



PD57006 PD57006S

RF POWER TRANSISTORS The *LdmoST* Plastic FAMILY

PRELIMINARY DATA

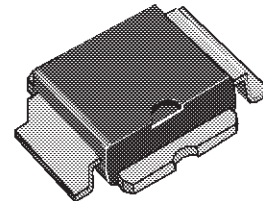
N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- POUT = 6 W with 14 dB gain @ 945 MHz / 28V
- NEW RF PLASTIC PACKAGE

DESCRIPTION

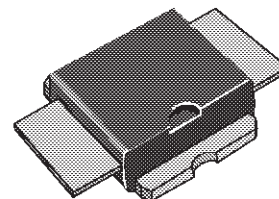
The PD57006 is a common source N-Channel, enhancement-mode, lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 28V in common source mode at frequencies of up to 1GHz. PD57006 boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. PD57006's superior linearity performance makes it an ideal solution for base station applications.

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.



PowerSO-10RF
(Formed Lead)

ORDER CODE	BRANDING
PD57006	XPD57006



PowerSO-10RF
(Straight Lead)

ORDER CODE	BRANDING
PD57006S	XPD57006S

ABSOLUTE MAXIMUM RATINGS($T_{CASE} = 25^{\circ}C$)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-Source Voltage	65	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current	1	A
P_{DISS}	Power Dissipation (@ $T_c = 70^{\circ}C$)	20	W
T_j	Max. Operating Junction Temperature	165	$^{\circ}C$
T_{STG}	Storage Temperature	-65 to 165	$^{\circ}C$

THERMAL DATA($T_{CASE} = 70^{\circ}C$)

$R_{th(j-c)}$	Junction-Case Thermal Resistance	5	$^{\circ}C/W$
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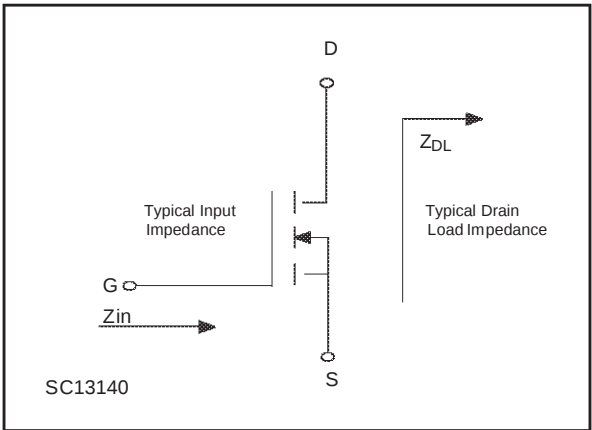
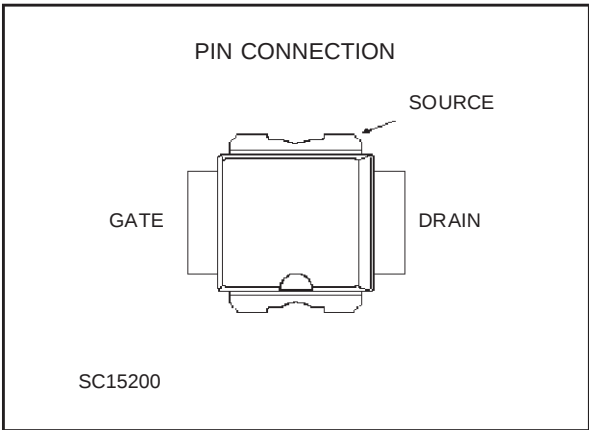
ELECTRICAL SPECIFICATION($T_{CASE} = 25^{\circ}C$)

STATIC

Symbol	Parameter		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 10\text{ mA}$	65			V
I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 28\text{ V}$			1	μA
I_{GSS}	$V_{GS} = 20\text{ V}$	$V_{DS} = 0\text{ V}$			1	μA
$V_{GS(Q)}$	$V_{DS} = 28\text{ V}$	$I_D = 70\text{ mA}$	2.0		5.0	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 0.5\text{ A}$			0.9	V
g_{FS}	$V_{DS} = 10\text{ V}$	$I_D = 1\text{ A}$		0.58		mho
C_{ISS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 28\text{ V}$		27		pF
C_{OSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 28\text{ V}$		14		pF
C_{RSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 28\text{ V}$		0.9		pF

DYNAMIC

Symbol	Parameter			Min.	Typ.	Max.	Unit
P_{OUT}	$V_{DD} = 28\text{ V}$	$f = 945\text{ MHz}$	$I_{DQ} = 70\text{ mA}$	6			W
G_{PS}	$V_{DD} = 28\text{ V}$	$f = 945\text{ MHz}$	$P_{OUT} = 6\text{ W}$		15		dB
η_D	$V_{DD} = 28\text{ V}$	$f = 945\text{ MHz}$	$P_{OUT} = 6\text{ W}$		45		%
LOAD Mismatch	$V_{DD} = 28\text{ V}$	$f = 945\text{ MHz}$	$P_{OUT} = 6\text{ W}$	10:1			VSWR



