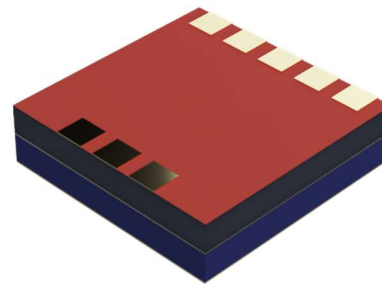
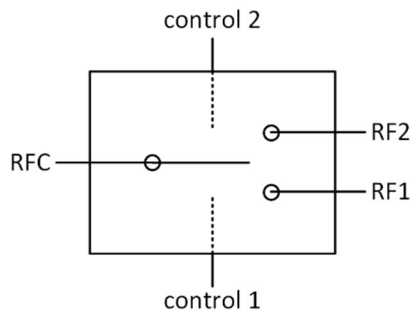


Light-controlled Reflective RF SPDT Switch PLMSW1.1

Summary

Under Development



Our light-controlled reflective RF SPDT switch PLMSW1.1 is based on our ten years' experience in photoconductive device research at the University of Bristol. It will be among the very first few commercially-available optically-controlled RF devices. Thanks to our novel light-controlled technology (pending European patent DJC144021P.GBA), we estimate that our device can achieve very low insertion losses, high IP3s, and high power handling capabilities with compact sizes and low costs. It also has the potential for record-low electrical power consumption (estimated 25 mW avg.) among reported light-controlled RF devices and an ultra-wide functional bandwidth (estimated 0.1 - 110 GHz).

Estimated Features

- Ultra-wide operating bandwidth (2 - 30 GHz) and functional bandwidth (0.1 - 110 GHz)
- Ultra-low insertion loss (max. 0.16 dB) and ultra-high isolation (min. 26.2 dB)
- Impressive 1-dB compression point and IIP3 (typical +60 dBm & +100 dBm)
- Ultra-low electrical power requirements (No DC supply pins required) and single TTL control (RFC-RF1 activated @ $V_{\text{control}_1} = 2.5 \text{ V}$ & $I_{\text{control}_1} = 20 \text{ mA}$ & $V_{\text{control}_2} = 0 - 1.5 \text{ V}$ & $I_{\text{control}_2} = 0 \text{ mA}$ and RFC-RF2 activated @ $V_{\text{control}_1} = 0 - 1.5 \text{ V}$ & $I_{\text{control}_1} = 0 \text{ mA}$ & $V_{\text{control}_2} = 2.5 \text{ V}$ & $I_{\text{control}_2} = 20 \text{ mA}$)
- High power handling (+40 dBm)
- Capable of hot switching (+35 dBm)
- High switching speed (tON: 73 us; tOFF: 19 us)
- Ultra-small footprint (500×500 μm^2 chip area)
- RF-CMOS-compatible enabling very competitive integration costs

Estimated Absolute Maximum Rating

parameter	rating	unit
control voltage	2.6	V
control current	20.5	mA
RF input power	+40	dBm
operating temperature	-40 - 80	°C
storage temperature	-60 - 100	°C

Estimated Performance Data

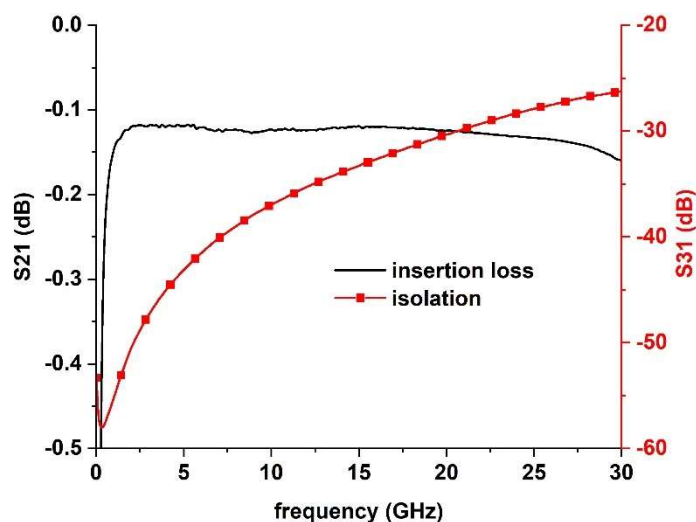


Fig. 1 Transmission coefficient versus frequency for RFC-RF1 and RFC-RF2 ($V_{\text{control}_1} = 2.5$ V & $I_{\text{control}_1} = 20$ mA & $V_{\text{control}_2} = 0 - 1.5$ V & $I_{\text{control}_2} = 0$ mA).

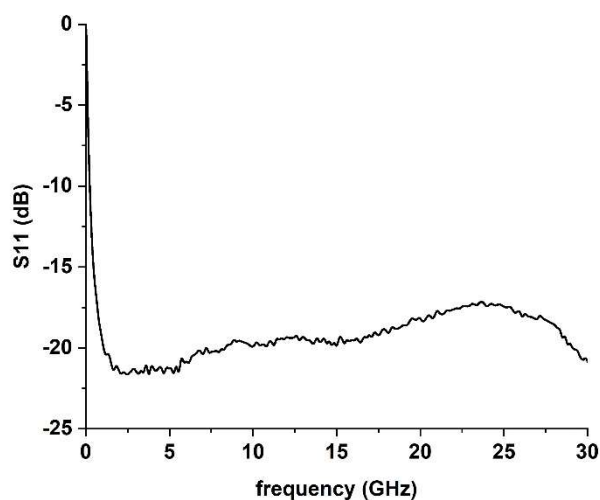
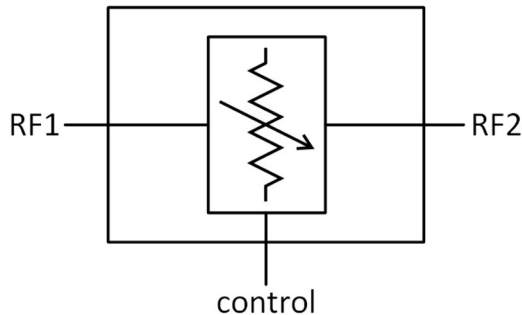


Fig. 2 Reflection coefficient versus frequency for RFC ($V_{\text{control}_1} = 2.5$ V & $I_{\text{control}_1} = 20$ mA & $V_{\text{control}_2} = 0 - 1.5$ V & $I_{\text{control}_2} = 0$ mA).

