

# APPLICATION NOTE

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Date : 28<sup>th</sup> Nov. 2011  
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**SUBJECT:** RD01MUS2B & RD07MUS2B two-stage amplifier at f=380 to 470MHz. (Vdd=7.2V)

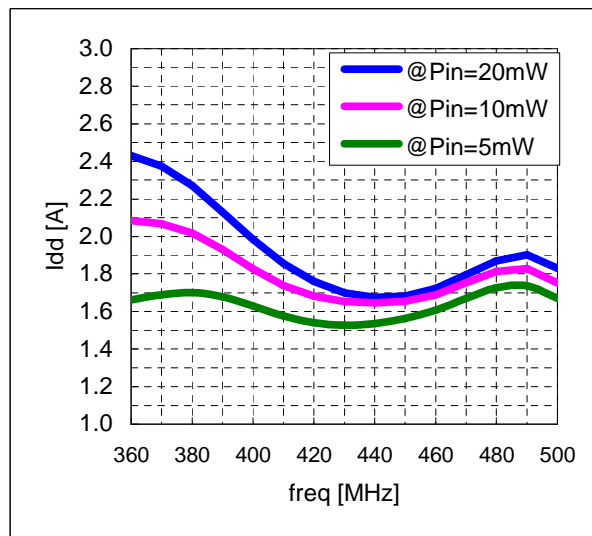
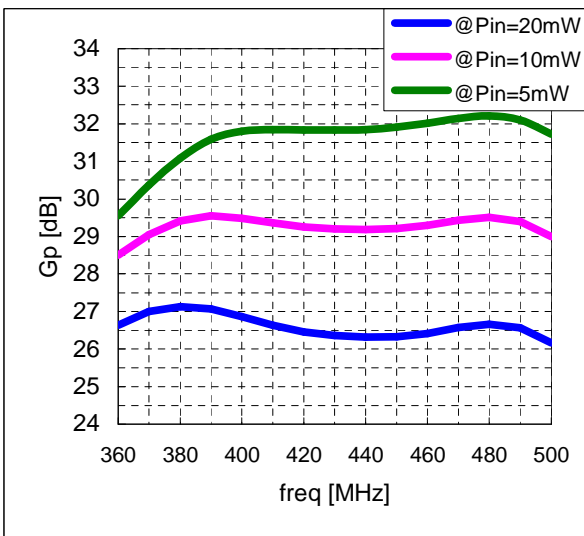
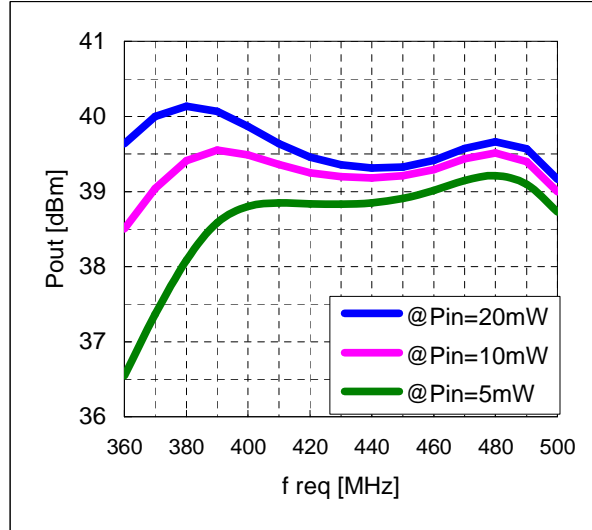
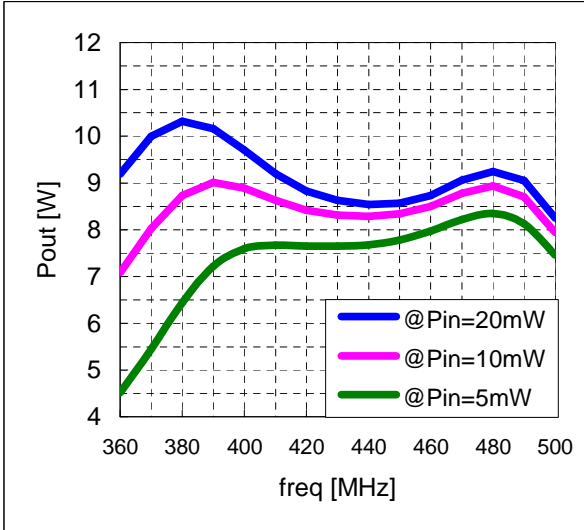
## SUMMARY:

This application note shows the RF wide band characteristics data  
(Frequency, Pout vs. Pin, Pout vs. Vgg characteristics) at f=380 to 470 MHz.

- Sample history :
  - RD01MUS2B : Lot number "151"
  - RD07MUS2B : Lot number "10YAA-G"
- Evaluate conditions :
  - @f=380 to 470MHz : Vdd=7.2V, Idq1=40mA(Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)
- Results :
  - Page 2-4. shows the Frequency characteristics data.
  - Page 5-9. shows the Pout vs. Pin characteristics data.
  - Page 10-14. shows the Pout vs. Vgg characteristics data.
  - Page 15-17. shows the Pout vs. Vdd characteristics data.
  - Page 18-19. shows the equivalent circuit.

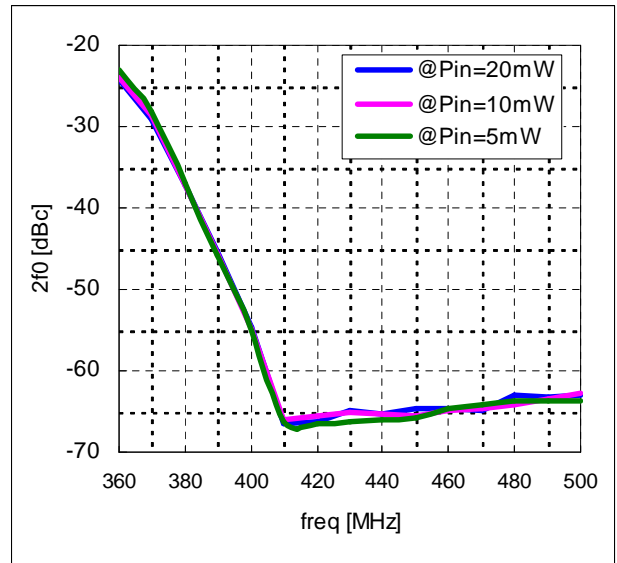
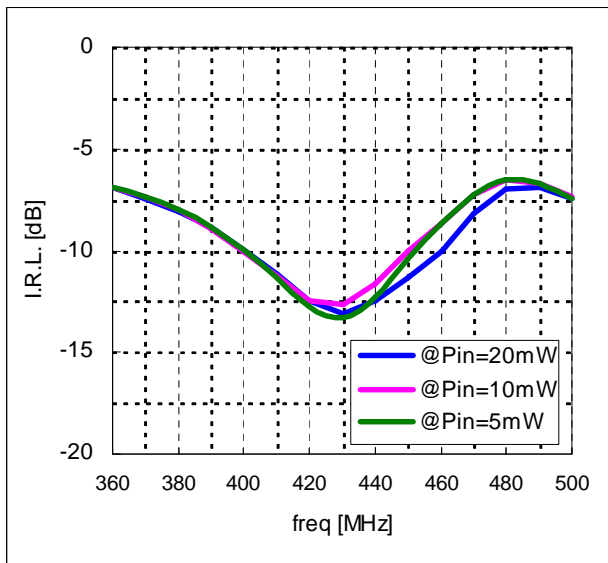
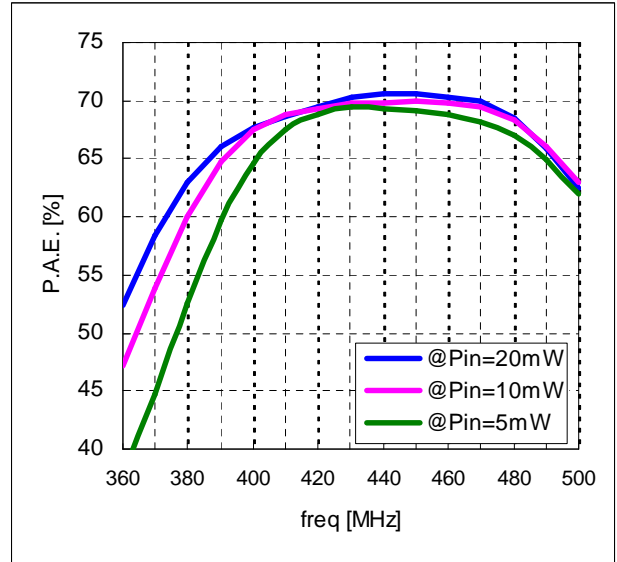
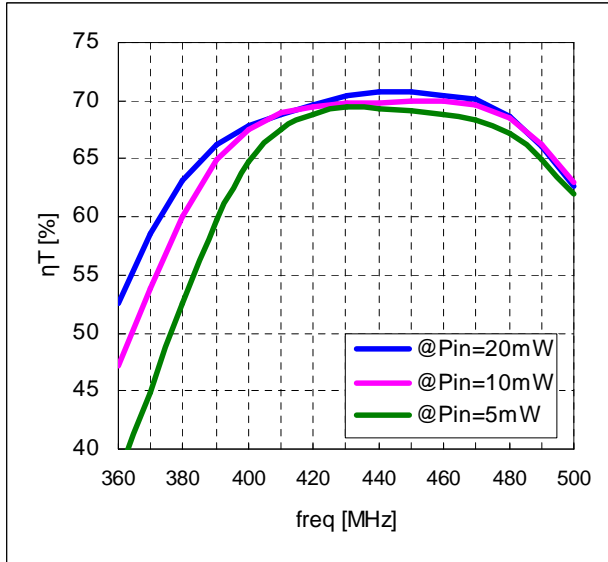
### Frequency characteristics

@Pi=5mW/10mW/20mW, Vdd=7.2V, Idq1=40mA(Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)



### Frequency characteristics

@Pi=5 / 10 / 20mW, Vdd=7.2V, Idq1=40mA(Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)