IMPEDANCE DATA

PD57006

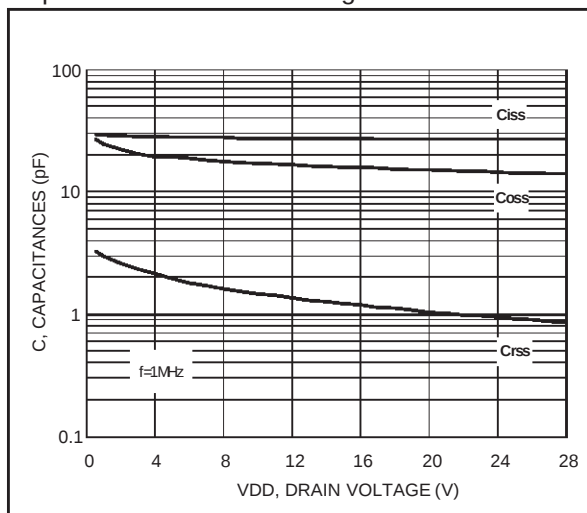
Frequency MHz	Z_{in} Ω	Z_{dl} Ω
960	$6.056 - j3.522$	$7.215 + j7.539$
945	$5.886 - j2.326$	$6.578 + j5.999$
925	$6.040 - j0.936$	$6.273 + j8.729$

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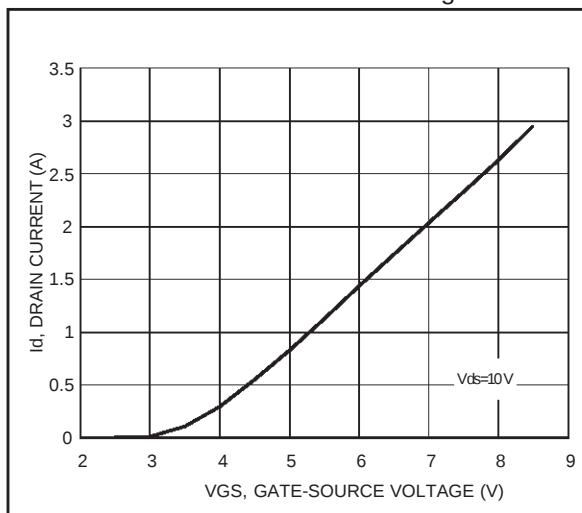
Frequency MHz	Z_{in} Ω	Z_{dl} Ω
960	$4.250 - j3.791$	$4.005 + j11.34$
945	$4.039 - j2.300$	$3.862 + j10.58$
925	$3.794 - j1.632$	$3.513 + j10.81$

