

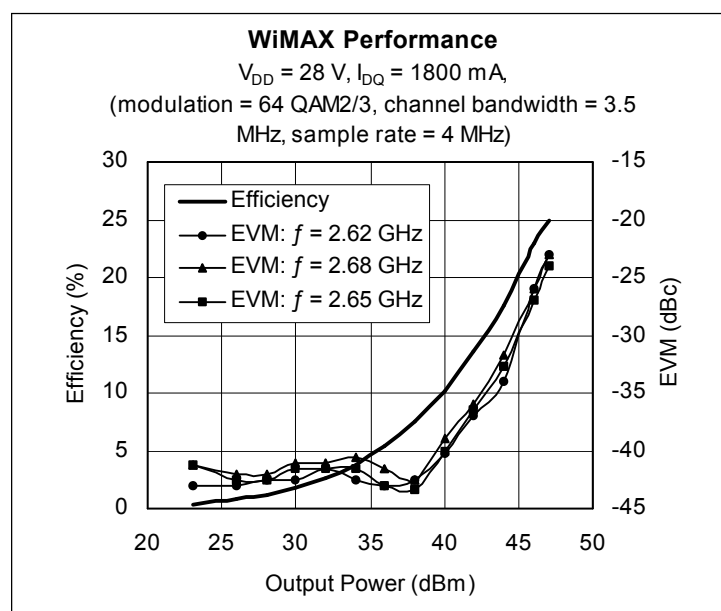
Thermally-Enhanced High Power RF LDMOS FETs 170 W, 2500 – 2700 MHz

Description

The PTFA261702E is a 170-watt LDMOS FET designed for WiMAX power amplifier applications in the 2500 to 2700 MHz band. Features include input and output matching, and thermally-enhanced package with slotted flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTFA261702E
Package H-30275-4



Features

- Thermally-enhanced packages, Pb-free and RoHS-compliant
- Broadband internal matching
- Typical WiMAX performance at 2650 MHz, 28 V
 - Average output power = 32 W
 - Linear gain = 15 dB
 - Efficiency = 20%
 - Error vector magnitude = -29 dB
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 170 W (CW) output power

RF Characteristics

WiMAX Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $P_{OUT} = 32\text{ W}$ average

$f = 2650\text{ MHz}$, modulation = 64 QAM 2/3, channel bandwidth = 3.5 MHz, sample rate = 4 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	—	15	—	dB
Drain Efficiency	η_D	—	20	—	%
Error Vector Magnitude	EVM	—	-29	—	dB

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $P_{OUT} = 170\text{ W PEP}$, $f = 2650\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	14	15	—	dB
Drain Efficiency	η_D	31	33	—	%
Intermodulation Distortion	IMD	—	−30	−27	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.08	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$	V_{GS}	—	2.5	—	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	−0.5 to +12	V
Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	643	W
		3.68	W/°C
Storage Temperature Range	T_{STG}	−40 to +150	°C
Thermal Resistance ($T_{CASE} = 70^\circ\text{C}$, 170 W CW)	$R_{\theta JC}$	0.272	°C/W

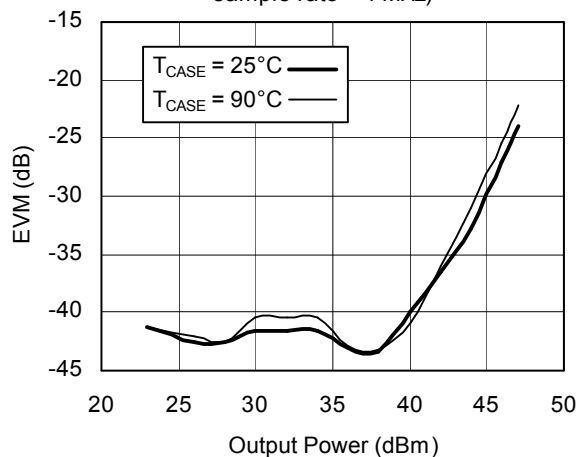
Ordering Information

Type and Version	Package Type	Package Description	Marking
PTFA261702E V1	H-30275-4	Thermally-enhanced slotted flange, push-pull	PTFA261702E

Typical Performance (data taken in a production test fixture)

