

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss = -3.2V, TEMPERATURE=-45degC

| FREQUENCY (MHz) | STEP ATTENUATION* AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 THRU LOSS | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 0.98 | 0.54 | 1.04 | 2.05 | 4.11 | 8.17 | 16.17 | 31.70 |
| 50 | 0.98 | 0.54 | 1.05 | 2.05 | 4.11 | 8.17 | 16.20 | 31.85 |
| 100 | 0.99 | 0.53 | 1.04 | 2.05 | 4.11 | 8.16 | 16.20 | 31.77 |
| 150 | 1.00 | 0.53 | 1.04 | 2.04 | 4.10 | 8.16 | 16.19 | 31.79 |
| 200 | 1.00 | 0.53 | 1.05 | 2.05 | 4.10 | 8.16 | 16.20 | 31.73 |
| 250 | 1.01 | 0.53 | 1.04 | 2.05 | 4.10 | 8.16 | 16.20 | 31.79 |
| 300 | 1.01 | 0.53 | 1.04 | 2.05 | 4.11 | 8.16 | 16.21 | 31.73 |
| 350 | 1.02 | 0.53 | 1.04 | 2.05 | 4.11 | 8.17 | 16.21 | 31.81 |
| 400 | 1.02 | 0.53 | 1.04 | 2.05 | 4.11 | 8.17 | 16.21 | 31.80 |
| 450 | 1.03 | 0.53 | 1.04 | 2.04 | 4.10 | 8.16 | 16.20 | 31.75 |
| 500 | 1.05 | 0.53 | 1.04 | 2.04 | 4.10 | 8.15 | 16.19 | 31.80 |
| 550 | 1.07 | 0.53 | 1.03 | 2.03 | 4.09 | 8.14 | 16.17 | 31.79 |
| 600 | 1.08 | 0.53 | 1.03 | 2.03 | 4.09 | 8.13 | 16.17 | 31.77 |
| 700 | 1.12 | 0.52 | 1.03 | 2.03 | 4.07 | 8.11 | 16.14 | 31.74 |
| 800 | 1.17 | 0.52 | 1.03 | 2.02 | 4.06 | 8.09 | 16.12 | 31.65 |
| 900 | 1.18 | 0.52 | 1.03 | 2.02 | 4.05 | 8.10 | 16.14 | 31.77 |
| 1000 | 1.21 | 0.52 | 1.03 | 2.02 | 4.05 | 8.10 | 16.17 | 32.01 |
| 1100 | 1.24 | 0.51 | 1.02 | 2.02 | 4.05 | 8.10 | 16.16 | 31.91 |
| 1200 | 1.26 | 0.51 | 1.02 | 2.01 | 4.04 | 8.08 | 16.12 | 31.56 |
| 1300 | 1.25 | 0.51 | 1.02 | 2.01 | 4.04 | 8.08 | 16.08 | 31.15 |
| 1400 | 1.24 | 0.51 | 1.02 | 2.01 | 4.04 | 8.06 | 16.00 | 30.78 |
| 1500 | 1.28 | 0.51 | 1.02 | 2.02 | 4.05 | 8.10 | 16.14 | 31.59 |
| 1600 | 1.32 | 0.51 | 1.02 | 2.02 | 4.07 | 8.13 | 16.22 | 31.94 |
| 1700 | 1.32 | 0.51 | 1.02 | 2.02 | 4.08 | 8.13 | 16.20 | 31.54 |
| 1800 | 1.33 | 0.51 | 1.03 | 2.02 | 4.08 | 8.13 | 16.16 | 31.17 |
| 1900 | 1.34 | 0.51 | 1.03 | 2.02 | 4.09 | 8.12 | 16.09 | 30.57 |
| 2000 | 1.36 | 0.51 | 1.02 | 2.02 | 4.09 | 8.13 | 16.04 | 30.18 |
| 2100 | 1.38 | 0.51 | 1.02 | 2.02 | 4.10 | 8.16 | 16.06 | 30.06 |
| 2200 | 1.39 | 0.51 | 1.03 | 2.03 | 4.11 | 8.17 | 16.03 | 29.85 |
| 2300 | 1.47 | 0.51 | 1.04 | 2.05 | 4.14 | 8.23 | 16.15 | 30.47 |
| 2400 | 1.57 | 0.51 | 1.04 | 2.06 | 4.18 | 8.31 | 16.34 | 31.36 |
| 2500 | 1.34 | 0.51 | 1.04 | 2.05 | 4.17 | 8.27 | 16.09 | 29.72 |
| 2600 | 1.21 | 0.52 | 1.05 | 2.07 | 4.23 | 8.35 | 16.19 | 29.95 |
| 2700 | 1.17 | 0.52 | 1.06 | 2.08 | 4.28 | 8.43 | 16.28 | 30.02 |
| 2800 | 1.32 | 0.51 | 1.05 | 2.08 | 4.32 | 8.51 | 16.51 | 31.22 |
| 2900 | 1.63 | 0.50 | 1.03 | 2.05 | 4.29 | 8.48 | 16.56 | 31.50 |
| 3000 | 2.09 | 0.47 | 0.99 | 1.99 | 4.24 | 8.45 | 16.81 | 34.16 |

* Step Attenuation above Thru Loss (TTL Logic 000000).



