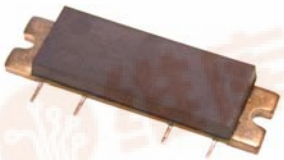
Preliminary

XD010-04S-D4F

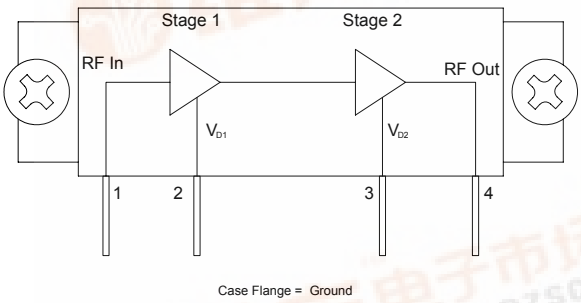
350-600 MHz Class AB 10W Power Amplifier Module



Product Description

The **XD010-04S-D4F** 10W power module is a robust broadband 2-stage Class A/AB amplifier, suitable for use as a power amplifier driver or output stage. It is a drop-in, no-tune, solution for high power applications requiring high efficiency, excellent linearity, and unit to unit repeatability. Internal bias current compensation ensures stable performance over a wide temperature range.

Functional Block Diagram



Product Features

- 50 Ω RF Impedance
- > 10W Output P_{1dB}
- Single Voltage Operation
- High Gain: 32 dB Typical
- Temperature Compensation
- Robust 8000V ESD (HBM), Class 3B

Applications

- DTV
- Public Service
- Wireless Infrastructure
- Military
- CDMA or GSM

Key Specifications

Parameter	Test Conditions: $Z_{in} = Z_{out} = 50\Omega$, $V_D = 28.0V$, $I_{D1} = 230mA$, $I_{D2} = 150mA$, $T_{Flange} = 25°C$	Unit	Min.	Typ.	Max.
Frequency	Frequency of Operation	MHz	350	-	600
P_{1dB}	Output Power at 1dB Compression, 450MHz	W	-	12	-
Gain	Gain at 10W Output Power, 450MHz	dB	30	32	-
Gain Flatness	Peak to Peak Gain Variation, 350 - 600MHz	dB	-	1.0	2.0
IRL	Input Return Loss 1W Output Power, 350 - 600MHz	dB	10	15	-
Efficiency	Drain Efficiency at 10W CW, 350-600MHz	%	26	30	-
Linearity	3rd Order IMD at 10W PEP (Two Tone), 450MHz & 451MHz	dBc	-	-32	-28
Delay	Signal Delay from Pin 1 to Pin 4	nS	-	2.5	-
Phase Linearity	Deviation from Linear Phase (Peak to Peak)	Deg	-	0.5	-

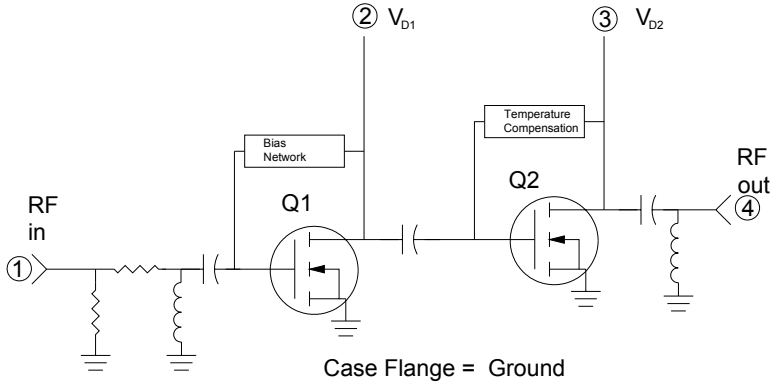
Quality Specifications

Parameter		Unit	Min	Typical	Max
ESD Rating	Human Body Model, JEDEC Document - JESD22-A114-B	V	8000	-	-
MTTF	85°C Baseplate, 200°C Channel	H	-	1.2×10^6	-
$R_{TH, j-l}$	Thermal Resistance Stage 1 (Junction to Case)	°C/W	-	11	-
$R_{TH, j-2}$	Thermal Resistance Stage 2 (Junction to Case)	°C/W	-	4	-

Pin Description

Pin #	Function	Comments
1	RF Input	Internally connected to DC ground. Do not apply DC voltages to the RF leads.
2	V_{D1}	1st stage bias
3	V_{D2}	2nd stage bias. Integrated temperature compensation maintains constant current over the operating temperature range. See Note 1.
4	RF Output	Internally connected to DC ground. Do not apply DC voltages to the RF leads.
Flange	Gnd	Baseplate provides electrical ground and a thermal transfer path for the device. Proper mounting assures optimal performance and the highest reliablility. See Sirenza applications note: AN-060 Installation Instructions for XD Module Series.

