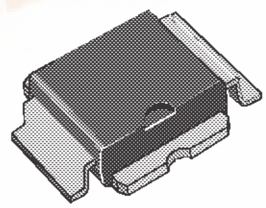
PD55015 - PD55015S

RF POWER TRANSISTORS
The *LdmoST* Plastic FAMILY

PRELIMINARY DATA

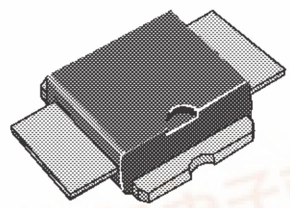
N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- POUT = 15 W with 13.5 dB gain @ 500 MHz / 12.5V
- NEW RF PLASTIC PACKAGE



PowerSO-10RF
(Formed Lead)

ORDER CODE	BRANDING
PD55015	XPD55015



PowerSO-10RF
(Straight Lead)

ORDER CODE	BRANDING
PD55015S	XPD55015S

DESCRIPTION

The PD55015 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. PD55015 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. PD55015'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	5	A
P_{DISS}	Power Dissipation (@ Tc = 70 °C)	73	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	1.3	°C/W

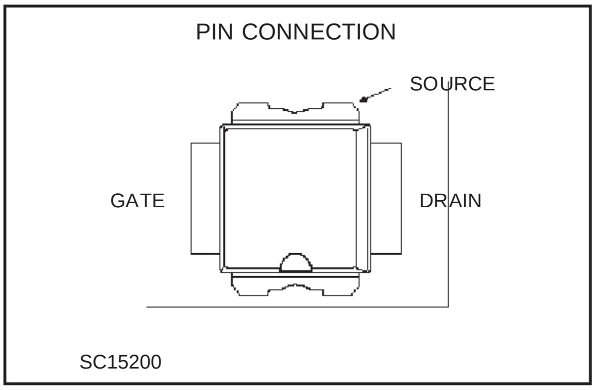
ELECTRICAL SPECIFICATION (T_{CASE} = 25 °C)

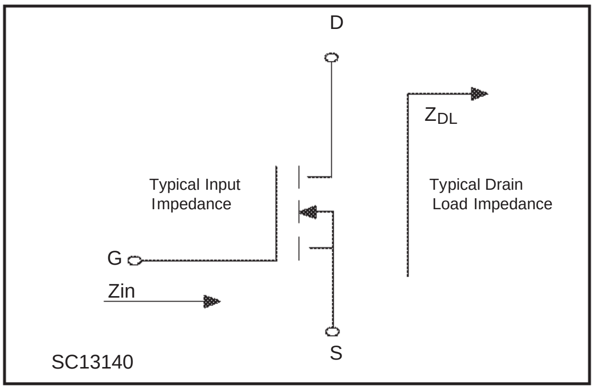
STATIC

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 = 2.5 A			0.8	V
g_{FS}	V_{DS} = 10 V I_D = 2.5 A	2.0	2.5		mho
C_{ISS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		89		pF
C_{OSS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		60		pF
C_{RSS}	V_{GS} = 0 V V_{DS} = 12.5 V f = 1 MHz		6.5		pF

DYNAMIC

Symbol	Parameter	Min.	Typ.	Max.	Unit
P_{OUT}	f = 500 MHz V_{DD} = 12.5 V I_{DQ} = 150 mA	15			W
G_{PS}	f = 500 MHz V_{DD} = 12.5 V P_{OUT} = 15 W I_{DQ} = 150 mA		13.5		dB
η_D	f = 500 MHz V_{DD} = 12.5 V P_{OUT} = 15 W I_{DQ} = 150 mA		50		%
LOAD Mismatch	f = 500 MHz V_{DD} = 15.5 V P_{OUT} = 15 W I_{DQ} = 150 mA ALL PHASE ANGLES	20:1			VSWR





IMPEDANCE DATA

PD55015

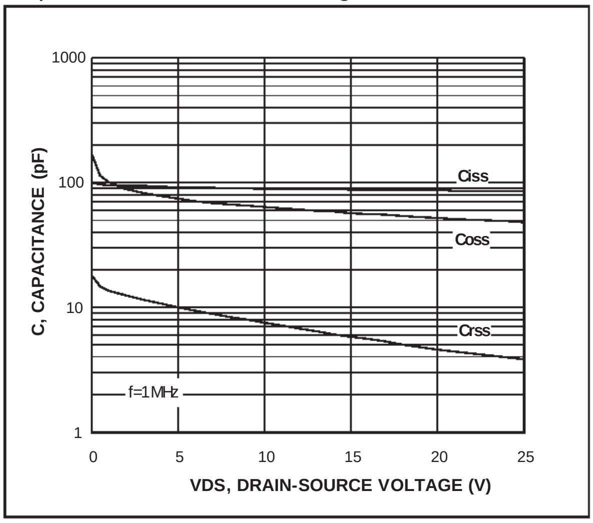
Frequency MHz	Zin Ω	Zdl Ω
480	2.13 - j1.09	1.55 + j.34
500	1.95 - j.31	1.63 - j.25
520	1.83 - j.70	1.43 + j.30