## Frequency characteristics data

@Pin=5mW(Pin=7dBm)

| f (MHz) | Pin (dBm) | Pout (W) (dBm) |      | Gp (dB) | Idd (A) | $\eta_T$ (%) | P.A.E. (%) | 2fo (dBc) | 3fo (dBc) | I.R.L. (dB) | VSWR (-) |
|---------|-----------|----------------|------|---------|---------|--------------|------------|-----------|-----------|-------------|----------|
| 360     | 7.0       | 4.52           | 36.5 | 29.5    | 1.66    | 37.8         | 37.7       | -23.0     | <-70      | -6.8        | 2.7:1    |
| 370     | 7.0       | 5.45           | 37.4 | 30.4    | 1.69    | 44.8         | 44.8       | -28.2     | <-70      | -7.3        | 2.5:1    |
| 380     | 7.0       | 6.44           | 38.1 | 31.1    | 1.70    | 52.5         | 52.5       | -37.1     | <-70      | -8.0        | 2.3:1    |
| 390     | 7.0       | 7.22           | 38.6 | 31.6    | 1.68    | 59.7         | 59.7       | -45.8     | <-70      | -8.8        | 2.1:1    |
| 400     | 7.0       | 7.59           | 38.8 | 31.8    | 1.63    | 64.7         | 64.6       | -55.2     | <-70      | -10.0       | 1.9:1    |
| 410     | 7.0       | 7.67           | 38.8 | 31.8    | 1.58    | 67.5         | 67.5       | -66.3     | <-70      | -11.3       | 1.7:1    |
| 420     | 7.0       | 7.65           | 38.8 | 31.8    | 1.54    | 68.9         | 68.8       | -66.5     | <-70      | -12.7       | 1.6:1    |
| 430     | 7.0       | 7.64           | 38.8 | 31.8    | 1.53    | 69.5         | 69.4       | -66.2     | <-70      | -13.3       | 1.6:1    |
| 440     | 7.0       | 7.67           | 38.8 | 31.8    | 1.54    | 69.4         | 69.3       | -66.0     | <-70      | -12.3       | 1.6:1    |
| 450     | 7.0       | 7.78           | 38.9 | 31.9    | 1.56    | 69.2         | 69.1       | -65.8     | <-70      | -10.4       | 1.9:1    |
| 460     | 7.0       | 7.97           | 39.0 | 32.0    | 1.61    | 68.9         | 68.8       | -64.6     | <-70      | -8.6        | 2.2:1    |
| 470     | 7.0       | 8.22           | 39.1 | 32.1    | 1.67    | 68.3         | 68.2       | -64.2     | <-70      | -7.2        | 2.5:1    |
| 480     | 7.0       | 8.34           | 39.2 | 32.2    | 1.73    | 67.1         | 67.1       | -63.6     | <-70      | -6.5        | 2.8:1    |
| 490     | 7.0       | 8.12           | 39.1 | 32.1    | 1.74    | 65.0         | 64.9       | -63.8     | <-70      | -6.7        | 2.7:1    |
| 500     | 7.0       | 7.46           | 38.7 | 31.7    | 1.67    | 62.0         | 61.9       | -63.7     | <-70      | -7.4        | 2.5:1    |

@Pin=10mW(Pin=10dBm)

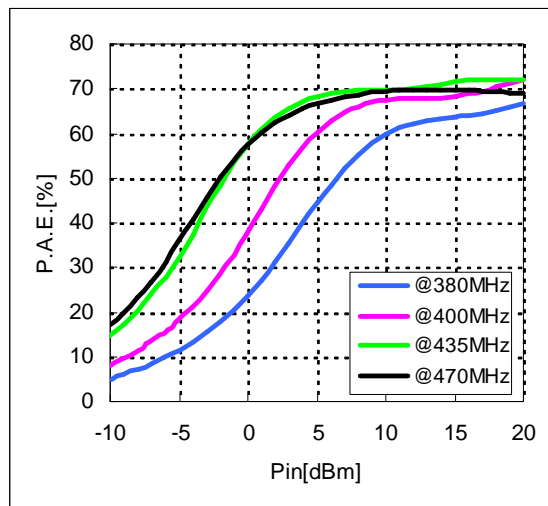
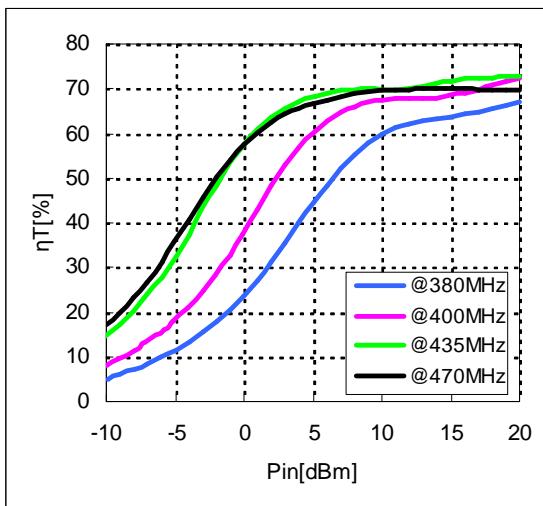
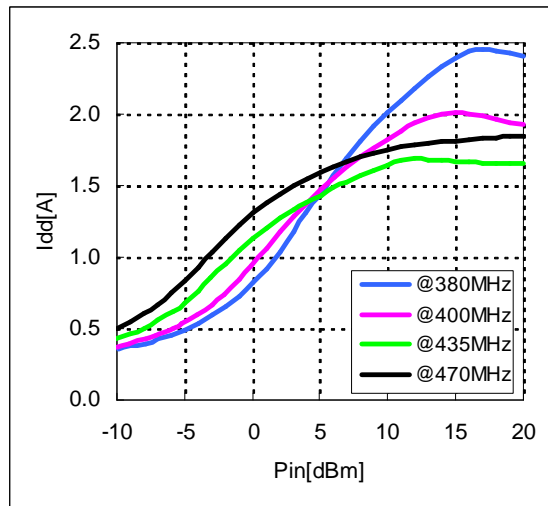
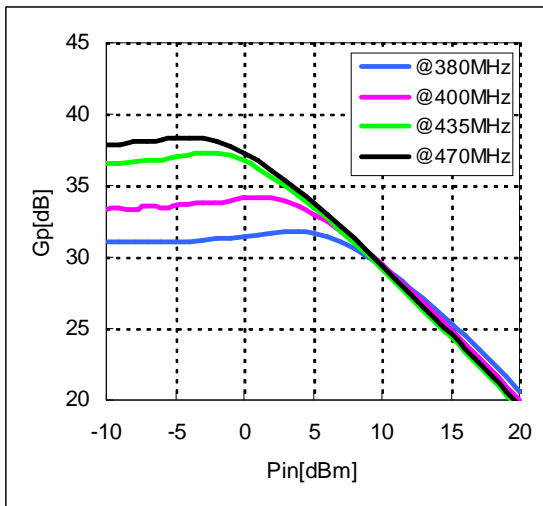
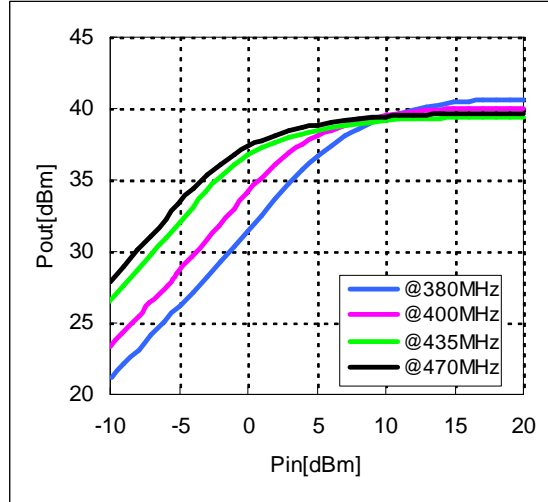
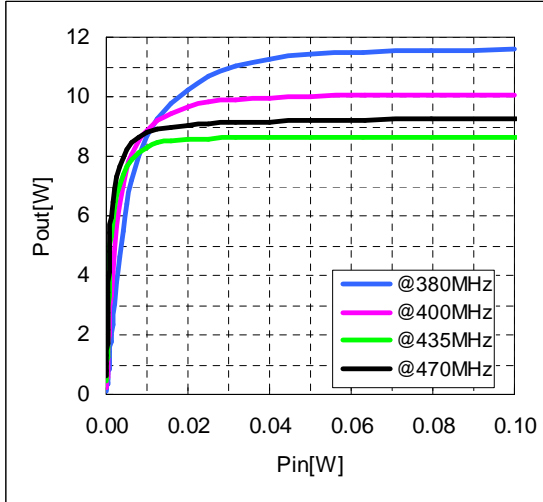
| f (MHz) | Pin (dBm) | Pout (W) (dBm) |      | Gp (dB) | Idd (A) | $\eta_T$ (%) | P.A.E. (%) | 2fo (dBc) | 3fo (dBc) | I.R.L. (dB) | VSWR (-) |
|---------|-----------|----------------|------|---------|---------|--------------|------------|-----------|-----------|-------------|----------|
| 360     | 10.0      | 7.08           | 38.5 | 28.5    | 2.08    | 47.2         | 47.1       | -23.9     | <-70      | -6.8        | 2.7:1    |
| 370     | 10.0      | 8.02           | 39.0 | 29.0    | 2.07    | 53.9         | 53.8       | -28.7     | <-70      | -7.4        | 2.5:1    |
| 380     | 10.0      | 8.73           | 39.4 | 29.4    | 2.02    | 60.1         | 60.0       | -37.1     | <-70      | -8.0        | 2.3:1    |
| 390     | 10.0      | 9.01           | 39.5 | 29.5    | 1.93    | 64.8         | 64.8       | -45.7     | <-70      | -8.9        | 2.1:1    |
| 400     | 10.0      | 8.89           | 39.5 | 29.5    | 1.83    | 67.6         | 67.5       | -55.0     | <-70      | -10.0       | 1.9:1    |
| 410     | 10.0      | 8.63           | 39.4 | 29.4    | 1.74    | 68.9         | 68.8       | -66.0     | <-70      | -11.3       | 1.7:1    |
| 420     | 10.0      | 8.41           | 39.2 | 29.2    | 1.68    | 69.4         | 69.4       | -65.5     | <-70      | -12.5       | 1.6:1    |
| 430     | 10.0      | 8.31           | 39.2 | 29.2    | 1.65    | 69.8         | 69.7       | -65.2     | <-70      | -12.7       | 1.6:1    |
| 440     | 10.0      | 8.28           | 39.2 | 29.2    | 1.65    | 69.8         | 69.8       | -65.4     | <-70      | -11.6       | 1.7:1    |
| 450     | 10.0      | 8.34           | 39.2 | 29.2    | 1.66    | 70.0         | 69.9       | -65.6     | <-70      | -10.1       | 1.9:1    |
| 460     | 10.0      | 8.50           | 39.3 | 29.3    | 1.69    | 69.9         | 69.8       | -64.9     | <-70      | -8.6        | 2.2:1    |
| 470     | 10.0      | 8.78           | 39.4 | 29.4    | 1.75    | 69.6         | 69.5       | -64.6     | <-70      | -7.2        | 2.5:1    |
| 480     | 10.0      | 8.94           | 39.5 | 29.5    | 1.81    | 68.5         | 68.4       | -64.1     | <-70      | -6.5        | 2.8:1    |
| 490     | 10.0      | 8.70           | 39.4 | 29.4    | 1.83    | 66.1         | 66.1       | -63.6     | <-70      | -6.7        | 2.7:1    |
| 500     | 10.0      | 7.94           | 39.0 | 29.0    | 1.75    | 63.0         | 62.9       | -62.9     | <-70      | -7.3        | 2.5:1    |