REV. OR
DAT-31575A-SN+

10/12/2016

Page 1 of 9

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss = -3.2V, TEMPERATURE=-45degC

| FREQUENCY (MHz) | INPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 19.90 | 21.26 | 22.62 | 24.20 | 37.05 | 29.27 | 24.73 | 23.22 |
| 50 | 19.52 | 20.97 | 22.11 | 23.57 | 40.52 | 30.44 | 25.60 | 23.88 |
| 100 | 19.65 | 21.09 | 22.23 | 23.70 | 38.36 | 30.30 | 25.67 | 23.92 |
| 150 | 19.34 | 20.71 | 21.78 | 23.12 | 40.42 | 31.89 | 26.66 | 24.74 |
| 200 | 19.48 | 20.84 | 21.90 | 23.28 | 40.22 | 31.60 | 26.53 | 24.66 |
| 250 | 19.26 | 20.61 | 21.66 | 23.02 | 43.20 | 32.44 | 26.90 | 24.97 |
| 300 | 19.37 | 20.77 | 21.88 | 23.30 | 39.35 | 30.95 | 26.16 | 24.38 |
| 350 | 19.23 | 20.64 | 21.73 | 23.16 | 38.01 | 30.83 | 26.08 | 24.31 |
| 400 | 19.25 | 20.66 | 21.77 | 23.20 | 33.77 | 29.38 | 25.47 | 23.87 |
| 450 | 19.17 | 20.55 | 21.61 | 22.99 | 32.66 | 29.41 | 25.68 | 24.05 |
| 500 | 19.16 | 20.49 | 21.50 | 22.81 | 30.62 | 28.57 | 25.46 | 23.95 |
| 550 | 19.16 | 20.45 | 21.43 | 22.69 | 30.54 | 28.94 | 25.91 | 24.40 |
| 600 | 19.14 | 20.41 | 21.35 | 22.51 | 29.56 | 28.48 | 25.91 | 24.46 |
| 700 | 19.27 | 20.48 | 21.36 | 22.42 | 29.16 | 28.41 | 26.24 | 24.84 |
| 800 | 19.12 | 20.27 | 21.11 | 22.05 | 28.32 | 27.82 | 26.19 | 25.00 |
| 900 | 18.82 | 19.91 | 20.72 | 21.58 | 27.30 | 27.00 | 25.87 | 24.88 |
| 1000 | 18.40 | 19.46 | 20.24 | 21.06 | 26.63 | 26.55 | 25.80 | 25.00 |
| 1100 | 17.94 | 18.94 | 19.68 | 20.46 | 26.06 | 26.39 | 26.26 | 25.64 |
| 1200 | 17.57 | 18.52 | 19.22 | 19.95 | 25.76 | 26.48 | 27.05 | 26.78 |
| 1300 | 17.20 | 18.11 | 18.79 | 19.46 | 25.71 | 26.97 | 28.63 | 28.90 |
| 1400 | 16.73 | 17.60 | 18.25 | 18.88 | 25.36 | 27.13 | 30.04 | 31.54 |
| 1500 | 16.49 | 17.35 | 17.99 | 18.62 | 25.55 | 27.98 | 32.73 | 36.17 |
| 1600 | 16.66 | 17.50 | 18.15 | 18.77 | 26.34 | 29.76 | 38.44 | 49.76 |
| 1700 | 17.54 | 18.35 | 19.01 | 19.55 | 27.63 | 30.95 | 32.98 | 30.94 |
| 1800 | 18.73 | 19.46 | 19.99 | 20.44 | 26.58 | 27.79 | 26.51 | 24.95 |
| 1900 | 19.68 | 20.18 | 20.59 | 20.92 | 23.77 | 24.17 | 22.85 | 21.64 |
| 2000 | 20.01 | 20.22 | 20.45 | 20.78 | 21.21 | 21.36 | 20.23 | 19.26 |
| 2100 | 20.22 | 20.13 | 20.16 | 20.43 | 19.17 | 19.12 | 18.12 | 17.29 |
| 2200 | 19.86 | 19.60 | 19.50 | 19.72 | 17.81 | 17.64 | 16.75 | 16.04 |
| 2300 | 21.46 | 21.11 | 20.95 | 21.07 | 18.03 | 17.47 | 16.44 | 15.72 |
| 2400 | 25.55 | 24.38 | 23.45 | 22.70 | 17.70 | 16.57 | 15.48 | 14.81 |
| 2500 | 31.40 | 27.39 | 24.90 | 22.83 | 16.81 | 15.37 | 14.32 | 13.79 |
| 2600 | 25.84 | 24.59 | 22.87 | 20.87 | 15.62 | 14.01 | 13.06 | 12.64 |
| 2700 | 19.54 | 19.78 | 19.43 | 18.47 | 14.69 | 13.10 | 12.25 | 11.91 |
| 2800 | 15.02 | 15.59 | 15.81 | 15.75 | 13.73 | 12.46 | 11.80 | 11.53 |
| 2900 | 12.33 | 12.92 | 13.33 | 13.68 | 12.92 | 12.09 | 11.62 | 11.42 |
| 3000 | 10.55 | 11.17 | 11.66 | 12.21 | 12.36 | 12.01 | 11.82 | 11.71 |



REV. OR
DAT-31575A-SN+

10/12/2016

Page 2 of 9

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss = -3.2V, TEMPERATURE=-45degC