TYPICAL PERFORMANCE

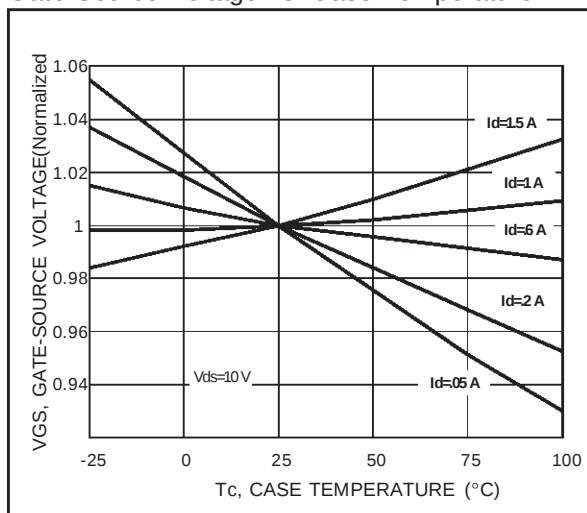
Capacitance vs. Drain Voltage



Drain Current vs. Gate-Source Voltage



Gate-Source Voltage vs. Case Temperature

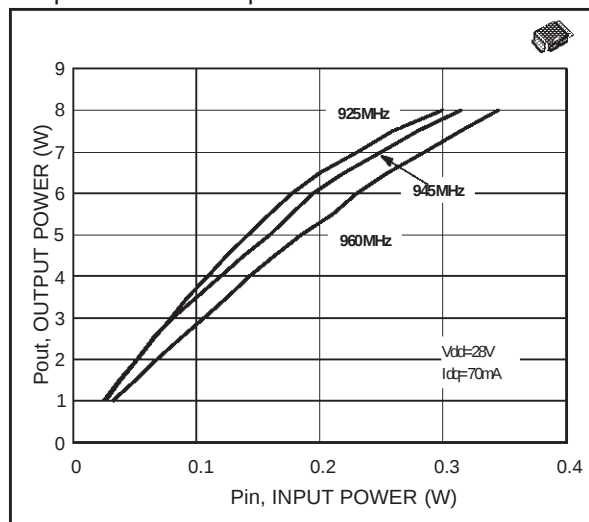


PD57006 PD57006S

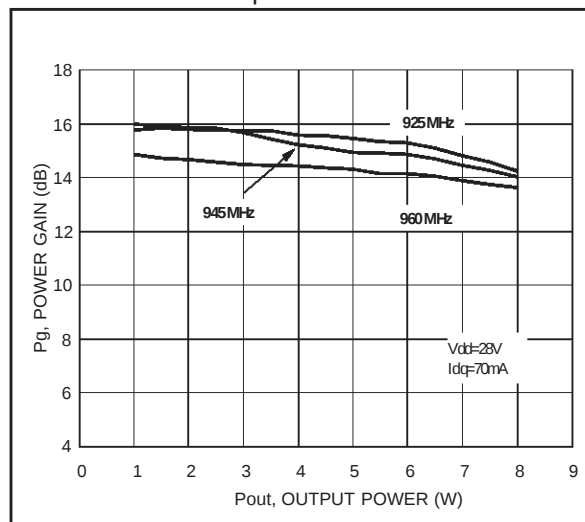
TYPICAL PERFORMANCE

Output Power vs. Input Power

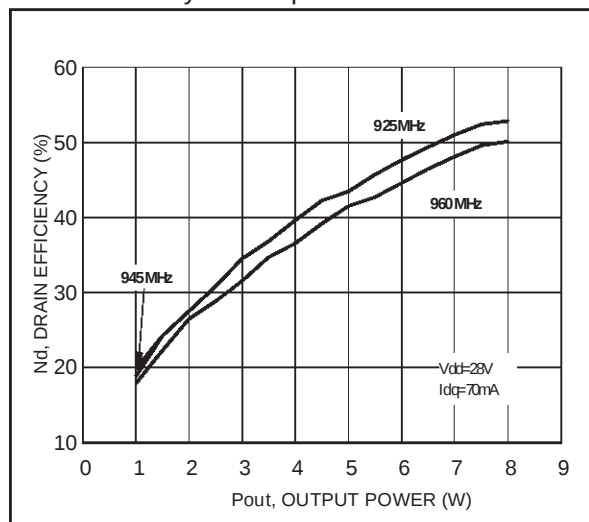
PD57006



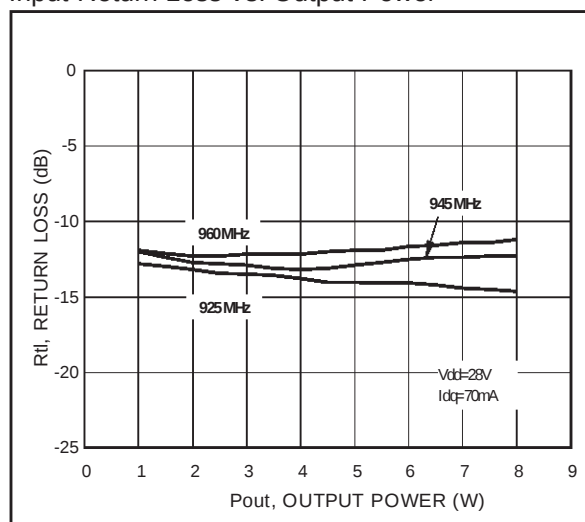
Power Gain vs. Output Power



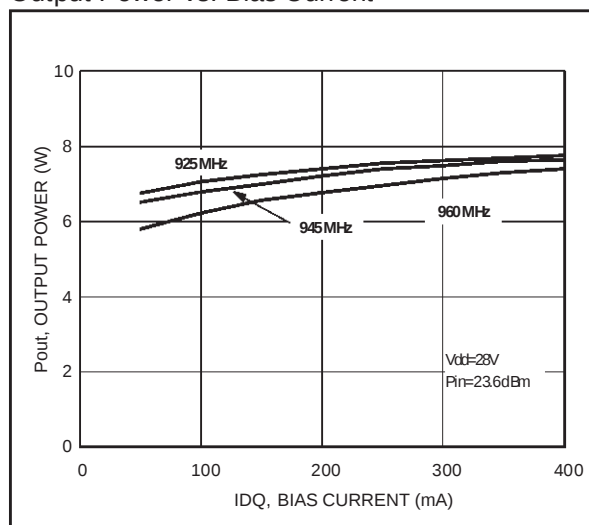
Drain Efficiency vs. Output Power



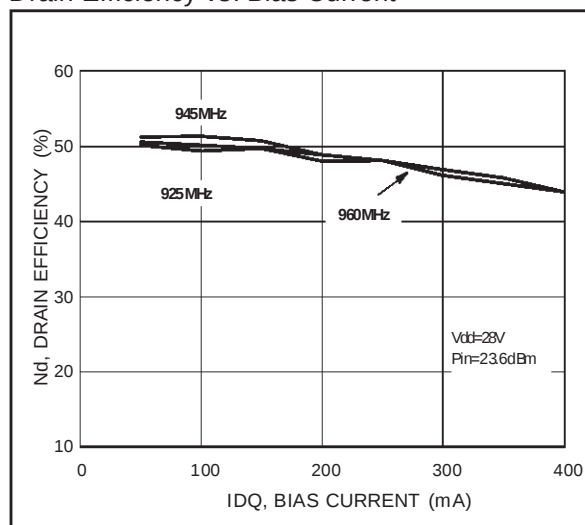
