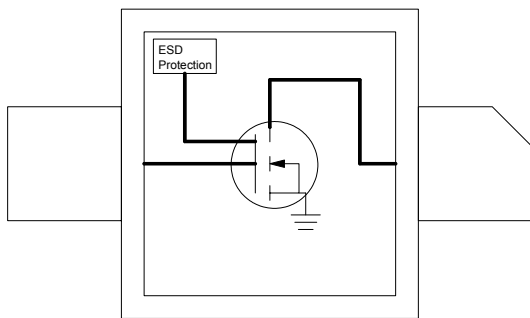


## Product Description

The **SLD-3091FZ** is a 30 Watt high performance LDMOS transistor designed for operation to 2200MHz. It is an excellent solution for applications requiring high linearity and efficiency at a low cost. The SLD-3091FZ is typically used in power amplifiers, repeaters, and radio amplifier applications. The power transistor is fabricated using Sirenza's high performance XeMOS II™ process.

## Functional Schematic Diagram



Case Flange = Ground

## Key RF Specifications

Symbol	Parameter	Units	Min.	Typ.	Max.
Frequency	Frequency of Operation	MHz	-	-	2200
Gain	30 Watt CW, 869-894MHz	dB	17	18	-
Efficiency	Drain Efficiency at 30 Watt CW, 881MHz	%	38	45	-
IRL	Input Return Loss, 30 Watt Output Power, 881MHz	dB	-	-15	-10
Linearity	3 <sup>rd</sup> Order IMD at 30 Watt PEP (Two Tone), 881MHz	dBc	-	-28	-26
	1dB Compression ( $P_{1dB}$ ), 881MHz	Watt	30	35	-

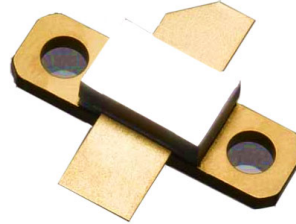
## Key DC Parameters

Symbol	Parameter	Unit	Min	Typ.	Max
$g_m$	Forward Transconductance @ 425mA $I_{DQ}$	mA / V		1650	
$V_{GS}$ Threshold	$I_{DS}=3mA$	Volt		3.3	
$V_{DS}$ Breakdown	1mA $I_{DS}$ current	Volt		65	
$C_{iss}$	Input Capacitance (Gate to Source) $V_{GS}=0V$ , $V_{DS}=28V$	pF		66	
$C_{rss}$	Reverse Capacitance (Gate to Drain) $V_{GS}=0V$ , $V_{DS}=28V$	pF		1.4	
$C_{oss}$	Output Capacitance (Drain to Source) $V_{GS}=0V$ , $V_{DS}=28V$	pF		30	
$R_{DSon}$	Drain to Source Resistance, $V_{GS}=10V$ , $V_{DS}=250mV$	$\Omega$		0.2	

## SLD-3091FZ



### 30 Watt Discrete LDMOS Device Ceramic Flanged Package



## Product Features

- 30 Watt Output  $P_{1dB}$
- Single Polarity Supply Voltage
- High Gain: 18 dB at 881 MHz
- High Efficiency: 45% at 30W CW
- Advanced, XeMOS II LDMOS
- Integrated ESD Protection

## Applications

- Base Station PA driver
- Repeater
- Radio Amplifier
- GSM, CDMA, RFID, Point-to-Point

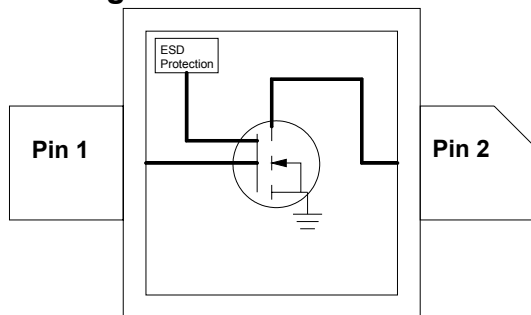
## Quality Specifications

Parameter		Unit	Min	Typical	Max
ESD Rating	Human Body Model	Volts		500	
MTTF	85°C Leadframe, 200°C Channel	Hours		1.2 X 10 <sup>6</sup>	
R <sub>TH</sub>	Thermal Resistance (Junction-to-Case)	°C/W		1.5	