| FREQUENCY (MHz) | OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|---|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 19.74 | 21.47 | 22.14 | 24.03 | 27.77 | 29.67 | 24.76 | 23.29 |
| 50 | 19.38 | 20.95 | 21.61 | 23.41 | 26.75 | 30.95 | 25.66 | 23.90 |
| 100 | 19.33 | 20.87 | 21.49 | 23.26 | 26.41 | 31.23 | 25.88 | 24.11 |
| 150 | 18.91 | 20.41 | 20.99 | 22.63 | 25.49 | 33.29 | 27.04 | 25.04 |
| 200 | 19.06 | 20.56 | 21.15 | 22.83 | 25.78 | 32.89 | 26.80 | 24.85 |
| 250 | 18.99 | 20.48 | 21.08 | 22.77 | 25.79 | 33.27 | 26.90 | 24.92 |
| 300 | 19.16 | 20.70 | 21.34 | 23.13 | 26.32 | 31.42 | 25.98 | 24.23 |
| 350 | 18.98 | 20.52 | 21.14 | 22.94 | 26.04 | 31.33 | 26.06 | 24.26 |
| 400 | 18.87 | 20.39 | 21.03 | 22.81 | 25.66 | 29.72 | 25.49 | 23.84 |
| 450 | 18.57 | 20.04 | 20.64 | 22.33 | 24.97 | 30.08 | 25.92 | 24.26 |
| 500 | 18.26 | 19.65 | 20.21 | 21.81 | 24.14 | 29.53 | 26.06 | 24.48 |
| 550 | 18.15 | 19.51 | 20.03 | 21.58 | 23.77 | 30.28 | 26.89 | 25.16 |
| 600 | 18.00 | 19.33 | 19.83 | 21.27 | 23.29 | 30.21 | 27.33 | 25.64 |
| 700 | 18.09 | 19.38 | 19.85 | 21.24 | 23.11 | 31.09 | 28.40 | 26.56 |
| 800 | 18.38 | 19.69 | 20.09 | 21.45 | 23.12 | 31.03 | 28.76 | 26.95 |
| 900 | 19.13 | 20.50 | 20.90 | 22.29 | 23.79 | 29.73 | 27.43 | 25.82 |
| 1000 | 19.34 | 20.68 | 21.04 | 22.33 | 23.50 | 28.86 | 27.20 | 25.78 |
| 1100 | 18.94 | 20.18 | 20.45 | 21.57 | 22.36 | 27.65 | 27.19 | 26.19 |
| 1200 | 18.73 | 19.89 | 20.09 | 21.09 | 21.63 | 26.79 | 27.08 | 26.52 |
| 1300 | 18.93 | 20.10 | 20.26 | 21.20 | 21.51 | 26.36 | 26.74 | 26.32 |
| 1400 | 19.08 | 20.26 | 20.39 | 21.27 | 21.47 | 26.35 | 26.79 | 26.52 |
| 1500 | 18.84 | 19.98 | 20.09 | 20.94 | 21.17 | 27.43 | 28.57 | 28.63 |
| 1600 | 17.94 | 18.96 | 19.04 | 19.79 | 20.04 | 26.40 | 28.69 | 29.97 |
| 1700 | 17.76 | 18.76 | 18.85 | 19.63 | 20.03 | 27.53 | 31.06 | 33.57 |
| 1800 | 17.64 | 18.61 | 18.78 | 19.63 | 20.48 | 30.43 | 39.49 | 50.18 |
| 1900 | 17.78 | 18.69 | 18.98 | 19.90 | 21.51 | 32.17 | 33.48 | 30.32 |
| 2000 | 17.73 | 18.49 | 18.89 | 19.80 | 22.30 | 26.88 | 25.50 | 23.87 |
| 2100 | 17.35 | 18.08 | 18.54 | 19.48 | 22.39 | 24.73 | 23.19 | 21.81 |
| 2200 | 18.72 | 19.44 | 19.97 | 20.94 | 24.86 | 22.27 | 20.37 | 19.23 |
| 2300 | 20.43 | 20.84 | 21.40 | 21.86 | 25.17 | 19.62 | 18.00 | 17.07 |
| 2400 | 23.35 | 23.66 | 24.34 | 24.35 | 27.15 | 19.09 | 17.37 | 16.46 |
| 2500 | 32.82 | 32.15 | 32.58 | 28.44 | 25.16 | 17.67 | 16.17 | 15.41 |
| 2600 | 33.07 | 37.02 | 32.66 | 27.15 | 21.43 | 16.16 | 14.81 | 14.19 |
| 2700 | 21.41 | 22.98 | 22.75 | 22.22 | 18.18 | 14.85 | 13.65 | 13.15 |
| 2800 | 15.53 | 16.64 | 16.90 | 17.58 | 15.68 | 14.14 | 13.21 | 12.81 |
| 2900 | 11.84 | 12.72 | 13.04 | 13.89 | 13.20 | 13.07 | 12.59 | 12.35 |
| 3000 | 9.64 | 10.37 | 10.71 | 11.56 | 11.48 | 12.29 | 12.29 | 12.23 |



REV. OR
DAT-31575A-SN+

10/12/2016

Page 3 of 9

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss= -3.2V, TEMPERATURE=+25degC