PD55015S

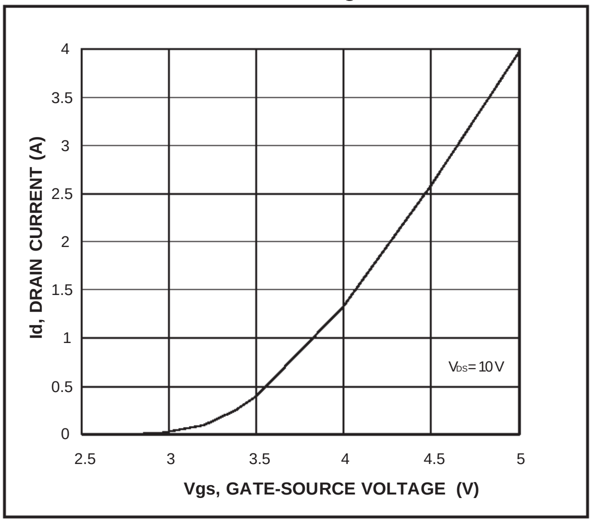
Frequency MHz	Zin Ω	Zdl Ω
480	1.43 - j1.27	1.47 + j.65
500	1.62 - j1.05	1.49 + j.58
520	1.57 - j.91	1.35 +j.36

TYPICAL PERFORMANCE

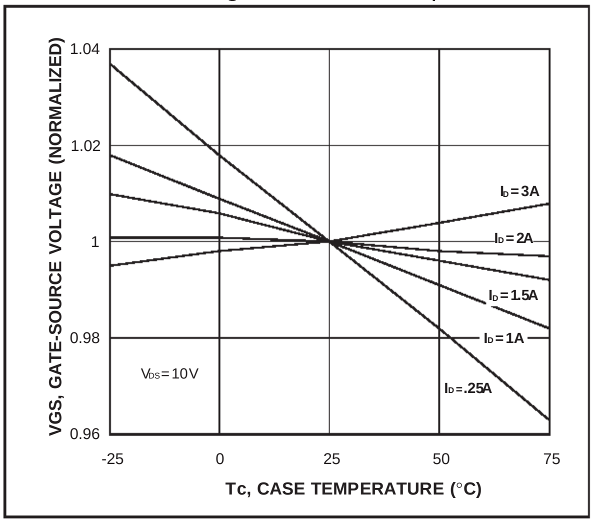
Capacitance vs. Drain Voltage



Drain Current vs. Gate Voltage



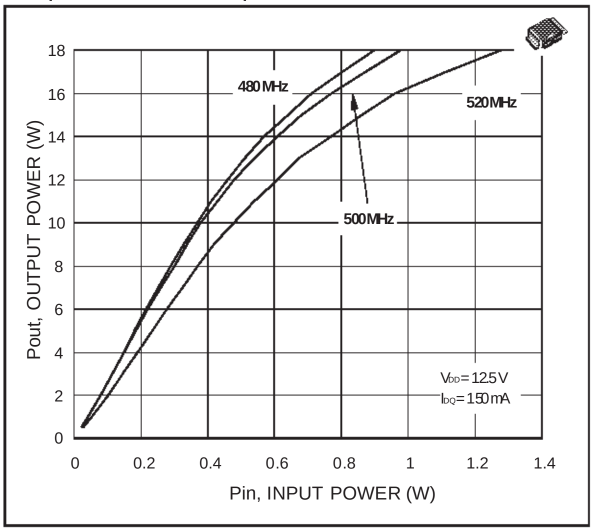
Gate-Source Volatge vs. Case Temperature