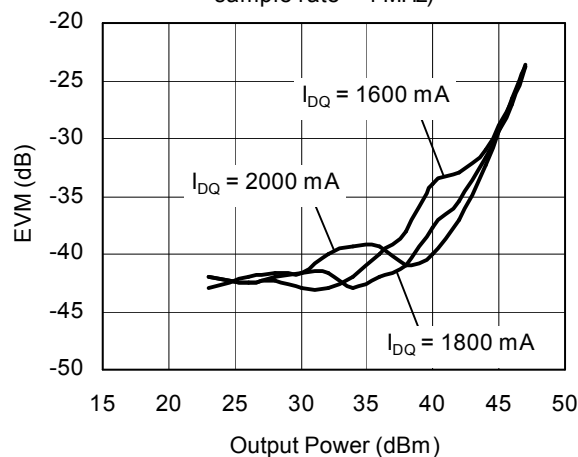
WiMAX Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $f = 2650\text{ MHz}$,
(modulation = 64 QAM2/3, channel bandwidth = 3.5 MHz,
sample rate = 4 MHz)



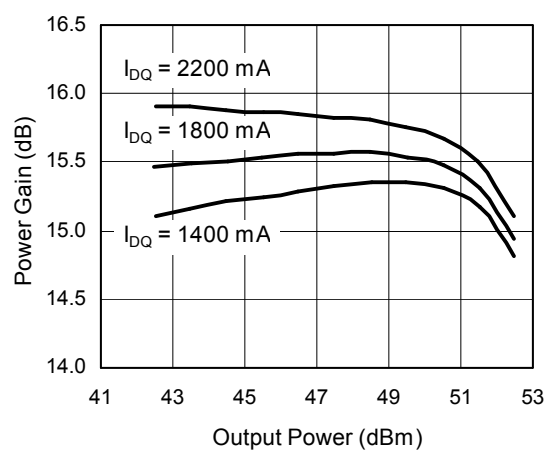
WiMAX Performance

$V_{DD} = 28\text{ V}$, $f = 2650\text{ MHz}$
(modulation = 64 QAM2/3, channel bandwidth = 3.5 MHz,
sample rate = 4 MHz)



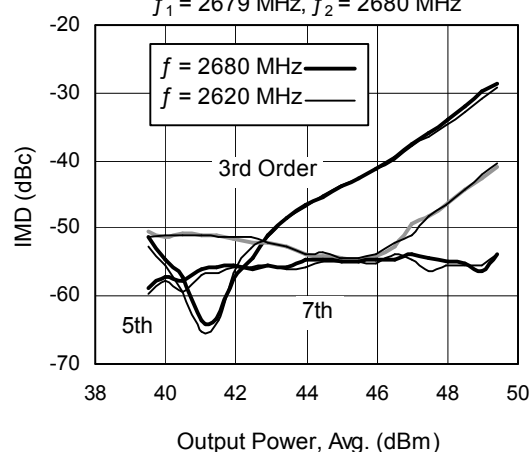
Gain vs. Output Power

$V_{DD} = 28\text{ V}$, $f = 2650\text{ MHz}$



Intermodulation Distortion vs. Output Power

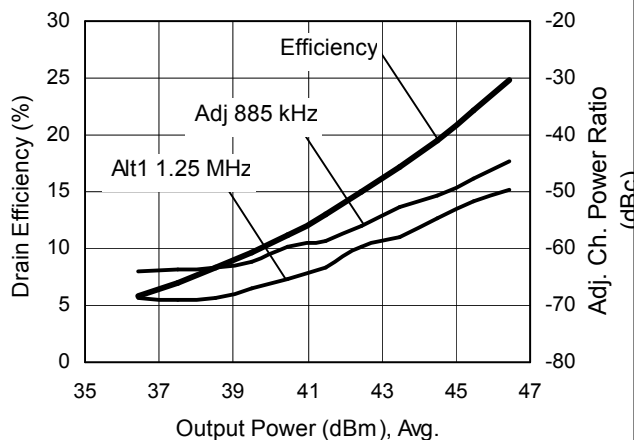
$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$
 $f_1 = 2619\text{ MHz}$, $f_2 = 2620\text{ MHz}$;
 $f_1 = 2679\text{ MHz}$, $f_2 = 2680\text{ MHz}$



Typical Performance (cont.)