| FREQUENCY (MHz) | STEP ATTENUATION* AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 THRU LOSS | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 1.10 | 0.52 | 1.02 | 2.03 | 4.04 | 8.00 | 16.00 | 31.41 |
| 50 | 1.11 | 0.51 | 1.02 | 2.01 | 4.01 | 8.00 | 15.97 | 31.38 |
| 100 | 1.12 | 0.52 | 1.02 | 2.02 | 4.01 | 8.01 | 15.98 | 31.42 |
| 150 | 1.13 | 0.52 | 1.01 | 2.02 | 4.02 | 8.00 | 15.98 | 31.39 |
| 200 | 1.14 | 0.51 | 1.02 | 2.02 | 4.01 | 8.00 | 15.97 | 31.39 |
| 250 | 1.15 | 0.51 | 1.01 | 2.01 | 4.01 | 8.00 | 15.96 | 31.38 |
| 300 | 1.16 | 0.51 | 1.01 | 2.01 | 4.01 | 7.99 | 15.96 | 31.40 |
| 350 | 1.18 | 0.51 | 1.02 | 2.01 | 4.01 | 8.00 | 15.98 | 31.47 |
| 400 | 1.20 | 0.51 | 1.01 | 2.01 | 4.01 | 7.99 | 15.97 | 31.38 |
| 450 | 1.21 | 0.51 | 1.01 | 2.01 | 4.00 | 7.98 | 15.96 | 31.38 |
| 500 | 1.22 | 0.51 | 1.01 | 2.01 | 4.00 | 7.98 | 15.95 | 31.44 |
| 550 | 1.24 | 0.51 | 1.01 | 2.00 | 4.00 | 7.97 | 15.94 | 31.42 |
| 600 | 1.26 | 0.51 | 1.01 | 2.00 | 3.99 | 7.97 | 15.94 | 31.43 |
| 700 | 1.29 | 0.51 | 1.01 | 2.00 | 3.99 | 7.96 | 15.93 | 31.41 |
| 800 | 1.34 | 0.50 | 1.00 | 2.00 | 3.98 | 7.95 | 15.92 | 31.33 |
| 900 | 1.36 | 0.50 | 1.00 | 2.00 | 3.98 | 7.96 | 15.94 | 31.50 |
| 1000 | 1.41 | 0.50 | 1.00 | 2.00 | 3.97 | 7.96 | 15.96 | 31.65 |
| 1100 | 1.44 | 0.50 | 1.00 | 2.00 | 3.97 | 7.96 | 15.96 | 31.56 |
| 1200 | 1.47 | 0.49 | 1.00 | 1.99 | 3.97 | 7.95 | 15.93 | 31.26 |
| 1300 | 1.48 | 0.49 | 0.99 | 1.99 | 3.96 | 7.94 | 15.87 | 30.80 |
| 1400 | 1.49 | 0.49 | 0.99 | 1.99 | 3.96 | 7.93 | 15.82 | 30.64 |
| 1500 | 1.54 | 0.49 | 1.00 | 1.99 | 3.98 | 7.97 | 15.97 | 31.44 |
| 1600 | 1.57 | 0.49 | 1.00 | 2.00 | 4.00 | 8.00 | 16.03 | 31.60 |
| 1700 | 1.58 | 0.49 | 1.00 | 2.00 | 4.00 | 8.00 | 15.99 | 31.19 |
| 1800 | 1.60 | 0.49 | 1.00 | 2.00 | 4.01 | 8.01 | 15.99 | 30.84 |
| 1900 | 1.62 | 0.49 | 1.00 | 1.99 | 4.01 | 8.01 | 15.91 | 30.35 |
| 2000 | 1.64 | 0.49 | 1.00 | 1.99 | 4.01 | 8.00 | 15.86 | 30.04 |
| 2100 | 1.63 | 0.49 | 0.99 | 1.99 | 4.01 | 8.02 | 15.88 | 29.98 |
| 2200 | 1.60 | 0.49 | 1.00 | 1.99 | 4.02 | 8.04 | 15.86 | 29.75 |
| 2300 | 1.59 | 0.49 | 1.00 | 1.99 | 4.04 | 8.09 | 15.97 | 30.38 |
| 2400 | 1.52 | 0.49 | 1.00 | 2.00 | 4.07 | 8.15 | 16.07 | 30.47 |
| 2500 | 1.29 | 0.49 | 1.00 | 2.00 | 4.08 | 8.12 | 15.88 | 29.40 |
| 2600 | 1.24 | 0.49 | 1.00 | 2.01 | 4.12 | 8.19 | 15.96 | 29.55 |
| 2700 | 1.28 | 0.49 | 1.01 | 2.02 | 4.15 | 8.24 | 16.03 | 29.80 |
| 2800 | 1.47 | 0.48 | 1.00 | 2.01 | 4.16 | 8.28 | 16.19 | 30.82 |
| 2900 | 1.80 | 0.46 | 0.98 | 1.98 | 4.14 | 8.25 | 16.27 | 31.32 |
| 3000 | 2.25 | 0.44 | 0.95 | 1.94 | 4.11 | 8.24 | 16.51 | 33.77 |

* Step Attenuation above Thru Loss (TTL Logic 000000).



REV. OR
DAT-31575A-SN+

10/12/2016

Page 4 of 9



Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss= -3.2V, TEMPERATURE=+25degC

| FREQUENCY (MHz) | INPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 18.79 | 19.68 | 20.35 | 20.96 | 31.48 | 36.58 | 48.35 | 36.54 |
| 50 | 18.49 | 19.35 | 19.95 | 20.56 | 30.32 | 34.85 | 58.89 | 39.15 |
| 100 | 18.63 | 19.53 | 20.14 | 20.79 | 30.94 | 35.85 | 48.82 | 37.48 |
| 150 | 18.34 | 19.22 | 19.81 | 20.45 | 29.72 | 33.88 | 46.04 | 39.82 |
| 200 | 18.43 | 19.30 | 19.90 | 20.53 | 29.75 | 33.77 | 42.37 | 38.30 |
| 250 | 18.23 | 19.07 | 19.65 | 20.28 | 28.90 | 32.38 | 41.03 | 40.71 |
| 300 | 18.27 | 19.12 | 19.68 | 20.29 | 28.68 | 31.95 | 38.64 | 38.92 |
| 350 | 18.12 | 18.94 | 19.50 | 20.08 | 28.13 | 31.12 | 38.22 | 41.50 |
| 400 | 18.16 | 18.98 | 19.54 | 20.11 | 27.99 | 30.78 | 36.94 | 39.38 |
| 450 | 18.18 | 18.99 | 19.52 | 20.08 | 27.92 | 30.71 | 37.43 | 42.61 |
| 500 | 18.29 | 19.10 | 19.63 | 20.17 | 27.94 | 30.49 | 36.66 | 40.79 |
| 550 | 18.38 | 19.19 | 19.73 | 20.22 | 28.05 | 30.62 | 37.47 | 44.41 |
| 600 | 18.49 | 19.29 | 19.82 | 20.32 | 28.01 | 30.42 | 36.62 | 41.84 |
| 700 | 18.69 | 19.49 | 20.01 | 20.47 | 28.17 | 30.25 | 36.03 | 40.84 |
| 800 | 18.64 | 19.43 | 19.93 | 20.36 | 27.56 | 29.26 | 33.80 | 37.26 |
| 900 | 18.43 | 19.19 | 19.70 | 20.10 | 26.68 | 27.94 | 31.48 | 33.94 |
| 1000 | 18.00 | 18.75 | 19.24 | 19.63 | 25.60 | 26.68 | 29.75 | 32.13 |
| 1100 | 17.36 | 18.06 | 18.54 | 18.91 | 24.38 | 25.36 | 28.27 | 30.89 |
| 1200 | 16.72 | 17.37 | 17.84 | 18.15 | 23.21 | 24.14 | 26.88 | 29.50 |
| 1300 | 16.19 | 16.79 | 17.21 | 17.49 | 22.22 | 23.08 | 25.50 | 27.97 |
| 1400 | 15.82 | 16.37 | 16.74 | 16.97 | 21.46 | 22.16 | 24.22 | 26.22 |
| 1500 | 15.77 | 16.28 | 16.64 | 16.82 | 21.29 | 21.95 | 23.77 | 25.47 |
| 1600 | 16.09 | 16.56 | 16.87 | 17.00 | 21.42 | 22.02 | 23.40 | 24.57 |
| 1700 | 16.76 | 17.15 | 17.41 | 17.45 | 21.54 | 21.99 | 22.63 | 23.04 |
| 1800 | 17.43 | 17.69 | 17.86 | 17.85 | 21.11 | 21.51 | 21.51 | 21.33 |
| 1900 | 17.92 | 18.04 | 18.14 | 18.14 | 20.33 | 20.80 | 20.41 | 19.89 |
| 2000 | 18.14 | 18.17 | 18.20 | 18.31 | 19.44 | 20.04 | 19.46 | 18.77 |
| 2100 | 18.40 | 18.32 | 18.32 | 18.54 | 18.66 | 19.27 | 18.54 | 17.77 |
| 2200 | 18.43 | 18.34 | 18.34 | 18.68 | 18.24 | 18.84 | 18.08 | 17.25 |
| 2300 | 20.19 | 20.16 | 20.20 | 20.69 | 19.43 | 19.83 | 18.76 | 17.76 |
| 2400 | 24.65 | 24.63 | 24.57 | 25.20 | 20.83 | 20.38 | 18.89 | 17.78 |
| 2500 | 38.26 | 39.29 | 34.82 | 31.78 | 20.49 | 18.98 | 17.63 | 16.76 |
| 2600 | 26.93 | 27.86 | 27.40 | 25.46 | 18.73 | 16.95 | 15.91 | 15.32 |
| 2700 | 19.83 | 20.60 | 20.93 | 20.57 | 17.28 | 15.60 | 14.78 | 14.37 |
| 2800 | 15.55 | 16.24 | 16.74 | 16.96 | 15.86 | 14.63 | 14.11 | 13.84 |
| 2900 | 12.92 | 13.57 | 14.13 | 14.62 | 14.75 | 14.05 | 13.83 | 13.68 |
| 3000 | 11.10 | 11.71 | 12.28 | 12.91 | 13.90 | 13.74 | 13.91 | 13.93 |



