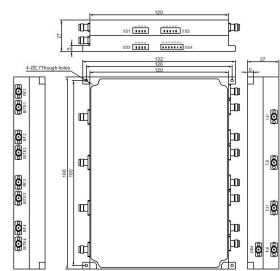


2–18 GHz Four-Channel Downconverter with SPI Control

Four-channel conversion to fixed 1.8 GHz IF, ≥ 28 dB gain, ≤ 12 dB noise figure and independent RF/calibration attenuation.



Electrical specifications

Parameter	Value	Unit	Notes
RF input frequency	2–18	GHz	-
Channel count	4	-	-
IF output frequency	1.8	GHz	-
IF output bandwidth	1	GHz	-
Downconversion gain	≥ 28	dB	Minimum: 28 dB.
Noise figure	≤ 12	dB	Maximum: 12 dB.
Output P1dB	≥ 12	dBm	Minimum: 12 dBm.
Output OIP3	≥ 25	dBm	Minimum: 25 dBm.
RF attenuation range	0–31.5	dB	Range follows the explicit binary weights and each bit's enable/disable behavior.
RF attenuation step	0.5	dB	-
RF attenuator bit count	6	-	-
Calibration attenuation range	0–15.5	dB	Range follows the explicit binary weights and each bit's enable/disable behavior.
Calibration attenuation step	0.5	dB	-
Calibration attenuator bit count	5	-	-
RF-input-equivalent spurious level	≤ -90	dBm	Equivalent RF input, bandwidth: 1000 MHz. Maximum: -90 dBm.
Single-tone SFDR	≥ 55	dB	RF input power: -25 dBm. Minimum: 55 dB.
Harmonic rejection	≥ 45	dB	RF input power: -29 dBm. Minimum: 45 dB.
Image rejection	≥ 70	dB	Minimum: 70 dB.
Gain flatness	≤ 5	dB	Bandwidth: 1 GHz. Maximum: 5 dB.

Electrical specifications

Parameter	Value	Unit	Notes
IF filter rejection	≥50	dBc	IF frequency: 1.8 GHz; Offset: ±700 MHz. Minimum: 50 dBc.
Supply voltage	+12	VDC	Typical: 12 VDC.
Supply current	2	A	Typical: 2 A.

Environmental limits

Parameter	Value	Unit
Operating temperature	−40–+80	°C
Storage temperature	−55–+125	°C

Interfaces and contacts

Parameter	Value	Unit
RF input ports	RF1–RF4: 2–18 GHz	-
BITE calibration input	BITE1–BITE4: 2–18 GHz	-
IF output ports	IF1–IF4: 1.8 GHz	-
Reference input	REF: 100	MHz
Typical reference input drive range	0–6 (Typical range stated by the source; not an absolute drive limit.)	dBm
Reference phase noise at 100 Hz	≤-130 (Offset: 100 Hz. Maximum: -130 dBc/Hz.)	dBc/Hz
Reference phase noise at 1 kHz	≤-150 (Offset: 1 kHz. Maximum: -150 dBc/Hz.)	dBc/Hz
Reference phase noise at 10 kHz	≤-165 (Offset: 10 kHz. Maximum: -165 dBc/Hz.)	dBc/Hz
Reference phase noise at 100 kHz	≤-165 (Offset: 100 kHz. Maximum: -165 dBc/Hz.)	dBc/Hz
XS1: Supply contacts	XS1: 1, 2 → +12 V	-
XS1: Ground contacts	XS1: 3, 4 → GND	-
XS3: Supply contacts	XS3: 1, 2 → +12 V	-
XS3: Ground contacts	XS3: 3, 4 → GND	-
XS2: SPI data contact	XS2: 1 → SPI_MOSI	-
XS2: SPI clock contact	XS2: 2 → SPI_SCK	-
XS2: SPI select contact	XS2: 3 → SPI_NSS (LE)	-
XS2: SPI ground contact	XS2: 4 → GND	-
XS4: SPI data contact	XS4: 1 → SPI_MOSI	-

Interfaces and contacts

Parameter	Value	Unit
XS4: SPI clock contact	XS4: 2 → SPI_SCK	-
XS4: SPI select contact	XS4: 3 → SPI_NSS (LE)	-
XS4: SPI ground contact	XS4: 4 → GND	-
XS2: SPI NC contact	XS2: 5 → NC	-
XS4 lock-detect contact	XS4: 5 → LD	-

