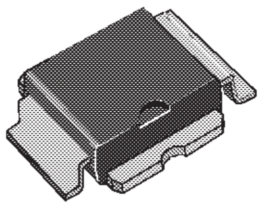
PD55008 - PD55008S

RF POWER TRANSISTORS
The *LdmoST* Plastic FAMILY

PRELIMINARY DATA

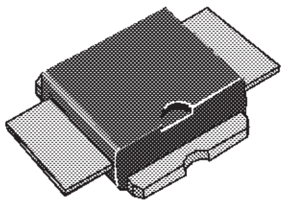
N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- POUT = 8 W with 17 dB gain @ 500 MHz / 12.5V
- NEW RF PLASTIC PACKAGE



PowerSO-10RF
(Formed Lead)

ORDER CODE	BRANDING
PD55008	XPD55008



PowerSO-10RF
(Straight Lead)

ORDER CODE	BRANDING
PD55008S	XPD55008S

DESCRIPTION

The PD55008 is a common source N-Channel, enhancement-mode, lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 12V in common source mode at frequencies of up to 1GHz. PD55008 boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. PD55008's superior linearity performance makes it an ideal solution for car mobile radio.

The PowerSO-10 plastic package, designed to offer high reliability, is the first ST JEDEC approved, high power SMD package. It has been specially optimized for RF needs and offers excellent RF performances and ease of assembly.

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current	4	A
P_{DISS}	Power Dissipation (@ Tc = 70 °C)	52.8	W
T_j	Max. Operating Junction Temperature	165	°C
T_{STG}	Storage Temperature	-65 to 165	°C

THERMAL DATA

$R_{th(j-c)}$	Junction-Case Thermal Resistance	1.8	°C/W

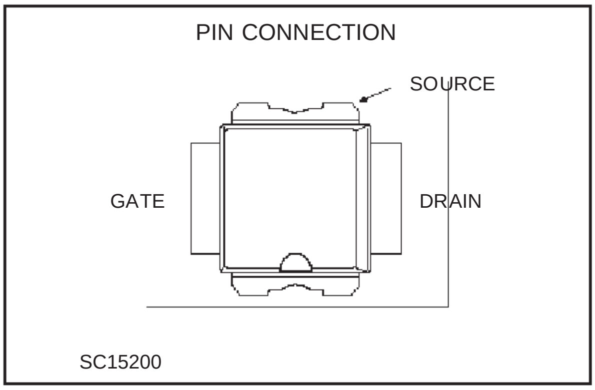
ELECTRICAL SPECIFICATION (T_{CASE} = 25 °C)

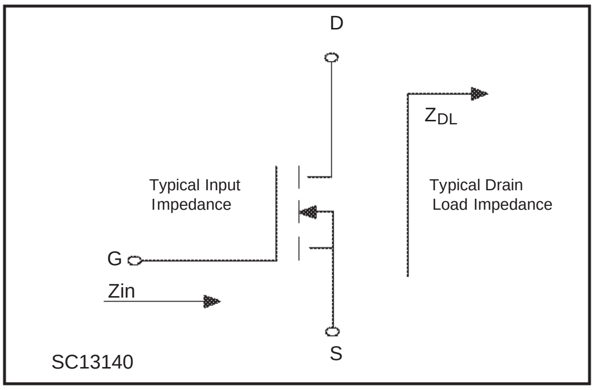
STATIC

Symbol	Parameter	Min.	Typ.	Max.	Unit
I_{DSS}	V_{GS} = 0 V V_{DS} = 28 V			1	µA
I_{GSS}	V_{GS} = 20 V V_{DS} = 0 V			1	µA
$V_{GS(Q)}$	V_{DS} = 10 V I_D = 150 mA	2.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10 V I_D = 1.5 A			1.0	V
g_{FS}	V_{DS} = 10 V I_D = 1.5 A		1.6		mho
C_{ISS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		58		pF
C_{OSS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		39		pF
C_{RSS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		2.6		pF

DYNAMIC

Symbol	Parameter	Min.	Typ.	Max.	Unit
P_{OUT}	f = 500 MHz V_{DD} = 12.5 V I_{DQ} = 150 mA	8			W
G_{PS}	f = 500 MHz V_{DD} = 12.5 V P_{OUT} = 8 W I_{DQ} = 150 mA		17		dB
η_D	f = 500 MHz V_{DD} = 12.5 V P_{OUT} = 8 W I_{DQ} = 150 mA		55		%
LOAD Mismatch	f = 500 MHz V_{DD} = 15.5 V P_{OUT} = 8 W I_{DQ} = 150 mA ALL PHASE ANGLES	20:1			VSWR