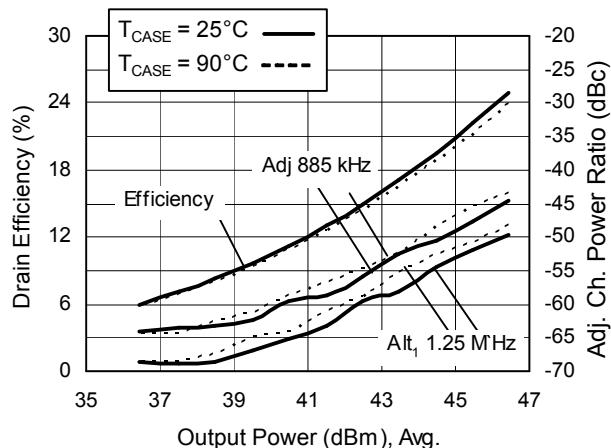
IS-95 CDMA Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $f = 2680\text{ MHz}$,
 $PAR = 9.8\text{ dB @ 0.01 probability on CCDF}$



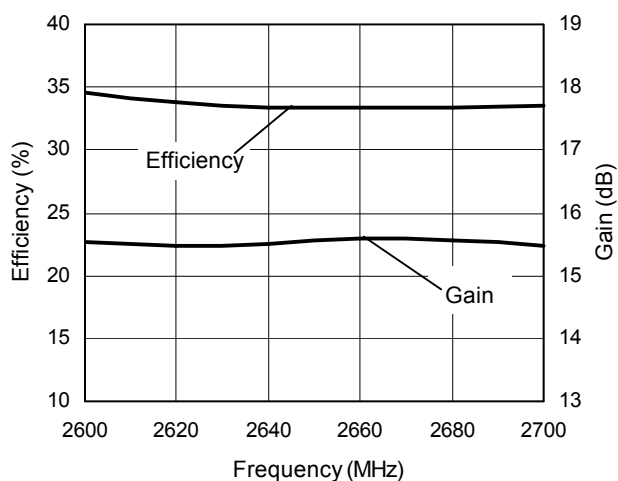
IS-95 CDMA Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $f = 2680\text{ MHz}$,
 $PAR = 9.8\text{ dB @ 0.01 probability on CCDF}$