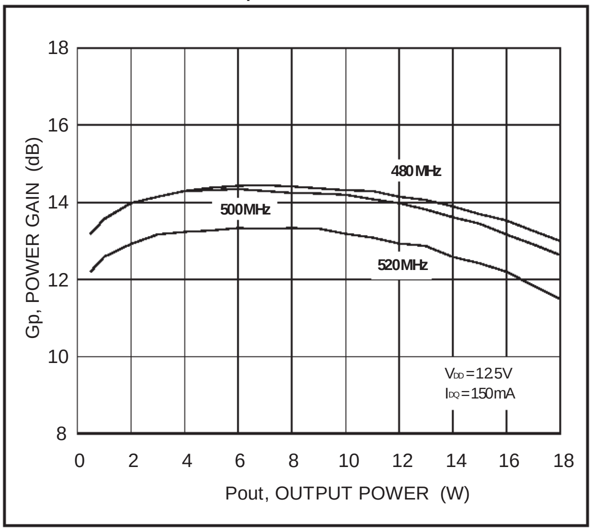
TYPICAL PERFORMANCE

PD55015

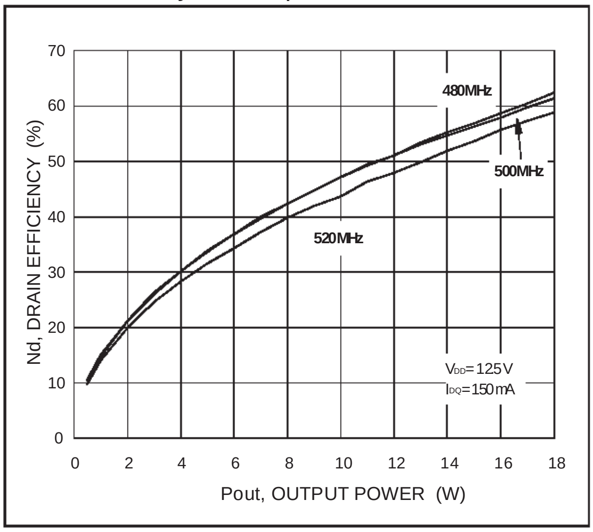
Output Power vs. Input Power



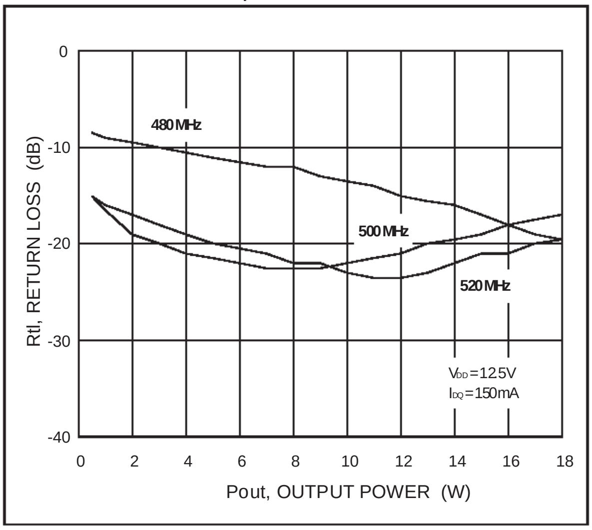
Power Gain vs. Output Power



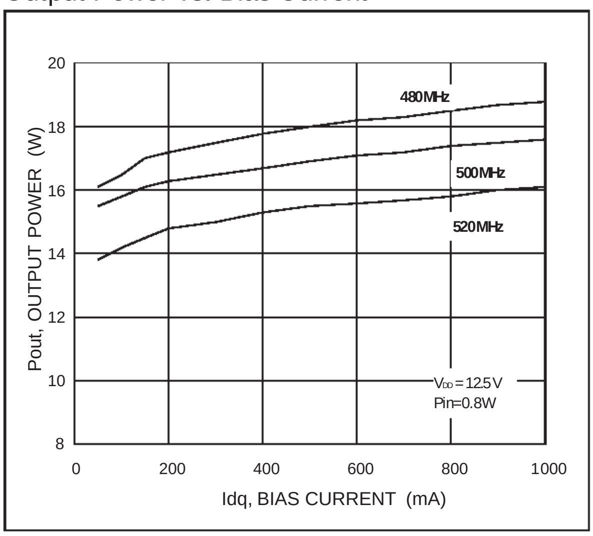
Drain Efficiency vs. Output Power



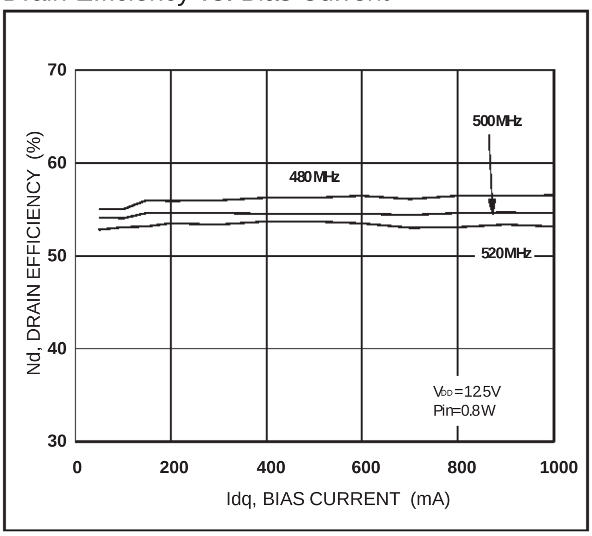
Return Loss vs. Output Power



Output Power vs. Bias Current

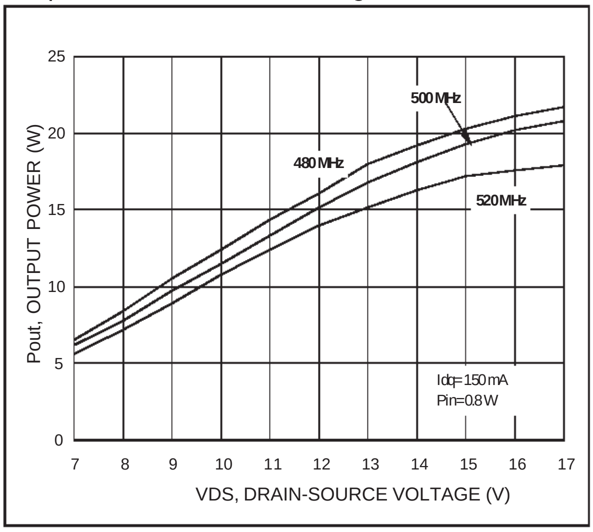


Drain Efficiency vs. Bias Current

