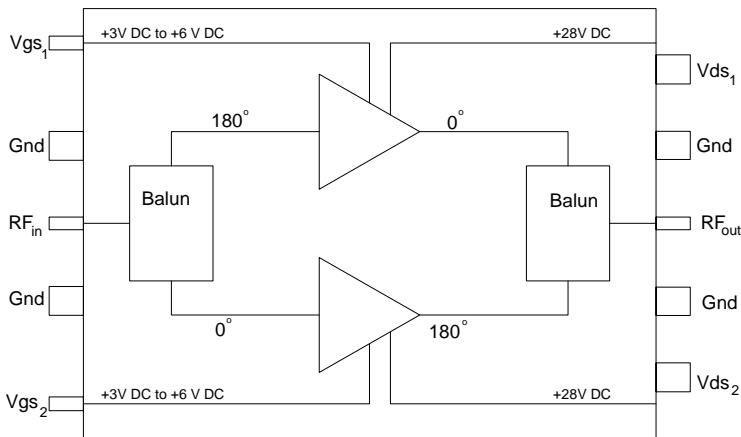




## Product Description

Sirenza Microdevices' **SDM-09120** 130W power module is a robust impedance matched, single-stage, push-pull Class AB amplifier module suitable for use as a power amplifier driver or output stage. The power transistors are fabricated using Sirenza's latest, high performance LDMOS process. It is a drop-in, no-tune solution for high power applications requiring high efficiency, excellent linearity, and unit-to-unit repeatability. It is internally matched to 50 ohms.

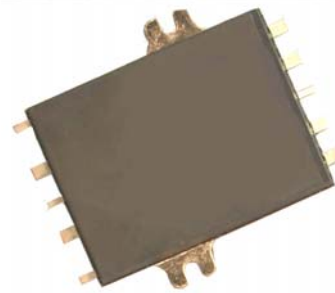
## Functional Block Diagram



Case Flange = Ground

# SDM-09120 SDM-09120Y

925-960 MHz Class AB  
130W Power Amplifier Module



## Product Features

- Available in RoHS compliant packaging
- 50  $\Omega$  RF impedance
- 130W Output  $P_{1dB}$
- Single Supply Operation : Nominally 28V
- High Gain: 15 dB at 942 MHz
- High Efficiency: 42% at 942 MHz

## Applications

- Base Station PA driver
- Repeater
- CDMA
- GSM / EDGE

## Key Specifications

Symbol	Parameter	Units	Min.	Typ.	Max.
Frequency	Frequency of Operation	MHz	925	-	960
$P_{1dB}$	Output Power at 1dB Compression, 943 MHz	W	120	130	-
Gain	120W PEP Output Power, 942MHz and 943MHz	dB	14	15	-
Gain Flatness	Peak-to-Peak Gain Variation, 120W PEP, 925 - 960MHz	dB	-	0.3	0.5
IRL	Input Return Loss, 120W PEP Output Power, 925 - 960MHz	dB	-	-14	-12
IMD	3rd Order Product, 120W PEP Output, 942MHz and 943MHz	dBc	-	-28	-26
IMD Variation	120W PEP Output, Change in Spacing 100KHz - 25MHz	dB	-	1.0	-
Efficiency	Drain Efficiency, 120W PEP Output, 942MHz and 943MHz	%	32	33	-
	Drain Efficiency, 120W CW Output, 943MHz	%	-	42	-
Delay	Signal Delay from Pin 3 to Pin 8	nS	-	4.0	-
Phase Linearity	Deviation from Linear Phase (Peak-to-Peak)	Deg	-	0.7	-
$R_{TH}$	Thermal Resistance (Junction-to-Case)	$^{\circ}C/W$		0.7	

Test Conditions  $Z_{in} = Z_{out} = 50\Omega$ ,  $V_{DD} = 28.0V$ ,  $I_{DQ1} = I_{DQ2} = 500mA$ ,  $T_{Flange} = 25^{\circ}C$

## Quality Specifications

Parameter	Description	Unit	Typical
ESD Rating	Human Body Model	Volts	2000
MTTF	200 $^{\circ}C$ Channel	Hours	1.2 X 10 <sup>6</sup>

