# 1N5153 (SILICON)


**CASE 47**

Silicon high-frequency step-recovery power varactor, designed for high-power, high-frequency harmonic generation applications.

## MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Reverse Voltage | $V_R$ | 75 | Vdc |
| Forward Current | $I_F$ | 0.25 | Adc |
| RF Power Input | $P_{in}$ | 15 | Watts |
| Total Device Dissipation @ $T_C$ = 75°C<br>Derate above 75°C | $P_D$ | 5.5<br>45 | Watts<br>mW/°C |
| Junction Temperature | $T_J$ | +200 | °C |
| Storage Temperature | $T_{stg}$ | -65 to +200 | °C |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise noted)

| Characteristic | Condition | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage | $I_R$ = 10 μAdc | $BV_R$ | 75 | 80 | — | Vdc |
| Reverse Current | $V_R$ = 60 Vdc<br>$V_R$ = 60 Vdc, $T_A$ = 150°C | $I_R$ | —<br>— | 0.5<br>— | 1.0<br>100 | μAdc |
| Series Resistance | $V_R$ = 6 Vdc, f = 50 MHz | $R_S$ | — | 0.5 | — | Ohms |
| Diode Capacitance | $V_R$ = 6 Vdc, f = 1.0 MHz<br>$V_R$ = 70 Vdc, f = 1.0 MHz | $C_T$* | 5.0<br>— | 5.8<br>4.0 | 7.5<br>— | pF |
| Figure of Merit | $V_R$ = 6 Vdc, f = 50 MHz | Q | — | 1100 | — | — |
| Power Output | DOUBLER TEST CIRCUIT (Figure 1)<br>$P_{in}$ = 12 W, $f_{in}$ = 1GHz<br>$f_{out}$ = 2 GHz | $P_{out}$ | 6.0 | 7.2 | — | Watts |
| Efficiency | | $\eta$ | 50 | 60 | — | % |
| Thermal Resistance | | $\theta_J$ | — | 19 | 23 | °C/Watt |

*$C_T = C_J + C_C$

**FIGURE 1 — HARMONIC DOUBLER EFFICIENCY TEST CIRCUIT**

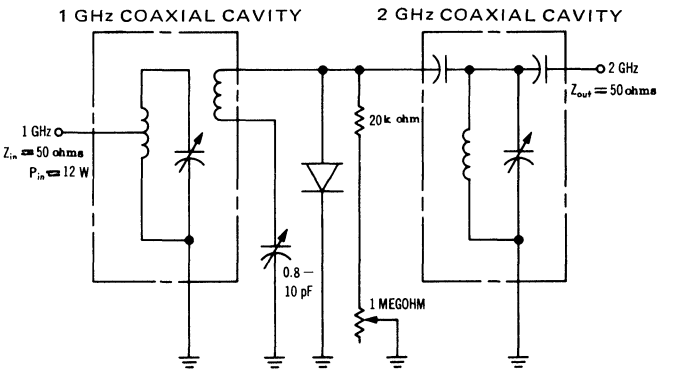
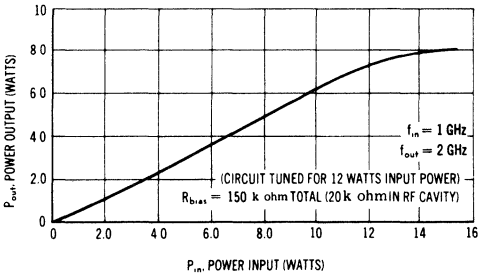



