



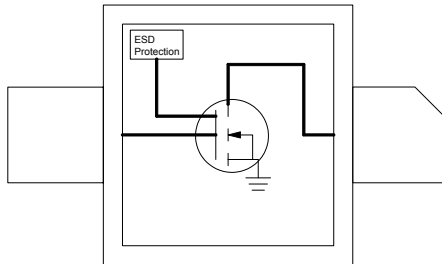
### Product Description

RFMD's SLD-2083CZ is a robust 12Watt high performance LDMOS transistor designed for operation to 1600MHz. It is an excellent solution for applications requiring high linearity and efficiency at a low cost. The SLD-2083CZ is typically used in the design of driver stages for power amplifiers, repeaters, and RFID applications. The power transistor is fabricated using RFMD's latest, high performance XeMOS II™ process.

#### Optimum Technology Matching® Applied

- GaAs HBT
- GaAs MESFET
- InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- InP HBT
- RF MEMS
- LDMOS

### Functional Schematic Diagram



Case Flange = Ground

### Features

- 12Watt Output  $P_{1dB}$
- Single Polarity Supply Voltage
- High Gain: 18dB at 915MHz
- High Efficiency: 47% at 10W CW
- XeMOS II LDMOS
- Integrated ESD Protection, Class 1B

### Applications

- Base Station PA Driver
- Repeater
- RFID
- Military Communication
- GSM/CDMA

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>RF Specifications</b>					
$V_{DS} = 28.0V, I_{DQ} = 125mA, T_{FLANGE} = 25^\circ C$					
Frequency of Operation	10		1600	MHz	
Gain	17	18		dB	10Watt CW, 902MHz to 928MHz
Drain Efficiency	40	47		%	10Watt CW, 915MHz
Input Return Loss		-15	-10	dB	10Watt output Power, 915MHz
Third Order IMD		-28	-26	dBc	10Watt PEP (Two Tone), 915MHz
1dB Compression		12		Watt	915MHz
IS-95, 9 Ch Fwd, Offset = 750KHz		1.6		Watt	ACPR Integrated Bandwidth, ACPR = -55dB
		3.6		Watt	ACPR Integrated Bandwidth, ACPR = -45dB
Thermal Resistance (Junction - Case)		4		$^\circ C/W$	
<b>DC Specifications</b>					
Forward Transconductance		590		mA/V	125mA $I_{DS}$
$V_{GS}$ Threshold		3.6		Volts	$I_{DS} = 3mA$
$V_{GS}$ Quiescent	3	4	5	Volts	$I_{DS} = 125mA$
$V_{DS}$ Breakdown		65		Volts	1mA $I_{DS}$ current
Input Capacitance (Gate to Source)		27.5		pF	$V_{GS} = 0V, V_{DS} = 28V$
Reverse Capacitance (Gate to Drain)		0.81		pF	$V_{GS} = 0V, V_{DS} = 28V$
Output Capacitance (Drain to Source)		14.65		pF	$V_{GS} = 0V, V_{DS} = 28V$
Drain to Source Resistance		0.6		$\Omega$	$V_{GS} = 10V, V_{DS} = 250mV$

## Absolute Maximum Ratings

Parameter	Rating	Unit
Drain Voltage ( $V_{DS}$ )	35	V
Gate Voltage ( $V_{GS}$ )	20	V
RF Input Power	+33	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	-40 to +90	°C
Storage Temperature Range	-40 to +100	°C
ESD Rating - Human Body Model	750	Volts
MTTF - 85 °C Leadframe, 200 °C Channel	$1.2 \times 10^6$	Hours

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.