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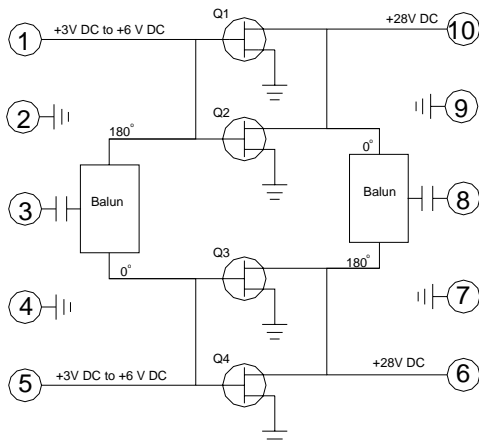
Phone: (800) SMI-MMIC

<http://www.sirenza.com>  
EDS-103478 Rev G

### Pin Description

Pin #	Function	Description
1	V <sub>GS1</sub>	LDMOS FET Q1 and Q2 gate bias. V <sub>GSTH</sub> 3.0 to 5.0 VDC. See Notes 2, 3 and 4
2,4,7,9	Ground	Module Topside ground.
3	RF Input	Internally DC blocked
5	V <sub>GS2</sub>	LDMOS FET Q3 and Q4 gate bias. V <sub>GSTH</sub> 3.0 to 5.0 VDC. See Notes 2, 3 and 4
6	V <sub>D2</sub>	LDMOS FET Q3 and Q4 drain bias. See Note 1.
8	RF Output	Internally DC blocked
10	V <sub>D1</sub>	LDMOS FET Q1 and Q2 drain bias. See Note 1.
Flange	Ground	Baseplate provides electrical ground and a thermal transfer path for the device. Proper mounting assures optimal performance and the highest reliability. See Sirenza applications note AN-054 Detailed Installation Instructions for Power Modules.

### Simplified Device Schematic



**Note 1:**

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<sub>D</sub> leads to accommodate modulated signals.

**Note 2:**

Gate voltage must be applied to V<sub>GS</sub> leads simultaneously with or after application of drain voltage to prevent potentially destructive oscillations. Bias voltages should never be applied to a module unless it is properly terminated on both input and output.

**Note 3:**

The required V<sub>GS</sub> corresponding to a specific I<sub>DQ</sub> will vary from module to module and may differ between V<sub>GS1</sub> and V<sub>GS2</sub> on the same module by as much as ±0.10 volts due to the normal die-to-die variation in threshold voltage for LDMOS transistors.

**Note 4:**

The threshold voltage (V<sub>GSTH</sub>) of LDMOS transistors varies with device temperature. External temperature compensation may be required. See Sirenza application notes AN-067 LDMOS Bias Temperature Compensation.

**Note 5:**

This module was designed to have its leads hand soldered to an adjacent PCB. The maximum soldering iron tip temperature should not exceed 700° F, and the soldering iron tip should not be in direct contact with the lead for longer than 10 seconds. Refer to app note AN054 ([www.sirenza.com](http://www.sirenza.com)) for further installation instructions.

### Absolute Maximum Ratings

Parameters	Value	Unit
Drain Voltage (V <sub>DD</sub> )	35	V
RF Input Power	+43	dBm
Load Impedance for Continuous Operation Without Damage	5:1	VSWR
Control (Gate) Voltage, VDD = 0 VDC	15	V
Output Device Channel Temperature	+200	°C
Operating Temperature Range	-20 to +90	°C
Storage Temperature Range	-40 to +100	°C

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation see typical setup values specified in the table on page one.