**FIGURE 2 — LINEARITY CHARACTERISTIC WITHOUT RETUNING**



POWER OUTPUT
versus OUTPUT FREQUENCY

**FIGURE 3A — DOUBLING (X2)**

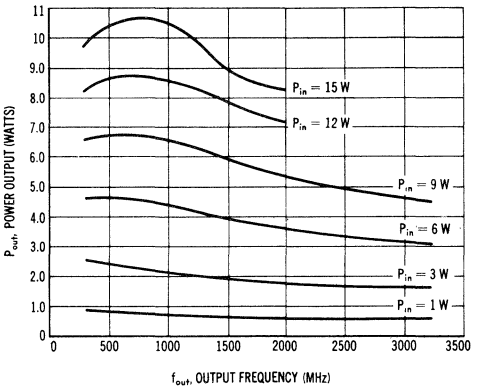



**FIGURE 3B — TRIPLING (X3)**

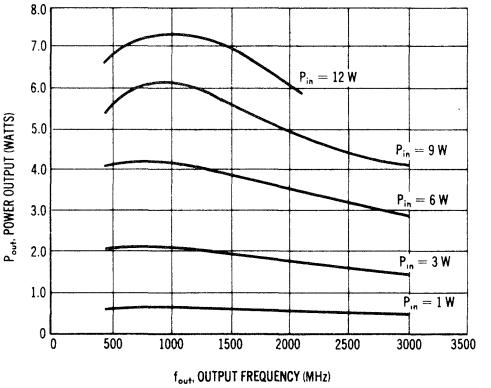
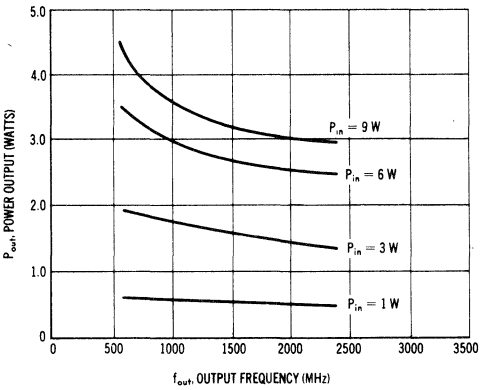



**FIGURE 3C — QUADRUPLING (X4)**




TYPICAL CHARACTERISTICS at 25°C

**FIGURE 4 — FIGURE OF MERIT versus REVERSE VOLTAGE**

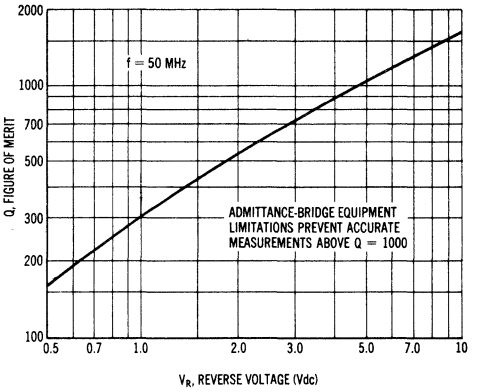



**FIGURE 5 — VARACTOR CAPACITANCE versus REVERSE VOLTAGE**

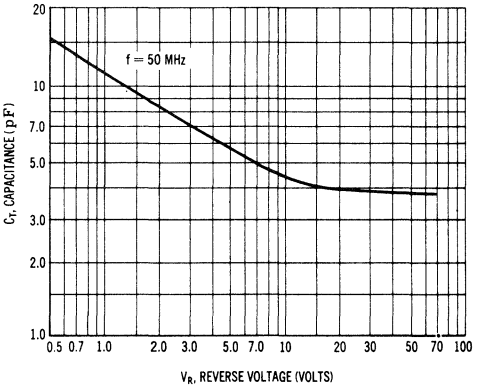
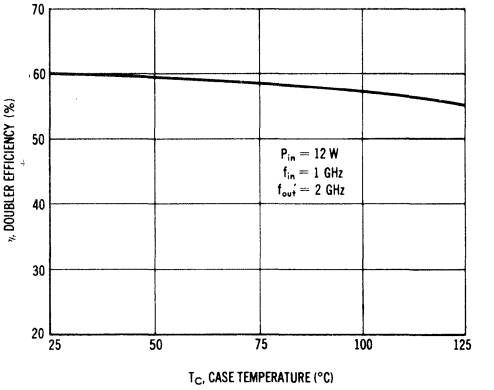



**FIGURE 6 — DOUBLER EFFICIENCY versus CASE TEMPERATURE**




# 1N5153A

For Specifications, See 1N5150A Data