IMPEDANCE DATA

PD55008

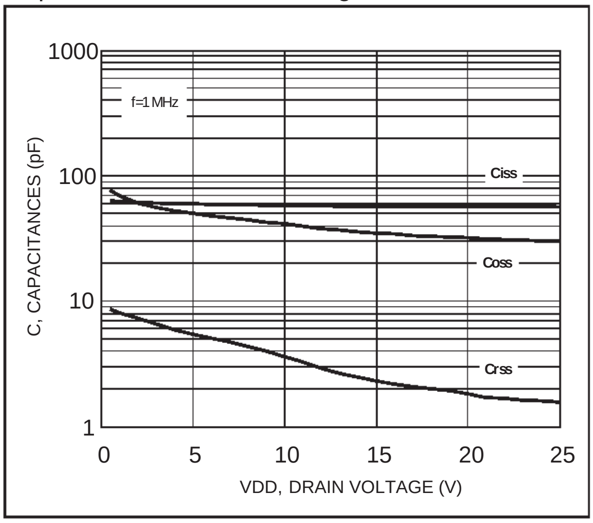
Frequency MHz	Zin Ω	Zdl Ω
520	1.649 - j1.965	1.716 - j1.552
500	1.589 - j1.185	1.561 - j2.639
480	1.141 - j2.054	1.649 - j2.916

PD55008S

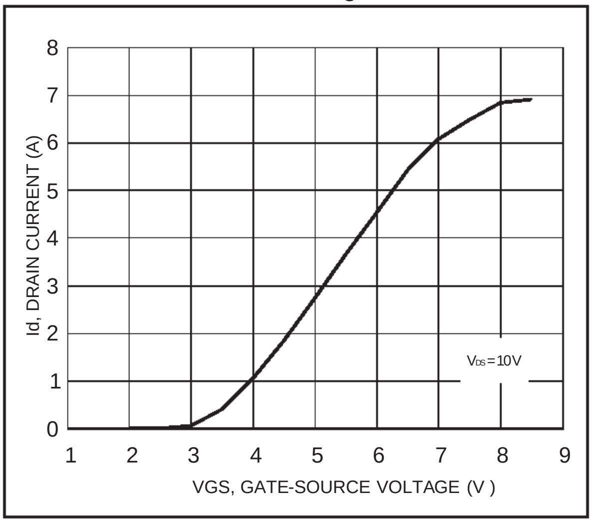
Frequency MHz	Zin Ω	Zdl Ω
520	1.586 - j2.087	3.082 + j2.043
500	1.409 - j3.448	2.129 + j3.219
480	1.075 - j2.727	2.046 +j1.960