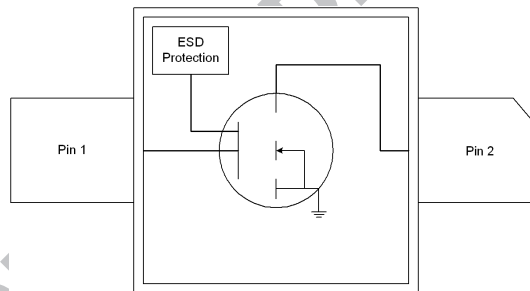
Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

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## Pin Diagram



Case Flange = Ground

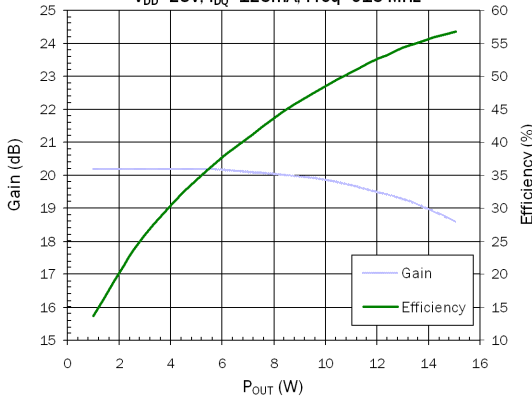
Note 1: Gate voltage must be applied to  $V_{GS}$  lead concurrently or after application of drain voltage to prevent potentially destructive oscillations. Bias voltages should never be applied to the transistor unless it is properly terminated on both input and output.

Note 2: The required  $V_{GS}$  corresponding to a specific  $I_{DQ}$  will vary from device to device due to the normal die-to-die variation in threshold voltage with LDMOS transistors.

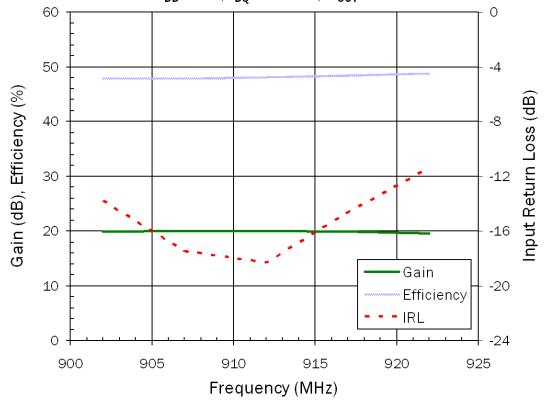
Note 3: The threshold voltage ( $V_{GSTH}$ ) of LDMOS transistors varies with device temperature. External temperature compensation may be required. See application notes.

Typical Performance Curves in 900 MHz Application Circuit

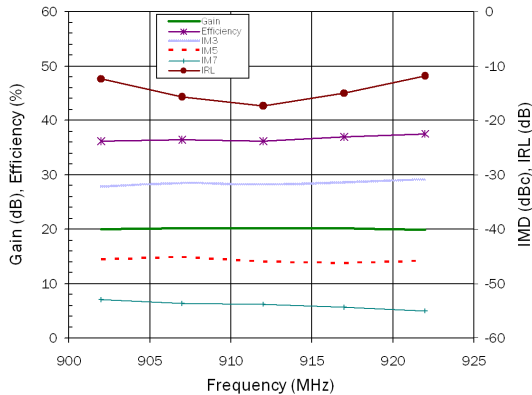
**CW Gain, Efficiency versus P<sub>OUT</sub>**  
 $V_{DD}=28V, I_{DQ}=125mA, Freq=915\text{ MHz}$



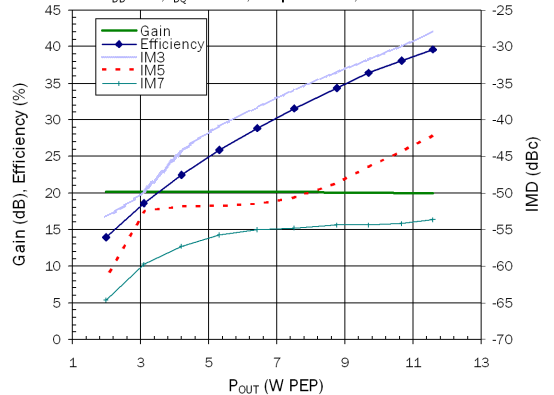
**CW Gain, Efficiency, IRL versus Frequency**  
 $V_{DD}=28V, I_{DQ}=125mA, P_{OUT}=10W$



**2 Tone Gain, Efficiency, Linearity and IRL versus Frequency**  
 $V_{DD}=28V, I_{DQ}=125mA, P_{OUT}=10W\text{ PEP}, \Delta F=1\text{ MHz}$