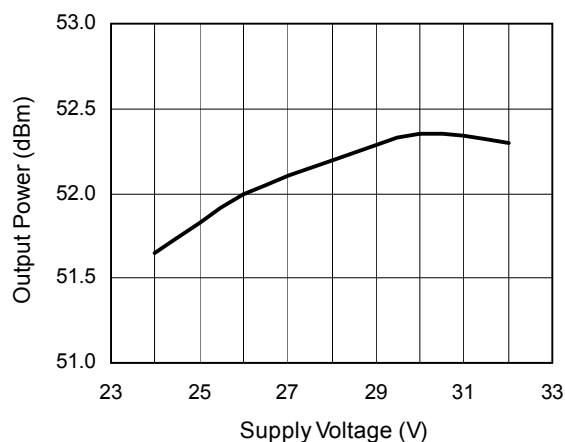
CW Sweep in a Broadband Test Fixture

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $P_{OUT} = 50\text{ dBm}$

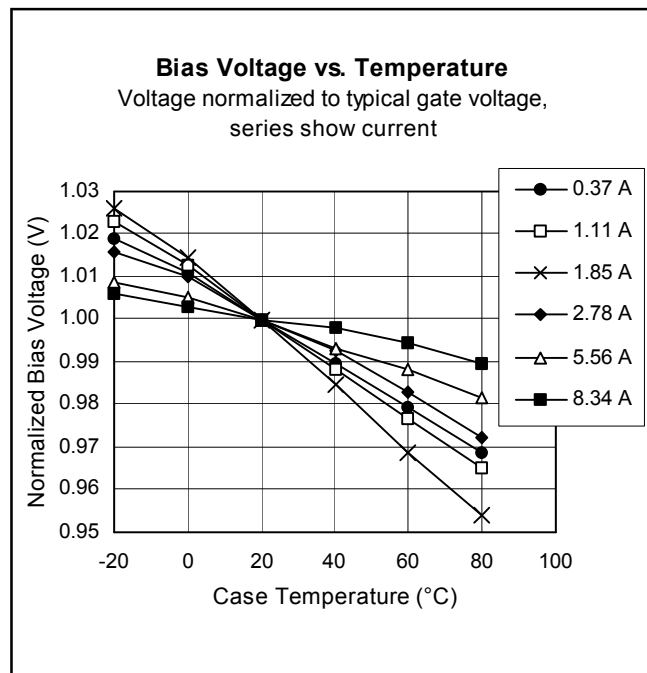
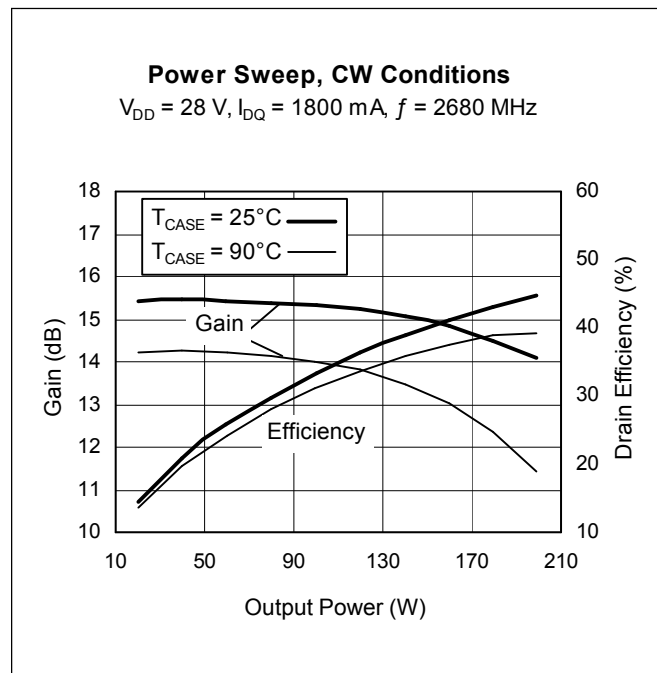


Output Power vs. Supply Voltage

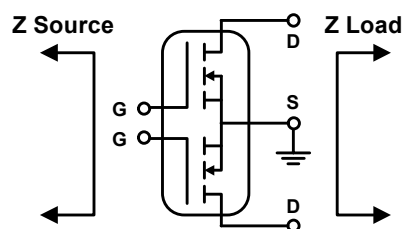
$I_{DQ} = 1800\text{ mA}$, $f = 2680\text{ MHz}$



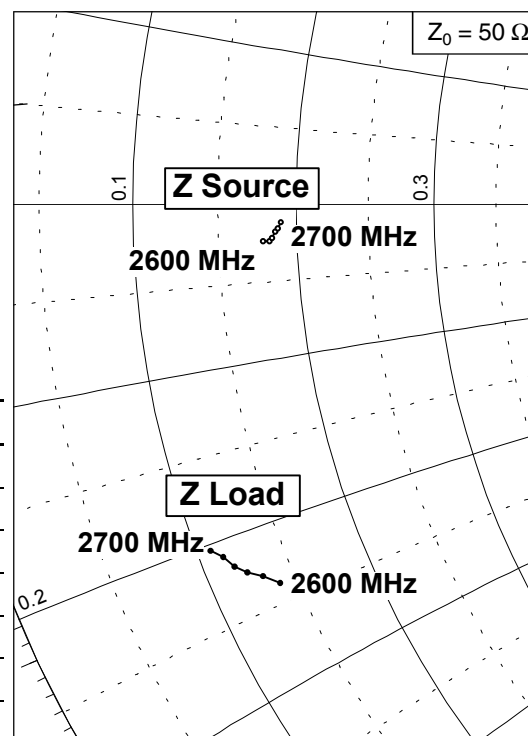
Typical Performance (cont.)