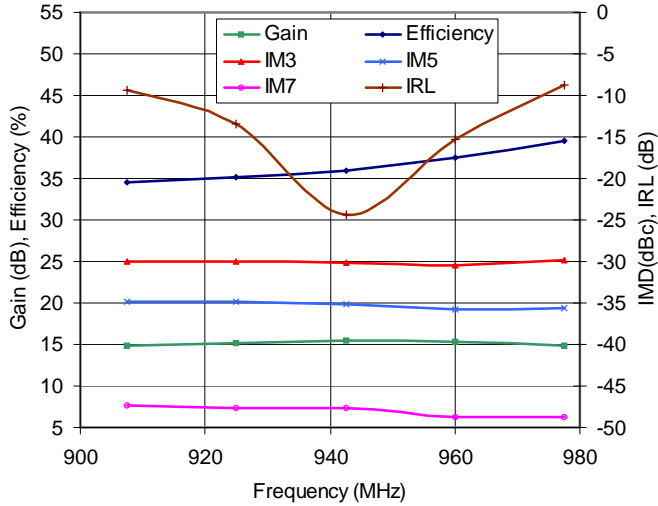


**Caution: ESD Sensitive**

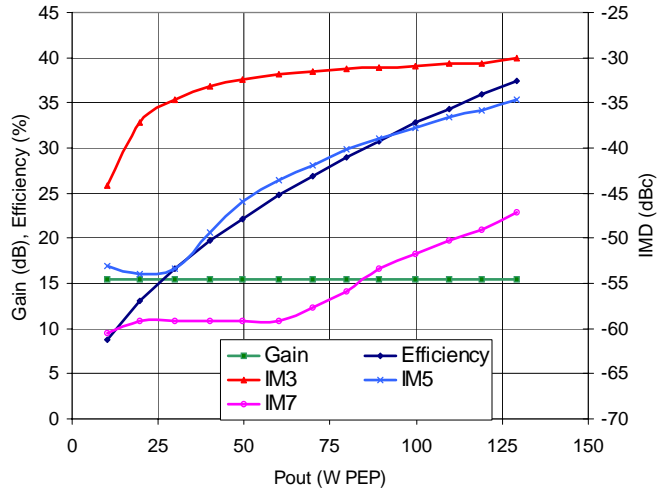
Appropriate precaution in handling, packaging and testing devices must be observed.

### Typical Performance Curves

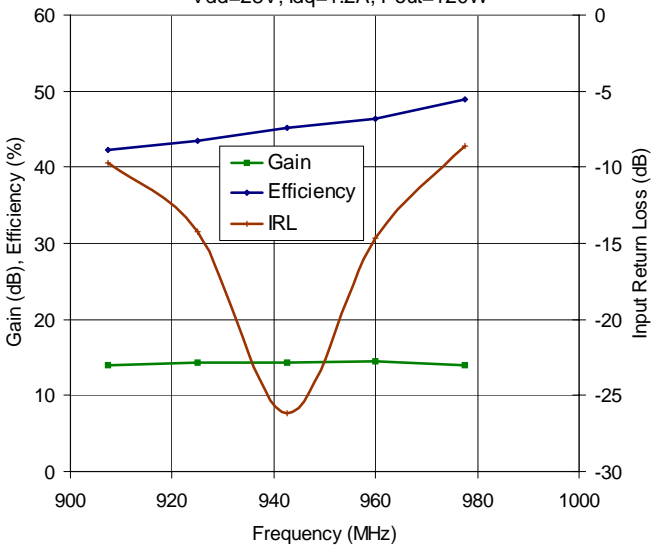
2 Tone Gain, Efficiency, Linearity and IRL vs Frequency  
 Vdd=28V, Idq=1.2A, Pout=120W PEP, Delta F=1 MHz



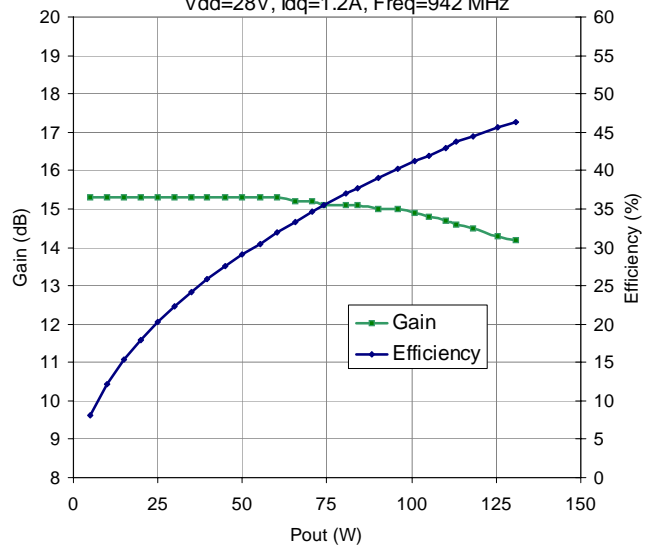
2 Tone Gain, Efficiency, Linearity vs Pout  
 Vdd=28V, Idq=1.2A, Freq=942 MHz, Delta F=1 MHz



