = 10 %)
- Package Dimensions: 15.2 x 15.2 x 3.5 mm
- Package base is pure Cu offering superior thermal management

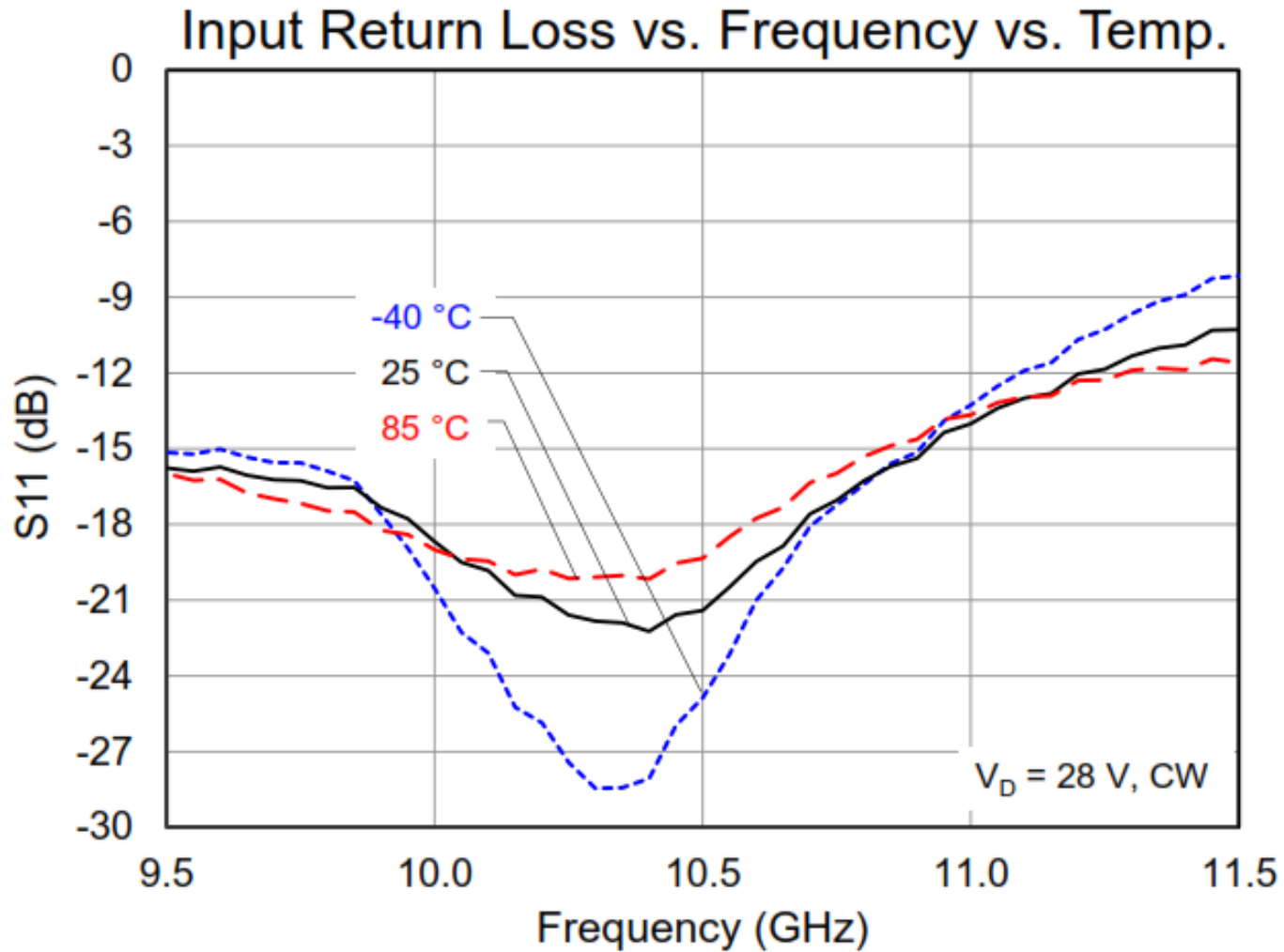
Functional Block Diagram