Input Return Loss vs. Output Power



Output Power vs. Bias Current

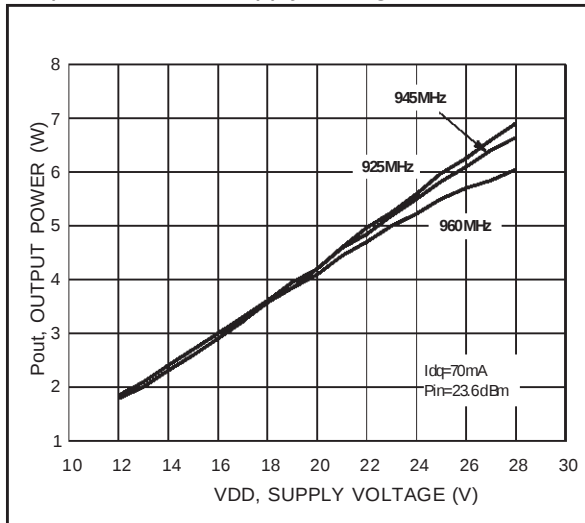


Drain Efficiency vs. Bias Current

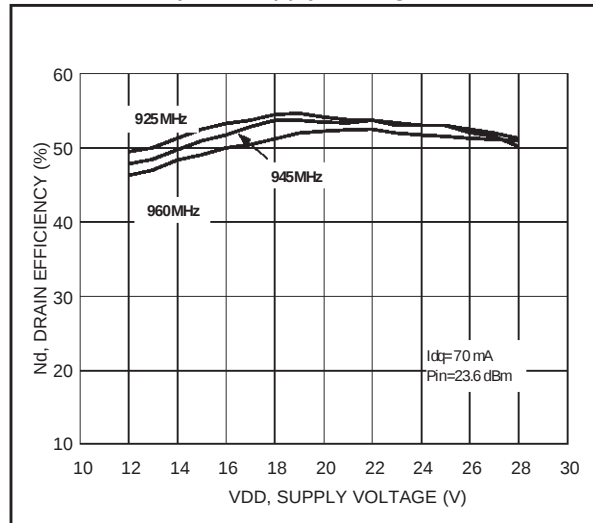


TYPICAL PERFORMANCE

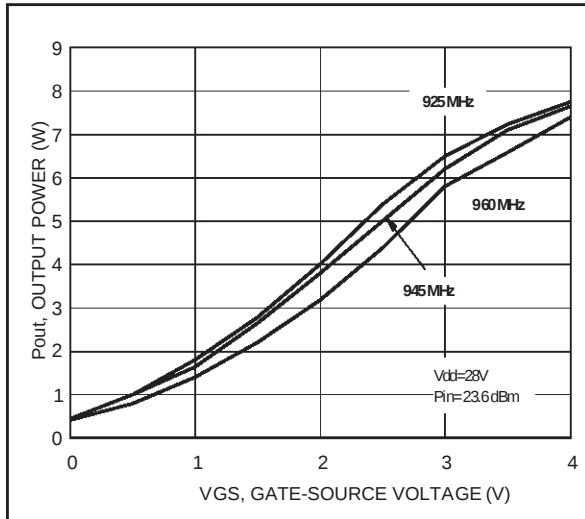
Output Power vs. Supply Voltage



Drain Efficiency vs. Supply Voltage

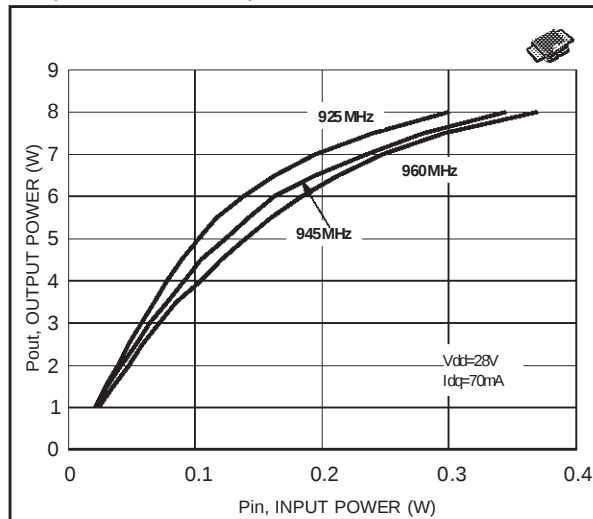


Output Power vs. Gate-Source Voltage

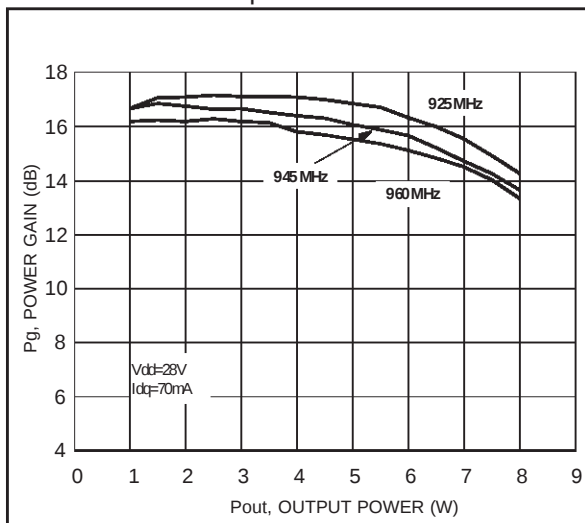


Output Power vs. Input Power

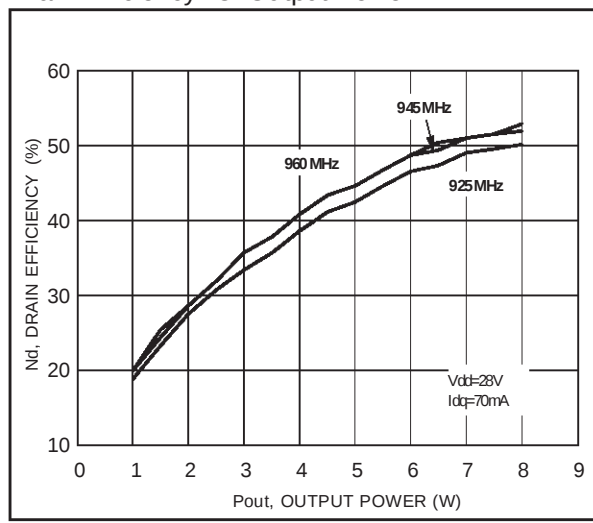
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Power Gain vs. Output Power