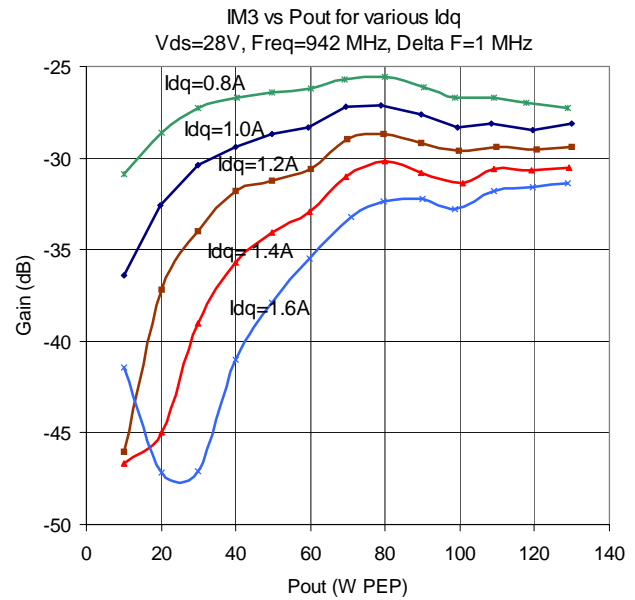
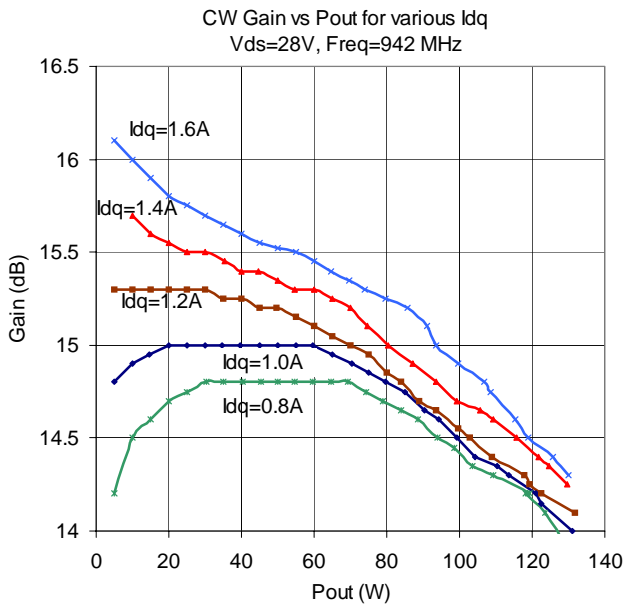
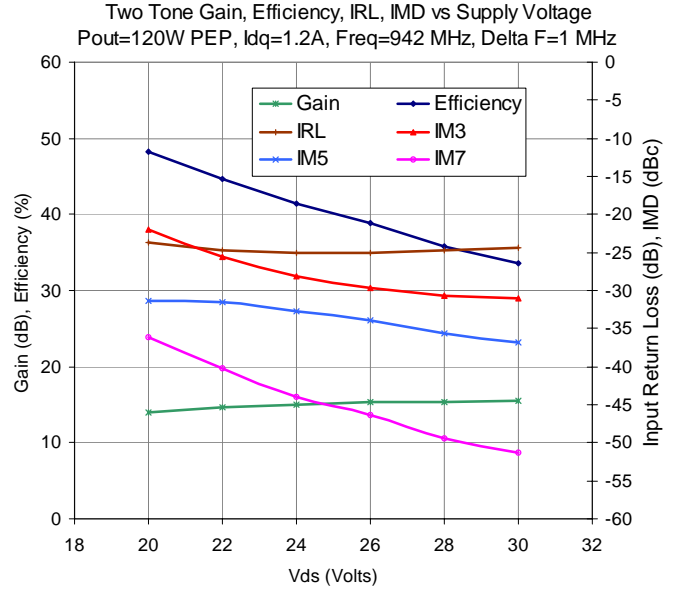
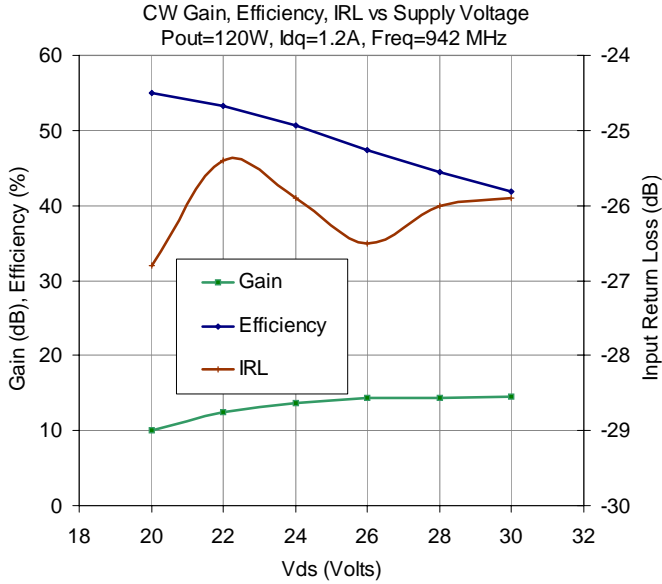
CW Gain, Efficiency, IRL vs Frequency  
 Vdd=28V, Idq=1.2A, Pout=120W