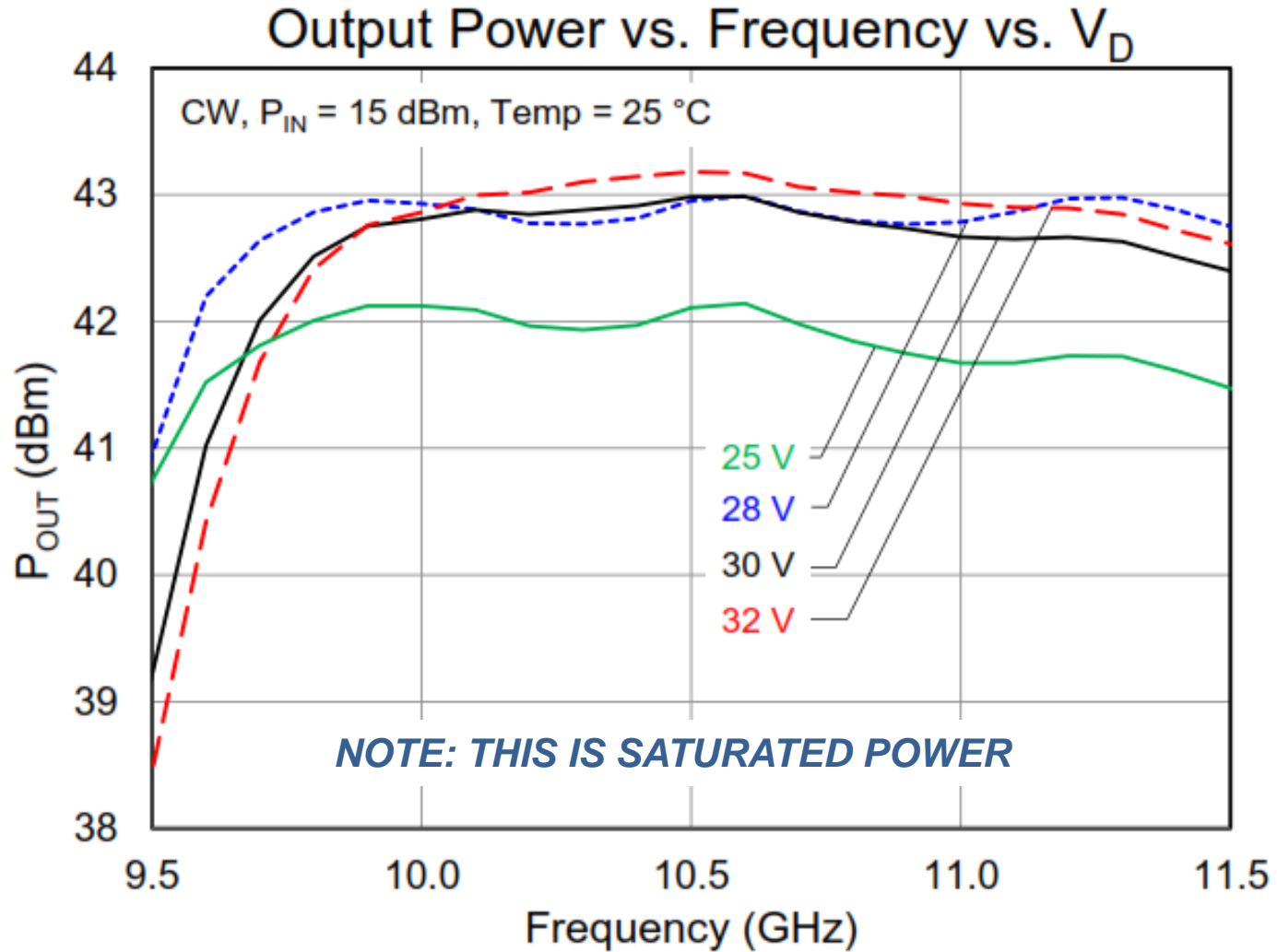
Power Transfer Curves – vs I_{DQ}



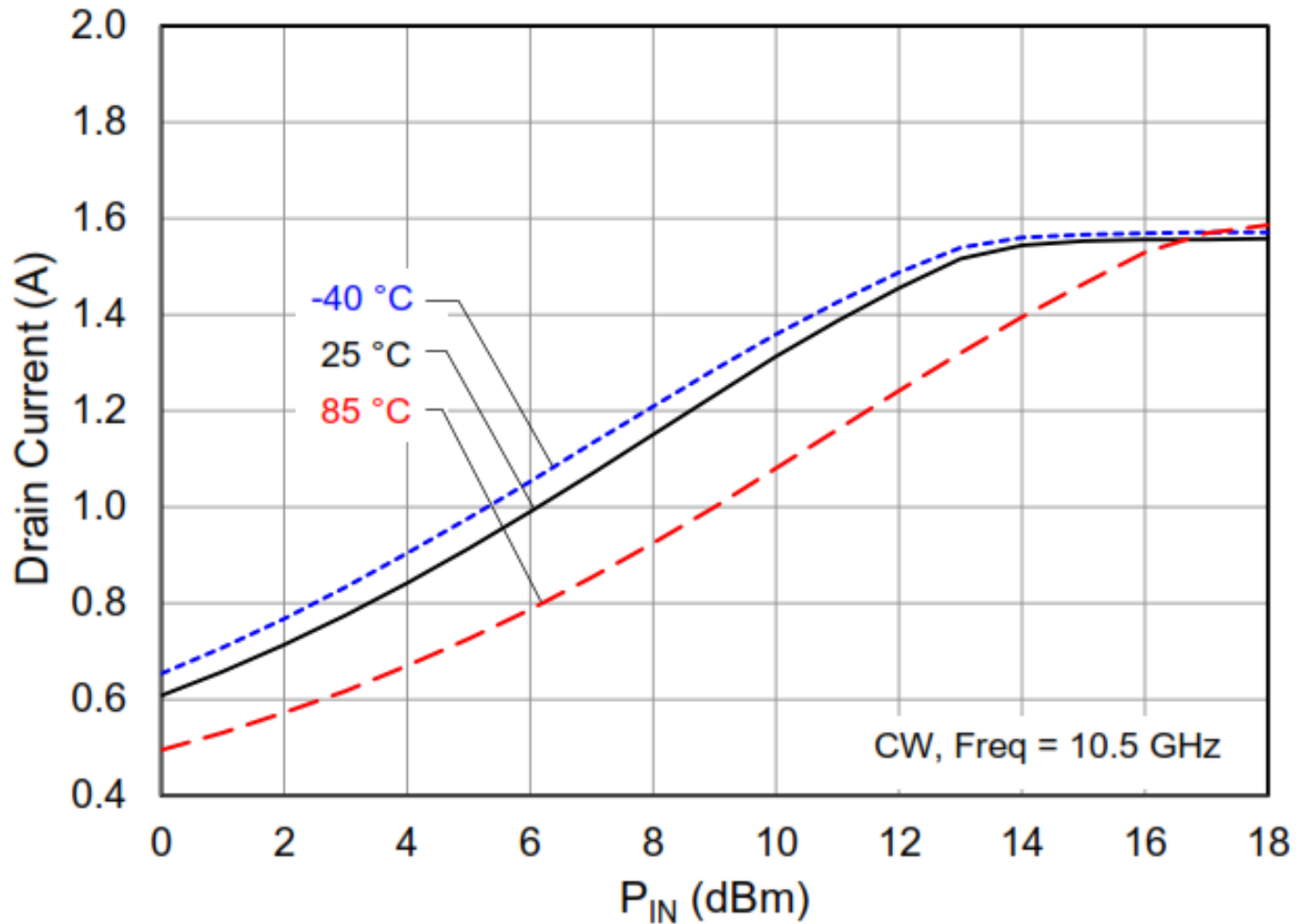
Input Return Loss



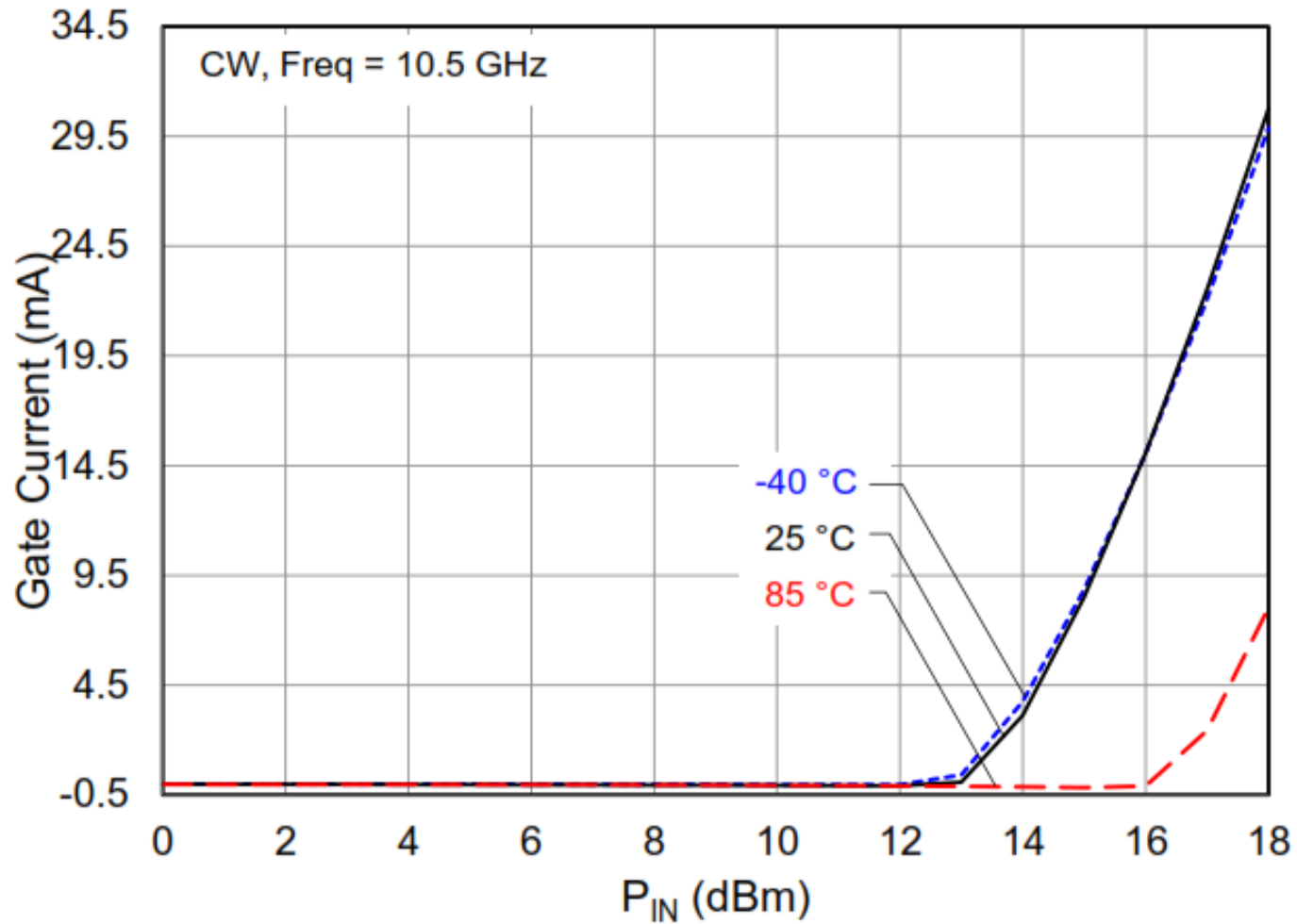
Frequency Response