## Pin Description

Pin #	Function	Description
1	Gate	Transistor RF input and gate bias voltage. The gate bias voltage must be temperature compensated to maintain constant bias current over the operating temperature range. Care must be taken to protect against video transients that exceed the recommended maximum input power or voltage.
2	Drain	Transistor RF output and drain bias voltage. Typical voltage is 28V.
Flange	Source, Gnd	Exposed area on the bottom side of the package needs to be mechanically attached to the ground plane of the board for optimum thermal and RF performance. See mounting instructions for recommendation.

## Pin Diagram



Case Flange = Ground

### Note 1:

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

### Note 2:

The required V<sub>GS</sub> corresponding to a specific I<sub>DQ</sub> will vary from device to device due to the normal die-to-die variation in threshold voltage with LDMOS transistors.

### Note 3:

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.

## Absolute Maximum Ratings

Parameters	Value	Unit
Drain Voltage (V <sub>DS</sub> )	35	V
Gate Voltage (V <sub>GS</sub> )	20	V
RF Input Power	+36	dBm
Load Impedance for Continuous Operation Without Damage	10:1	VSWR
Output Device Channel Temperature	+200	°C
Lead Temperature During Solder Reflow	+270	°C
Operating Temperature Range	-20 to +90	°C
Storage Temperature Range	-40 to +100	°C

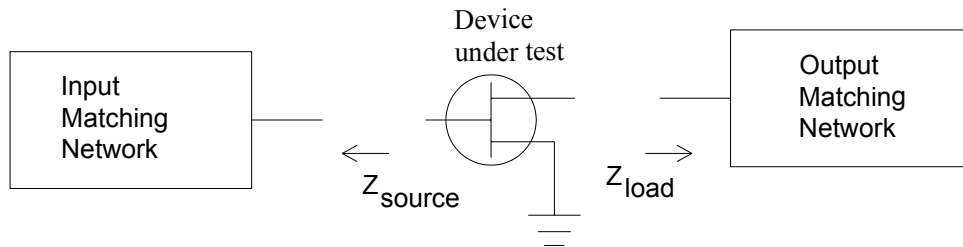
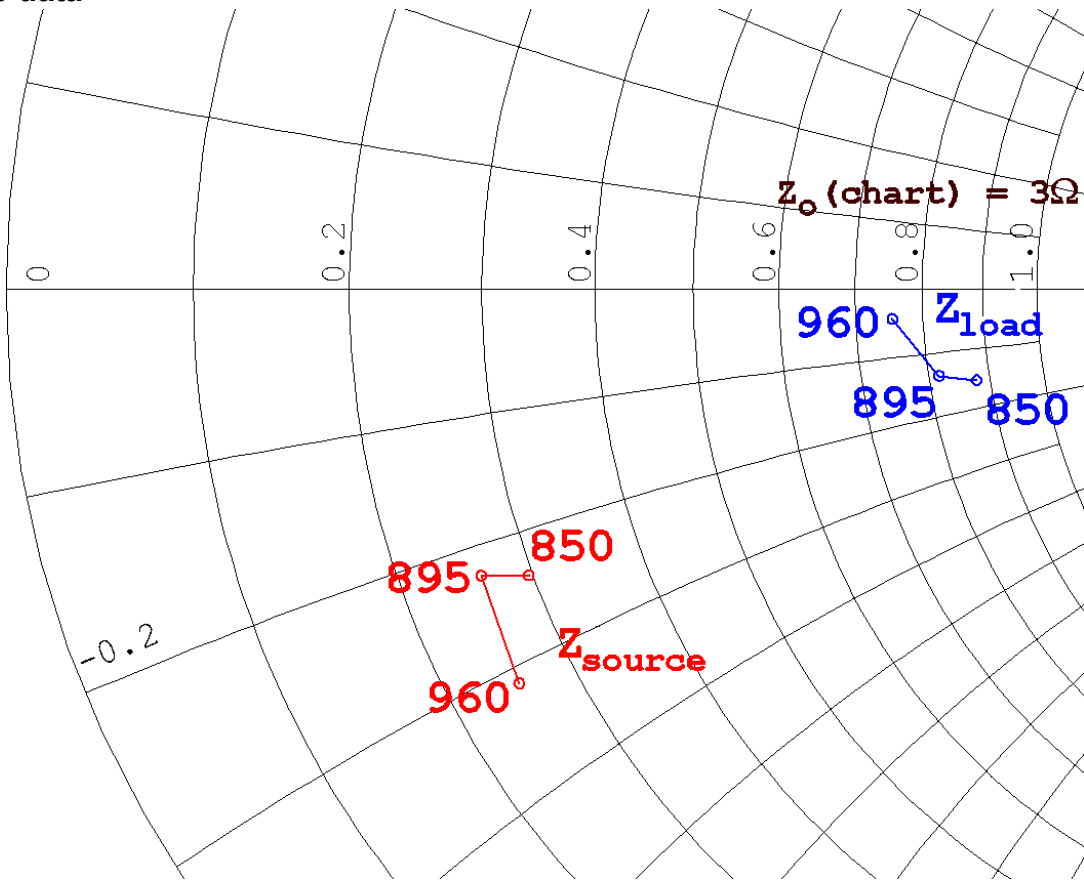
**Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation see typical setup values specified in the table on page one.**