REV. OR
DAT-31575A-SN+

10/12/2016

Page 5 of 9

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss= -3.2V, TEMPERATURE=+25degC

| FREQUENCY (MHz) | OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|---|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 18.77 | 19.81 | 20.00 | 20.91 | 21.82 | 35.76 | 45.95 | 36.34 |
| 50 | 18.41 | 19.44 | 19.65 | 20.55 | 21.52 | 34.18 | 59.31 | 38.84 |
| 100 | 18.48 | 19.50 | 19.73 | 20.65 | 21.68 | 34.69 | 47.71 | 37.58 |
| 150 | 18.14 | 19.15 | 19.36 | 20.27 | 21.26 | 32.93 | 45.25 | 40.09 |
| 200 | 18.15 | 19.16 | 19.38 | 20.28 | 21.29 | 32.65 | 41.83 | 38.53 |
| 250 | 17.89 | 18.87 | 19.08 | 19.98 | 20.92 | 31.42 | 40.95 | 41.58 |
| 300 | 17.86 | 18.84 | 19.05 | 19.92 | 20.86 | 30.89 | 38.39 | 39.49 |
| 350 | 17.68 | 18.63 | 18.83 | 19.67 | 20.55 | 30.09 | 37.70 | 42.53 |
| 400 | 17.67 | 18.61 | 18.81 | 19.67 | 20.54 | 29.81 | 36.54 | 40.08 |
| 450 | 17.60 | 18.54 | 18.72 | 19.56 | 20.37 | 29.56 | 36.80 | 44.15 |
| 500 | 17.56 | 18.49 | 18.67 | 19.50 | 20.28 | 29.10 | 35.84 | 42.12 |
| 550 | 17.59 | 18.50 | 18.67 | 19.50 | 20.22 | 29.05 | 36.03 | 45.82 |
| 600 | 17.56 | 18.48 | 18.63 | 19.43 | 20.13 | 28.69 | 35.20 | 43.65 |
| 700 | 17.70 | 18.61 | 18.74 | 19.53 | 20.13 | 28.69 | 35.30 | 44.98 |
| 800 | 17.93 | 18.85 | 18.97 | 19.73 | 20.22 | 28.69 | 35.20 | 44.70 |
| 900 | 18.46 | 19.45 | 19.53 | 20.31 | 20.68 | 29.67 | 37.12 | 48.16 |
| 1000 | 18.61 | 19.57 | 19.62 | 20.36 | 20.56 | 29.09 | 35.47 | 43.22 |
| 1100 | 18.36 | 19.28 | 19.29 | 19.97 | 19.98 | 27.25 | 31.88 | 36.50 |
| 1200 | 18.04 | 18.89 | 18.87 | 19.48 | 19.30 | 25.51 | 29.00 | 32.26 |
| 1300 | 17.88 | 18.71 | 18.63 | 19.15 | 18.84 | 24.47 | 27.43 | 30.24 |
| 1400 | 17.89 | 18.67 | 18.54 | 18.98 | 18.55 | 24.01 | 26.73 | 29.42 |
| 1500 | 17.63 | 18.31 | 18.15 | 18.49 | 18.08 | 23.34 | 25.73 | 28.14 |
| 1600 | 17.09 | 17.72 | 17.57 | 17.86 | 17.52 | 22.44 | 24.48 | 26.56 |
| 1700 | 17.06 | 17.67 | 17.53 | 17.86 | 17.66 | 22.83 | 24.80 | 26.60 |
| 1800 | 16.99 | 17.57 | 17.49 | 17.85 | 17.96 | 23.12 | 24.75 | 25.72 |
| 1900 | 17.12 | 17.66 | 17.66 | 18.10 | 18.63 | 23.43 | 24.24 | 24.17 |
| 2000 | 17.14 | 17.56 | 17.66 | 18.08 | 19.20 | 22.53 | 22.42 | 21.81 |
| 2100 | 17.40 | 17.81 | 17.99 | 18.44 | 20.09 | 22.51 | 21.89 | 21.02 |
| 2200 | 18.75 | 19.01 | 19.26 | 19.69 | 22.23 | 22.07 | 20.80 | 19.68 |
| 2300 | 19.44 | 19.50 | 19.88 | 20.17 | 23.60 | 20.76 | 19.38 | 18.32 |
| 2400 | 21.25 | 21.48 | 21.98 | 22.43 | 27.59 | 21.41 | 19.60 | 18.42 |
| 2500 | 25.96 | 26.87 | 28.08 | 28.74 | 36.27 | 20.76 | 18.75 | 17.65 |
| 2600 | 27.11 | 32.40 | 34.15 | 41.08 | 25.87 | 19.38 | 17.61 | 16.69 |
| 2700 | 20.63 | 22.57 | 22.77 | 24.03 | 20.00 | 17.62 | 16.29 | 15.64 |
| 2800 | 15.48 | 16.62 | 16.88 | 17.96 | 16.27 | 16.18 | 15.45 | 15.05 |
| 2900 | 12.18 | 13.05 | 13.32 | 14.28 | 13.54 | 14.55 | 14.43 | 14.28 |
| 3000 | 10.06 | 10.76 | 11.06 | 11.93 | 11.68 | 13.39 | 13.80 | 13.91 |