TYPICAL PERFORMANCE

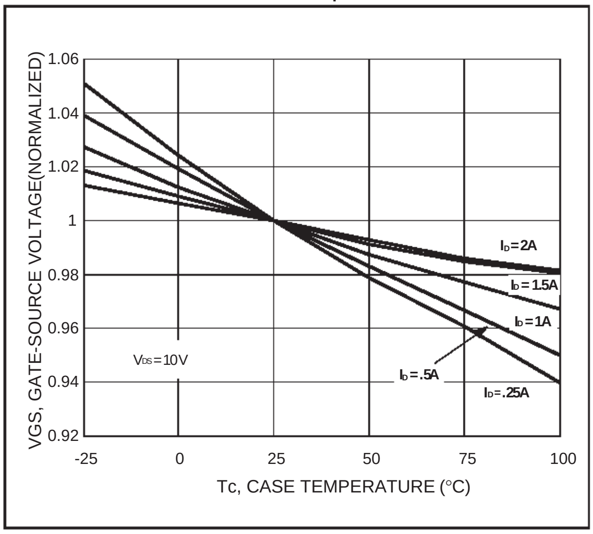
Capacitance vs. Drain Voltage



Drain Current vs. Gate Voltage



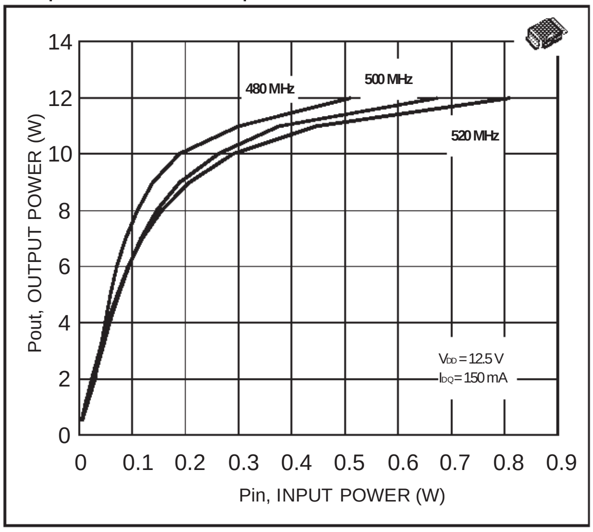
Gate-Source vs. Case Temperature



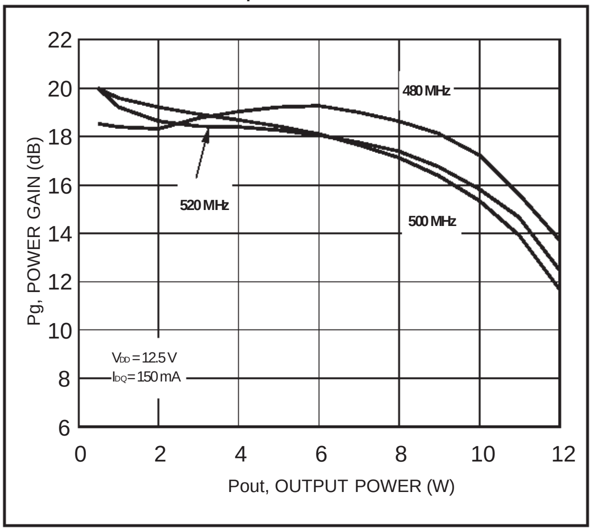
TYPICAL PERFORMANCE

PD55008

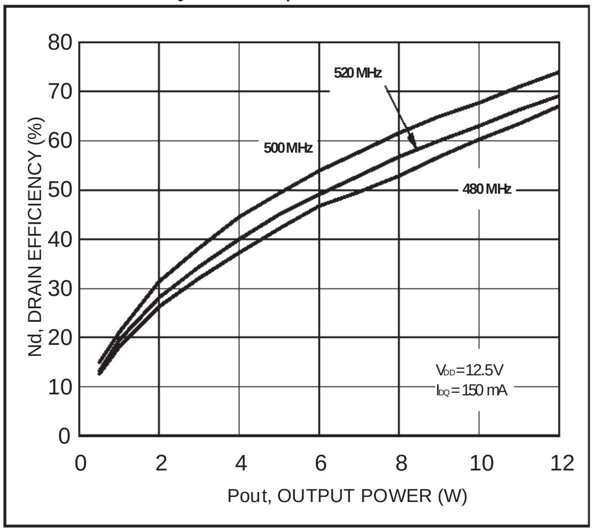
Output Power vs. Input Power



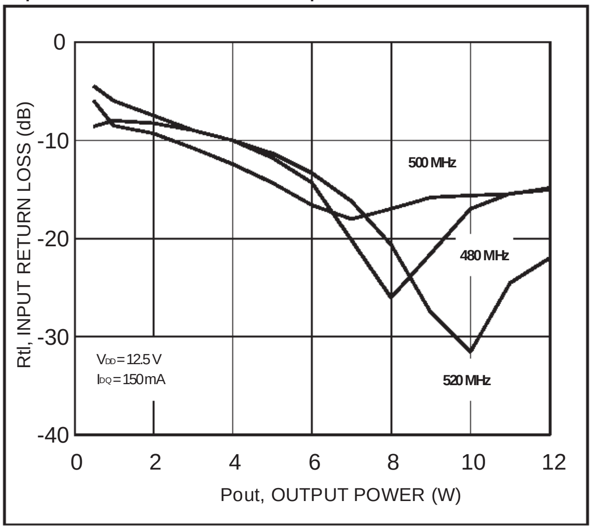
Power Gain vs. Output Power



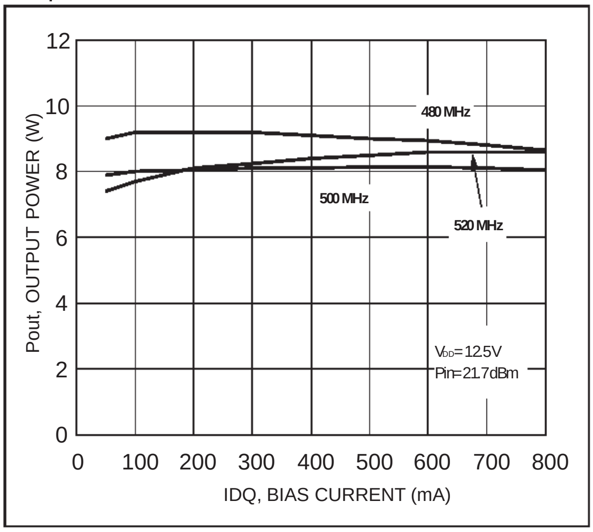