### Caution: ESD Sensitive

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

Impedance data

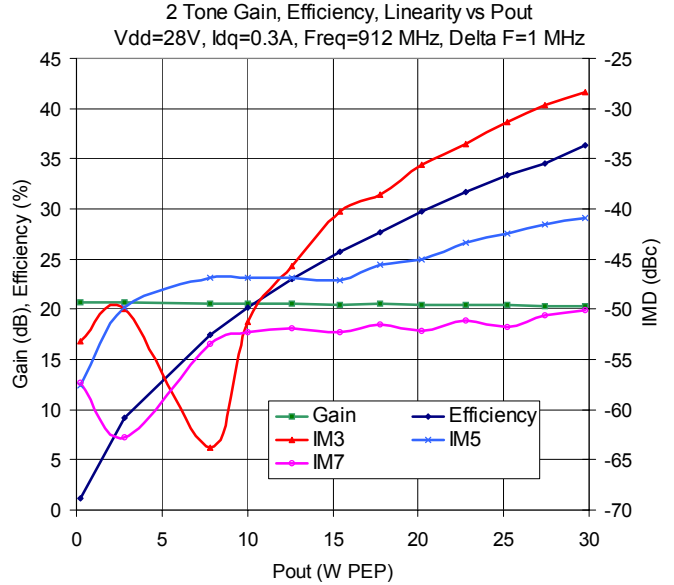
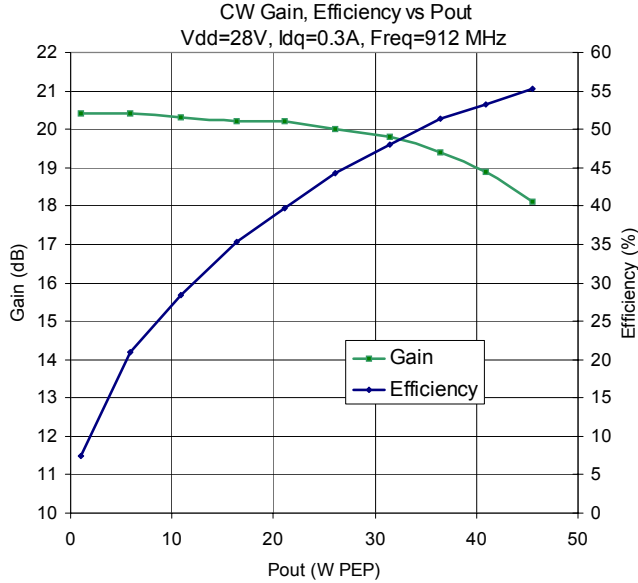