REV. OR
DAT-31575A-SN+

10/12/2016

Page 6 of 9

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss =-3.2V, TEMPERATURE=+85degC

| FREQUENCY (MHz) | STEP ATTENUATION* AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 THRU LOSS | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 1.30 | 0.48 | 0.99 | 1.99 | 3.91 | 7.82 | 15.72 | 31.26 |
| 50 | 1.30 | 0.50 | 0.99 | 1.99 | 3.92 | 7.84 | 15.72 | 30.97 |
| 100 | 1.30 | 0.50 | 0.99 | 1.99 | 3.92 | 7.84 | 15.74 | 30.96 |
| 150 | 1.30 | 0.50 | 0.99 | 1.99 | 3.92 | 7.84 | 15.73 | 31.02 |
| 200 | 1.32 | 0.50 | 0.99 | 1.99 | 3.92 | 7.84 | 15.73 | 31.02 |
| 250 | 1.34 | 0.50 | 0.99 | 1.99 | 3.92 | 7.84 | 15.72 | 31.00 |
| 300 | 1.37 | 0.49 | 0.98 | 1.99 | 3.92 | 7.83 | 15.71 | 31.00 |
| 350 | 1.40 | 0.49 | 0.99 | 1.99 | 3.92 | 7.82 | 15.72 | 30.98 |
| 400 | 1.43 | 0.49 | 0.99 | 1.98 | 3.91 | 7.82 | 15.72 | 30.99 |
| 450 | 1.45 | 0.49 | 0.98 | 1.98 | 3.91 | 7.81 | 15.70 | 31.04 |
| 500 | 1.46 | 0.49 | 0.99 | 1.98 | 3.91 | 7.81 | 15.71 | 31.03 |
| 550 | 1.48 | 0.49 | 0.98 | 1.98 | 3.91 | 7.81 | 15.71 | 31.02 |
| 600 | 1.49 | 0.49 | 0.98 | 1.98 | 3.91 | 7.82 | 15.70 | 31.02 |
| 700 | 1.52 | 0.49 | 0.98 | 1.98 | 3.91 | 7.82 | 15.71 | 30.93 |
| 800 | 1.57 | 0.49 | 0.98 | 1.98 | 3.90 | 7.82 | 15.71 | 31.00 |
| 900 | 1.60 | 0.48 | 0.98 | 1.98 | 3.91 | 7.83 | 15.74 | 31.12 |
| 1000 | 1.65 | 0.48 | 0.98 | 1.98 | 3.90 | 7.83 | 15.77 | 31.32 |
| 1100 | 1.70 | 0.48 | 0.97 | 1.98 | 3.90 | 7.83 | 15.76 | 31.17 |
| 1200 | 1.74 | 0.48 | 0.97 | 1.97 | 3.90 | 7.82 | 15.71 | 30.89 |
| 1300 | 1.76 | 0.47 | 0.97 | 1.97 | 3.89 | 7.81 | 15.66 | 30.43 |
| 1400 | 1.78 | 0.47 | 0.97 | 1.97 | 3.90 | 7.81 | 15.66 | 30.45 |
| 1500 | 1.84 | 0.47 | 0.98 | 1.98 | 3.91 | 7.85 | 15.78 | 31.16 |
| 1600 | 1.86 | 0.47 | 0.98 | 1.98 | 3.93 | 7.87 | 15.82 | 31.21 |
| 1700 | 1.86 | 0.47 | 0.98 | 1.98 | 3.94 | 7.88 | 15.78 | 30.76 |
| 1800 | 1.85 | 0.47 | 0.98 | 1.98 | 3.94 | 7.89 | 15.75 | 30.33 |
| 1900 | 1.83 | 0.47 | 0.98 | 1.98 | 3.94 | 7.90 | 15.75 | 30.18 |
| 2000 | 1.82 | 0.47 | 0.98 | 1.98 | 3.95 | 7.91 | 15.72 | 29.97 |
| 2100 | 1.76 | 0.47 | 0.97 | 1.98 | 3.96 | 7.93 | 15.74 | 29.89 |
| 2200 | 1.72 | 0.47 | 0.97 | 1.97 | 3.96 | 7.95 | 15.74 | 29.76 |
| 2300 | 1.69 | 0.47 | 0.97 | 1.97 | 3.99 | 8.01 | 15.88 | 30.47 |
| 2400 | 1.54 | 0.47 | 0.97 | 1.96 | 4.00 | 8.00 | 15.75 | 29.53 |
| 2500 | 1.42 | 0.46 | 0.97 | 1.96 | 4.00 | 8.00 | 15.67 | 29.14 |
| 2600 | 1.42 | 0.46 | 0.96 | 1.96 | 4.01 | 8.02 | 15.72 | 29.35 |
| 2700 | 1.51 | 0.45 | 0.95 | 1.95 | 4.02 | 8.05 | 15.80 | 29.72 |
| 2800 | 1.72 | 0.44 | 0.94 | 1.94 | 4.03 | 8.07 | 15.89 | 30.40 |
| 2900 | 2.06 | 0.43 | 0.92 | 1.91 | 4.01 | 8.05 | 16.00 | 31.19 |
| 3000 | 2.48 | 0.42 | 0.90 | 1.89 | 3.99 | 8.05 | 16.21 | 33.43 |