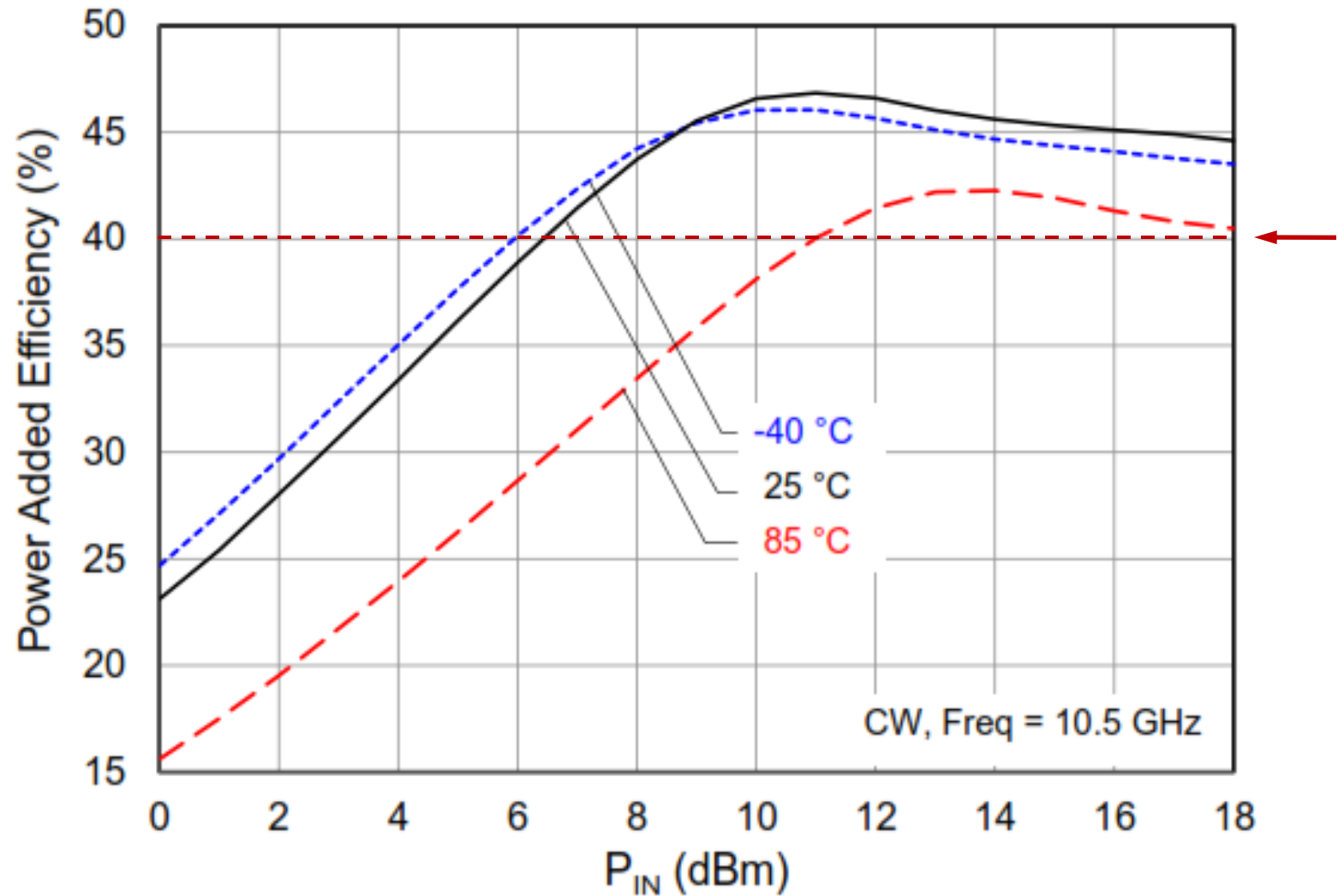
Drain Current



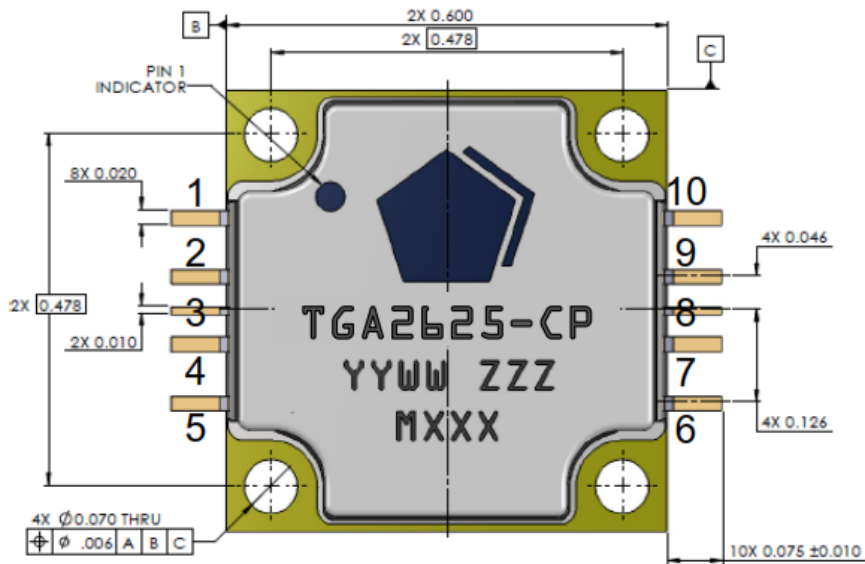
Gate Current



PAE



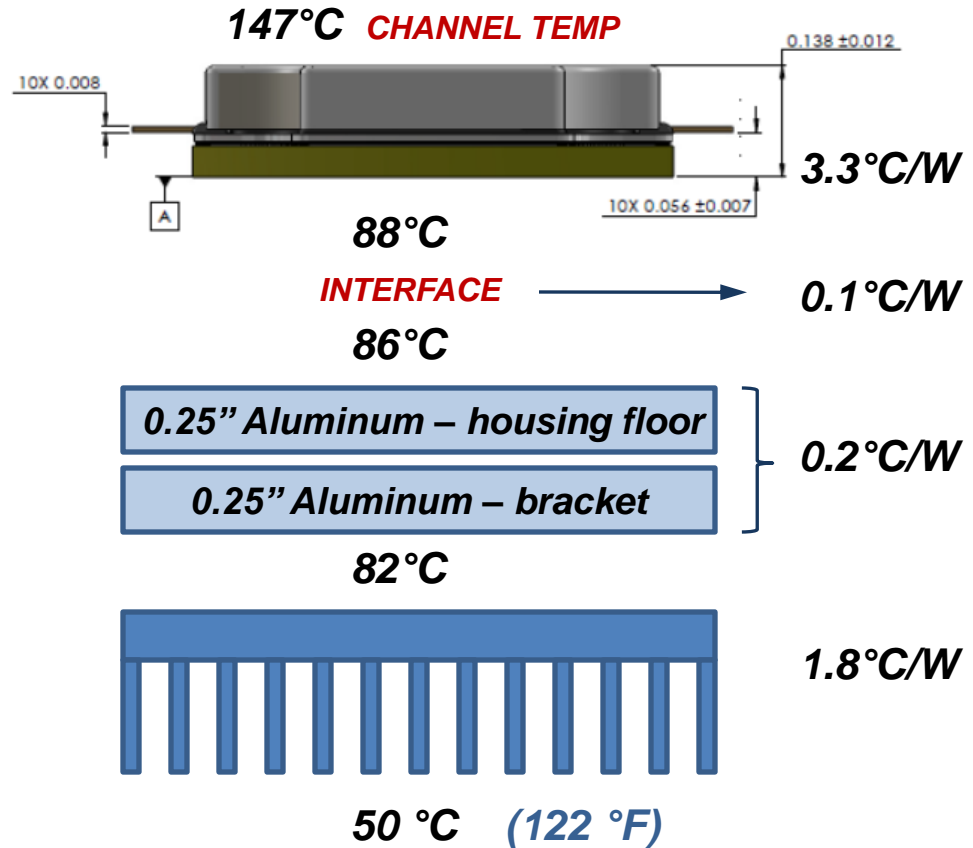
MMIC Package and Thermal Budget



$P_{OUT} = 12\text{ W}$
 $PAE = 40\%$
 $P_{DISS} = 18\text{ W}$
 $P_{DC} = 30\text{ W}$
 $(28\text{ V} \times 1.1\text{ A})$

$5.4\text{ }^{\circ}\text{C/W}$
 $\times 18\text{ W}$
 $97\text{ }^{\circ}\text{C } \Delta T$