**2 Tone Gain, Efficiency, Linearity versus P<sub>OUT</sub>**  
 $V_{DD}=28V, I_{DQ}=125mA, Freq=915\text{ MHz}, \Delta F=1\text{ MHz}$



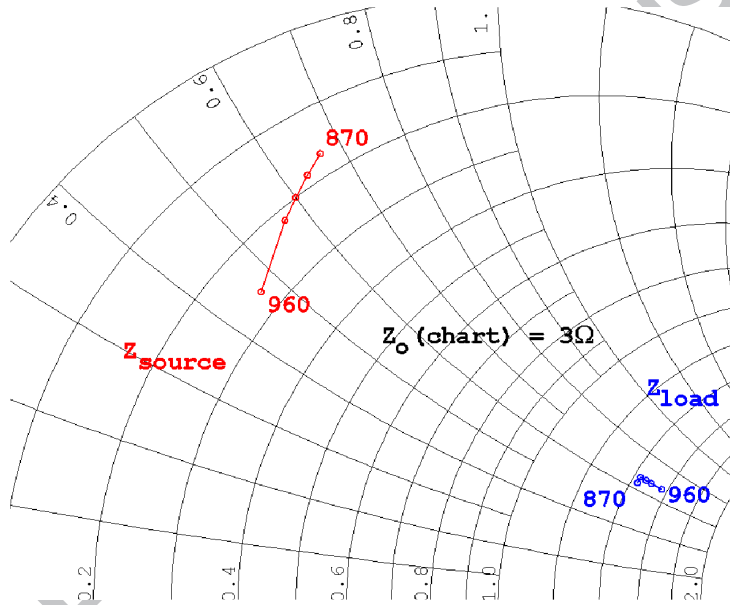
NOT

### Impedance Data

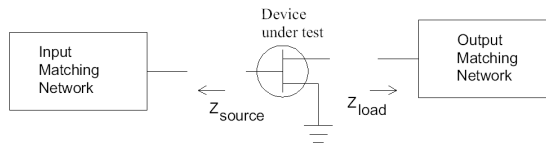
Frequency (MHz)	Z <sub>SOURCE</sub>	Z <sub>LOAD</sub>
870	0.50 + j2.0	4.3 + j1.9
880	0.55 + j1.9	4.3 + j2.0
900	0.60 + j1.8	4.4 + j2.0
930	0.65 + j1.7	4.5 + j2.0
960	0.80 + j1.4	4.7 + j2.0

Z<sub>SOURCE</sub> and Z<sub>LOAD</sub> are optimal impedances presented to the SLD-2083CZ when operating at 28V, I<sub>DQ</sub>=125mA, P<sub>OUT</sub>=10W PEP

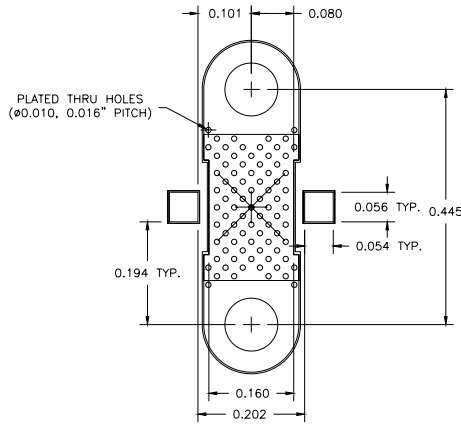
### Impedance Data



NOT



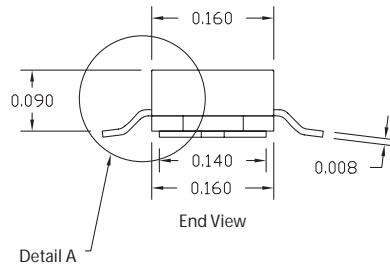
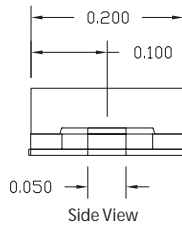
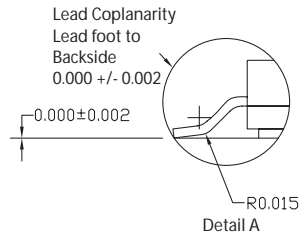
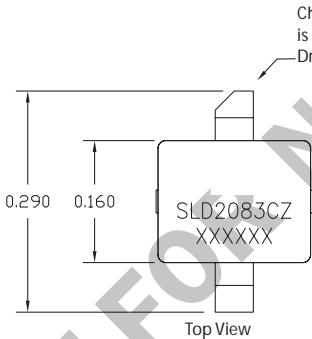
**Suggested Pad Layout**