* Step Attenuation above Thru Loss (TTL Logic 000000).



REV. OR
DAT-31575A-SN+

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

10/12/2016
Page 7 of 9

IF/RF MICROWAVE COMPONENTS

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss =-3.2V, TEMPERATURE=+85degC

| FREQUENCY (MHz) | INPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|--|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 17.47 | 17.98 | 18.18 | 18.17 | 22.85 | 22.90 | 24.57 | 26.13 |
| 50 | 17.26 | 17.70 | 17.88 | 17.94 | 22.47 | 22.63 | 24.19 | 25.76 |
| 100 | 17.37 | 17.83 | 18.03 | 18.13 | 22.86 | 23.12 | 24.84 | 26.51 |
| 150 | 17.14 | 17.60 | 17.82 | 17.94 | 22.54 | 22.89 | 24.58 | 26.24 |
| 200 | 17.20 | 17.68 | 17.91 | 18.03 | 22.69 | 23.05 | 24.82 | 26.53 |
| 250 | 17.01 | 17.47 | 17.69 | 17.80 | 22.23 | 22.52 | 24.13 | 25.71 |
| 300 | 17.02 | 17.45 | 17.67 | 17.76 | 22.05 | 22.28 | 23.84 | 25.30 |
| 350 | 16.88 | 17.30 | 17.48 | 17.53 | 21.61 | 21.71 | 23.08 | 24.43 |
| 400 | 16.91 | 17.31 | 17.50 | 17.50 | 21.47 | 21.51 | 22.79 | 24.08 |
| 450 | 16.95 | 17.32 | 17.47 | 17.45 | 21.32 | 21.23 | 22.39 | 23.56 |
| 500 | 17.10 | 17.46 | 17.59 | 17.53 | 21.40 | 21.25 | 22.35 | 23.49 |
| 550 | 17.22 | 17.56 | 17.68 | 17.60 | 21.44 | 21.23 | 22.25 | 23.34 |
| 600 | 17.39 | 17.73 | 17.86 | 17.75 | 21.66 | 21.44 | 22.45 | 23.54 |
| 700 | 17.79 | 18.14 | 18.26 | 18.15 | 22.30 | 22.04 | 23.08 | 24.24 |
| 800 | 18.02 | 18.41 | 18.57 | 18.48 | 22.95 | 22.73 | 23.97 | 25.28 |
| 900 | 18.00 | 18.42 | 18.62 | 18.57 | 23.25 | 23.11 | 24.61 | 26.22 |
| 1000 | 17.52 | 17.97 | 18.22 | 18.22 | 22.75 | 22.72 | 24.35 | 26.07 |
| 1100 | 16.75 | 17.17 | 17.44 | 17.47 | 21.62 | 21.65 | 23.17 | 24.74 |
| 1200 | 15.93 | 16.34 | 16.59 | 16.62 | 20.36 | 20.40 | 21.73 | 23.08 |
| 1300 | 15.29 | 15.65 | 15.89 | 15.88 | 19.25 | 19.20 | 20.26 | 21.34 |
| 1400 | 14.96 | 15.26 | 15.45 | 15.37 | 18.45 | 18.27 | 19.08 | 19.95 |
| 1500 | 14.96 | 15.22 | 15.35 | 15.20 | 18.08 | 17.78 | 18.36 | 19.05 |
| 1600 | 15.33 | 15.49 | 15.55 | 15.31 | 17.96 | 17.55 | 17.84 | 18.33 |
| 1700 | 15.87 | 15.95 | 15.92 | 15.58 | 17.86 | 17.41 | 17.45 | 17.69 |
| 1800 | 16.35 | 16.32 | 16.21 | 15.86 | 17.68 | 17.37 | 17.16 | 17.20 |
| 1900 | 16.63 | 16.51 | 16.38 | 16.12 | 17.44 | 17.40 | 17.04 | 16.87 |
| 2000 | 16.85 | 16.71 | 16.58 | 16.46 | 17.34 | 17.62 | 17.16 | 16.80 |
| 2100 | 17.25 | 17.11 | 16.98 | 17.01 | 17.41 | 17.99 | 17.41 | 16.85 |
| 2200 | 17.80 | 17.69 | 17.59 | 17.78 | 17.94 | 18.79 | 18.09 | 17.38 |
| 2300 | 19.86 | 19.83 | 19.78 | 20.13 | 20.03 | 21.16 | 20.02 | 18.92 |
| 2400 | 24.16 | 24.38 | 24.56 | 25.29 | 23.78 | 24.83 | 22.58 | 20.83 |
| 2500 | 28.95 | 31.30 | 34.08 | 37.73 | 25.19 | 24.04 | 21.98 | 20.47 |
| 2600 | 24.72 | 26.47 | 28.31 | 28.40 | 23.27 | 21.28 | 20.08 | 19.17 |
| 2700 | 19.46 | 20.43 | 21.43 | 21.75 | 21.02 | 19.23 | 18.65 | 18.16 |
| 2800 | 15.93 | 16.69 | 17.48 | 17.97 | 18.89 | 17.76 | 17.67 | 17.47 |
| 2900 | 13.48 | 14.13 | 14.84 | 15.43 | 17.17 | 16.69 | 17.08 | 17.16 |
| 3000 | 11.63 | 12.22 | 12.88 | 13.50 | 15.74 | 15.89 | 16.79 | 17.21 |