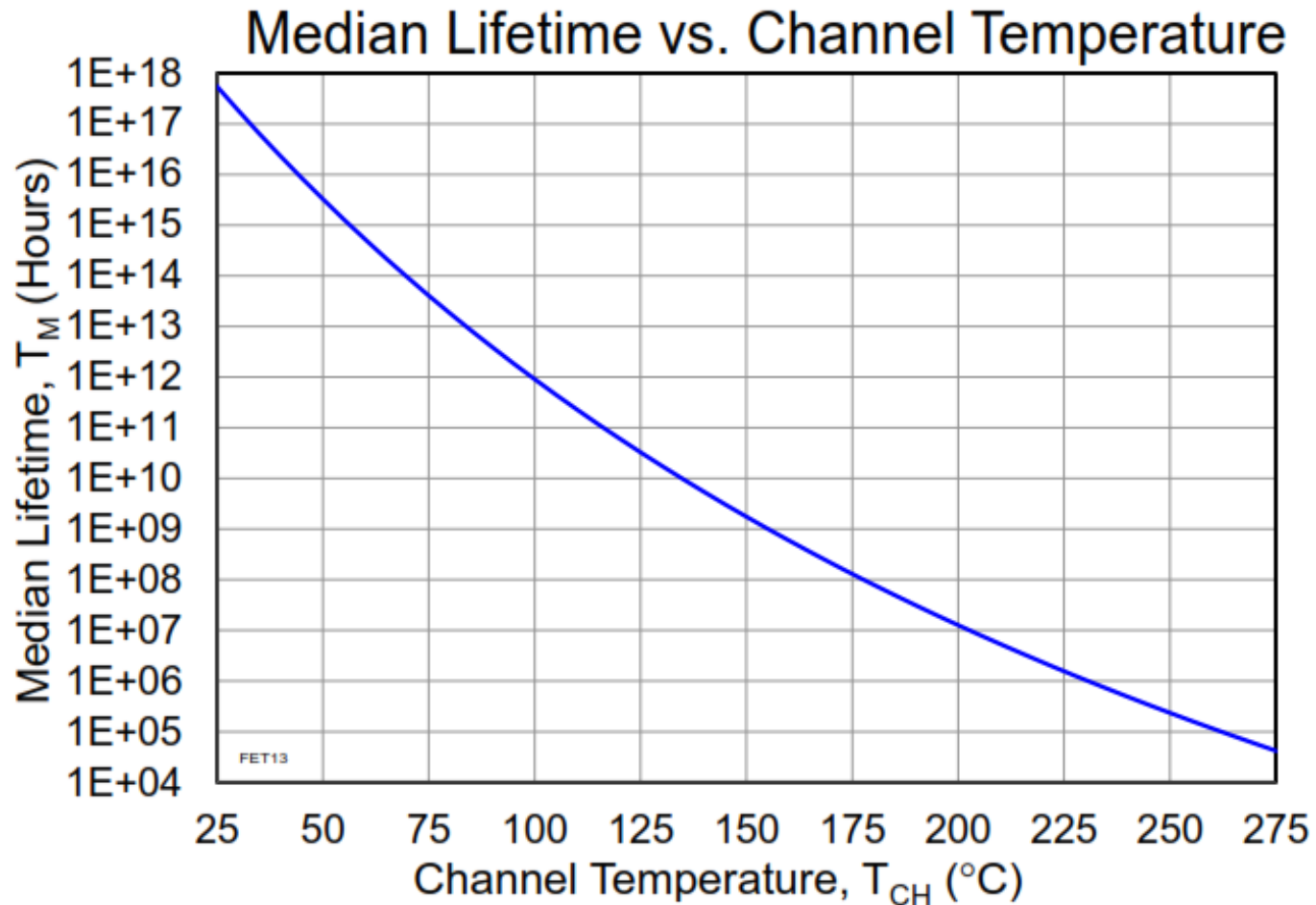
TOTAL $\theta = 5.4\text{ }^{\circ}\text{C/W}$