Drain Efficiency vs. Output Power



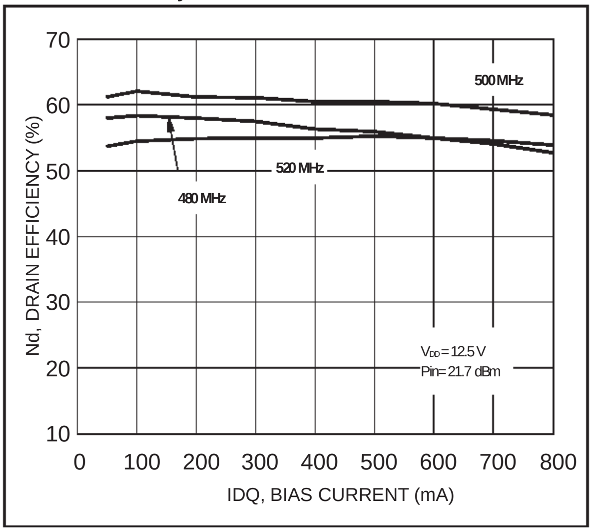
Input Return Loss vs. Output Power



Output Power vs. Bias Current

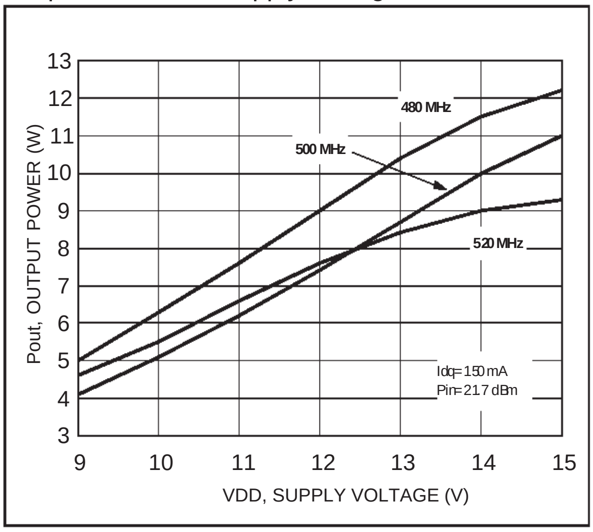


Drain Efficiency vs. Bias Current

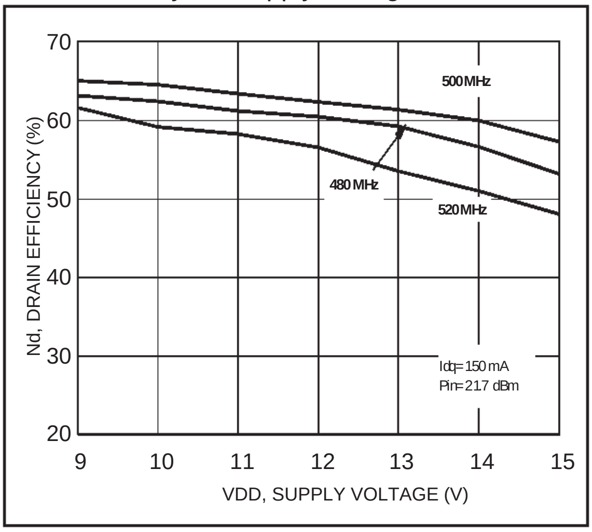


TYPICAL PERFORMANCE

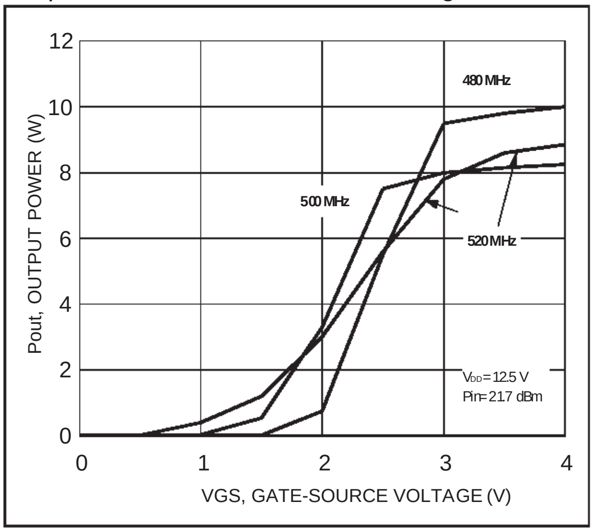
Output Power vs. Supply Voltage



Drain Efficency vs. Supply Voltage

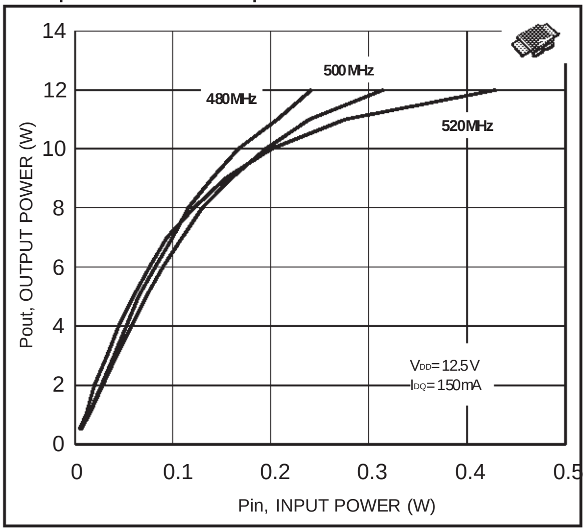


Output Power vs. Gate-Source Voltage