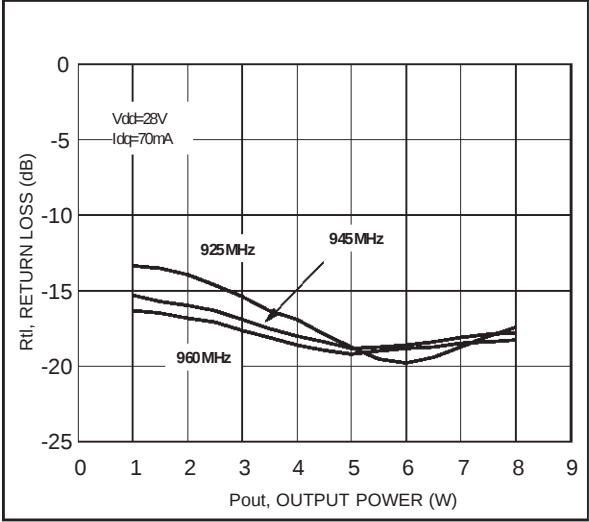


Drain Efficiency vs. Output Power

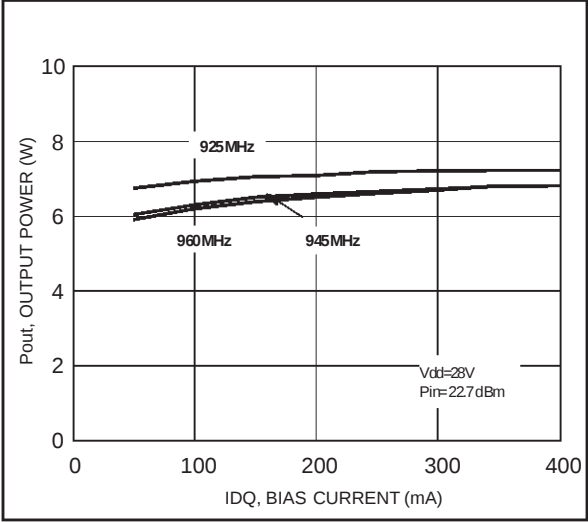


TYPICAL PERFORMANCE

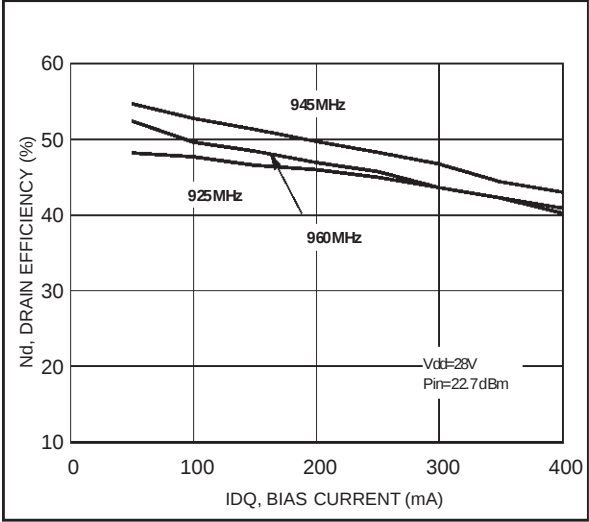
Input Return Loss vs. Output Power



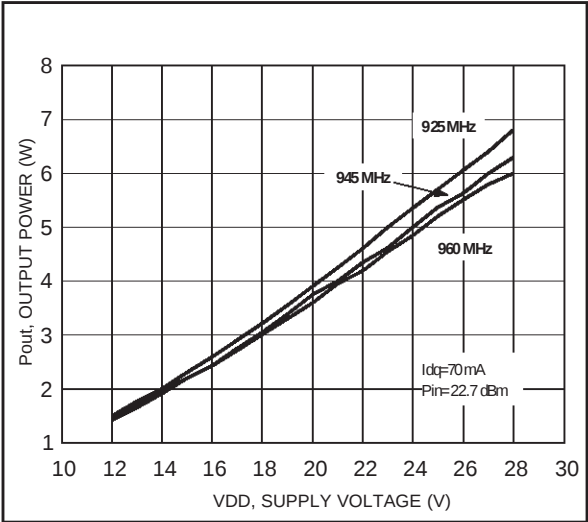
Output Power vs. Bias Current



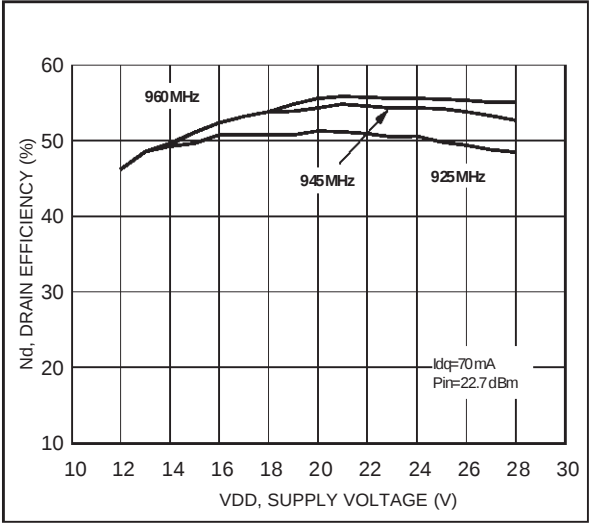
Drain Efficiency vs. Bias Current



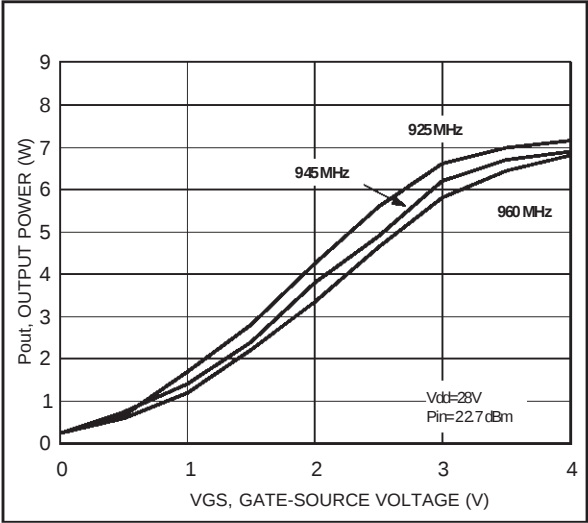
Output Power vs. Supply Voltage



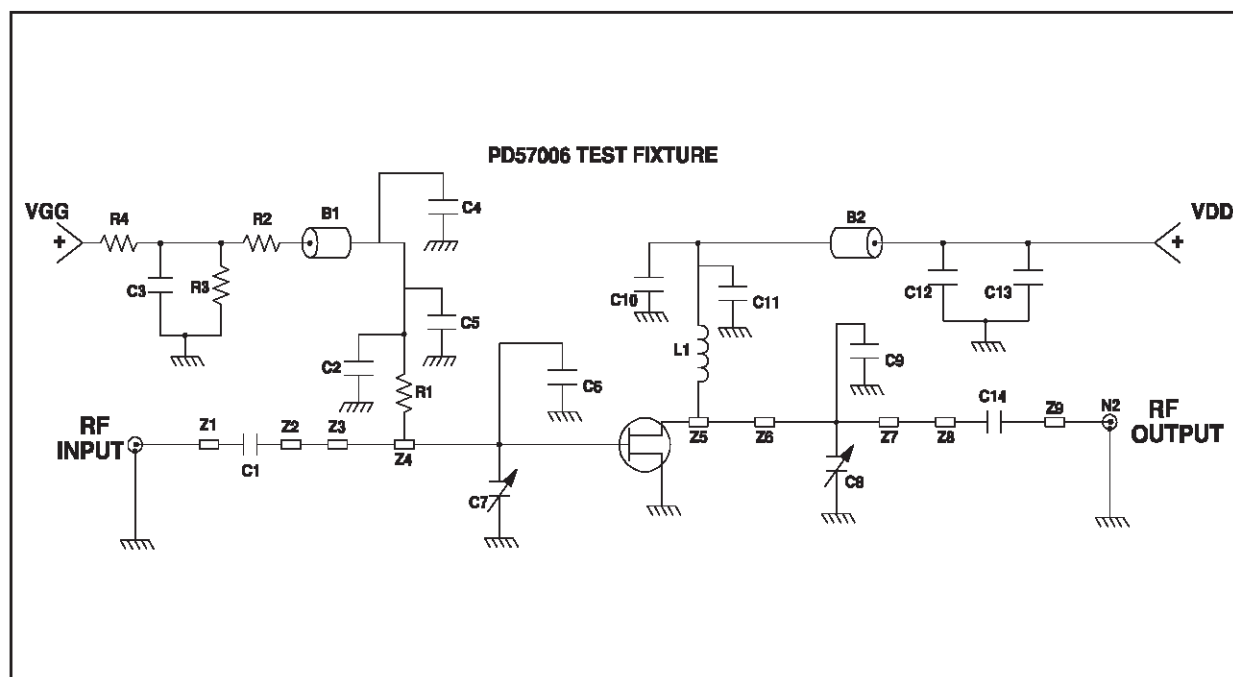