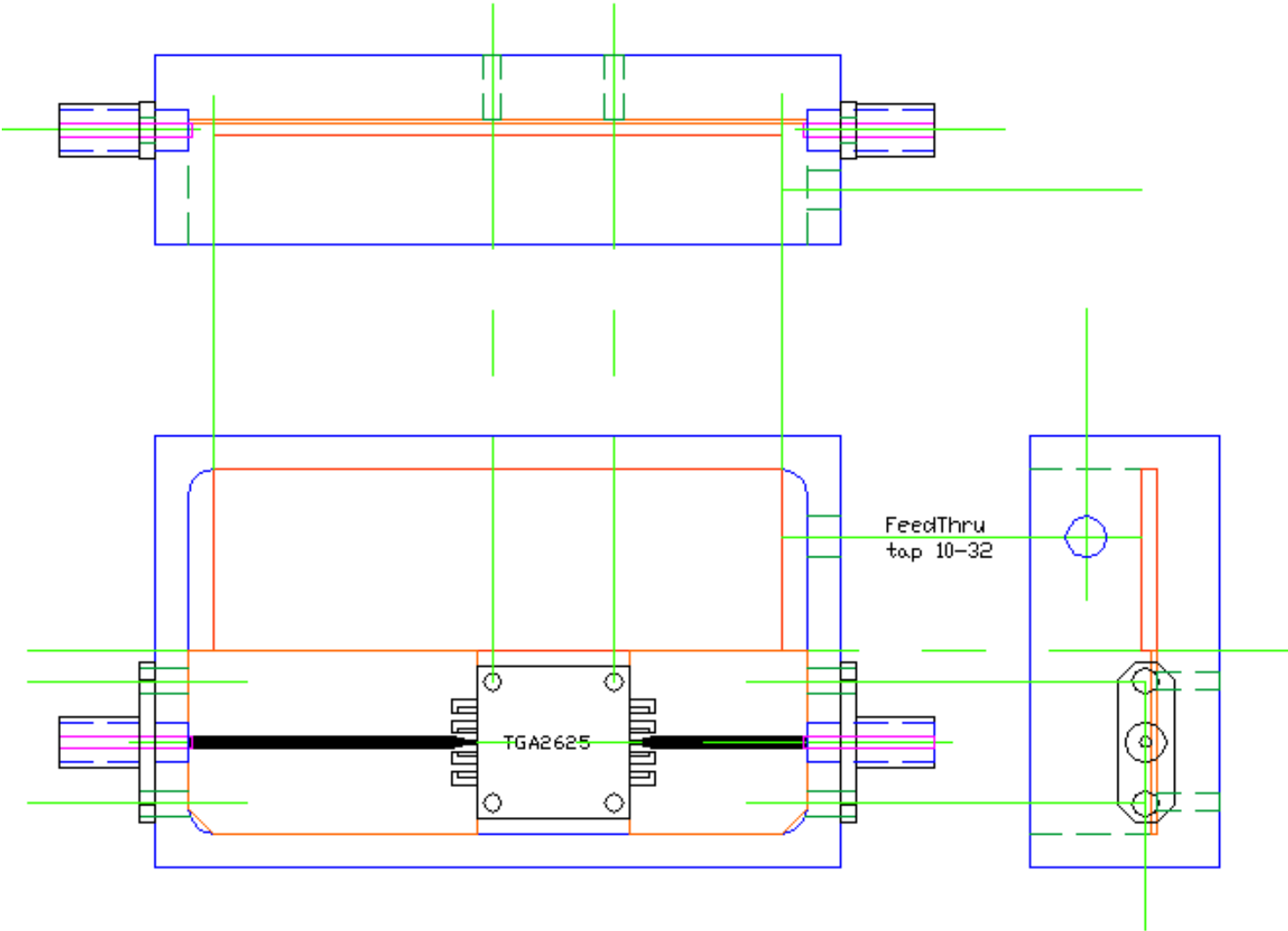
MAX AMBIENT TEMPERATURE

MTTF vs Temperature

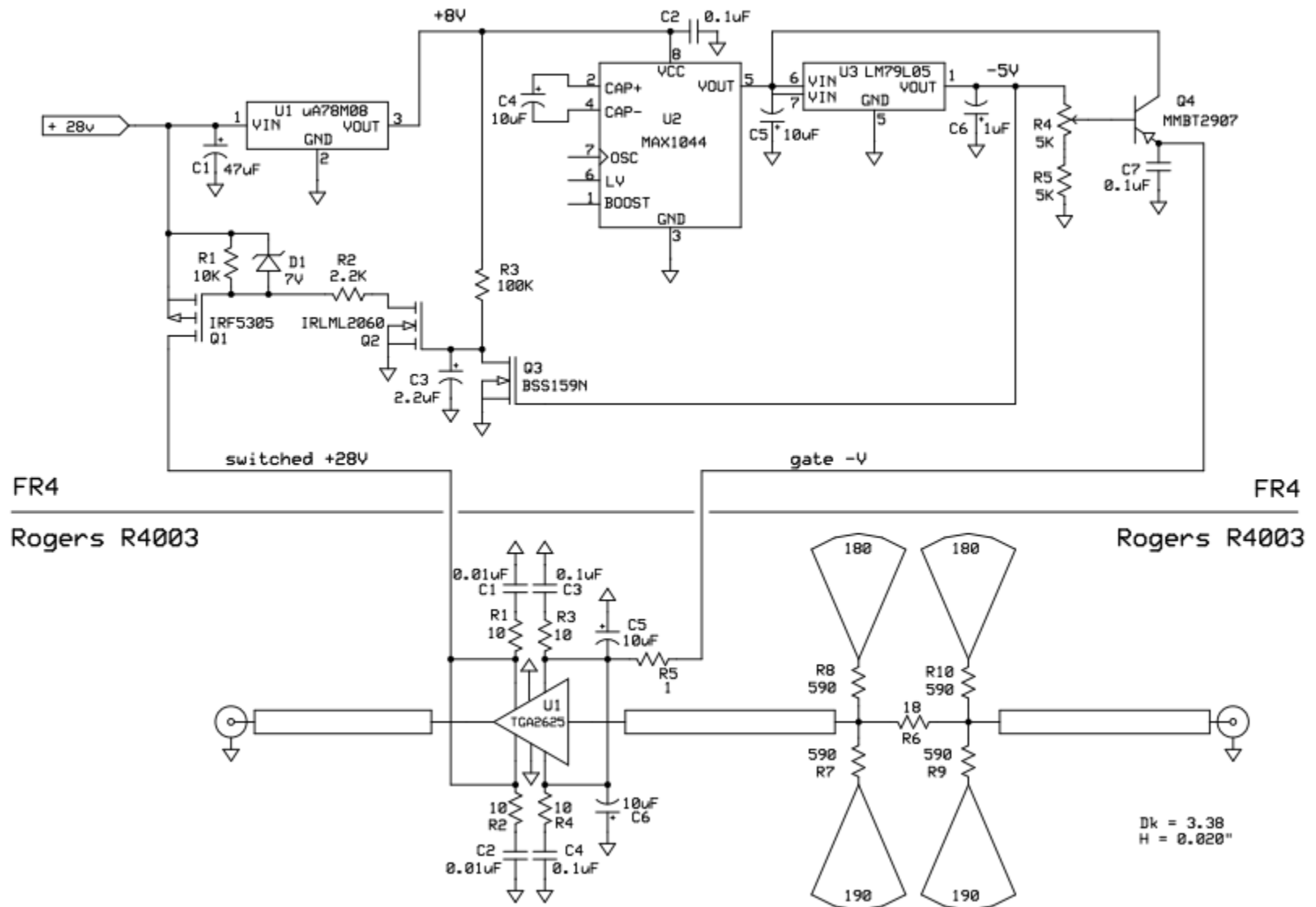
Test Conditions: $V_D = 40\text{ V}$; Failure Criteria = 10% reduction in I_{D_MAX}