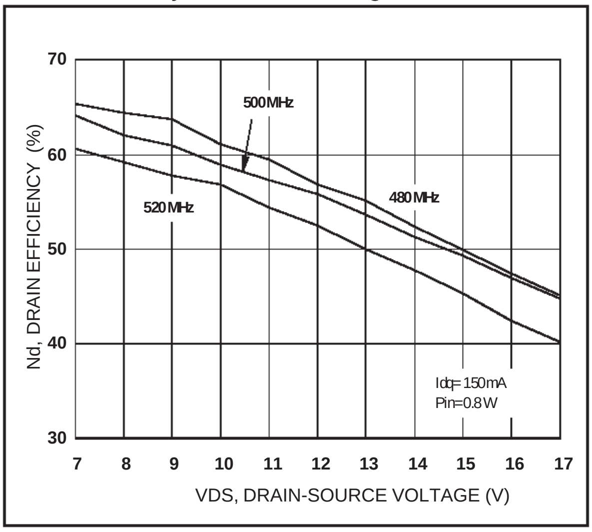


TYPICAL PERFORMANCE

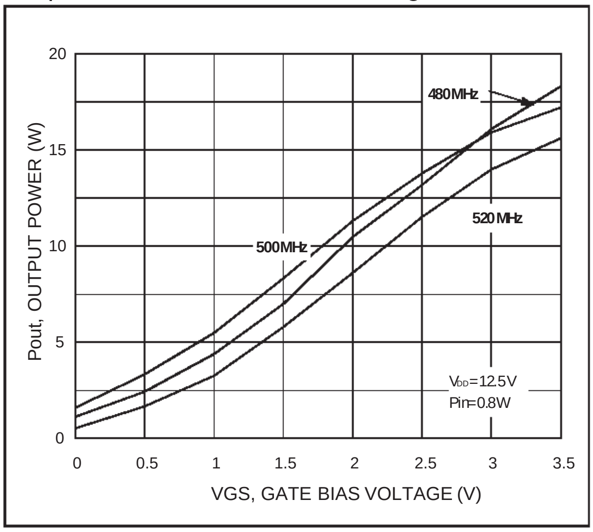
Output Power vs. Drain Voltage



Drain Efficency vs. Drain Voltage

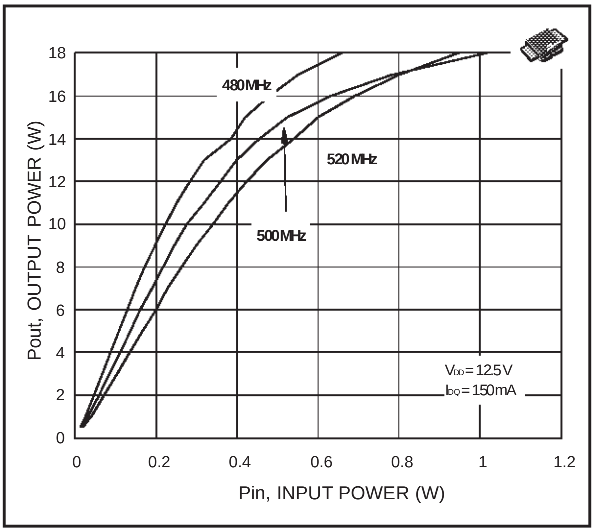


Output Power vs. Gate Bias Voltage

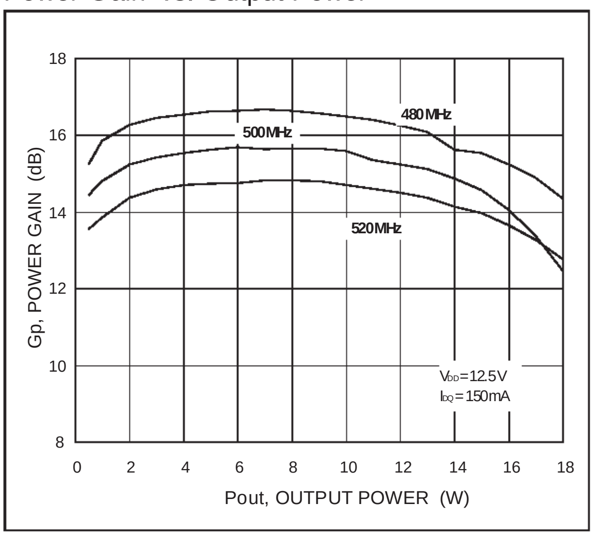


Output Power vs. Input Power

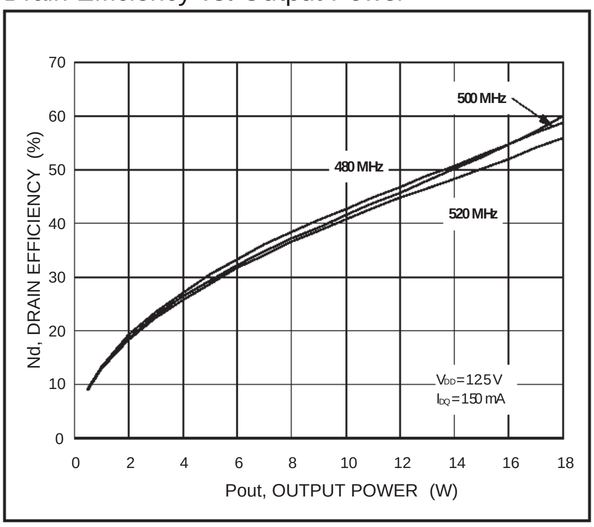
PD55015S



Power Gain vs. Output Power

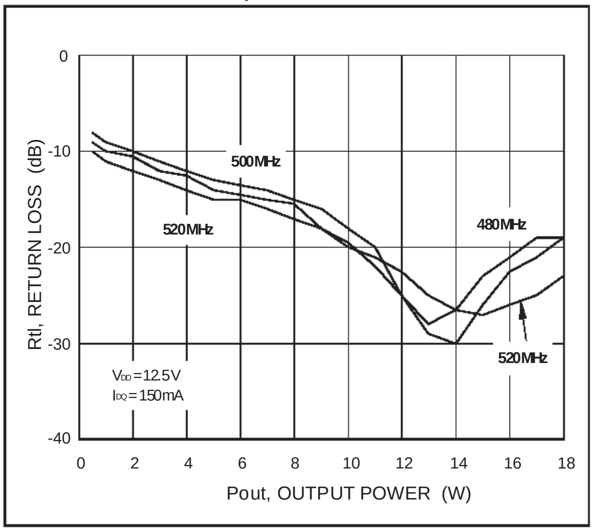