@Pin=20mW(Pin=13dBm)

| f (MHz) | Pin (dBm) | Pout (W) (dBm) |      | Gp (dB) | Idd (A) | $\eta_T$ (%) | P.A.E. (%) | 2fo (dBc) | 3fo (dBc) | I.R.L. (dB) | VSWR (-) |
|---------|-----------|----------------|------|---------|---------|--------------|------------|-----------|-----------|-------------|----------|
| 360     | 13.0      | 9.19           | 39.6 | 26.6    | 2.43    | 52.5         | 52.4       | -24.3     | <-70      | -6.9        | 2.7:1    |
| 370     | 13.0      | 10.00          | 40.0 | 27.0    | 2.37    | 58.5         | 58.4       | -29.0     | <-70      | -7.4        | 2.5:1    |
| 380     | 13.0      | 10.32          | 40.1 | 27.1    | 2.27    | 63.1         | 63.0       | -37.2     | <-70      | -8.1        | 2.3:1    |
| 390     | 13.0      | 10.16          | 40.1 | 27.1    | 2.13    | 66.2         | 66.1       | -45.4     | <-70      | -8.9        | 2.1:1    |
| 400     | 13.0      | 9.70           | 39.9 | 26.9    | 1.98    | 67.9         | 67.7       | -54.6     | <-70      | -10.0       | 1.9:1    |
| 410     | 13.0      | 9.20           | 39.6 | 26.6    | 1.86    | 68.8         | 68.7       | -66.6     | <-70      | -11.2       | 1.8:1    |
| 420     | 13.0      | 8.83           | 39.5 | 26.5    | 1.76    | 69.7         | 69.5       | -66.2     | <-70      | -12.5       | 1.6:1    |
| 430     | 13.0      | 8.63           | 39.4 | 26.4    | 1.70    | 70.5         | 70.3       | -64.9     | <-70      | -13.1       | 1.6:1    |
| 440     | 13.0      | 8.54           | 39.3 | 26.3    | 1.68    | 70.7         | 70.6       | -65.4     | <-70      | -12.5       | 1.6:1    |
| 450     | 13.0      | 8.57           | 39.3 | 26.3    | 1.68    | 70.8         | 70.6       | -64.7     | <-70      | -11.4       | 1.7:1    |
| 460     | 13.0      | 8.73           | 39.4 | 26.4    | 1.72    | 70.4         | 70.2       | -64.8     | <-70      | -10.0       | 1.9:1    |
| 470     | 13.0      | 9.06           | 39.6 | 26.6    | 1.80    | 70.1         | 69.9       | -64.9     | <-70      | -8.2        | 2.3:1    |
| 480     | 13.0      | 9.25           | 39.7 | 26.7    | 1.87    | 68.7         | 68.5       | -63.1     | <-70      | -7.0        | 2.6:1    |
| 490     | 13.0      | 9.05           | 39.6 | 26.6    | 1.90    | 66.1         | 66.0       | -63.3     | <-70      | -6.9        | 2.6:1    |
| 500     | 13.0      | 8.25           | 39.2 | 26.2    | 1.83    | 62.6         | 62.4       | -63.1     | <-70      | -7.4        | 2.5:1    |

**Pout vs. Pin characteristics**

@ f=380/400/435/470MHz, Vdd=7.2V, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)



**Pout vs. Pin characteristics data**@ **f=380MHz**, Vdd=7.2V, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Pin   |       | Pout  |       | Gp   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|-------|-------|-------|-------|------|------|----------|--------|--------|
| (W)   | (dBm) | (W)   | (dBm) | (dB) | (A)  | (%)      | (%)    | (dB)   |
| 0.000 | -9.9  | 0.13  | 21.2  | 31.1 | 0.36 | 5.1      | 5.1    | -7.7   |
| 0.000 | -9.0  | 0.16  | 22.1  | 31.1 | 0.38 | 6.0      | 6.0    | -7.8   |
| 0.000 | -7.9  | 0.21  | 23.1  | 31.0 | 0.40 | 7.2      | 7.2    | -8.0   |
| 0.000 | -7.0  | 0.26  | 24.1  | 31.1 | 0.42 | 8.5      | 8.5    | -8.1   |
| 0.000 | -6.0  | 0.32  | 25.1  | 31.1 | 0.45 | 9.9      | 9.9    | -8.2   |
| 0.000 | -5.0  | 0.41  | 26.1  | 31.1 | 0.49 | 11.6     | 11.6   | -8.3   |
| 0.000 | -4.0  | 0.52  | 27.1  | 31.1 | 0.54 | 13.4     | 13.4   | -8.3   |
| 0.001 | -3.0  | 0.66  | 28.2  | 31.2 | 0.59 | 15.5     | 15.5   | -8.3   |
| 0.001 | -2.0  | 0.84  | 29.3  | 31.3 | 0.66 | 17.9     | 17.8   | -8.3   |
| 0.001 | -1.0  | 1.08  | 30.3  | 31.3 | 0.73 | 20.6     | 20.6   | -8.2   |
| 0.001 | 0.0   | 1.40  | 31.5  | 31.4 | 0.82 | 23.7     | 23.7   | -8.2   |
| 0.001 | 1.0   | 1.80  | 32.5  | 31.6 | 0.92 | 27.1     | 27.1   | -8.2   |
| 0.002 | 2.0   | 2.34  | 33.7  | 31.7 | 1.04 | 31.2     | 31.2   | -8.1   |
| 0.002 | 3.0   | 3.01  | 34.8  | 31.8 | 1.17 | 35.6     | 35.6   | -8.1   |
| 0.003 | 4.0   | 3.77  | 35.8  | 31.8 | 1.31 | 40.0     | 40.0   | -8.0   |
| 0.003 | 5.0   | 4.63  | 36.7  | 31.6 | 1.45 | 44.5     | 44.5   | -8.0   |
| 0.004 | 6.0   | 5.49  | 37.4  | 31.4 | 1.57 | 48.5     | 48.5   | -8.0   |
| 0.005 | 7.0   | 6.38  | 38.0  | 31.0 | 1.69 | 52.3     | 52.2   | -8.0   |
| 0.006 | 8.0   | 7.21  | 38.6  | 30.6 | 1.81 | 55.4     | 55.4   | -8.0   |
| 0.008 | 9.0   | 7.99  | 39.0  | 30.0 | 1.91 | 57.9     | 57.9   | -8.0   |
| 0.010 | 10.0  | 8.67  | 39.4  | 29.4 | 2.01 | 59.9     | 59.8   | -8.0   |
| 0.013 | 11.0  | 9.26  | 39.7  | 28.7 | 2.10 | 61.2     | 61.2   | -8.1   |
| 0.016 | 12.0  | 9.78  | 39.9  | 27.9 | 2.18 | 62.2     | 62.1   | -8.1   |
| 0.020 | 13.0  | 10.22 | 40.1  | 27.1 | 2.26 | 62.8     | 62.7   | -8.1   |
| 0.025 | 14.0  | 10.66 | 40.3  | 26.3 | 2.34 | 63.4     | 63.2   | -8.1   |
| 0.032 | 15.0  | 11.01 | 40.4  | 25.4 | 2.40 | 63.8     | 63.6   | -8.2   |
| 0.040 | 16.0  | 11.27 | 40.5  | 24.5 | 2.44 | 64.2     | 64.0   | -8.3   |
| 0.050 | 17.0  | 11.42 | 40.6  | 23.6 | 2.45 | 64.8     | 64.5   | -8.6   |
| 0.063 | 18.0  | 11.50 | 40.6  | 22.6 | 2.44 | 65.5     | 65.1   | -8.9   |
| 0.079 | 19.0  | 11.57 | 40.6  | 21.6 | 2.42 | 66.3     | 65.8   | -9.2   |
| 0.100 | 20.0  | 11.62 | 40.7  | 20.6 | 2.40 | 67.2     | 66.6   | -9.5   |

RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

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@ **f=400MHz**, Vdd=7.2V, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Pin   |       | Pout  |       | Gp   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|-------|-------|-------|-------|------|------|----------|--------|--------|
| (W)   | (dBm) | (W)   | (dBm) | (dB) | (A)  | (%)      | (%)    | (dB)   |
| 0.000 | -10.0 | 0.22  | 23.3  | 33.3 | 0.37 | 8.0      | 8.0    | -9.6   |
| 0.000 | -9.1  | 0.27  | 24.3  | 33.4 | 0.39 | 9.5      | 9.5    | -9.8   |
| 0.000 | -7.9  | 0.35  | 25.5  | 33.4 | 0.43 | 11.6     | 11.5   | -10.1  |
| 0.000 | -7.2  | 0.43  | 26.4  | 33.5 | 0.45 | 13.3     | 13.3   | -10.1  |
| 0.000 | -5.8  | 0.58  | 27.6  | 33.4 | 0.50 | 16.0     | 16.0   | -10.4  |
| 0.000 | -5.2  | 0.70  | 28.4  | 33.6 | 0.54 | 18.0     | 18.0   | -10.3  |
| 0.000 | -4.1  | 0.91  | 29.6  | 33.6 | 0.60 | 21.0     | 21.0   | -10.4  |
| 0.000 | -3.0  | 1.20  | 30.8  | 33.8 | 0.67 | 24.9     | 24.9   | -10.5  |
| 0.001 | -2.1  | 1.50  | 31.8  | 33.9 | 0.74 | 28.1     | 28.0   | -10.4  |
| 0.001 | -0.9  | 1.99  | 33.0  | 33.9 | 0.84 | 32.8     | 32.8   | -10.4  |
| 0.001 | -0.1  | 2.52  | 34.0  | 34.1 | 0.94 | 37.3     | 37.3   | -10.3  |
| 0.001 | 1.0   | 3.29  | 35.2  | 34.2 | 1.06 | 43.0     | 43.0   | -10.2  |
| 0.002 | 2.0   | 4.10  | 36.1  | 34.1 | 1.18 | 48.2     | 48.2   | -10.2  |
| 0.002 | 3.0   | 4.89  | 36.9  | 33.9 | 1.29 | 52.8     | 52.8   | -10.1  |
| 0.003 | 4.0   | 5.64  | 37.5  | 33.5 | 1.38 | 56.7     | 56.7   | -10.1  |
| 0.003 | 5.0   | 6.37  | 38.0  | 33.0 | 1.47 | 60.1     | 60.1   | -10.0  |
| 0.004 | 6.0   | 7.02  | 38.5  | 32.5 | 1.55 | 62.7     | 62.7   | -10.0  |
| 0.005 | 7.0   | 7.59  | 38.8  | 31.8 | 1.63 | 64.7     | 64.6   | -10.0  |
| 0.006 | 8.0   | 8.08  | 39.1  | 31.1 | 1.70 | 66.1     | 66.0   | -9.9   |
| 0.008 | 9.0   | 8.51  | 39.3  | 30.3 | 1.76 | 67.0     | 66.9   | -10.0  |
| 0.010 | 10.0  | 8.88  | 39.5  | 29.5 | 1.83 | 67.5     | 67.5   | -10.0  |
| 0.013 | 11.0  | 9.18  | 39.6  | 28.6 | 1.88 | 67.8     | 67.7   | -10.0  |
| 0.016 | 12.0  | 9.45  | 39.8  | 27.8 | 1.94 | 67.8     | 67.7   | -10.0  |
| 0.020 | 13.0  | 9.68  | 39.9  | 26.8 | 1.98 | 67.8     | 67.7   | -9.9   |
| 0.025 | 14.0  | 9.82  | 39.9  | 25.9 | 2.01 | 68.0     | 67.8   | -10.2  |
| 0.032 | 15.0  | 9.90  | 40.0  | 25.0 | 2.01 | 68.4     | 68.2   | -10.5  |
| 0.040 | 16.0  | 9.96  | 40.0  | 24.0 | 2.00 | 69.1     | 68.8   | -11.0  |
| 0.050 | 17.0  | 10.00 | 40.0  | 23.0 | 1.99 | 69.9     | 69.5   | -11.5  |
| 0.063 | 18.0  | 10.03 | 40.0  | 22.0 | 1.97 | 70.8     | 70.3   | -11.9  |
| 0.080 | 19.0  | 10.06 | 40.0  | 21.0 | 1.95 | 71.8     | 71.2   | -12.3  |
| 0.100 | 20.0  | 10.07 | 40.0  | 20.0 | 1.93 | 72.5     | 71.8   | -12.6  |

RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

- AN-UHF-131-

@ **f=435MHz**, Vdd=7.2V, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Pin   |       | Pout |       | Gp   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|-------|-------|------|-------|------|------|----------|--------|--------|
| (W)   | (dBm) | (W)  | (dBm) | (dB) | (A)  | (%)      | (%)    | (dB)   |
| 0.000 | -10.1 | 0.44 | 26.5  | 36.5 | 0.43 | 14.5     | 14.5   | -11.4  |
| 0.000 | -9.0  | 0.57 | 27.6  | 36.6 | 0.46 | 17.2     | 17.2   | -11.9  |
| 0.000 | -8.0  | 0.73 | 28.7  | 36.6 | 0.50 | 20.3     | 20.3   | -12.4  |
| 0.000 | -7.0  | 0.95 | 29.8  | 36.8 | 0.55 | 23.9     | 23.9   | -12.6  |
| 0.000 | -5.9  | 1.24 | 30.9  | 36.8 | 0.62 | 27.9     | 27.9   | -12.9  |
| 0.000 | -5.0  | 1.59 | 32.0  | 37.0 | 0.68 | 32.3     | 32.3   | -12.9  |
| 0.000 | -4.0  | 2.06 | 33.1  | 37.1 | 0.77 | 37.4     | 37.4   | -13.1  |
| 0.000 | -3.0  | 2.64 | 34.2  | 37.3 | 0.85 | 43.0     | 43.0   | -13.2  |
| 0.001 | -2.0  | 3.34 | 35.2  | 37.2 | 0.96 | 48.5     | 48.5   | -13.2  |
| 0.001 | -1.0  | 4.05 | 36.1  | 37.1 | 1.05 | 53.5     | 53.5   | -13.2  |
| 0.001 | 0.0   | 4.71 | 36.7  | 36.7 | 1.13 | 57.6     | 57.6   | -13.2  |
| 0.001 | 1.0   | 5.30 | 37.2  | 36.2 | 1.21 | 61.0     | 61.0   | -13.3  |
| 0.002 | 2.0   | 5.83 | 37.7  | 35.6 | 1.27 | 63.6     | 63.6   | -13.3  |
| 0.002 | 3.0   | 6.28 | 38.0  | 35.0 | 1.33 | 65.6     | 65.6   | -13.4  |
| 0.003 | 4.0   | 6.68 | 38.2  | 34.3 | 1.38 | 67.1     | 67.1   | -13.4  |
| 0.003 | 5.0   | 7.05 | 38.5  | 33.5 | 1.43 | 68.3     | 68.3   | -13.3  |
| 0.004 | 6.0   | 7.37 | 38.7  | 32.7 | 1.48 | 69.0     | 69.0   | -13.2  |
| 0.005 | 7.0   | 7.65 | 38.8  | 31.8 | 1.53 | 69.5     | 69.5   | -13.0  |
| 0.006 | 8.0   | 7.90 | 39.0  | 31.0 | 1.57 | 69.8     | 69.8   | -12.8  |
| 0.008 | 9.0   | 8.12 | 39.1  | 30.1 | 1.61 | 69.9     | 69.9   | -12.6  |
| 0.010 | 10.0  | 8.29 | 39.2  | 29.2 | 1.65 | 69.9     | 69.8   | -12.4  |
| 0.013 | 11.0  | 8.44 | 39.3  | 28.3 | 1.68 | 69.9     | 69.8   | -11.8  |
| 0.016 | 12.0  | 8.52 | 39.3  | 27.3 | 1.69 | 70.2     | 70.1   | -12.1  |
| 0.020 | 13.0  | 8.56 | 39.3  | 26.3 | 1.68 | 70.7     | 70.5   | -13.0  |
| 0.025 | 14.0  | 8.60 | 39.3  | 25.3 | 1.68 | 71.2     | 71.0   | -14.2  |
| 0.032 | 15.0  | 8.62 | 39.4  | 24.4 | 1.67 | 71.8     | 71.5   | -15.6  |
| 0.040 | 16.0  | 8.64 | 39.4  | 23.4 | 1.66 | 72.2     | 71.9   | -17.4  |
| 0.050 | 17.0  | 8.65 | 39.4  | 22.4 | 1.66 | 72.4     | 72.0   | -19.7  |
| 0.063 | 18.0  | 8.65 | 39.4  | 21.4 | 1.66 | 72.6     | 72.0   | -22.6  |
| 0.080 | 19.0  | 8.65 | 39.4  | 20.4 | 1.65 | 72.6     | 72.0   | -26.3  |
| 0.100 | 20.0  | 8.65 | 39.4  | 19.4 | 1.65 | 72.7     | 71.8   | -30.8  |



**RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)**

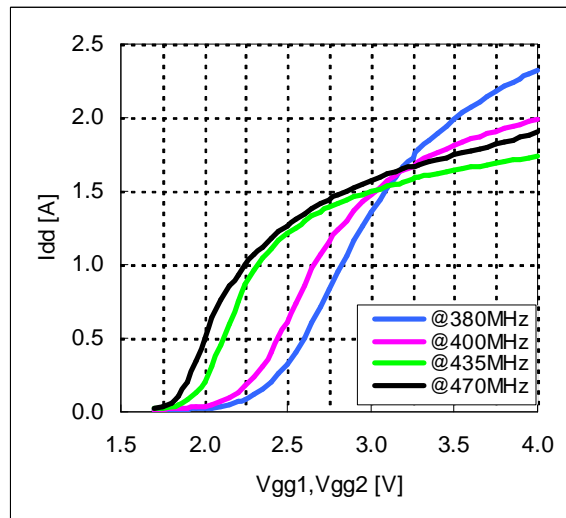
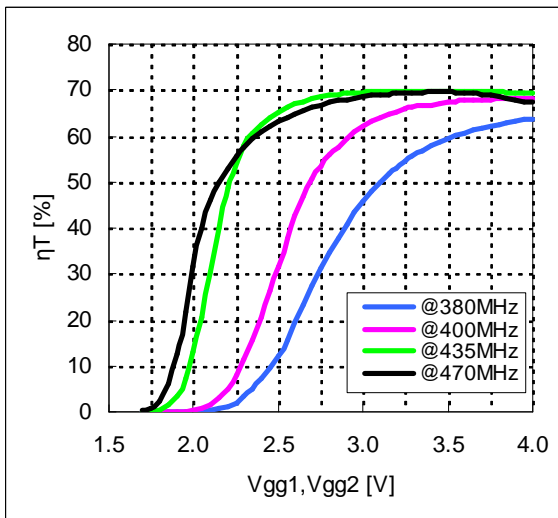
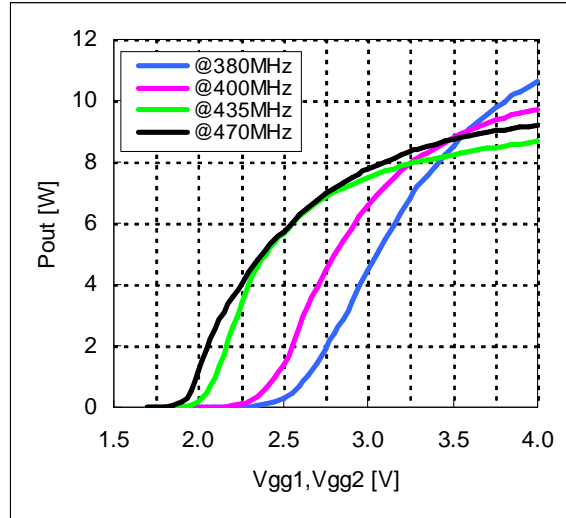
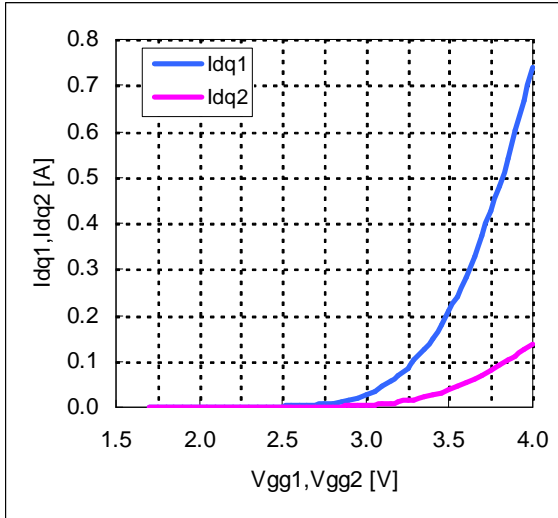
**- AN-UHF-131-**

@ **f=470MHz**, Vdd=7.2V, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Pin   |       | Pout |       | Gp   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|-------|-------|------|-------|------|------|----------|--------|--------|
| (W)   | (dBm) | (W)  | (dBm) | (dB) | (A)  | (%)      | (%)    | (dB)   |
| 0.000 | -10.0 | 0.61 | 27.9  | 37.9 | 0.50 | 17.0     | 17.0   | -6.4   |
| 0.000 | -9.0  | 0.78 | 28.9  | 37.9 | 0.55 | 19.9     | 19.9   | -6.6   |
| 0.000 | -8.0  | 1.02 | 30.1  | 38.0 | 0.61 | 23.4     | 23.4   | -6.7   |
| 0.000 | -7.0  | 1.29 | 31.1  | 38.1 | 0.67 | 26.8     | 26.8   | -6.8   |
| 0.000 | -6.0  | 1.70 | 32.3  | 38.3 | 0.75 | 31.4     | 31.4   | -6.8   |
| 0.000 | -5.0  | 2.16 | 33.3  | 38.3 | 0.83 | 35.9     | 35.9   | -6.8   |
| 0.000 | -4.0  | 2.75 | 34.4  | 38.4 | 0.93 | 40.9     | 40.9   | -6.9   |
| 0.001 | -3.0  | 3.41 | 35.3  | 38.3 | 1.03 | 45.8     | 45.8   | -6.9   |
| 0.001 | -2.0  | 4.10 | 36.1  | 38.1 | 1.13 | 50.2     | 50.2   | -6.9   |
| 0.001 | -1.0  | 4.77 | 36.8  | 37.8 | 1.22 | 54.2     | 54.1   | -7.0   |
| 0.001 | 0.0   | 5.41 | 37.3  | 37.3 | 1.31 | 57.5     | 57.5   | -7.0   |
| 0.001 | 1.0   | 5.97 | 37.8  | 36.8 | 1.38 | 60.2     | 60.1   | -7.0   |
| 0.002 | 2.0   | 6.48 | 38.1  | 36.1 | 1.44 | 62.4     | 62.4   | -7.1   |
| 0.002 | 3.0   | 6.93 | 38.4  | 35.4 | 1.50 | 64.2     | 64.2   | -7.1   |
| 0.003 | 4.0   | 7.31 | 38.6  | 34.6 | 1.55 | 65.6     | 65.6   | -7.2   |
| 0.003 | 5.0   | 7.66 | 38.8  | 33.8 | 1.59 | 66.7     | 66.7   | -7.2   |
| 0.004 | 6.0   | 7.95 | 39.0  | 33.0 | 1.63 | 67.6     | 67.6   | -7.2   |
| 0.005 | 7.0   | 8.21 | 39.1  | 32.1 | 1.67 | 68.3     | 68.2   | -7.2   |
| 0.006 | 8.0   | 8.43 | 39.3  | 31.3 | 1.70 | 68.8     | 68.7   | -7.2   |
| 0.008 | 9.0   | 8.62 | 39.4  | 30.4 | 1.73 | 69.2     | 69.2   | -7.2   |
| 0.010 | 10.0  | 8.77 | 39.4  | 29.4 | 1.75 | 69.5     | 69.4   | -7.3   |
| 0.013 | 11.0  | 8.89 | 39.5  | 28.5 | 1.77 | 69.8     | 69.7   | -7.4   |
| 0.016 | 12.0  | 8.98 | 39.5  | 27.5 | 1.78 | 69.9     | 69.8   | -7.8   |
| 0.020 | 13.0  | 9.04 | 39.6  | 26.6 | 1.79 | 70.0     | 69.8   | -8.2   |
| 0.025 | 14.0  | 9.09 | 39.6  | 25.6 | 1.80 | 70.0     | 69.8   | -8.8   |
| 0.032 | 15.0  | 9.14 | 39.6  | 24.6 | 1.81 | 70.0     | 69.7   | -9.4   |
| 0.040 | 16.0  | 9.17 | 39.6  | 23.6 | 1.82 | 69.9     | 69.6   | -10.0  |
| 0.050 | 17.0  | 9.19 | 39.6  | 22.6 | 1.83 | 69.9     | 69.5   | -10.7  |
| 0.063 | 18.0  | 9.22 | 39.6  | 21.6 | 1.83 | 69.8     | 69.3   | -11.4  |
| 0.080 | 19.0  | 9.24 | 39.7  | 20.7 | 1.84 | 69.7     | 69.1   | -12.0  |
| 0.100 | 20.0  | 9.25 | 39.7  | 19.6 | 1.84 | 69.7     | 68.9   | -12.7  |