$Z_{source}$  and  $Z_{load}$  are the optimal impedances presented to the SLD3091FZ

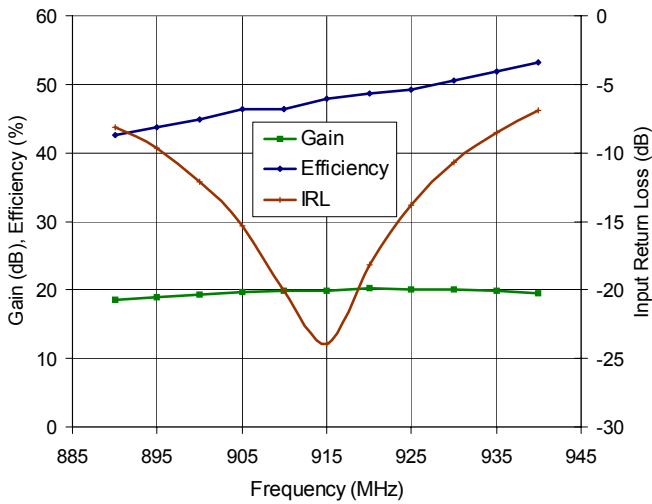
Impedance Data

Frequency (MHz)	$Z_{source}$	$Z_{load}$
850	0.9 - j 0.7	2.6 - j 0.5
895	0.8 - j 0.7	2.4 - j 0.4
960	0.7 - j 0.9	2.3 - j 0.1

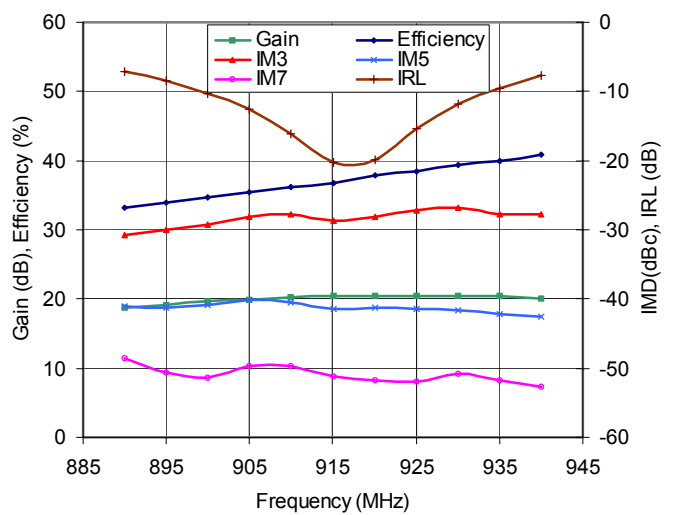
### Typical Performance Curves for 900 MHz Application Circuit