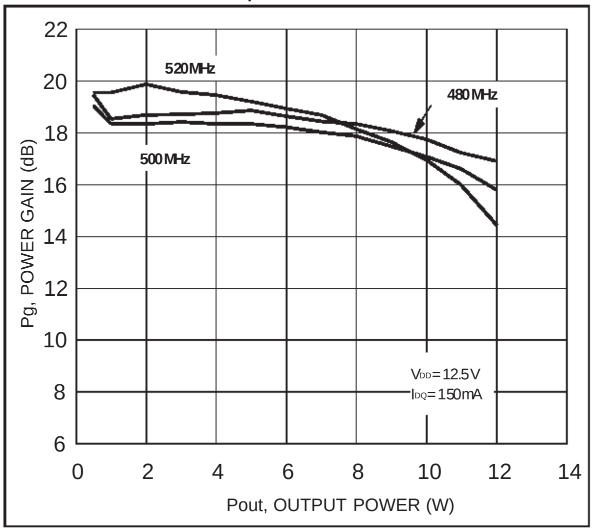


Output Power vs. Input Power

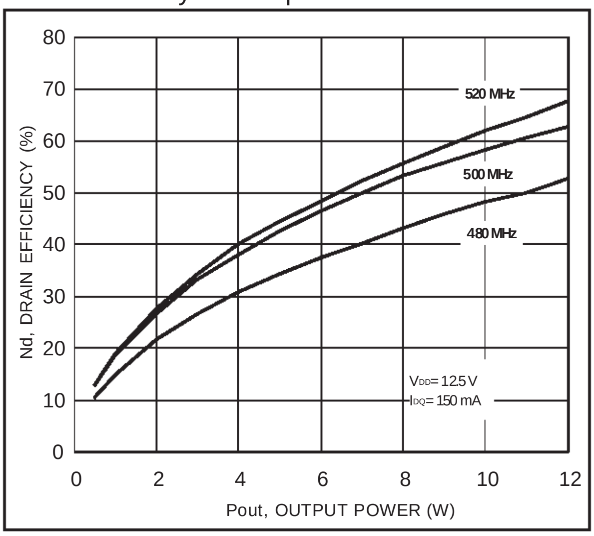
PD55008S



Power Gain vs. Output Power

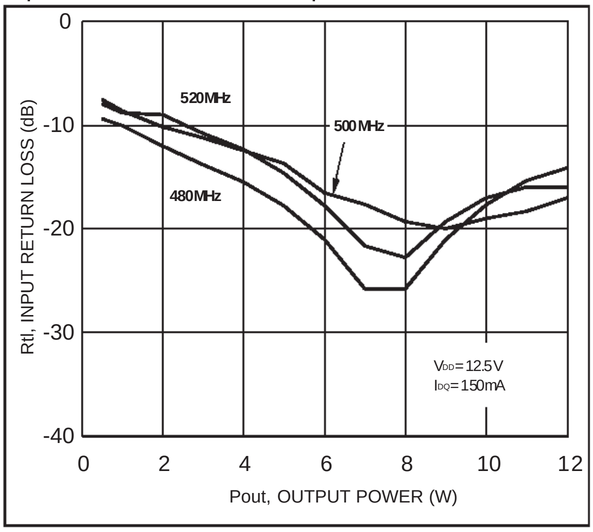


Drain Efficiency vs. Output Power

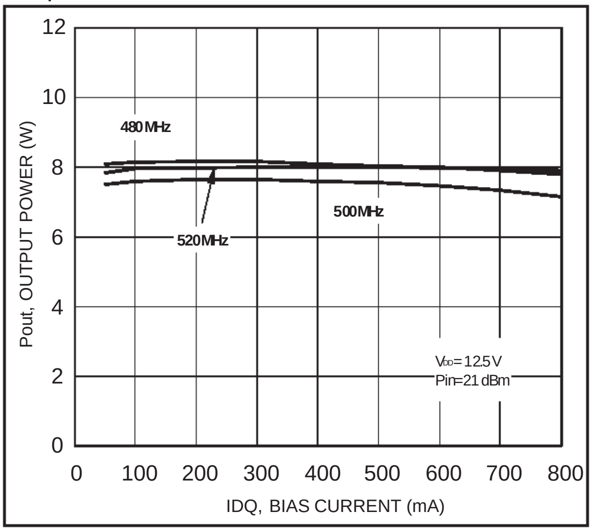


TYPICAL PERFORMANCE

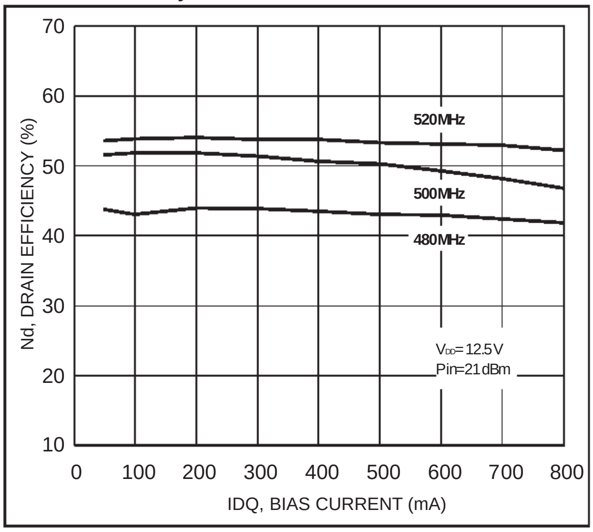
Input Return Loss vs. Output Power



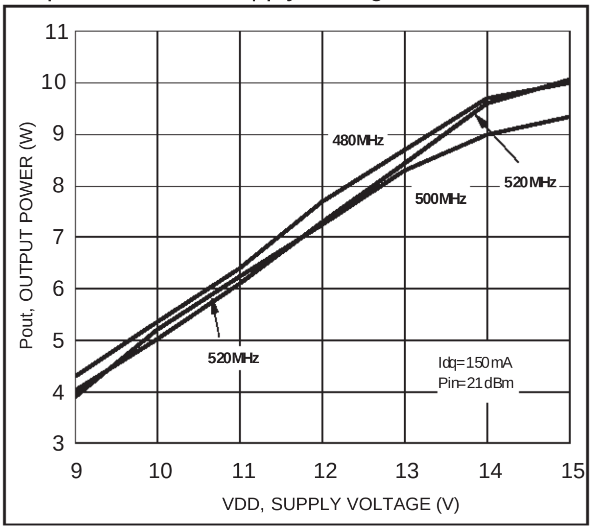
Output Power vs. Bias Current