Drain Efficiency vs. Output Power

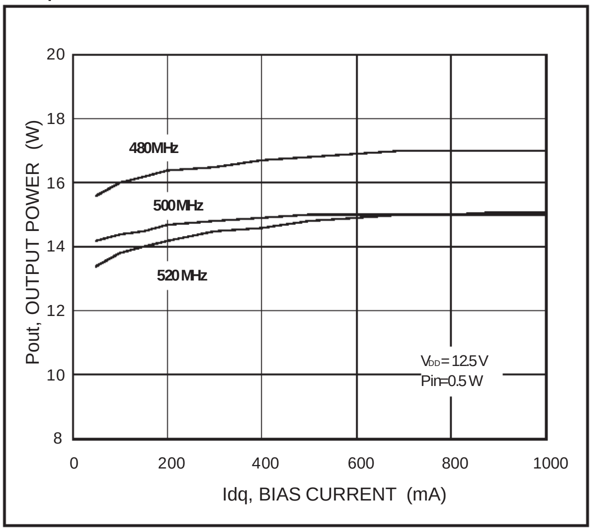


TYPICAL PERFORMANCE

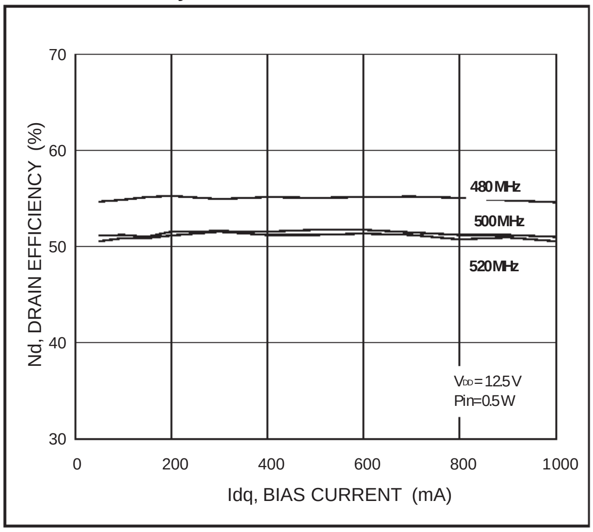
Return Loss vs. Output Power



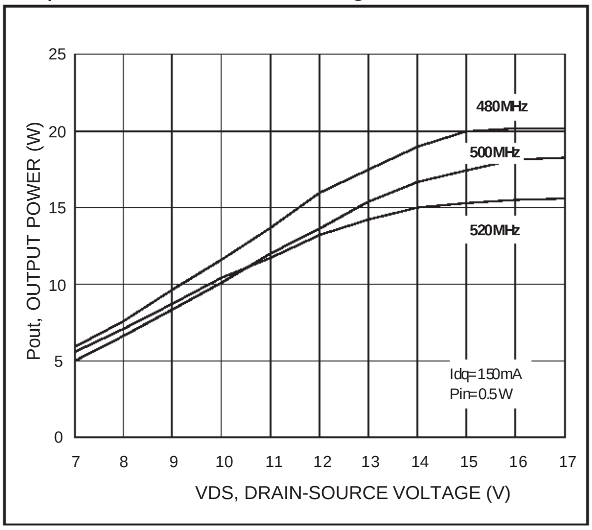
Output Power vs. Bias Current



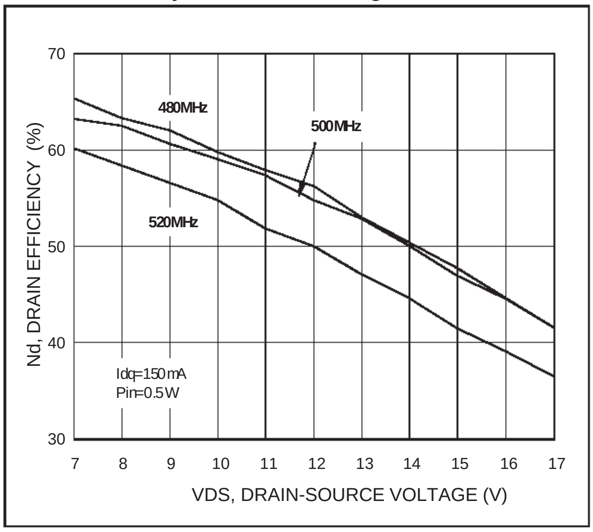
Drain Efficiency vs. Bias Current



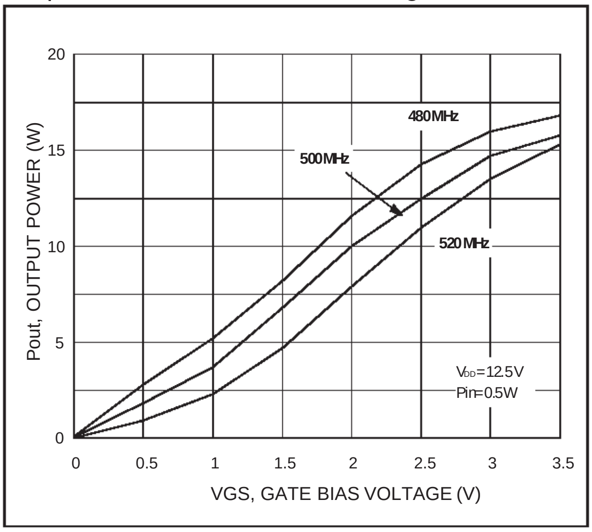
Output Power vs. Drain Voltage



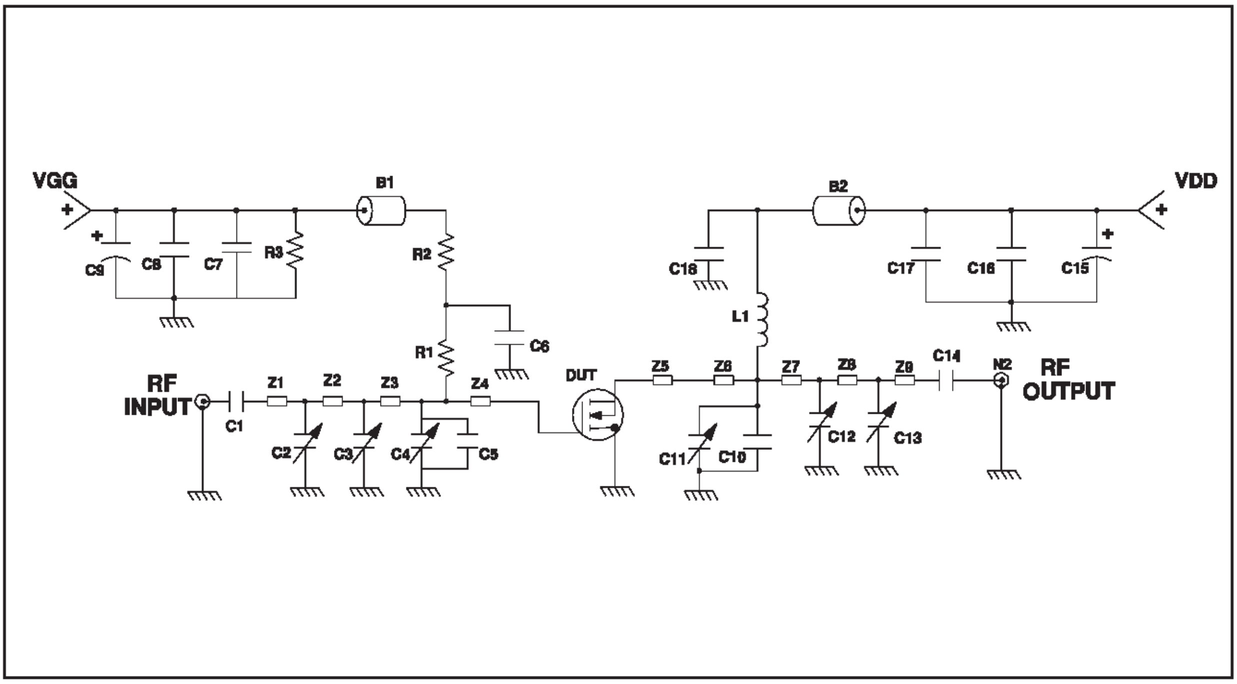