Drain Efficiency vs. Supply Voltage



Output Power vs. Gate-Source Voltage



TEST CIRCUIT SCHEMATIC

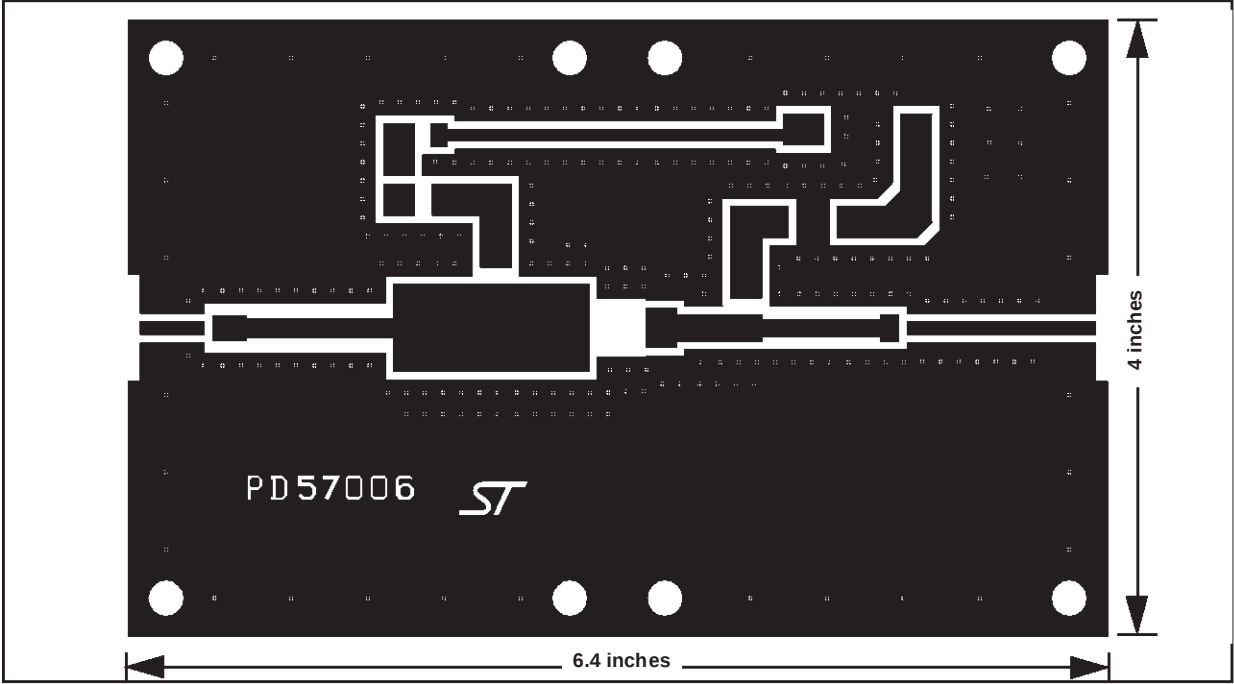


TEST CIRCUIT COMPONENT PART LIST

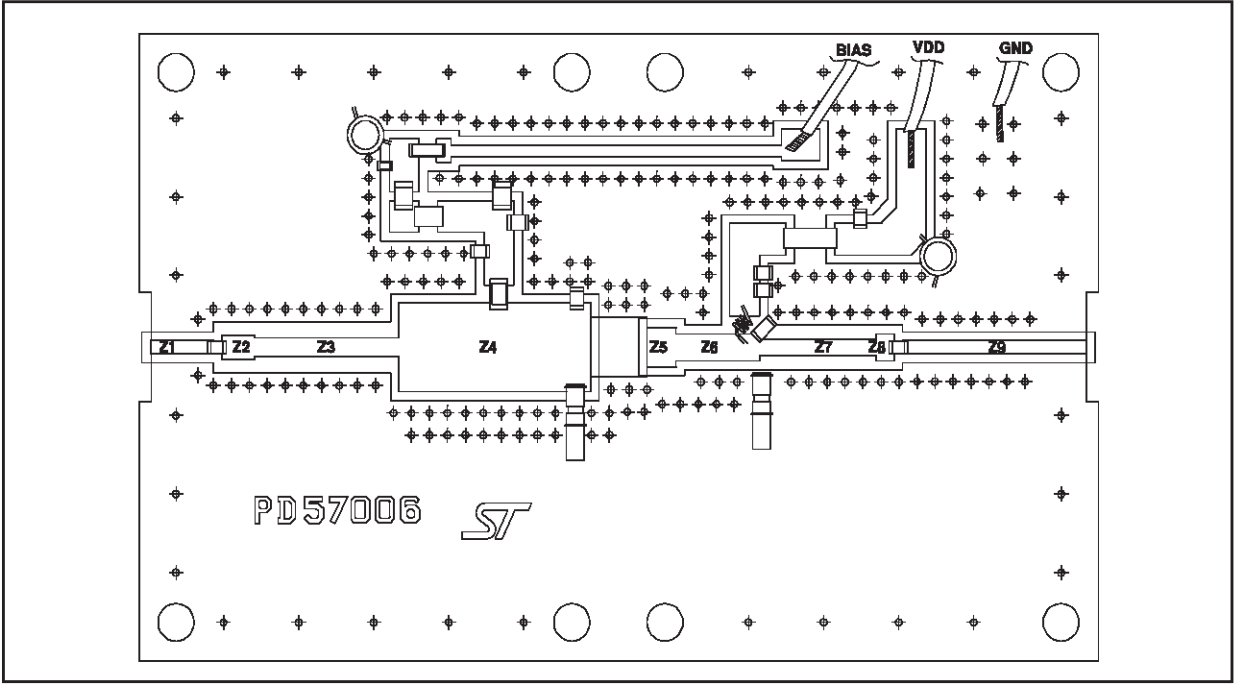
B1,B2	SHORT FERRITE BEAD, FAIR RITE PRODUCTS (2743021446)	R2	18K Ω CHIP RESISTOR 1 W
C1,C2,C11,C14	47pF, 100B ATC CHIP CAPACITOR	R3	4.7m Ω CHIP RESISTOR 1 W
C5	1000pF, 100B ATC CHIP CAPACITOR	R4	120 Ω CHIP RESISTOR 1 W
C4,C12	.01 μ F, VENKEL CHIP CAPACITOR	Z1	0.430" X 0.084" MICROSTRIP
C3,C13	220 μ F, 63V ELECTROLYTIC CAPACITOR	Z2	1.186" X 1.120" MICROSTRIP
C10	100pF, 100B ATC CHIP CAPACITOR	Z3	1.273" X 0.565" MICROSTRIP
C9	6.2pF, 100B ATC CHIP CAPACITOR	Z4	0.770" X 0.171" MICROSTRIP
C7,C8	.8-8pF, VARIABLE CAPACITOR JOHANSON	Z5	0.880" X 0.105" MICROSTRIP
L1	15 nH, 3 TURN, .140" DIA. 22 AWG BELDEN 8021 BLIS BER WIRE,	Z6	1.200" X 0.084" MICROSTRIP
N1,N2	TYPE N FLANGE MOUNT	BOARD	ROGER, ULTRA LAM 2000 THK 0.030" $\epsilon_r = 2.55$ 2oz ED Cu 2 SIDES
R1	100, Ω CHIP RESISTOR 1 W		