### Pout vs. Vgg characteristics

@ @ f=380/400/435/470MHz, Vdd=7.2V, Pi=10mW, Vgg1=Vgg2



**Pout vs. Vgg characteristics data**@ **f=380MHz**, Vdd=7.2V, Pi=10mW, Vgg1=Vgg2

| Vgg1,2<br>[V] | Idq1<br>[A] | Idq2<br>[A] | Po<br>[W] | Idd<br>[A] | $\eta_T$<br>[%] | P.A.E.<br>[%] | I.R.L.<br>[dB] |
|---------------|-------------|-------------|-----------|------------|-----------------|---------------|----------------|
| 1.70          | 0.000       | 0.000       | 0.00      | 0.01       | 0.0             | -12.6         | -7.3           |
| 1.75          | 0.000       | 0.000       | 0.00      | 0.01       | 0.0             | -11.4         | -7.3           |
| 1.80          | 0.000       | 0.000       | 0.00      | 0.01       | 0.0             | -10.4         | -7.2           |
| 1.85          | 0.000       | 0.000       | 0.00      | 0.02       | 0.0             | -9.2          | -7.2           |
| 1.90          | 0.000       | 0.000       | 0.00      | 0.02       | 0.0             | -8.1          | -7.2           |
| 1.95          | 0.000       | 0.000       | 0.00      | 0.02       | 0.0             | -7.0          | -7.2           |
| 2.00          | 0.000       | 0.000       | 0.00      | 0.02       | 0.0             | -5.8          | -7.2           |
| 2.05          | 0.000       | 0.000       | 0.00      | 0.03       | 0.1             | -4.6          | -7.1           |
| 2.10          | 0.000       | 0.000       | 0.00      | 0.04       | 0.3             | -3.4          | -7.1           |
| 2.15          | 0.000       | 0.000       | 0.00      | 0.05       | 0.6             | -2.2          | -7.1           |
| 2.20          | 0.000       | 0.001       | 0.01      | 0.07       | 1.2             | -1.0          | -7.1           |
| 2.25          | 0.000       | 0.001       | 0.01      | 0.09       | 2.0             | 0.5           | -7.1           |
| 2.30          | 0.000       | 0.001       | 0.03      | 0.12       | 3.3             | 2.1           | -7.1           |
| 2.35          | 0.000       | 0.001       | 0.06      | 0.16       | 5.0             | 4.1           | -7.1           |
| 2.40          | 0.001       | 0.001       | 0.10      | 0.20       | 7.1             | 6.4           | -7.1           |
| 2.45          | 0.001       | 0.001       | 0.18      | 0.26       | 9.6             | 9.1           | -7.1           |
| 2.50          | 0.001       | 0.002       | 0.29      | 0.32       | 12.3            | 11.9          | -7.1           |
| 2.55          | 0.000       | 0.002       | 0.45      | 0.41       | 15.6            | 15.3          | -7.1           |
| 2.60          | 0.001       | 0.003       | 0.69      | 0.50       | 19.3            | 19.0          | -7.1           |
| 2.65          | 0.001       | 0.004       | 1.01      | 0.60       | 23.3            | 23.0          | -7.1           |
| 2.70          | 0.001       | 0.005       | 1.41      | 0.72       | 27.2            | 27.0          | -7.1           |
| 2.75          | 0.001       | 0.007       | 1.87      | 0.84       | 31.1            | 30.9          | -7.1           |
| 2.80          | 0.001       | 0.009       | 2.39      | 0.95       | 34.8            | 34.6          | -7.1           |
| 2.85          | 0.002       | 0.012       | 2.87      | 1.06       | 37.7            | 37.6          | -7.2           |
| 2.90          | 0.002       | 0.016       | 3.42      | 1.16       | 40.7            | 40.6          | -7.2           |
| 2.95          | 0.003       | 0.020       | 3.96      | 1.26       | 43.4            | 43.3          | -7.2           |
| 3.00          | 0.004       | 0.027       | 4.48      | 1.36       | 45.8            | 45.7          | -7.3           |
| 3.05          | 0.005       | 0.034       | 4.99      | 1.44       | 48.0            | 47.9          | -7.3           |
| 3.10          | 0.007       | 0.044       | 5.48      | 1.53       | 49.9            | 49.8          | -7.4           |
| 3.15          | 0.009       | 0.055       | 5.95      | 1.60       | 51.6            | 51.6          | -7.5           |
| 3.19          | 0.011       | 0.068       | 6.35      | 1.66       | 53.1            | 53.0          | -7.5           |
| 3.25          | 0.014       | 0.084       | 6.78      | 1.73       | 54.5            | 54.4          | -7.6           |
| 3.29          | 0.017       | 0.103       | 7.18      | 1.79       | 55.8            | 55.7          | -7.7           |
| 3.35          | 0.021       | 0.125       | 7.55      | 1.84       | 56.8            | 56.8          | -7.8           |
| 3.40          | 0.026       | 0.149       | 7.90      | 1.90       | 57.8            | 57.8          | -7.8           |
| 3.45          | 0.031       | 0.178       | 8.23      | 1.95       | 58.7            | 58.6          | -7.9           |
| 3.50          | 0.038       | 0.211       | 8.53      | 1.99       | 59.5            | 59.4          | -8.0           |
| 3.55          | 0.044       | 0.242       | 8.79      | 2.03       | 60.1            | 60.1          | -8.1           |
| 3.60          | 0.052       | 0.282       | 9.06      | 2.07       | 60.7            | 60.7          | -8.3           |
| 3.65          | 0.060       | 0.326       | 9.31      | 2.11       | 61.3            | 61.2          | -8.4           |
| 3.70          | 0.070       | 0.372       | 9.55      | 2.15       | 61.8            | 61.7          | -8.5           |
| 3.75          | 0.080       | 0.425       | 9.77      | 2.18       | 62.2            | 62.2          | -8.6           |
| 3.80          | 0.090       | 0.479       | 9.96      | 2.21       | 62.6            | 62.5          | -8.7           |
| 3.85          | 0.102       | 0.541       | 10.15     | 2.24       | 62.9            | 62.8          | -8.9           |
| 3.90          | 0.112       | 0.601       | 10.31     | 2.27       | 63.1            | 63.1          | -9.0           |
| 3.95          | 0.125       | 0.666       | 10.48     | 2.29       | 63.4            | 63.4          | -9.1           |
| 4.00          | 0.138       | 0.739       | 10.63     | 2.32       | 63.7            | 63.6          | -9.3           |

RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

- AN-UHF-131-

@ f=400MHz, Vdd=7.2V, Pi=10mW, Vgg1=Vgg2

| Vgg1,2 | Idq1  | Idq2  | Po   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|--------|-------|-------|------|------|----------|--------|--------|
| [V]    | [A]   | [A]   | [W]  | [A]  | [%]      | [%]    | [dB]   |
| 1.70   | 0.000 | 0.000 | 0.00 | 0.01 | 0.0      | -9.7   | -8.4   |
| 1.75   | 0.000 | 0.000 | 0.00 | 0.02 | 0.0      | -8.6   | -8.3   |
| 1.80   | 0.000 | 0.000 | 0.00 | 0.02 | 0.0      | -7.7   | -8.3   |
| 1.85   | 0.000 | 0.000 | 0.00 | 0.02 | 0.0      | -6.7   | -8.3   |
| 1.90   | 0.000 | 0.000 | 0.00 | 0.02 | 0.0      | -5.7   | -8.3   |
| 1.95   | 0.000 | 0.000 | 0.00 | 0.03 | 0.1      | -4.5   | -8.2   |
| 2.00   | 0.000 | 0.000 | 0.00 | 0.04 | 0.3      | -3.3   | -8.2   |
| 2.05   | 0.000 | 0.000 | 0.00 | 0.05 | 0.8      | -1.9   | -8.2   |
| 2.10   | 0.000 | 0.000 | 0.01 | 0.07 | 1.7      | -0.3   | -8.1   |
| 2.15   | 0.000 | 0.000 | 0.02 | 0.09 | 3.0      | 1.5    | -8.1   |
| 2.20   | 0.000 | 0.001 | 0.05 | 0.13 | 5.0      | 4.0    | -8.1   |
| 2.25   | 0.000 | 0.001 | 0.10 | 0.18 | 7.8      | 7.1    | -8.1   |
| 2.30   | 0.000 | 0.001 | 0.19 | 0.24 | 11.4     | 10.8   | -8.0   |
| 2.35   | 0.000 | 0.001 | 0.35 | 0.31 | 15.8     | 15.3   | -8.0   |
| 2.40   | 0.001 | 0.001 | 0.60 | 0.40 | 20.7     | 20.4   | -8.0   |
| 2.45   | 0.001 | 0.001 | 0.96 | 0.51 | 26.4     | 26.1   | -8.0   |
| 2.50   | 0.001 | 0.002 | 1.40 | 0.61 | 31.7     | 31.5   | -8.0   |
| 2.55   | 0.000 | 0.002 | 2.00 | 0.74 | 37.6     | 37.4   | -8.0   |
| 2.60   | 0.001 | 0.003 | 2.65 | 0.86 | 42.8     | 42.6   | -8.0   |
| 2.65   | 0.001 | 0.004 | 3.29 | 0.97 | 47.0     | 46.9   | -8.1   |
| 2.70   | 0.001 | 0.005 | 3.90 | 1.07 | 50.5     | 50.4   | -8.1   |
| 2.75   | 0.001 | 0.007 | 4.46 | 1.16 | 53.4     | 53.3   | -8.2   |
| 2.80   | 0.001 | 0.009 | 4.98 | 1.24 | 55.8     | 55.7   | -8.3   |
| 2.85   | 0.002 | 0.012 | 5.41 | 1.30 | 57.6     | 57.5   | -8.3   |
| 2.90   | 0.002 | 0.016 | 5.83 | 1.37 | 59.3     | 59.2   | -8.4   |
| 2.95   | 0.003 | 0.020 | 6.23 | 1.42 | 60.8     | 60.7   | -8.5   |
| 3.00   | 0.004 | 0.027 | 6.59 | 1.48 | 62.0     | 61.9   | -8.6   |
| 3.05   | 0.005 | 0.034 | 6.91 | 1.52 | 63.1     | 63.0   | -8.8   |
| 3.10   | 0.007 | 0.044 | 7.21 | 1.57 | 63.9     | 63.8   | -8.9   |
| 3.15   | 0.009 | 0.055 | 7.47 | 1.61 | 64.6     | 64.5   | -9.0   |
| 3.19   | 0.011 | 0.068 | 7.69 | 1.64 | 65.2     | 65.1   | -9.1   |
| 3.25   | 0.014 | 0.084 | 7.92 | 1.67 | 65.7     | 65.7   | -9.3   |
| 3.29   | 0.017 | 0.103 | 8.12 | 1.70 | 66.2     | 66.1   | -9.4   |
| 3.35   | 0.021 | 0.125 | 8.30 | 1.73 | 66.5     | 66.4   | -9.6   |
| 3.40   | 0.026 | 0.149 | 8.48 | 1.76 | 66.8     | 66.8   | -9.7   |
| 3.45   | 0.031 | 0.178 | 8.64 | 1.79 | 67.1     | 67.1   | -9.9   |
| 3.50   | 0.038 | 0.211 | 8.78 | 1.81 | 67.4     | 67.3   | -10.0  |
| 3.55   | 0.044 | 0.242 | 8.90 | 1.83 | 67.5     | 67.4   | -10.2  |
| 3.60   | 0.052 | 0.282 | 9.03 | 1.85 | 67.7     | 67.6   | -10.3  |
| 3.65   | 0.060 | 0.326 | 9.14 | 1.87 | 67.8     | 67.7   | -10.5  |
| 3.70   | 0.070 | 0.372 | 9.24 | 1.89 | 67.8     | 67.8   | -10.7  |
| 3.75   | 0.080 | 0.425 | 9.34 | 1.91 | 67.9     | 67.9   | -10.9  |
| 3.80   | 0.090 | 0.479 | 9.44 | 1.93 | 68.0     | 67.9   | -11.1  |
| 3.85   | 0.102 | 0.541 | 9.52 | 1.94 | 68.1     | 68.0   | -11.2  |
| 3.90   | 0.112 | 0.601 | 9.60 | 1.96 | 68.1     | 68.0   | -11.4  |
| 3.95   | 0.125 | 0.666 | 9.67 | 1.97 | 68.1     | 68.0   | -11.6  |
| 4.00   | 0.138 | 0.739 | 9.74 | 1.99 | 68.1     | 68.0   | -11.8  |

RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

- AN-UHF-131-

@ f=435MHz, Vdd=7.2V, Pi=10mW, Vgg1=Vgg2

| Vgg1,2<br>[V] | Idq1<br>[A] | Idq2<br>[A] | Po<br>[W] | Idd<br>[A] | $\eta_T$<br>[%] | P.A.E.<br>[%] | I.R.L.<br>[dB] |
|---------------|-------------|-------------|-----------|------------|-----------------|---------------|----------------|
| 1.70          | 0.000       | 0.000       | 0.00      | 0.02       | 0.0             | -6.7          | -11.7          |
| 1.75          | 0.000       | 0.000       | 0.00      | 0.03       | 0.1             | -5.2          | -11.8          |
| 1.80          | 0.000       | 0.000       | 0.00      | 0.04       | 0.4             | -3.6          | -11.8          |
| 1.85          | 0.000       | 0.000       | 0.01      | 0.05       | 1.3             | -1.3          | -11.9          |
| 1.90          | 0.000       | 0.000       | 0.02      | 0.08       | 3.4             | 1.8           | -12.0          |
| 1.95          | 0.000       | 0.000       | 0.07      | 0.13       | 7.1             | 6.1           | -12.1          |
| 2.00          | 0.000       | 0.000       | 0.19      | 0.21       | 12.8            | 12.1          | -12.3          |
| 2.05          | 0.000       | 0.000       | 0.47      | 0.31       | 20.6            | 20.2          | -12.4          |
| 2.10          | 0.000       | 0.000       | 0.99      | 0.45       | 30.4            | 30.1          | -12.5          |
| 2.15          | 0.000       | 0.000       | 1.70      | 0.59       | 39.9            | 39.6          | -12.7          |
| 2.20          | 0.000       | 0.001       | 2.62      | 0.75       | 48.6            | 48.4          | -12.9          |
| 2.25          | 0.000       | 0.001       | 3.40      | 0.87       | 54.1            | 54.0          | -13.1          |
| 2.30          | 0.000       | 0.001       | 4.02      | 0.97       | 57.8            | 57.7          | -13.3          |
| 2.35          | 0.000       | 0.001       | 4.55      | 1.04       | 60.5            | 60.4          | -13.5          |
| 2.40          | 0.001       | 0.001       | 5.00      | 1.11       | 62.5            | 62.4          | -13.6          |
| 2.45          | 0.001       | 0.001       | 5.38      | 1.17       | 64.1            | 63.9          | -13.7          |
| 2.50          | 0.001       | 0.002       | 5.68      | 1.21       | 65.2            | 65.0          | -13.7          |
| 2.55          | 0.000       | 0.002       | 5.97      | 1.25       | 66.1            | 66.0          | -13.8          |
| 2.60          | 0.001       | 0.003       | 6.23      | 1.29       | 66.9            | 66.8          | -13.8          |
| 2.65          | 0.001       | 0.004       | 6.46      | 1.33       | 67.5            | 67.4          | -13.9          |
| 2.70          | 0.001       | 0.005       | 6.66      | 1.36       | 68.0            | 67.9          | -13.9          |
| 2.75          | 0.001       | 0.007       | 6.85      | 1.39       | 68.5            | 68.4          | -13.9          |
| 2.80          | 0.001       | 0.009       | 7.01      | 1.42       | 68.8            | 68.7          | -13.9          |
| 2.85          | 0.002       | 0.012       | 7.14      | 1.44       | 69.0            | 68.9          | -13.9          |
| 2.90          | 0.002       | 0.016       | 7.28      | 1.46       | 69.2            | 69.2          | -13.8          |
| 2.95          | 0.003       | 0.020       | 7.40      | 1.48       | 69.4            | 69.3          | -13.8          |
| 3.00          | 0.004       | 0.027       | 7.50      | 1.50       | 69.5            | 69.4          | -13.8          |
| 3.05          | 0.005       | 0.034       | 7.61      | 1.52       | 69.6            | 69.5          | -13.7          |
| 3.10          | 0.007       | 0.044       | 7.70      | 1.53       | 69.7            | 69.6          | -13.6          |
| 3.15          | 0.009       | 0.055       | 7.79      | 1.55       | 69.8            | 69.7          | -13.5          |
| 3.19          | 0.011       | 0.068       | 7.87      | 1.56       | 69.8            | 69.7          | -13.4          |
| 3.25          | 0.014       | 0.084       | 7.94      | 1.58       | 69.8            | 69.8          | -13.3          |
| 3.29          | 0.017       | 0.103       | 8.01      | 1.59       | 69.9            | 69.8          | -13.1          |
| 3.35          | 0.021       | 0.125       | 8.08      | 1.61       | 69.9            | 69.8          | -12.9          |
| 3.40          | 0.026       | 0.149       | 8.14      | 1.62       | 69.9            | 69.8          | -12.8          |
| 3.45          | 0.031       | 0.178       | 8.20      | 1.63       | 69.8            | 69.8          | -12.6          |
| 3.50          | 0.038       | 0.211       | 8.25      | 1.64       | 69.8            | 69.7          | -12.4          |
| 3.55          | 0.044       | 0.242       | 8.30      | 1.65       | 69.8            | 69.7          | -12.2          |
| 3.60          | 0.052       | 0.282       | 8.34      | 1.66       | 69.7            | 69.7          | -12.0          |
| 3.65          | 0.060       | 0.326       | 8.39      | 1.67       | 69.7            | 69.6          | -11.8          |
| 3.70          | 0.070       | 0.372       | 8.43      | 1.68       | 69.7            | 69.6          | -11.6          |
| 3.75          | 0.080       | 0.425       | 8.47      | 1.69       | 69.6            | 69.6          | -11.4          |
| 3.80          | 0.090       | 0.479       | 8.51      | 1.70       | 69.6            | 69.5          | -11.2          |
| 3.85          | 0.102       | 0.541       | 8.55      | 1.71       | 69.5            | 69.4          | -11.0          |
| 3.90          | 0.112       | 0.601       | 8.59      | 1.72       | 69.4            | 69.4          | -10.9          |
| 3.95          | 0.125       | 0.666       | 8.62      | 1.73       | 69.3            | 69.2          | -10.7          |
| 4.00          | 0.138       | 0.739       | 8.66      | 1.74       | 69.2            | 69.1          | -10.6          |

RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

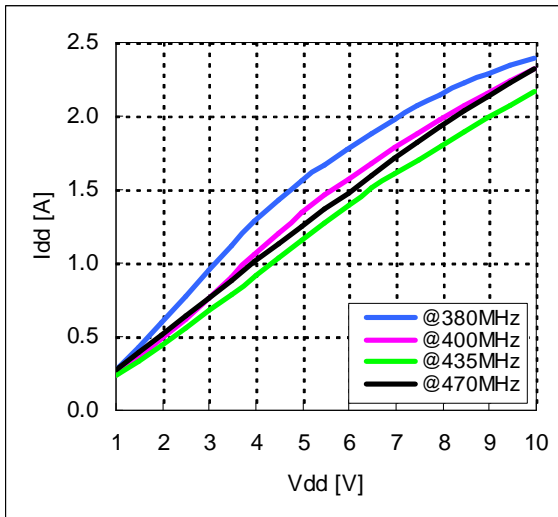
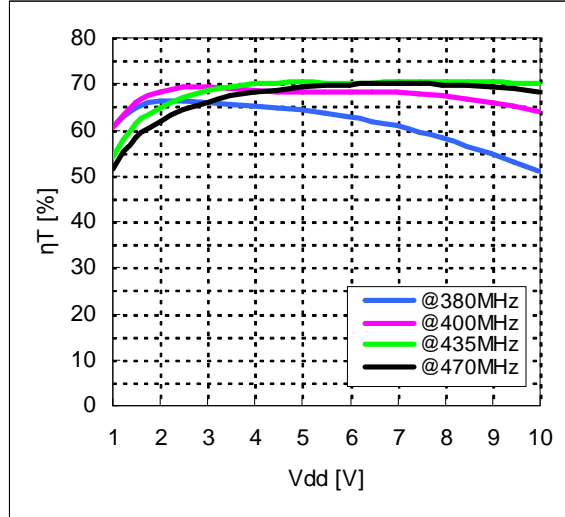
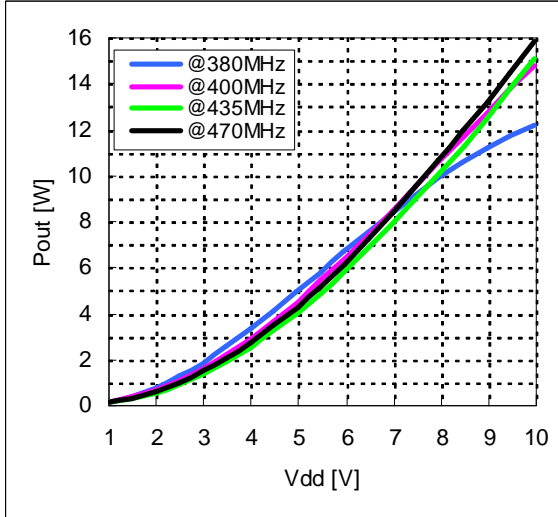
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@ f=470MHz, Vdd=7.2V, Pi=10mW, Vgg1=Vgg2