Simplified Device Schematic



Absolute Maximum Ratings

Parameters	Value	Unit
1st Stage Bias Voltage (V_{D1})	35	V
2nd Stage Bias Voltage (V_{D2})	35	V
RF Input Power	+20	dBm
Load VSWR for Continuous Operation Without Damage	5:1	VSWR
Device Channel Temperature	+200	ºC
Lead Temperature During Solder Reflow	+210	ºC
Operating Temperature Range	-20 to +90	ºC
Storage Temperature Range	-40 to +100	ºC

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation refer to the key specifications table on the first page of the datasheet.

Note 1:

The internally generated gate voltage is thermally compensated to maintain constant drain quiescent current over the temperature range listed in the data sheet. No compensation is provided for gain changes with temperature. This can only be provided with an external AGC circuit.

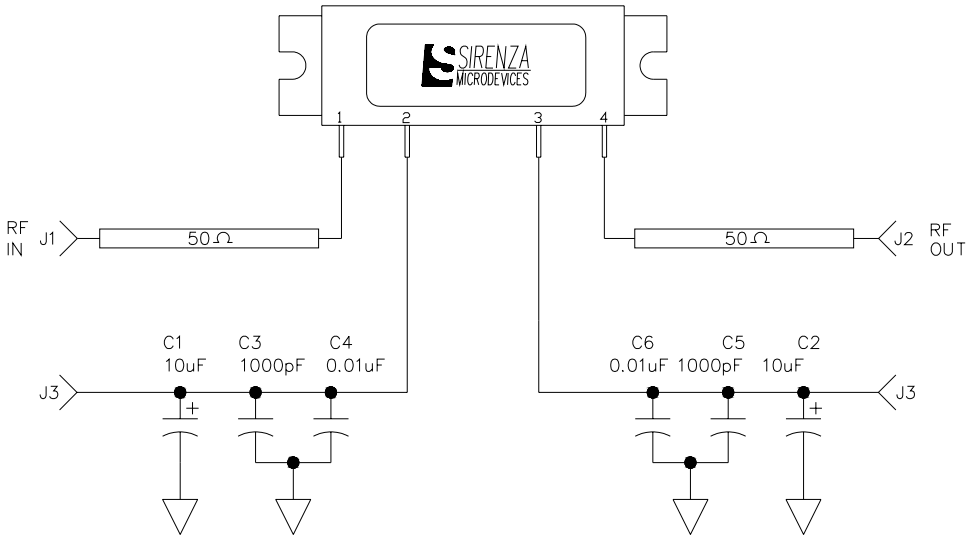
Note 2:

Internal RF decoupling is included on all bias leads. No additional bypass elements are required, however some applications may require energy storage on the V_D leads to accommodate modulated signals.

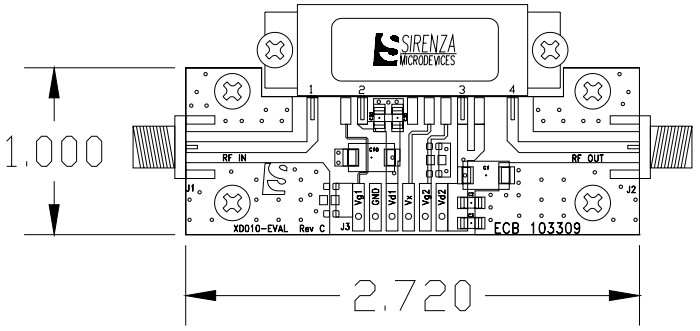
Caution: ESD Sensitive

Appropriate precautions in handling, packaging and testing devices must be observed.

Test Board Schematic with module attachments shown



Test Board Layout and Bill of Materials



Component	Description	Manufacturer
PCB	Rogers4350, ε_r=3.5 Thickness=30mils	Rogers
J1, J2	SMA, RF, PCB Mount Tab W / Flange	Johnson
J3	MTA Post Header, 6 Pin, Rectangle, Polarized, Surface Mount	AMP
C1, C2	Cap, 10μF 50V, 10%, Tant, D	Kemet
C4, C6	Cap, 0.01μF, 100V, 10%, 1206	Johanson
C3, C5	Cap, 1000pF, 100V, 10%, 1206	Johanson
Mounting Screws	4-40 X 0.250”	Various

Gerber files, DXF drawings, a detailed BOM, and assembly recommendations for the test board with fixture are available from Sirenza applications.