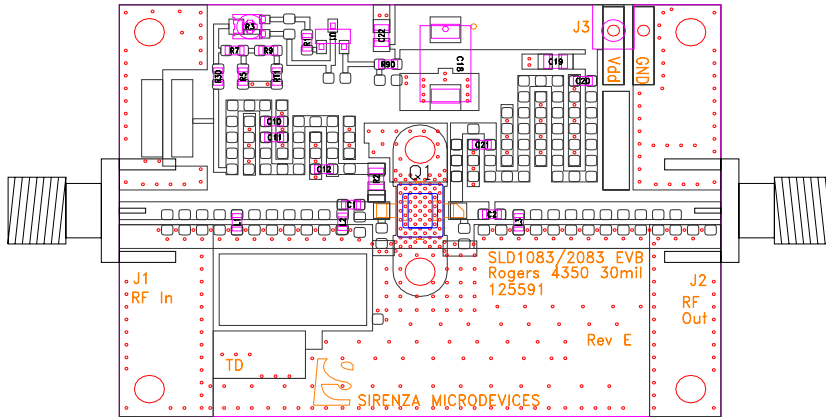
**Package Drawing**

Dimensions in inches

Refer to drawing posted at [www.rfmd.com](http://www.rfmd.com) for tolerances.



## 900MHz Application Circuit



### Bill of Materials - 900MHz Application Circuit

Reference Description	Description	Mfg	Mfg Part Number
C1	CAP 12pF 250V 1% 0603	ATC	600S120FT250XT
C2	CAP 6.8pF 250V ±0.1pF 0603	ATC	600S6R8BT250XT
L1	IND, 16nH 5% 0603	Coilcraft	0603CS-16NXJB
L2	IND, 1.6nH 5% 0603	Coilcraft	0603CS-1N6XJB
L3	IND, 4.7nH 5% 0603	Coilcraft	0603CS-4N7XJB
C10	CAP 01UF 16V 10% 0603	AVX	0603YG1042A2A
C11, C20	CAP 1000 PF 50V 10% 603	AVX	06035C102KAT2A
C12, C21	CAP 68PF 250V 5% 603LF	ATC	600S680JT250XT
C18	CAP 10UF 35V 20% TAN T ELECT	Kemet	T494D106M035AS
C19, C22	CAP 0.1UF 50V 10% 805	Panasonic	ECJ2YB1H104K
J1, J2	Connector SMA END 0.037	Johnson	142-0751-821
J3	Connector MTA SMD R/A 2 PIN	Amp	640455-2
R1	RES 324 1/16W 1% 603	Panasonic	ERJ-3EKF3240V
R2	RES 49.9 1/10W 1% 805	Panasonic	ERJ-6ENF49R9V
R3	POT TRIM 500Ω 2MM	Panasonic	EVM-2WSX80B52
R30	RES 49.9 1/16W 1% 603	Panasonic	ERJ-EKF49R9V
R5	RES 130 1/16 W 1% 603	Panasonic	ERJ-3EKF1300V
R7	RES 210 1/16W 1% 603	Phillips	9C06031A2100FKHFT
R9	RES 0 1/16W 5% 603	Panasonic	ERJ-3GSYOR00V
R90	RES 1.0K 1/16W 1% 603	Panasonic	ERJ-3EKF1001V
RT1	THERMISTOR 100K 5% 603	Panasonic	ERT-J1VV104J
U1	IC VOLT REG 100MA 5V SOT-23	National	LM3480IM3-5.0
6 screws	SCREW #2-56 PHILIPS PAN HEAD	various	-
6 washers	WASHER #2 FLAT SS	various	-
PCB	PCB, 30mils thick DK=3.48	Rogers	4350
Heatsink	machined aluminum	various	-

### Ordering Information

Part Number	Reel Size	Devices/Reel
SLD-2083CZ	7"	500