CW Gain, Efficiency vs Pout  
 Vdd=28V, Idq=1.2A, Freq=942 MHz

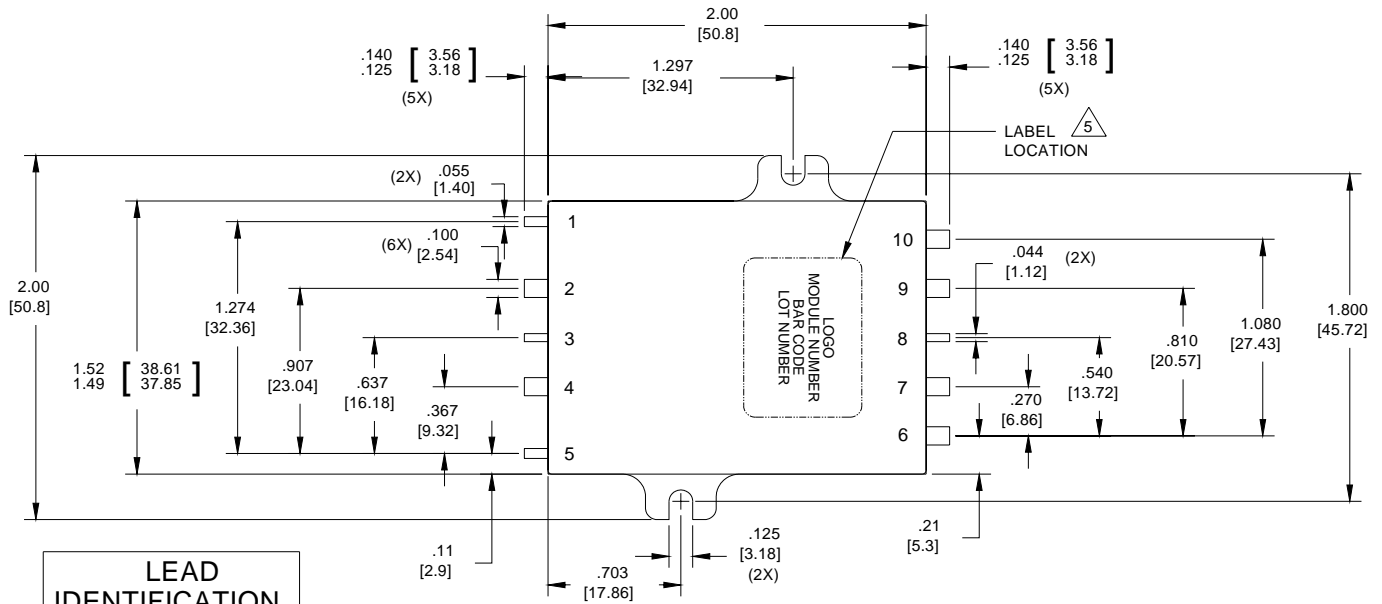


Typical Performance Curves (cont'd)

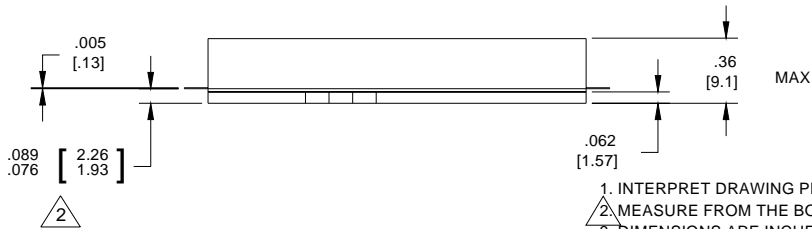


**Note:**  
 Evaluation test fixture information available on Sirenza Website, referred to as SDM-EVAL

Package Outline Drawing



LEAD IDENTIFICATION	
Lead No.	Function
1	V <sub>GS1</sub>
2	Ground
3	Input
4	Ground
5	V <sub>GS2</sub>
6	V <sub>D2</sub>
7	Ground
8	Output
9	Ground
10	V <sub>D1</sub>
BASE PLATE	Ground



1. INTERPRET DRAWING PER ANSI Y14.5.
2. MEASURE FROM THE BOTTOM OF THE LEADS.
3. DIMENSIONS ARE INCHES[MM].
4. LEAD IDENTIFICATION IS FOR REFERENCE ONLY.
5. ORIENTATION OF LABEL IS TO BE AS SHOWN.

MODULE WEIGHT = 41gm NOMINAL

Note:

Refer to Application note AN054, "Detailed Installation Instructions for Power Modules" for detailed mounting information.