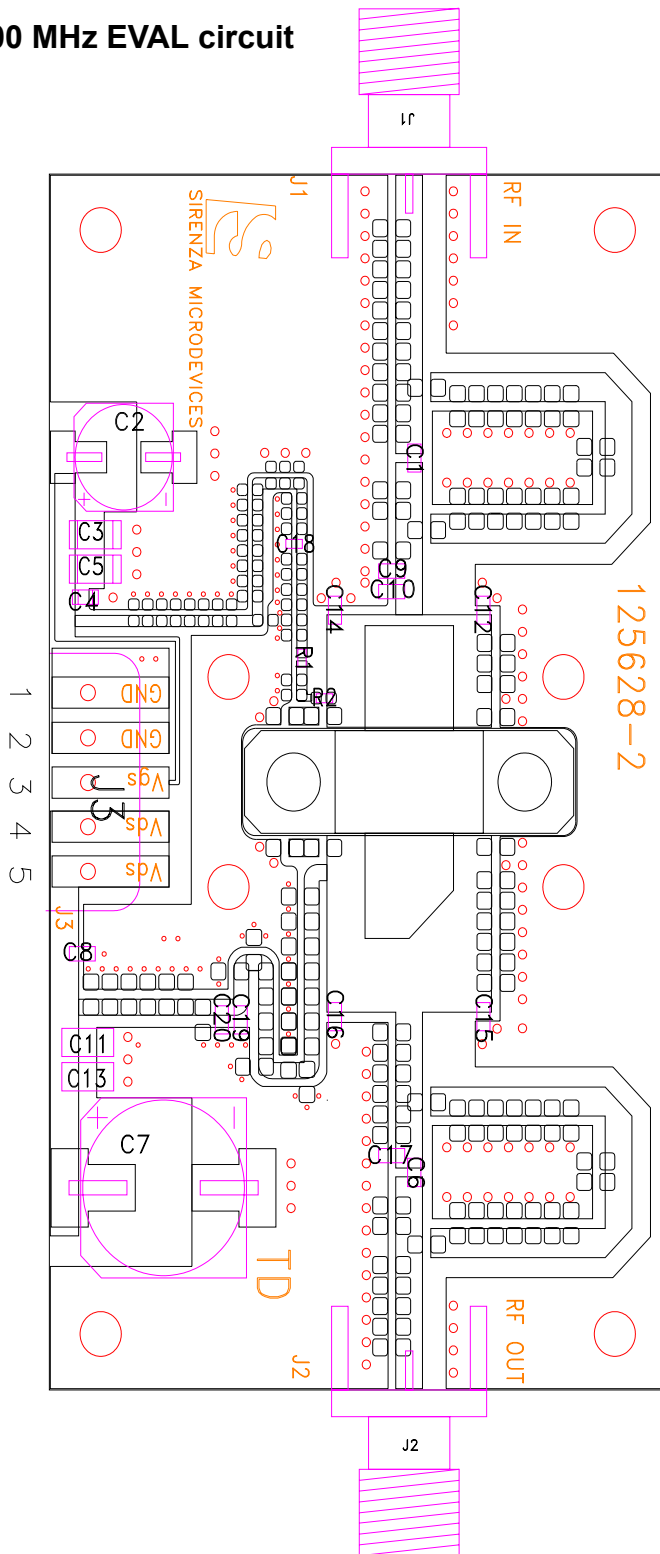
CW Gain, Efficiency, IRL vs Frequency Vdd=28V, Idq=0.3A, Pout=30W