Control and filter selection

Parameter	Value	Unit	Notes
SPI data rate	2 / 10	Mbps	Typical: 2 Mbps. Maximum: 10 Mbps.
SPI frame	0xAA 0x55 Address[7:0] Data[15:0] 0x44 0xBB	-	One address byte plus two Data[15:0] bytes; further payload byte order is not specified.
SPI channel addresses	00 → 1; 01 → 2; 02 → 3; 03 → 4	-	-
SPI filter-selection bits	14:C2; 13:C1; 12:C0	-	-
SPI BITE selection bit	11: 1 → BITE; 0 → RF	-	-
SPI RF attenuation bits	10:16; 9:8; 8:4; 7:2; 6:1; 5:0.5	dB	Each bit: 1 enables its attenuation step; 0 disables it.
SPI calibration attenuation bits	4:8; 3:4; 2:2; 1:1; 0:0.5	dB	Each bit: 1 enables its attenuation step; 0 disables it.
SPI NC data bit	15: NC	-	-
SPI power-down data state	0	-	Set all data bits to 0 when powered off.
Filter code 000 passband	000 → 1.9–3.2	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 001 passband	001 → 2.2–3.7	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 010 passband	010 → 2.7–4.6	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 011 passband	011 → 3.6–6.1	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 100 passband	100 → 5.1–8.9	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 101 passband	101 → 7.9–13.8	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.
Filter code 110 passband	110 → 12.8–18	GHz	Selected filter passband; overall RF operating range remains 2–18 GHz.

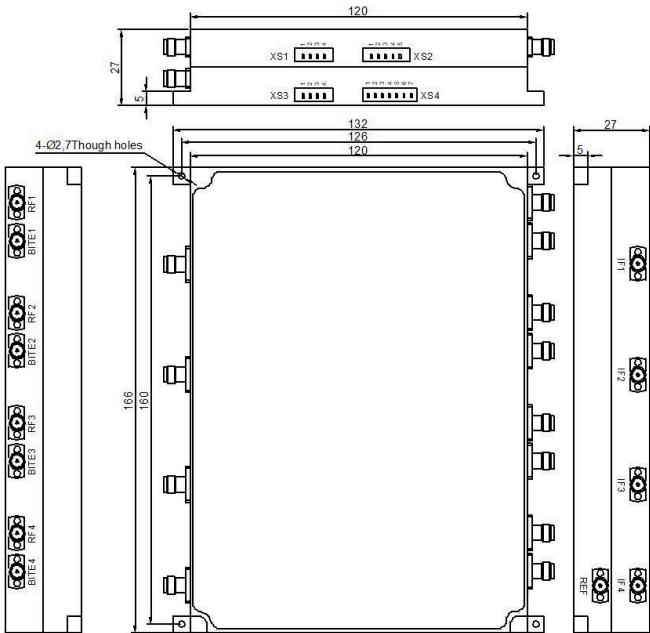
Oscillator specifications

Parameter	Value	Unit	Notes
LO1 frequency step	20	MHz	-
LO1 switching response	≤200	μs	Maximum: 200 μs.
LO1 spurious	≤-60	dBc	Maximum: -60 dBc.
LO2 frequency	20.2	GHz	-
LO2 spurious	≤-65	dBc	Maximum: -65 dBc.
LO1 phase noise at 100 Hz	≤-70	dBc/Hz	Offset: 100 Hz. Maximum: -70 dBc/Hz.
LO1 phase noise at 1 kHz	≤-81	dBc/Hz	Offset: 1 kHz. Maximum: -81 dBc/Hz.
LO1 phase noise at 10 kHz	≤-88	dBc/Hz	Offset: 10 kHz. Maximum: -88 dBc/Hz.
LO1 phase noise at 100 kHz	≤-92	dBc/Hz	Offset: 100 kHz. Maximum: -92 dBc/Hz.
LO1 phase noise at 1 MHz	≤-100	dBc/Hz	Offset: 1 MHz. Maximum: -100 dBc/Hz.
LO2 phase noise at 100 Hz	≤-75	dBc/Hz	Offset: 100 Hz. Maximum: -75 dBc/Hz.
LO2 phase noise at 1 kHz	≤-87	dBc/Hz	Offset: 1 kHz. Maximum: -87 dBc/Hz.
LO2 phase noise at 10 kHz	≤-94	dBc/Hz	Offset: 10 kHz. Maximum: -94 dBc/Hz.
LO2 phase noise at 100 kHz	≤-96	dBc/Hz	Offset: 100 kHz. Maximum: -96 dBc/Hz.
LO2 phase noise at 1 MHz	≤-106	dBc/Hz	Offset: 1 MHz. Maximum: -106 dBc/Hz.

Mechanical specifications

Parameter	Value	Unit
Body dimensions	132 × 166 × 27	mm
Weight	600 (Typical: 600 g.)	g
Mounting-hole center spacing	126 × 160	mm
Mounting holes	4 × Φ2.7 (Through holes.)	mm

Mechanical Outline



All dimensions are in mm [in].

Integration guidance

Parameter	Value	Unit
User-calibrated gain variation	±0.5 (After user calibration.)	dB
XS4 factory-debug contacts	XS4: 6 → CD; 7 → CK (Factory debug only; leave both contacts floating during normal operation.)	-

Current publication record · 1.0 · 2026-10-08. First publication of approved product data.

Document notice

Specifications are subject to revision. Before design release, confirm the current document revision and product-specific requirements with LCRF. The approved quotation and order documentation define the supplied configuration.