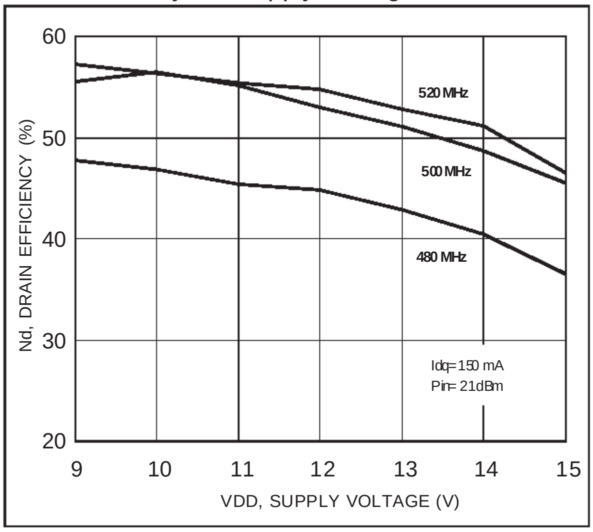
Drain Efficiency vs. Bias Current



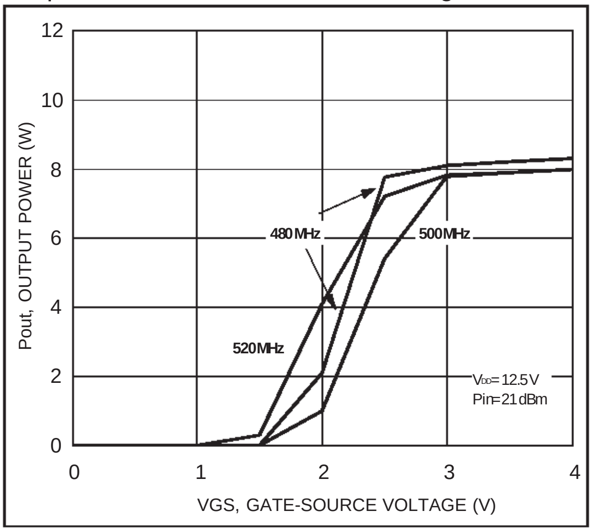
Output Power vs. Supply Voltage



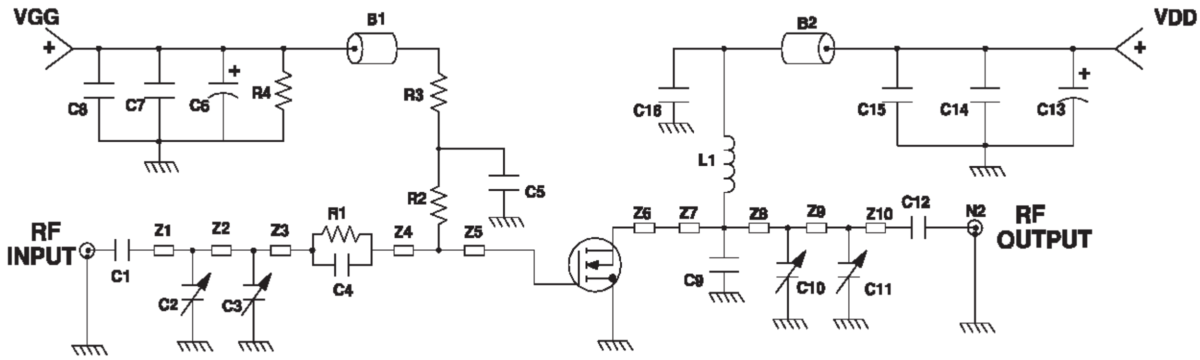
Drain Efficency vs. Supply Voltage



Output Power vs. Gate-Source Voltage



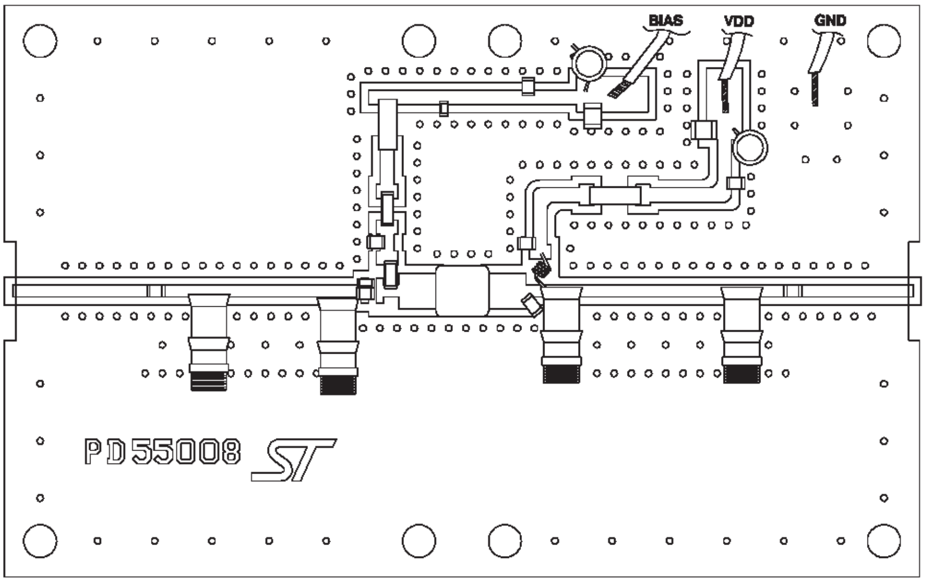
TEST CIRCUIT SCHEMATIC



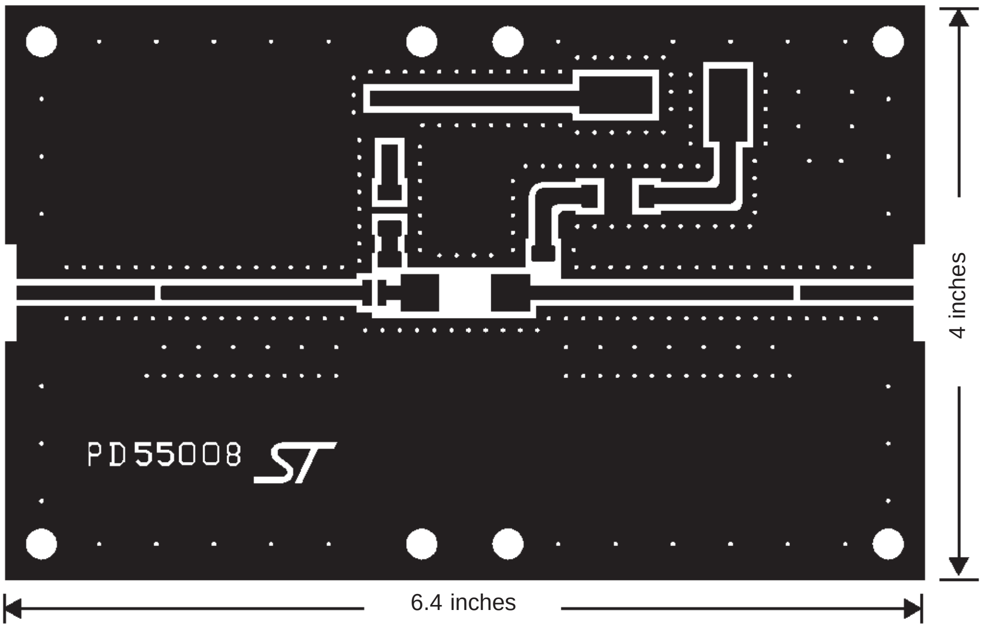
TEST CIRCUIT COMPONENT PART LIST

B1,B2	SHORT FERRITT BEAD, FAIR RITE PRODUCTS (2743021446)	R4	33KΩ, 1/8 W RESISTOR