| Vgg1,2 | Idq1  | Idq2  | Po   | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|--------|-------|-------|------|------|----------|--------|--------|
| [V]    | [A]   | [A]   | [W]  | [A]  | [%]      | [%]    | [dB]   |
| 1.70   | 0.000 | 0.000 | 0.00 | 0.02 | 0.2      | -6.6   | -19.2  |
| 1.75   | 0.000 | 0.000 | 0.00 | 0.03 | 0.9      | -3.1   | -19.9  |
| 1.80   | 0.000 | 0.000 | 0.01 | 0.06 | 2.5      | 0.1    | -20.8  |
| 1.85   | 0.000 | 0.000 | 0.05 | 0.11 | 6.0      | 4.8    | -22.1  |
| 1.90   | 0.000 | 0.000 | 0.18 | 0.20 | 12.5     | 11.8   | -24.1  |
| 1.95   | 0.000 | 0.000 | 0.53 | 0.34 | 21.6     | 21.2   | -26.7  |
| 2.00   | 0.000 | 0.000 | 1.14 | 0.50 | 31.5     | 31.3   | -28.5  |
| 2.05   | 0.000 | 0.000 | 1.87 | 0.65 | 40.0     | 39.8   | -27.1  |
| 2.10   | 0.000 | 0.000 | 2.55 | 0.77 | 46.2     | 46.0   | -24.4  |
| 2.15   | 0.000 | 0.000 | 3.07 | 0.85 | 50.0     | 49.8   | -22.4  |
| 2.20   | 0.000 | 0.001 | 3.57 | 0.93 | 53.1     | 53.0   | -20.6  |
| 2.25   | 0.000 | 0.001 | 4.02 | 1.00 | 55.6     | 55.5   | -19.3  |
| 2.30   | 0.000 | 0.001 | 4.42 | 1.07 | 57.6     | 57.5   | -18.2  |
| 2.35   | 0.000 | 0.001 | 4.80 | 1.12 | 59.4     | 59.3   | -17.3  |
| 2.40   | 0.001 | 0.001 | 5.15 | 1.18 | 60.8     | 60.7   | -16.5  |
| 2.45   | 0.001 | 0.001 | 5.47 | 1.22 | 62.1     | 62.0   | -15.8  |
| 2.50   | 0.001 | 0.002 | 5.74 | 1.26 | 63.1     | 63.0   | -15.3  |
| 2.55   | 0.000 | 0.002 | 6.02 | 1.31 | 64.0     | 63.9   | -14.7  |
| 2.60   | 0.001 | 0.003 | 6.28 | 1.34 | 64.9     | 64.8   | -14.1  |
| 2.65   | 0.001 | 0.004 | 6.52 | 1.38 | 65.6     | 65.5   | -13.6  |
| 2.70   | 0.001 | 0.005 | 6.75 | 1.41 | 66.2     | 66.1   | -13.1  |
| 2.75   | 0.001 | 0.007 | 6.95 | 1.45 | 66.8     | 66.7   | -12.6  |
| 2.80   | 0.001 | 0.009 | 7.14 | 1.48 | 67.3     | 67.2   | -12.2  |
| 2.85   | 0.002 | 0.012 | 7.30 | 1.50 | 67.6     | 67.5   | -11.8  |
| 2.90   | 0.002 | 0.016 | 7.46 | 1.53 | 67.9     | 67.9   | -11.4  |
| 2.95   | 0.003 | 0.020 | 7.61 | 1.55 | 68.2     | 68.2   | -10.9  |
| 3.00   | 0.004 | 0.027 | 7.76 | 1.57 | 68.5     | 68.4   | -10.5  |
| 3.05   | 0.005 | 0.034 | 7.89 | 1.59 | 68.8     | 68.7   | -10.1  |
| 3.10   | 0.007 | 0.044 | 8.01 | 1.61 | 69.0     | 68.9   | -9.8   |
| 3.15   | 0.009 | 0.055 | 8.13 | 1.63 | 69.1     | 69.0   | -9.4   |
| 3.19   | 0.011 | 0.068 | 8.22 | 1.65 | 69.2     | 69.1   | -9.1   |
| 3.25   | 0.014 | 0.084 | 8.32 | 1.67 | 69.3     | 69.2   | -8.7   |
| 3.29   | 0.017 | 0.103 | 8.41 | 1.68 | 69.4     | 69.3   | -8.4   |
| 3.35   | 0.021 | 0.125 | 8.50 | 1.70 | 69.5     | 69.4   | -8.1   |
| 3.40   | 0.026 | 0.149 | 8.59 | 1.72 | 69.5     | 69.5   | -7.8   |
| 3.45   | 0.031 | 0.178 | 8.67 | 1.73 | 69.6     | 69.5   | -7.5   |
| 3.50   | 0.038 | 0.211 | 8.74 | 1.75 | 69.5     | 69.5   | -7.3   |
| 3.55   | 0.044 | 0.242 | 8.80 | 1.76 | 69.5     | 69.4   | -7.1   |
| 3.60   | 0.052 | 0.282 | 8.86 | 1.77 | 69.4     | 69.3   | -6.9   |
| 3.65   | 0.060 | 0.326 | 8.92 | 1.79 | 69.3     | 69.2   | -6.7   |
| 3.70   | 0.070 | 0.372 | 8.97 | 1.80 | 69.1     | 69.0   | -6.6   |
| 3.75   | 0.080 | 0.425 | 9.01 | 1.82 | 68.8     | 68.8   | -6.4   |
| 3.80   | 0.090 | 0.479 | 9.05 | 1.83 | 68.6     | 68.5   | -6.3   |
| 3.85   | 0.102 | 0.541 | 9.10 | 1.85 | 68.3     | 68.2   | -6.3   |
| 3.90   | 0.112 | 0.601 | 9.13 | 1.87 | 68.0     | 67.9   | -6.2   |
| 3.95   | 0.125 | 0.666 | 9.17 | 1.88 | 67.6     | 67.5   | -6.2   |
| 4.00   | 0.138 | 0.739 | 9.22 | 1.90 | 67.3     | 67.2   | -6.1   |

**Pout vs. Vdd characteristics**

@ f=380/400/435/470MHz, Pin=10mW, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)



**Pout vs. Vdd characteristics data**@ **f=380MHz**, Pin=10mW, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Vdd<br>[V] | Po<br>[W] | Idd<br>[A] | $\eta_T$<br>[%] | P.A.E.<br>[%] | I.R.L.<br>[dB] |
|------------|-----------|------------|-----------------|---------------|----------------|
| 1.00       | 0.17      | 0.28       | 60.6            | 57.0          | -9.7           |
| 1.49       | 0.41      | 0.43       | 64.8            | 63.2          | -9.1           |
| 1.98       | 0.78      | 0.59       | 66.2            | 65.4          | -8.5           |
| 2.49       | 1.27      | 0.77       | 66.4            | 65.9          | -7.9           |
| 2.98       | 1.86      | 0.95       | 65.9            | 65.6          | -7.5           |
| 3.47       | 2.55      | 1.12       | 65.5            | 65.2          | -7.3           |
| 3.98       | 3.34      | 1.29       | 65.0            | 64.8          | -7.2           |
| 4.47       | 4.14      | 1.43       | 64.7            | 64.5          | -7.3           |
| 4.96       | 4.96      | 1.56       | 64.2            | 64.1          | -7.5           |
| 5.47       | 5.81      | 1.67       | 63.6            | 63.5          | -7.8           |
| 5.96       | 6.67      | 1.78       | 62.9            | 62.8          | -7.9           |
| 6.46       | 7.52      | 1.88       | 61.9            | 61.8          | -7.9           |
| 6.96       | 8.39      | 1.98       | 60.8            | 60.8          | -8.0           |
| 7.46       | 9.18      | 2.07       | 59.5            | 59.4          | -8.1           |
| 7.95       | 9.93      | 2.15       | 58.1            | 58.1          | -8.1           |
| 8.46       | 10.62     | 2.22       | 56.4            | 56.4          | -8.2           |
| 8.95       | 11.21     | 2.29       | 54.8            | 54.7          | -8.3           |
| 9.45       | 11.74     | 2.34       | 53.0            | 53.0          | -8.3           |
| 9.96       | 12.19     | 2.39       | 51.1            | 51.1          | -8.4           |

@ **f=400MHz**, Pin=10mW, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Vdd<br>[V] | Po<br>[W] | Idd<br>[A] | $\eta_T$<br>[%] | P.A.E.<br>[%] | I.R.L.<br>[dB] |
|------------|-----------|------------|-----------------|---------------|----------------|
| 1.00       | 0.14      | 0.24       | 60.4            | 56.2          | -13.5          |
| 1.49       | 0.35      | 0.36       | 65.9            | 64.0          | -13.0          |
| 1.98       | 0.65      | 0.48       | 68.1            | 67.1          | -12.2          |
| 2.49       | 1.07      | 0.62       | 69.2            | 68.6          | -11.3          |
| 2.98       | 1.58      | 0.76       | 69.4            | 69.0          | -10.5          |
| 3.48       | 2.18      | 0.91       | 69.0            | 68.7          | -9.9           |
| 3.98       | 2.90      | 1.06       | 68.6            | 68.4          | -9.4           |
| 4.47       | 3.68      | 1.21       | 68.3            | 68.1          | -9.2           |
| 4.97       | 4.53      | 1.34       | 68.0            | 67.9          | -9.1           |
| 5.47       | 5.46      | 1.47       | 68.1            | 68.0          | -9.3           |
| 5.97       | 6.40      | 1.57       | 68.2            | 68.1          | -9.6           |
| 6.46       | 7.39      | 1.68       | 68.2            | 68.1          | -9.9           |
| 6.97       | 8.45      | 1.78       | 68.0            | 67.9          | -10.0          |
| 7.46       | 9.51      | 1.88       | 67.8            | 67.7          | -10.1          |
| 7.95       | 10.59     | 1.98       | 67.3            | 67.3          | -10.2          |
| 8.46       | 11.69     | 2.07       | 66.7            | 66.7          | -10.3          |
| 8.95       | 12.75     | 2.16       | 66.0            | 65.9          | -10.4          |
| 9.45       | 13.77     | 2.24       | 65.1            | 65.0          | -10.4          |
| 9.96       | 14.77     | 2.32       | 64.0            | 64.0          | -10.5          |



RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

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@ **f=435MHz**, Pin=10mW, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