2 Tone Gain, Efficiency, Linearity and IRL vs Frequency Vdd=28V, Idq=0.3A, Pout=30W PEP, Delta F=1 MHz



900 MHz EVAL circuit



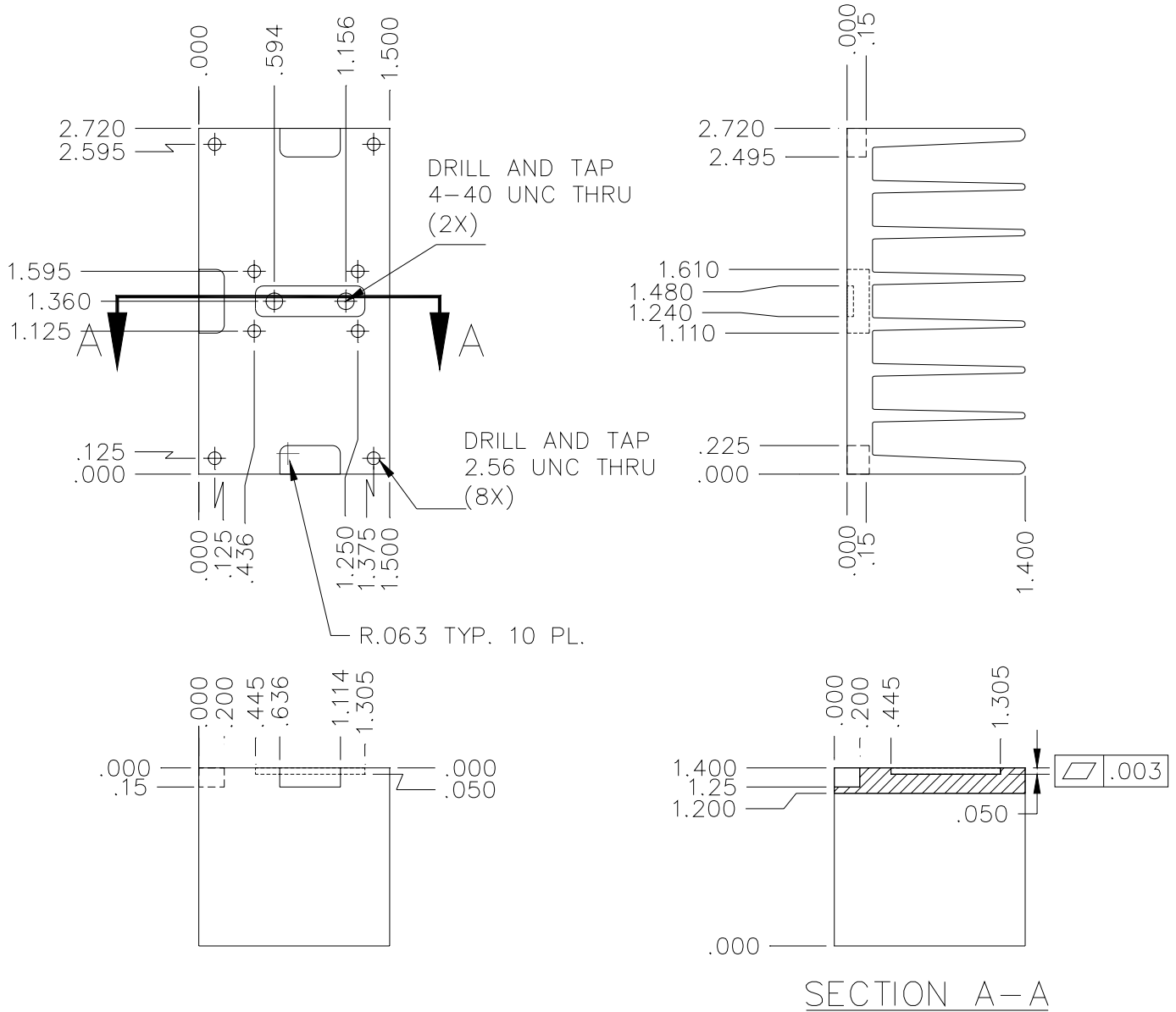
Pin Descriptions - 900 MHz Application Circuit

Connector	Pin #	Function	Description
J1	Coax	RF in	RF input to test fixture (50 Ohm system)
J2	Coax	RF out	RF output to test fixture (50 Ohm system)
J3	1	Gnd	DC ground for D package module. Also connected to RF ground.
J3	2	Gnd	DC ground for D package module. Also connected to RF ground.
J3	3	V <sub>GS</sub>	Gate voltage for the SLD3091FZ. Nominally +4Vdc.
J3	4	V <sub>DS</sub>	Drain voltage for the SLD3091FZ. Nominally +28Vdc.
J3	5	V <sub>DS</sub>	Drain voltage for the SLD3091FZ. Nominally +28Vdc.