Digital Step Attenuator

DAT-31575A-SN+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=-10dBm, Vdd=+3V, Vss =-3.2V, TEMPERATURE=+85degC

| FREQUENCY (MHz) | OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB) | | | | | | | |
|--------------------|---|------------------|------------------|------------------|------------------|------------------|-----------------|-------------------|
| | 000000 0 dB | 000001 0.5 dB | 000010 1.0 dB | 000100 2.0 dB | 001000 4.0 dB | 010000 8.0 dB | 100000 16 dB | 111111 31.5 dB |
| 10 | 17.48 | 17.94 | 17.82 | 18.10 | 17.95 | 22.77 | 24.68 | 26.30 |
| 50 | 17.25 | 17.80 | 17.68 | 17.95 | 17.78 | 22.52 | 24.32 | 25.93 |
| 100 | 17.43 | 18.01 | 17.89 | 18.21 | 18.08 | 23.07 | 25.04 | 26.83 |
| 150 | 17.23 | 17.82 | 17.73 | 18.07 | 17.98 | 22.92 | 24.90 | 26.65 |
| 200 | 17.18 | 17.77 | 17.69 | 18.05 | 17.98 | 22.94 | 24.98 | 26.78 |
| 250 | 16.80 | 17.37 | 17.29 | 17.64 | 17.58 | 22.22 | 24.07 | 25.65 |
| 300 | 16.58 | 17.13 | 17.06 | 17.38 | 17.32 | 21.72 | 23.47 | 24.98 |
| 350 | 16.32 | 16.84 | 16.74 | 17.05 | 16.92 | 21.06 | 22.61 | 23.92 |
| 400 | 16.30 | 16.80 | 16.70 | 16.99 | 16.83 | 20.85 | 22.33 | 23.59 |
| 450 | 16.30 | 16.81 | 16.68 | 16.93 | 16.73 | 20.62 | 21.94 | 23.10 |
| 500 | 16.42 | 16.92 | 16.78 | 16.99 | 16.78 | 20.63 | 21.93 | 23.06 |
| 550 | 16.61 | 17.11 | 16.94 | 17.14 | 16.89 | 20.69 | 21.88 | 22.97 |
| 600 | 16.81 | 17.28 | 17.11 | 17.30 | 17.01 | 20.88 | 22.05 | 23.12 |
| 700 | 17.19 | 17.70 | 17.50 | 17.67 | 17.35 | 21.38 | 22.54 | 23.59 |
| 800 | 17.53 | 18.07 | 17.87 | 18.07 | 17.71 | 22.02 | 23.28 | 24.45 |
| 900 | 17.96 | 18.57 | 18.35 | 18.58 | 18.13 | 22.86 | 24.33 | 25.63 |
| 1000 | 17.92 | 18.53 | 18.33 | 18.56 | 18.05 | 22.89 | 24.48 | 25.96 |
| 1100 | 17.47 | 18.08 | 17.88 | 18.14 | 17.55 | 22.18 | 23.84 | 25.46 |
| 1200 | 16.90 | 17.48 | 17.29 | 17.53 | 16.88 | 21.14 | 22.69 | 24.22 |
| 1300 | 16.48 | 17.01 | 16.79 | 16.99 | 16.27 | 20.15 | 21.47 | 22.84 |
| 1400 | 16.26 | 16.73 | 16.47 | 16.57 | 15.80 | 19.31 | 20.35 | 21.48 |
| 1500 | 15.92 | 16.29 | 15.98 | 15.98 | 15.21 | 18.27 | 19.00 | 19.86 |
| 1600 | 15.85 | 16.15 | 15.80 | 15.74 | 14.97 | 17.81 | 18.39 | 19.11 |
| 1700 | 16.12 | 16.36 | 16.00 | 15.88 | 15.18 | 17.85 | 18.24 | 18.77 |
| 1800 | 16.40 | 16.57 | 16.23 | 16.10 | 15.58 | 18.04 | 18.22 | 18.52 |
| 1900 | 16.58 | 16.67 | 16.42 | 16.31 | 16.15 | 18.26 | 18.20 | 18.25 |
| 2000 | 16.31 | 16.35 | 16.24 | 16.22 | 16.55 | 18.18 | 17.98 | 17.81 |
| 2100 | 16.51 | 16.56 | 16.57 | 16.66 | 17.55 | 18.89 | 18.51 | 18.08 |
| 2200 | 17.00 | 17.01 | 17.15 | 17.33 | 18.94 | 19.43 | 18.79 | 18.08 |
| 2300 | 17.51 | 17.55 | 17.76 | 18.00 | 20.29 | 19.95 | 19.03 | 18.15 |
| 2400 | 19.38 | 19.57 | 19.87 | 20.27 | 23.48 | 22.51 | 20.84 | 19.51 |
| 2500 | 22.28 | 23.00 | 23.48 | 24.50 | 29.92 | 24.88 | 21.90 | 20.17 |
| 2600 | 23.17 | 25.36 | 25.87 | 29.40 | 27.04 | 25.15 | 22.02 | 20.31 |
| 2700 | 19.49 | 21.24 | 21.50 | 23.68 | 20.74 | 22.30 | 20.81 | 19.66 |
| 2800 | 15.50 | 16.62 | 16.88 | 18.23 | 16.68 | 19.27 | 19.12 | 18.65 |
| 2900 | 12.63 | 13.48 | 13.73 | 14.79 | 13.93 | 16.73 | 17.39 | 17.46 |
| 3000 | 10.60 | 11.30 | 11.54 | 12.45 | 12.00 | 14.91 | 16.07 | 16.53 |



REV. OR
DAT-31575A-SN+

10/12/2016

Page 9 of 9