C1,C12	240pF, 100 mil CHIP CAPACITOR	Z1	0.451” X 0.080” MICROSTRIP
C2,C3,C10,C11	0 to 20 pF TRIMMER CAPACITOR	Z2	1.005” X 0.080” MICROSTRIP
C4	82pF, 100 mil CHIP CAP	Z3	0.020” X 0.080” MICROSTRIP
C5,C16	120pF, 100 mil CHIP CAP	Z4	0.155” X 0.080” MICROSTRIP
C6,C13	10µF, 50V ELECTROLYTIC CAPACITOR	Z5,Z6	0.260” X 0.223” MICROSTRIP
C7,C14	1.200pF mil CHIP CAP	Z7	0.065” X 0.080” MICROSTRIP
C8,C15	0.1 F, 100 mil CHIP CAP	Z8	0.266” X 0.080” MICROSTRIP
C9	30pF, 100 mil CHIP CAP	Z9	1.113” X 0.080” MICROSTRIP
L1	55.5 nH, TURN, COILCRAFT	Z10	0.433” X 0.080” MICROSTRIP
N1,N2	TYPE N FLANGE MOUNT	BOARD	ROGER, ULTRA LAM 2000
R1	15 Ω, 0805 CHIP RESISTOR		THK 0.030” ε_r = 2.55
R2	51 Ω, 1/2 W RESISTOR		2oz ED Cu 2 SIDES
R3	10 Ω, 0805 CHIP RESISTOR		

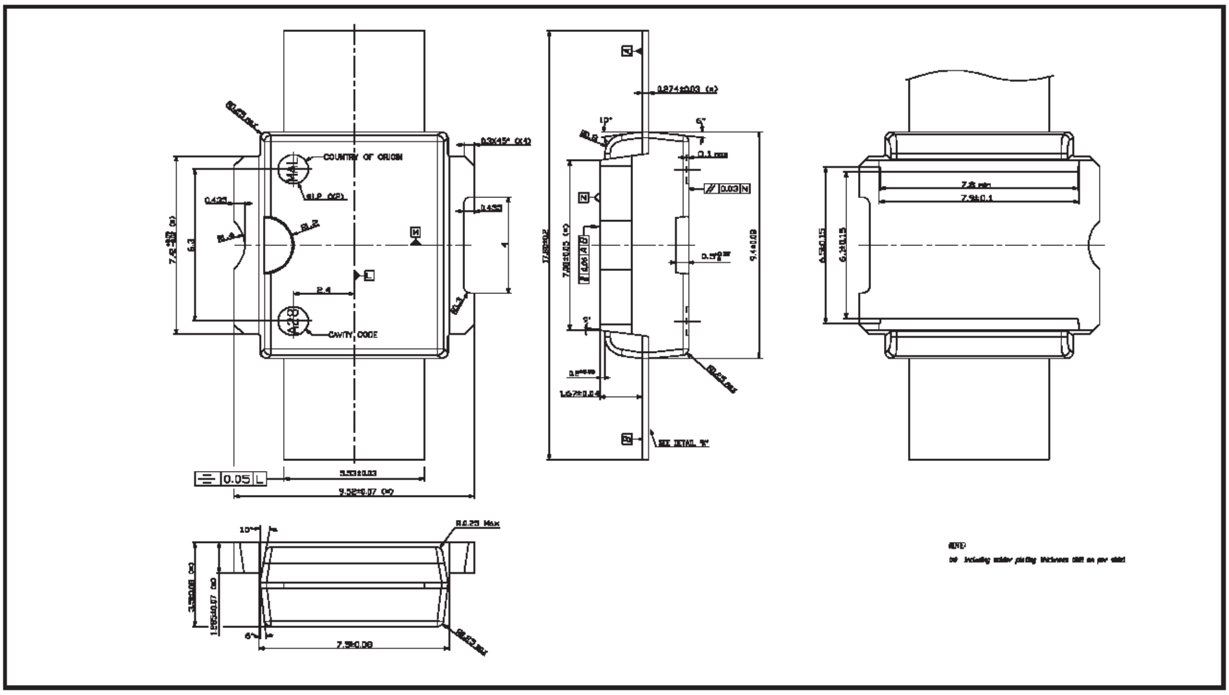
TEST CIRCUIT



TEST CIRCUIT PHOTOMASTER



PowerSO-10RF (Straight Lead) MECHANICAL DATA



PowerSO-10RF (Formed Lead) MECHANICAL DATA