Bill of Materials - 900 MHz Application Circuit

Component	Description	Manufacturer
PCB	Rogers 4350, $\epsilon_r=3.5$ Thickness=30 mils	Rogers
J1, J2	Connector, SMA END 0.037"	Johnson
J3	MTA Post Header, 5 Pin, Rect-angle, Polarized, Surface Mount	AMP
C2	Capacitor, Lytic 22F, 35V	Panasonic
C3, C11	Cap, 0.1 $\mu$ F, 100V, 10%, 1206	Johanson
C5, C13	Cap, 1000pF, 100V, 10%, 1206	Johanson
C7	Capacitor, Lytic 220uF, 50V	Panasonic
C1, C4, C6, C8, C19	CAP, 68PF, 250V, 5%, 0603	ATC
C10, C12, C14	CAP, 12PF, 250V, 1%, 0603	ATC
C15, C16	CAP, 10PF, 250V, 1%, 0603	ATC
C17	CAP, 7.5 PF, 250V, 0603	ATC
C18	CAP, 27PF, 250V, 5%, 0603	ATC
C2	CAP, 0.22UF, 50V, CERAMIC, X7R, 1206,	Kemet
C9	CAP, 4.3 PF, 250V, 0603	ATC
R2	RES, 560, 1/16W, 5%, 0402	Panasonic
R1	RES, 0.0, 1/16W, 5%, 0402	Panasonic
Mounting Screws	4-40 X 0.250"	Various

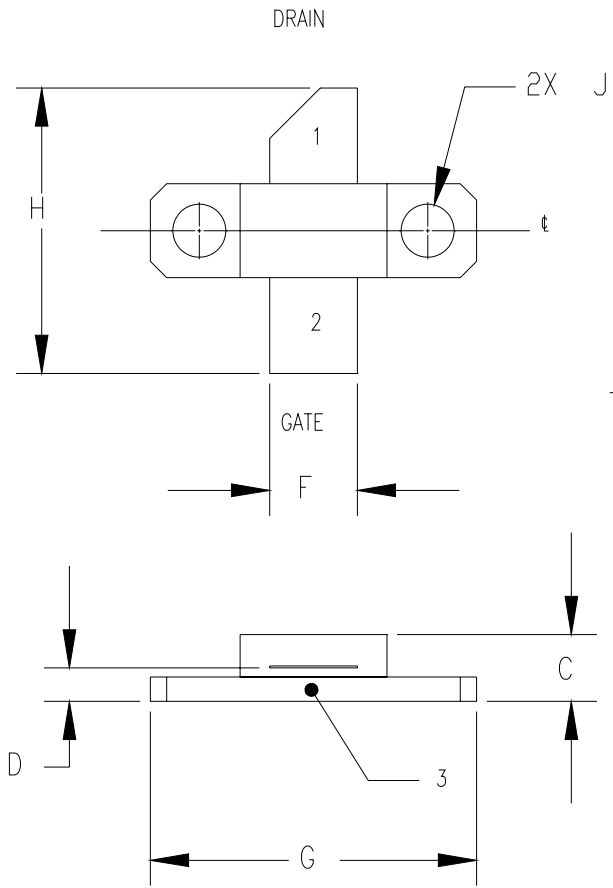
**900 MHz Application Circuit Heatsink**



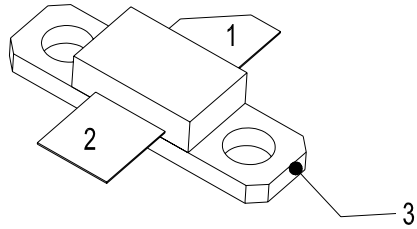
### Package Outline

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ADHESIVE FROM LID MAY EXTEND A MAXIMUM OF 0.020" BEYOND EDGE OF LID.
4. LID MAY BE MISALIGNED TO THE BODY OF THE PACKAGE BY A MAXIMUM OF 0.008" IN ANY DIRECTION.



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.72	5.97
B	0.004	0.006	0.102	0.152
C	0.149	0.178	3.78	4.52
D	0.077	0.087	1.96	2.21
E	0.355	0.365	9.02	9.27
F	0.210	0.220	5.33	5.59
G	0.795	0.805	20.19	20.45
H	0.697	0.703	17.70	17.86
J	DIA 0.130		DIA 3.30	



PIN 1. DRAIN  
PIN 2. GATE  
PIN 3. SOURCE