Drain Efficency vs. Drain Voltage



Output Power vs. Gate Bias Voltage



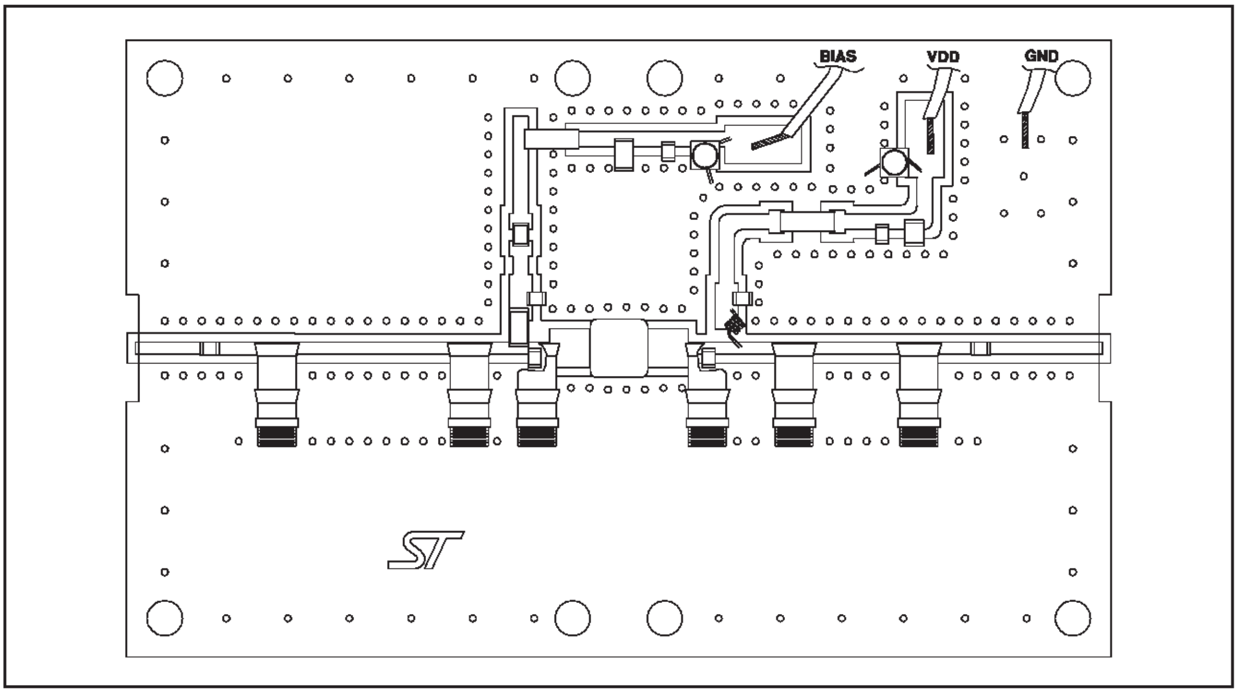
TEST CIRCUIT SCHEMATIC



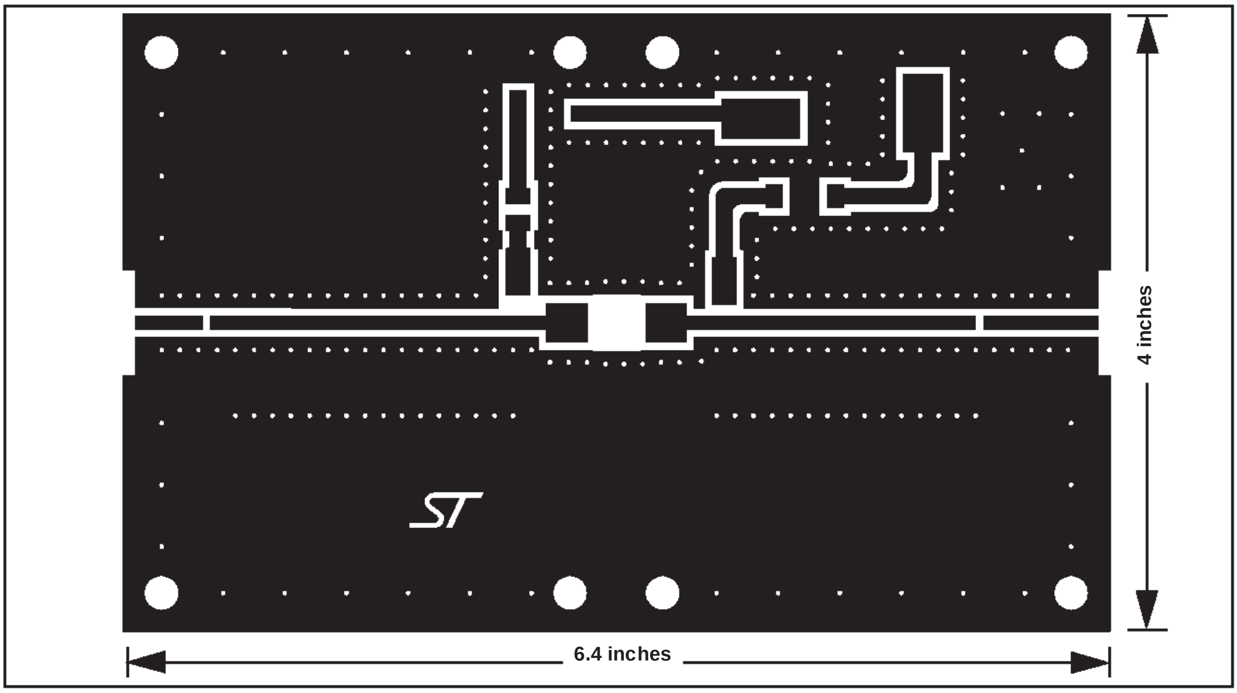
TEST CIRCUIT COMPONENT PART LIST

B1,B2	FERRITE BEAD	R2	1 kΩ, 1W CHIP RESISTOR
C1,C12	300pF, 100 mil CHIP CAPACITOR	R3	33 kΩ, 1W CHIP RESISTOR
C2,C3,C4,C11, C12,C13	1 TO 20 pF TRIMMER CAPACITOR	Z1	0.471" X 0.080" MICROSTRIP
C6,C18	pF 100 mil CHIP CAP	Z2	1.082" X 0.080" MICROSTRIP
C9,C15	10µF, 50V ELECTROLYTIC CAPACITOR	Z3	0.372" X 0.080" MICROSTRIP
C8,C16	0.1mF, 100 mil CHIP CAP	Z4,Z5	0.260" X 0.223" MICROSTRIP
C7,C17	1,000pF 100 mil CHIP CAP	Z6	0.050" X 0.080" MICROSTRIP
C5, C10	33pF, 100 mil CHIP CAP	Z7	0.551" X 0.080" MICROSTRIP
L1	56nH, 7 TURN, COILCRAFT	Z8	0.825" X 0.080" MICROSTRIP
N1,N2	TYPE N FLANGE MOUNT	Z9	0.489" X 0.080" MICROSTRIP
R1	15 Ω, 1W CHIP RESISTOR	BOARD	ROGER, ULTRA LAM 2000 THK 0.030" ε_r = 2.55 2oz ED Cu 2 SIDES