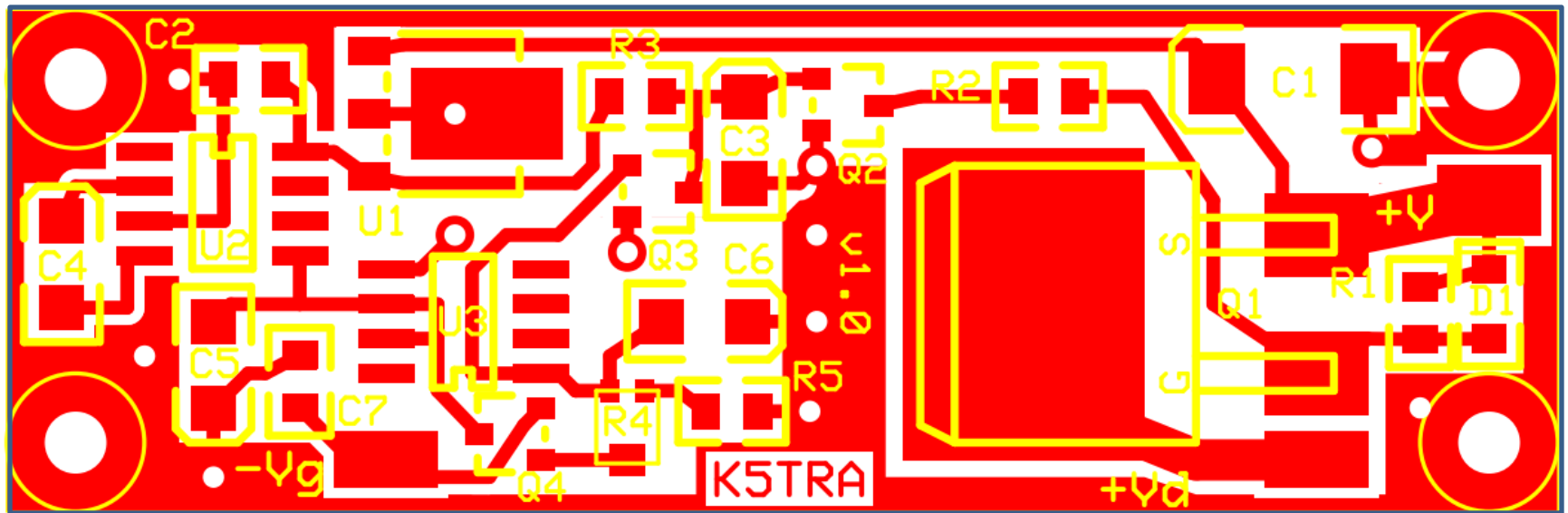
PA Housing



Schematic Diagram

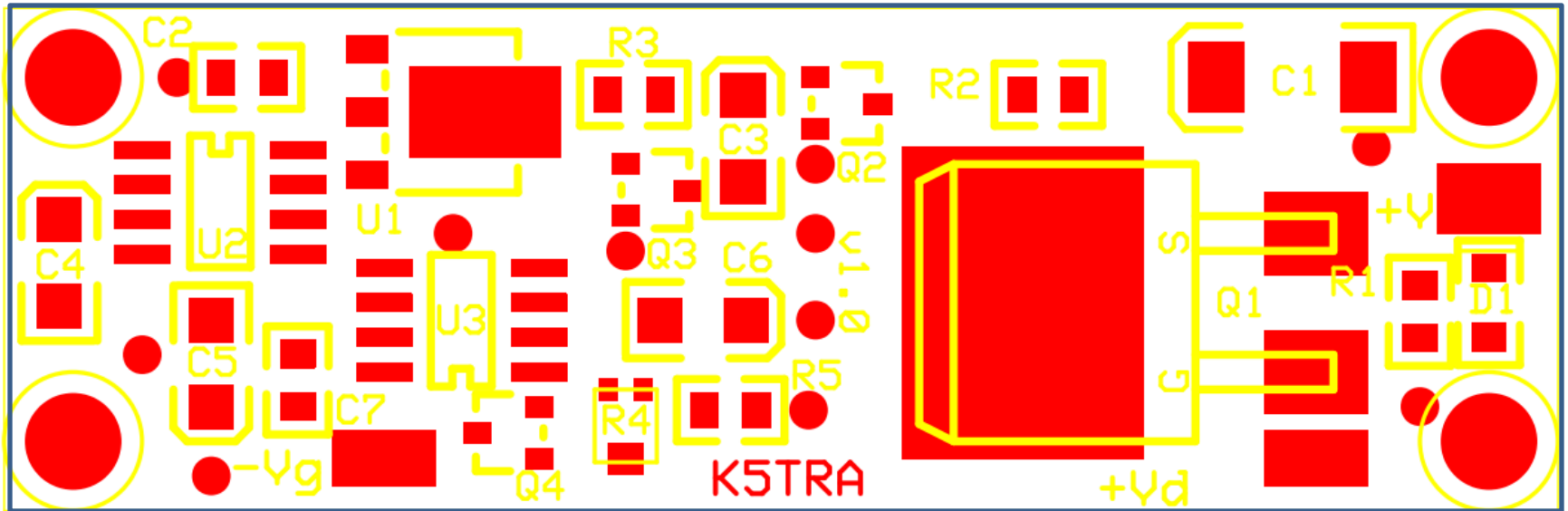


Bias Board Top Layer

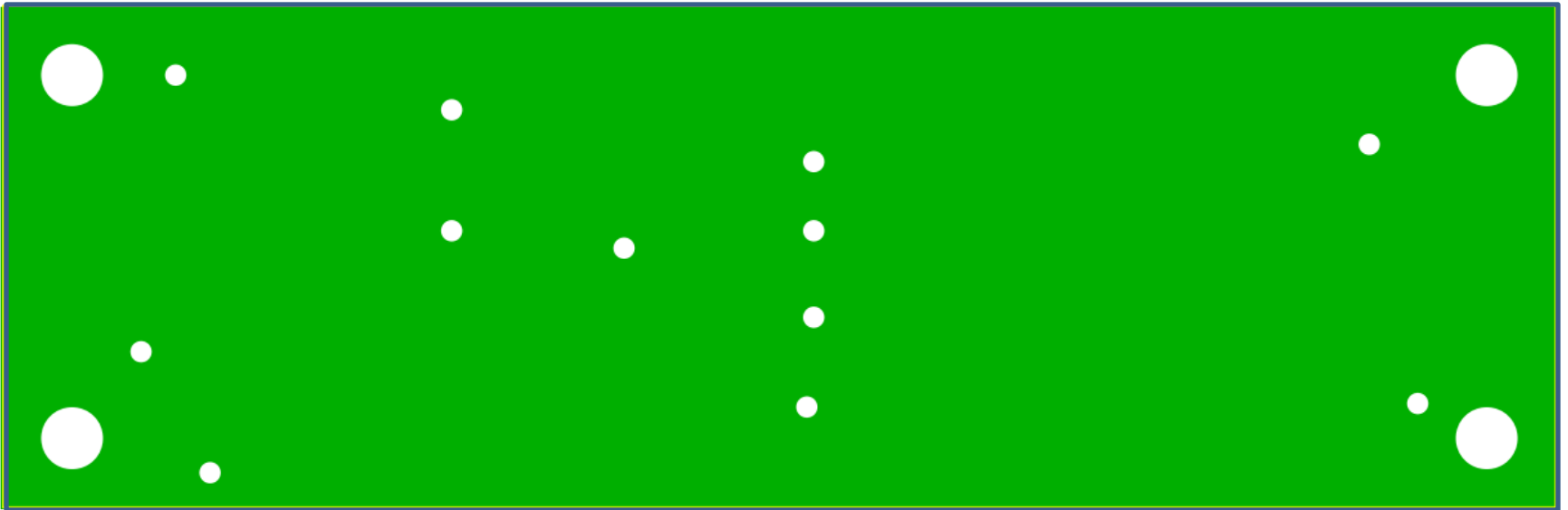


2.250" x 0.725"