Light-controlled Absorptive Analog Voltage-variable RF Attenuator PLMVVA1.1C

Summary

Under Development



Our light-controlled absorptive analog voltage-variable RF attenuator PLMVVA1.1C is based on our ten years' experience in photoconductive device research at the University of Bristol. It will be among the very first few commercially-available optically-controlled RF devices. Thanks to our novel light-controlled technology (pending European patent DJC144021P.GBA), we estimate that our device can achieve very impressive dynamic ranges, 1-dB compression points, and IP3s with compact sizes and low costs. It also has the potential for record-low electrical power consumption (estimated 13 mW avg.) among reported light-controlled RF devices and an ultra-wide functional bandwidth (estimated 0.1 - 40 GHz).

Estimated Features

- Ultra-wide operating bandwidth (2 - 18 GHz) and functional bandwidth (0.1 - 40 GHz)
- Low min. attenuation (max. 2.24 dB) and high max. attenuation (min. 34.3 dB)
- Ultra-low min. attenuation (max. 1 dB) achievable by improved fabrication
- Impressive 1-dB compression point and IIP3 (typical +60.7 dBm & +100 dBm @ min. attenuation)
- Ultra-low dispersion and ultra-linear phase up to 18 GHz
- Ultra-low electrical power requirements (No DC supply pins required) and single TTL control (min. attenuation activated @ $V_{\text{control}} = 0 - 1.45 \text{ V}$ & $I_{\text{control}} = 0 \text{ mA}$ and max. attenuation activated @ $V_{\text{control}} = 2.1 \text{ V}$ & $I_{\text{control}} = 12 \text{ mA}$)
- High power handling (+36 dBm)
- High switching speed (tON: 23 us; tOFF: 6 us)
- Absorptive configuration (min. 6.5 dB return loss @ max. attenuation)
- Ultra-small footprint (600×600 μm^2 active region size)
- RF-CMOS-compatible enabling very competitive integration costs

Estimated Absolute Maximum Rating

parameter	rating	unit
control voltage	2.15	V
control current	12.3	mA
RF input power	+36	dBm
operating temperature	-40 - 80	°C
storage temperature	-60 - 100	°C

Estimated Performance Data

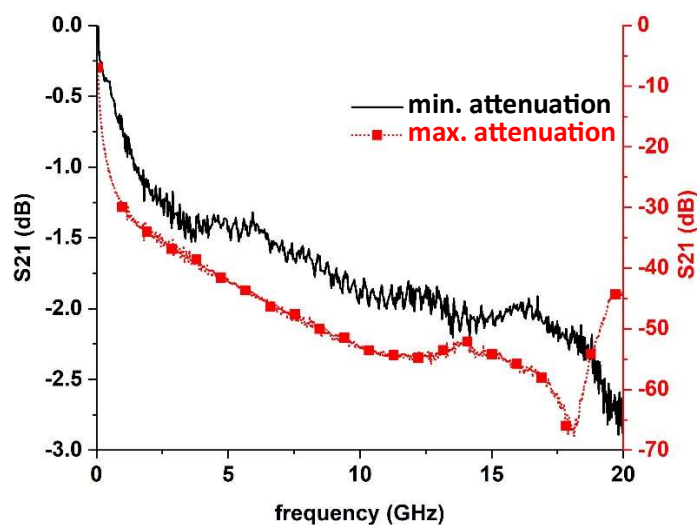


Fig. 1 De-embedded transmission coefficient versus frequency for min. attenuation and max. attenuation (RF input power: -17dBm; temperature: 25°C).

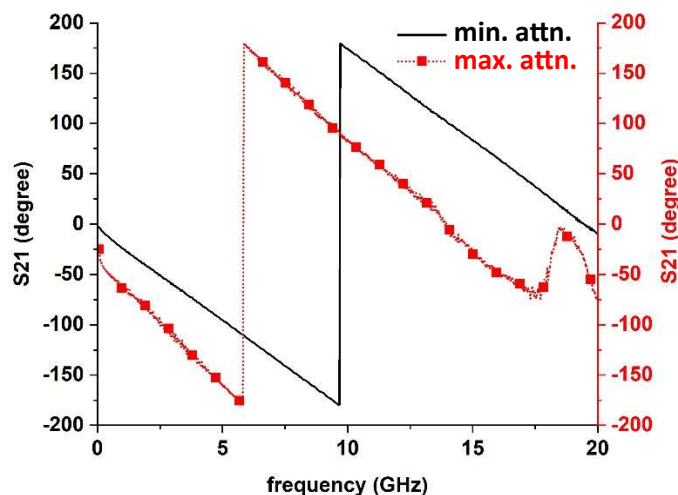


Fig. 2 De-embedded insertion phase shift versus frequency for min. attenuation and max. attenuation (RF input power: -17dBm; temperature: 25°C).