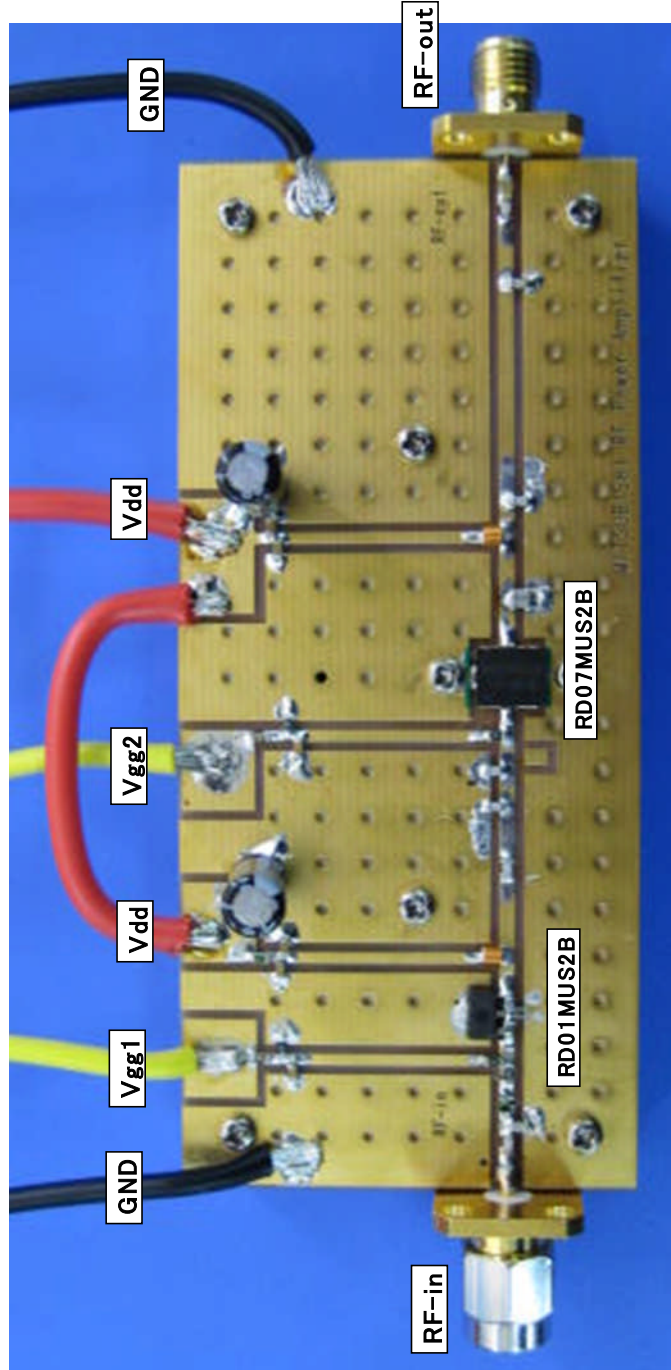
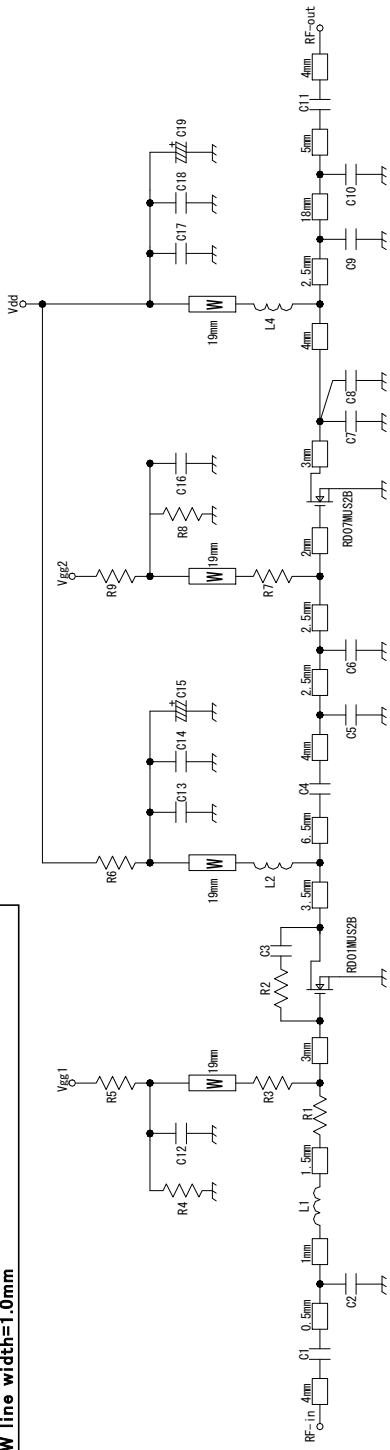
| Vdd  | Po    | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|------|-------|------|----------|--------|--------|
| [V]  | [W]   | [A]  | [%]      | [%]    | [dB]   |
| 1.00 | 0.13  | 0.24 | 54.3     | 50.0   | -23.7  |
| 1.49 | 0.31  | 0.34 | 61.5     | 59.5   | -26.7  |
| 1.99 | 0.57  | 0.44 | 64.8     | 63.7   | -26.6  |
| 2.49 | 0.93  | 0.56 | 67.2     | 66.5   | -22.9  |
| 2.99 | 1.38  | 0.67 | 68.4     | 67.9   | -19.5  |
| 3.48 | 1.91  | 0.79 | 69.3     | 69.0   | -16.9  |
| 3.99 | 2.54  | 0.91 | 69.9     | 69.7   | -15.0  |
| 4.48 | 3.24  | 1.03 | 70.2     | 70.0   | -13.6  |
| 4.97 | 4.02  | 1.15 | 70.3     | 70.1   | -12.6  |
| 5.48 | 4.91  | 1.28 | 70.2     | 70.0   | -11.8  |
| 5.97 | 5.84  | 1.39 | 70.1     | 70.0   | -11.5  |
| 6.47 | 6.83  | 1.51 | 70.1     | 70.0   | -11.6  |
| 6.97 | 7.89  | 1.61 | 70.3     | 70.2   | -12.2  |
| 7.47 | 8.97  | 1.71 | 70.4     | 70.3   | -12.6  |
| 7.96 | 10.10 | 1.80 | 70.4     | 70.4   | -12.8  |
| 8.47 | 11.31 | 1.90 | 70.4     | 70.3   | -12.9  |
| 8.96 | 12.53 | 1.99 | 70.4     | 70.3   | -13.1  |
| 9.45 | 13.78 | 2.07 | 70.3     | 70.2   | -13.2  |
| 9.96 | 15.09 | 2.16 | 70.1     | 70.0   | -13.4  |

@ **f=470MHz**, Pin=10mW, Idq1=40mA (Vgg1=3.50V), Idq2=250mA(Vgg2=3.55V)

| Vdd  | Po    | Idd  | $\eta_T$ | P.A.E. | I.R.L. |
|------|-------|------|----------|--------|--------|
| [V]  | [W]   | [A]  | [%]      | [%]    | [dB]   |
| 1.00 | 0.14  | 0.27 | 51.5     | 47.9   | -14.2  |
| 1.49 | 0.34  | 0.39 | 58.2     | 56.5   | -12.8  |
| 1.98 | 0.63  | 0.51 | 61.8     | 60.8   | -11.7  |
| 2.49 | 1.02  | 0.64 | 64.3     | 63.7   | -10.7  |
| 2.99 | 1.50  | 0.76 | 65.8     | 65.3   | -9.9   |
| 3.47 | 2.06  | 0.88 | 67.3     | 67.0   | -9.2   |
| 3.98 | 2.74  | 1.01 | 68.2     | 68.0   | -8.7   |
| 4.48 | 3.47  | 1.13 | 68.7     | 68.5   | -8.2   |
| 4.97 | 4.29  | 1.25 | 69.3     | 69.1   | -7.9   |
| 5.48 | 5.21  | 1.37 | 69.6     | 69.5   | -7.6   |
| 5.97 | 6.18  | 1.48 | 69.8     | 69.7   | -7.5   |
| 6.46 | 7.22  | 1.59 | 70.1     | 70.0   | -7.3   |
| 6.97 | 8.35  | 1.71 | 70.0     | 70.0   | -7.3   |
| 7.46 | 9.50  | 1.82 | 70.0     | 69.9   | -7.3   |
| 7.95 | 10.69 | 1.93 | 69.8     | 69.8   | -7.3   |
| 8.46 | 11.96 | 2.03 | 69.6     | 69.6   | -7.4   |
| 8.96 | 13.21 | 2.13 | 69.2     | 69.1   | -7.4   |
| 9.45 | 14.50 | 2.23 | 68.9     | 68.8   | -7.4   |
| 9.96 | 15.83 | 2.33 | 68.3     | 68.3   | -7.4   |

Equivalent circuit (@f=380 to 470MHz)

<Note>  
 Board material: Glass-Epoxy substrate ( $\epsilon_r=4.8$ ,  $h=0.8\text{mm}$ )  
 Microstrip line width=1.3mm  
 W line width=1.0mm



RD01MUS2B & RD07MUS2B two-stage amplifier at 380 to 470MHz. (Vdd=7.2V)

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| Parts Type | Symbol | Value  | Type name          | Vender                        |
|------------|--------|--|--------------------|-------------------------------|
| Capasitor  | C1     | 100pF  | GRM1882C1H101JA01D | Murata Manufacturing Co.,Ltd. |
|            | C2     | 10pF   | GRM1882C1H100JA01D | Murata Manufacturing Co.,Ltd. |
|            | C3     | 47pF   | GRM1882C1H470JA01D | Murata Manufacturing Co.,Ltd. |
|            | C4     | 100pF  | GRM1882C1H101JA01D | Murata Manufacturing Co.,Ltd. |
|            | C5     | 22pF   | GRM1882C1H220JA01D | Murata Manufacturing Co.,Ltd. |
|            | C6     | 33pF   | GRM1882C1H330JA01D | Murata Manufacturing Co.,Ltd. |
|            | C7     | 33pF   | GRM1882C1H330JA01D | Murata Manufacturing Co.,Ltd. |
|            | C8     | 33pF   | GRM1882C1H330JA01D | Murata Manufacturing Co.,Ltd. |
|            | C9     | 22pF   | GRM1882C1H220JA01D | Murata Manufacturing Co.,Ltd. |
|            | C10    | 13pF   | GRM1882C1H130JA01D | Murata Manufacturing Co.,Ltd. |
|            | C11    | 100pF  | GRM1882C1H101JA01D | Murata Manufacturing Co.,Ltd. |
|            | C12    | 1000pF   | GRM188R11H102KA01D | Murata Manufacturing Co.,Ltd. |
|            | C13    | 1000pF   | GRM188R11H102KA01D | Murata Manufacturing Co.,Ltd. |
|            | C14    | 10000pF  | GRM188R11H103KA01D | Murata Manufacturing Co.,Ltd. |
|            | C15    | 22uF   | UVZ1H220MDD        | NICHICON COPORATION           |
|            | C16    | 1000pF   | GRM188R11H102KA01D | Murata Manufacturing Co.,Ltd. |
|            | C17    | 1000pF   | GRM188R11H102KA01D | Murata Manufacturing Co.,Ltd. |
|            | C18    | 10000pF  | GRM188R11H103KA01D | Murata Manufacturing Co.,Ltd. |
|            | C19    | 22uF   | UVZ1H220MDD        | NICHICON COPORATION           |
| Resistance | R1     | 10Ω  | RPC05-100J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R2     | 390Ω   | RPC05-391J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R3     | 100Ω   | RPC05-101J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R4     | 12KΩ   | RPC05-123J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R5     | 18KΩ   | RPC05-183J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R6     | 0Ω   | RPC05-0R0          | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R7     | 100Ω   | RPC05-101J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R8     | 10KΩ   | RPC05-103J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
|            | R9     | 18KΩ   | RPC05-183J         | TAIYOSHA ELECTRIC CO.,Ltd.    |
| Inductance | L1     | 12nH   | LQG18HN18NJ00D     | Murata Manufacturing Co.,Ltd. |
|            | L2     | 30.9nH Enameled wire 6Turns,<br>Diameter:0.23mm, ϕ 1.62mm(the out side diameter) | 2306C              | yc corporation                |
|            | L3     | 30.9nH Enameled wire 6Turns,<br>Diameter:0.23mm, ϕ 1.62mm(the out side diameter) | 2306C              | yc corporation                |