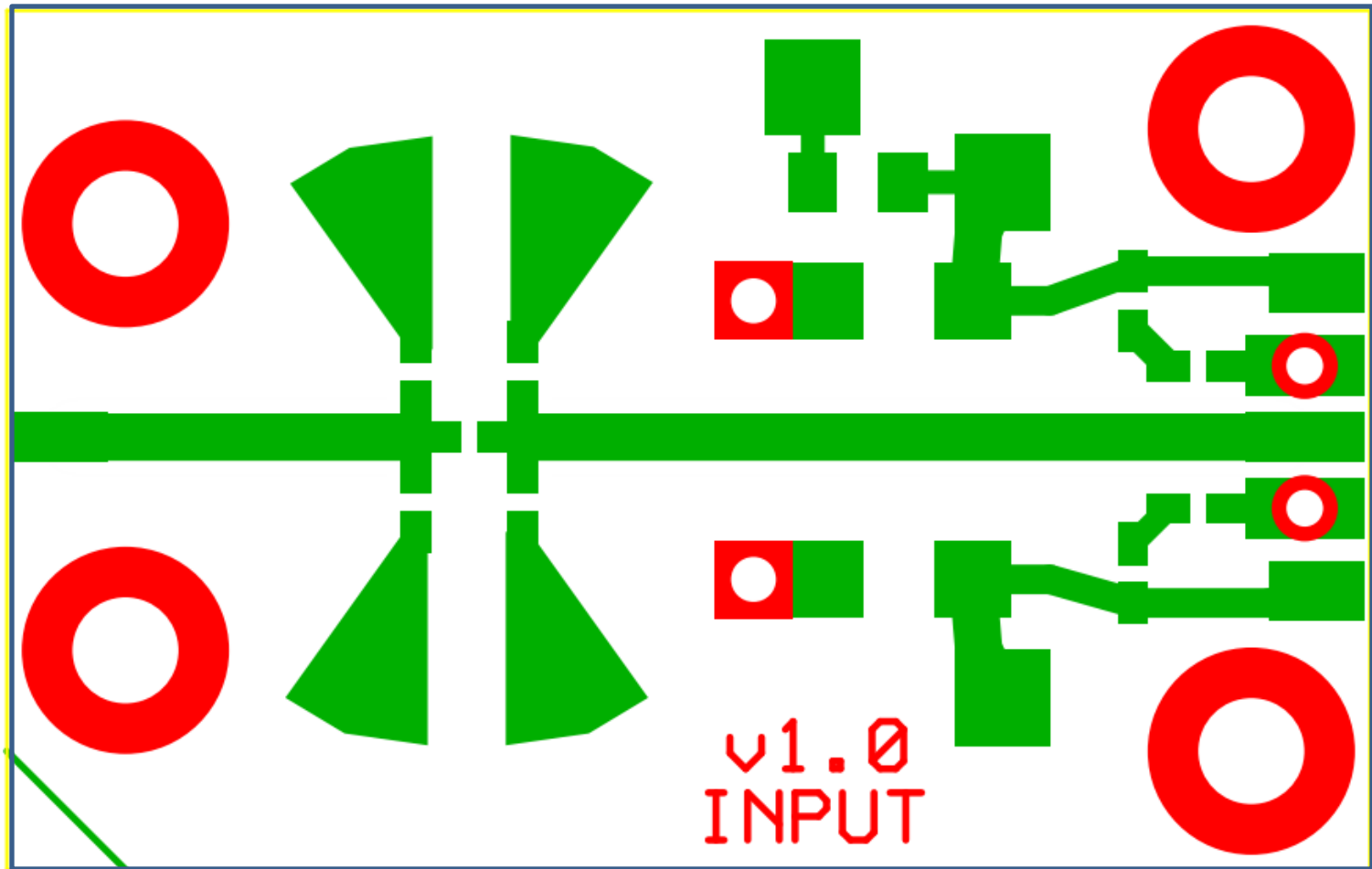
Bias Board Pads



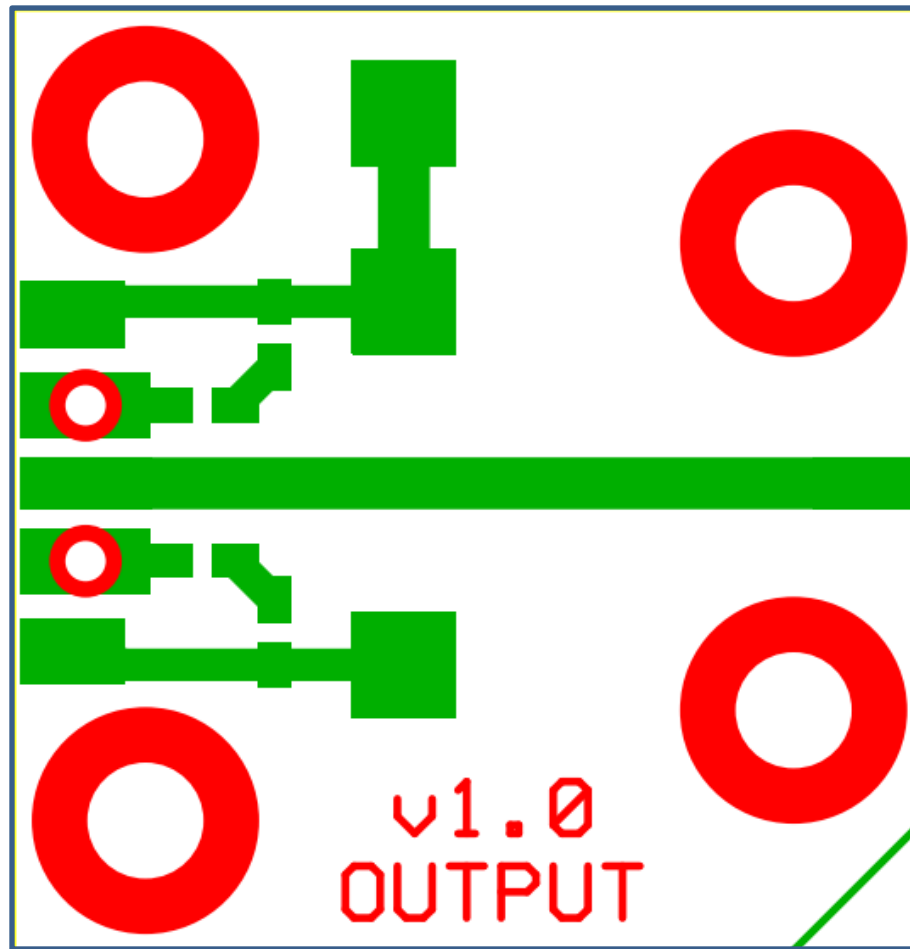
Bias Board Bottom Layer



RF Input



RF Output



Summary

- Conservative design – 12 W linear power output
- Milled Aluminum housing (2.7" x 1.7" x 0.75")
- Thermal design provides < 150°C channel temp.
- Internal, sequenced bias circuit (on FR4)
- RF boards on Rogers 4003
- TGA-2625-CP GaN MMIC from Triquint / Qorvo

Questo è Tutto