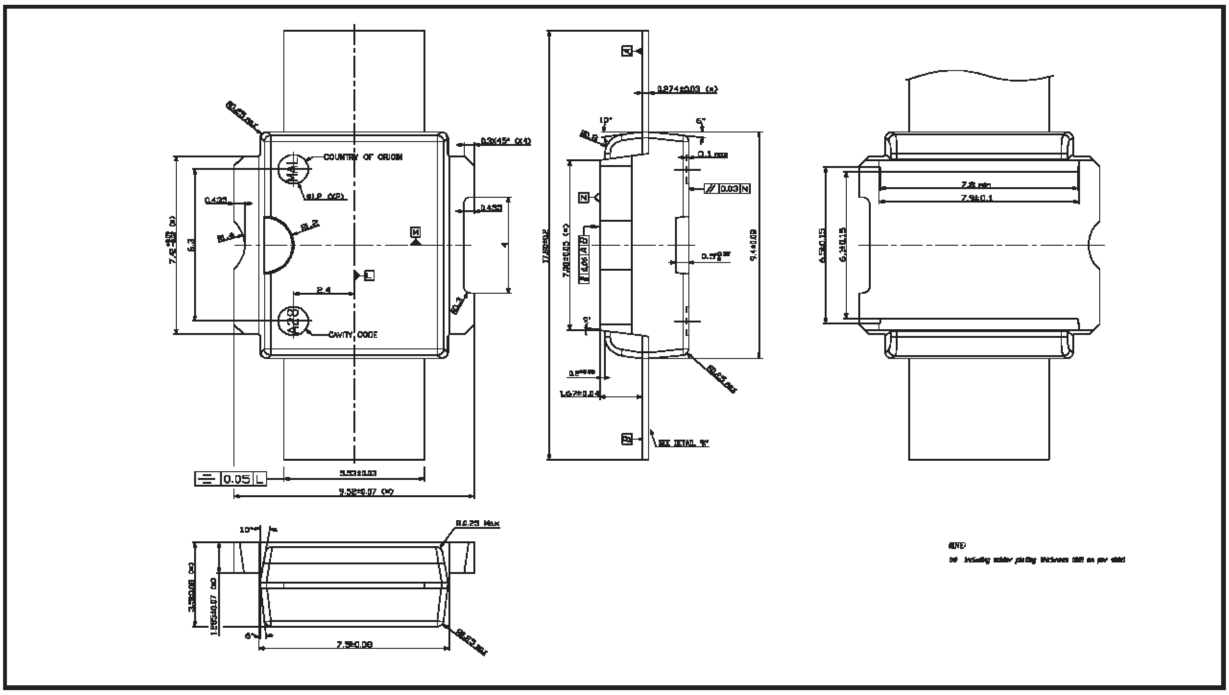
TEST CIRCUIT



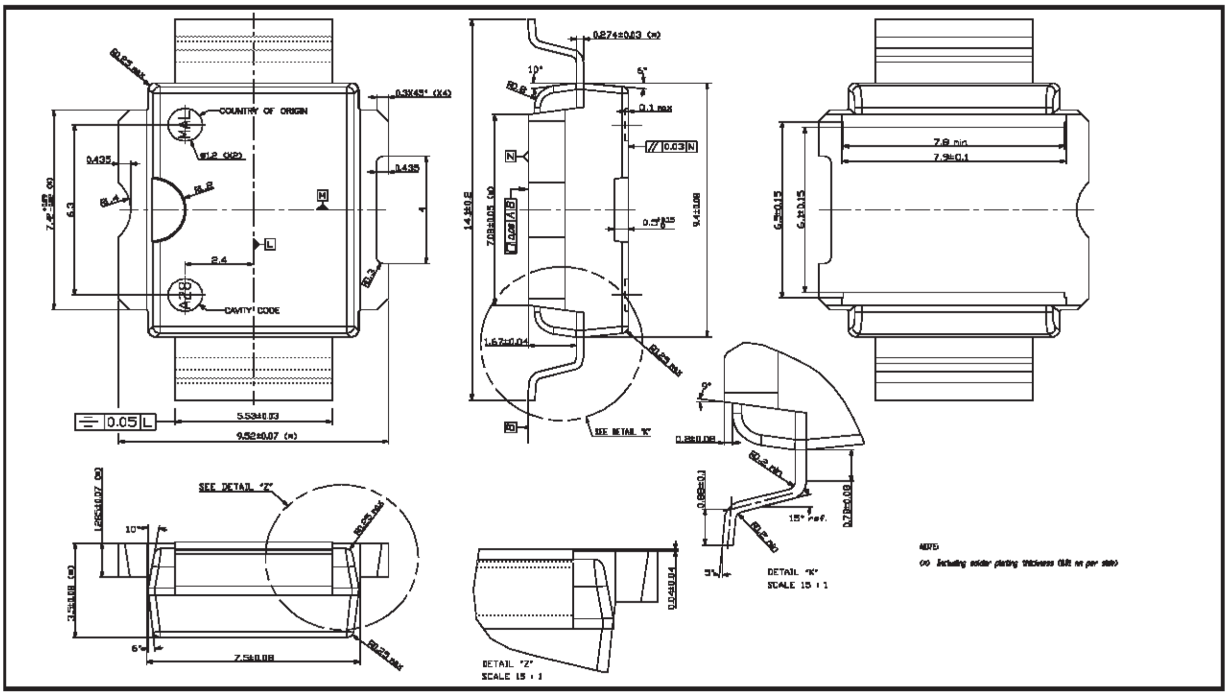
TEST CIRCUIT PHOTOMASTER



PowerSO-10RF (Straight Lead) MECHANICAL DATA



PowerSO-10RF (Formed Lead) MECHANICAL DATA



STMicroelectronics GROUP OF COMPANIES
Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

http://www.st.com