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TEST CIRCUIT PHOTOMASTER

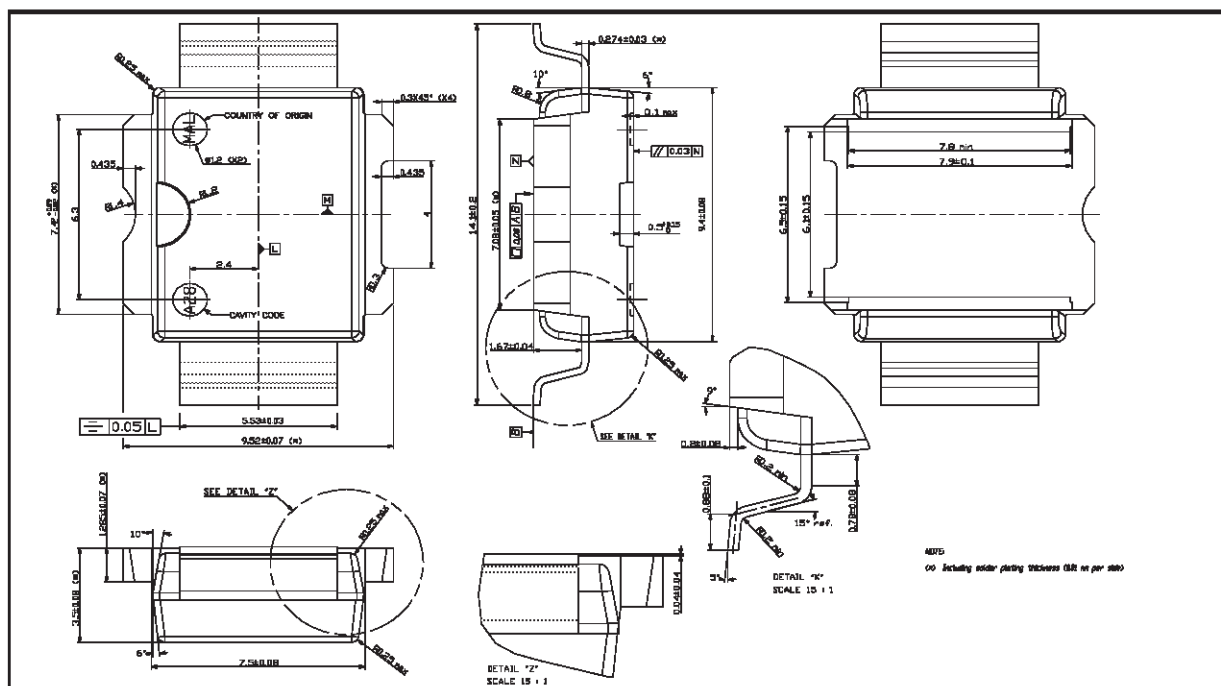


TEST CIRCUIT



TRANSMISSION LINE DIMENSIONS

Z1	0.430" x 0.084" MICROSTRIP	Z4	1.273" x 0.565" MICROSTRIP	Z7	0.778" x 0.150" MICROSTRIP
Z2	0.220" X 0.155" MICROSTRIP	Z5	0.195" x 0.250" MICROSTRIP	Z8	0.120" x 0.171" MICROSTRIP
Z3	0.960" x 0.120" MICROSTRIP	Z6	0.555" x 0.171" MICROSTRIP	Z9	1.200" x 0.084" MICROSTRIP



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