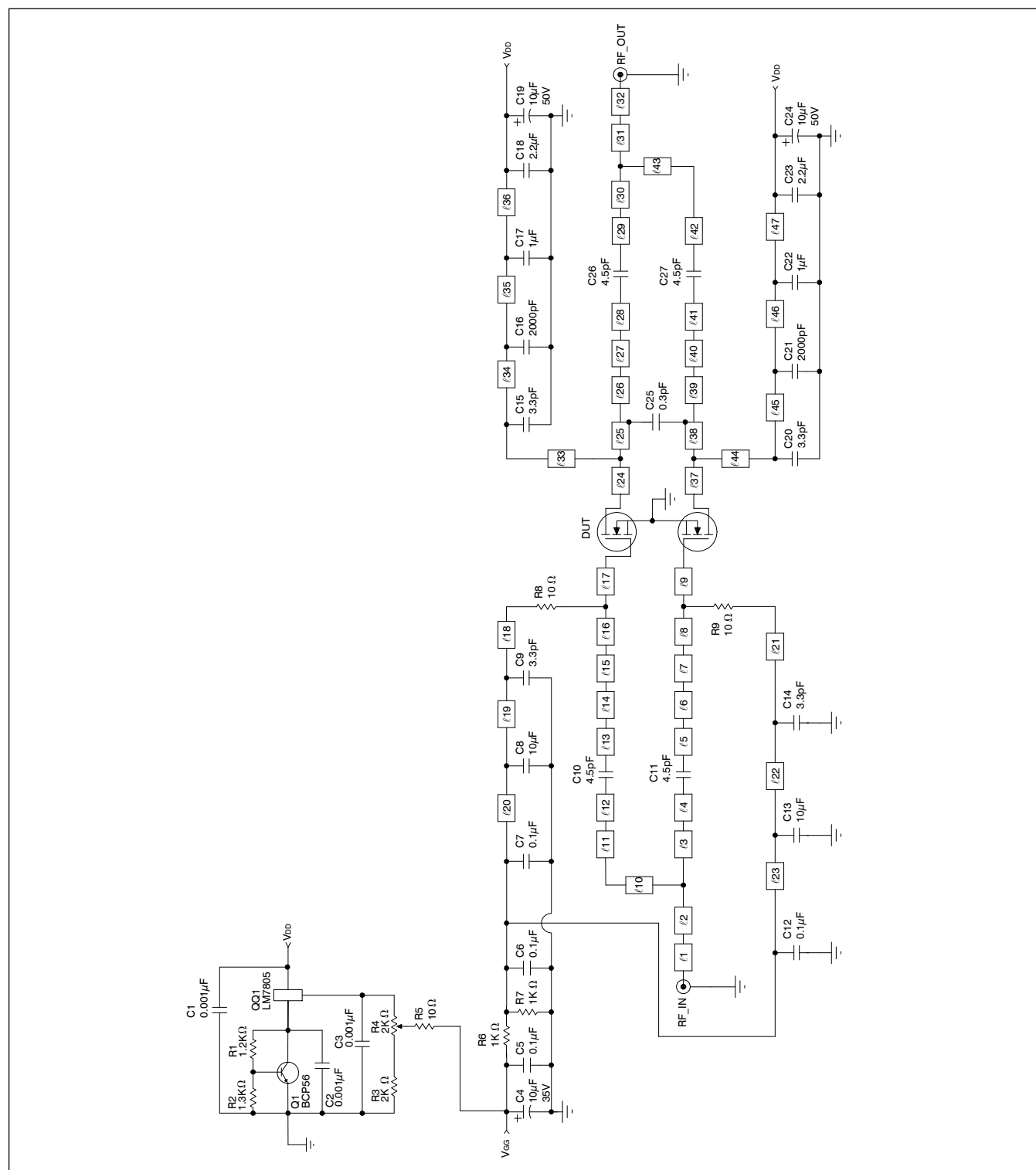
Broadband Circuit Impedance



Frequency	Z Source W		Z Load W	
MHz	R	jX	R	jX
2600	8.9	-1.2	7.0	-11.9
2620	9.1	-1.2	6.6	-11.5
2640	9.2	-1.1	6.2	-11.2
2660	9.3	-0.9	5.9	-10.9
2680	9.4	-0.8	5.7	-10.5
2700	9.5	-0.6	5.4	-10.2



Reference Circuit



Reference circuit block diagram for $f = 2680 \text{ MHz}$

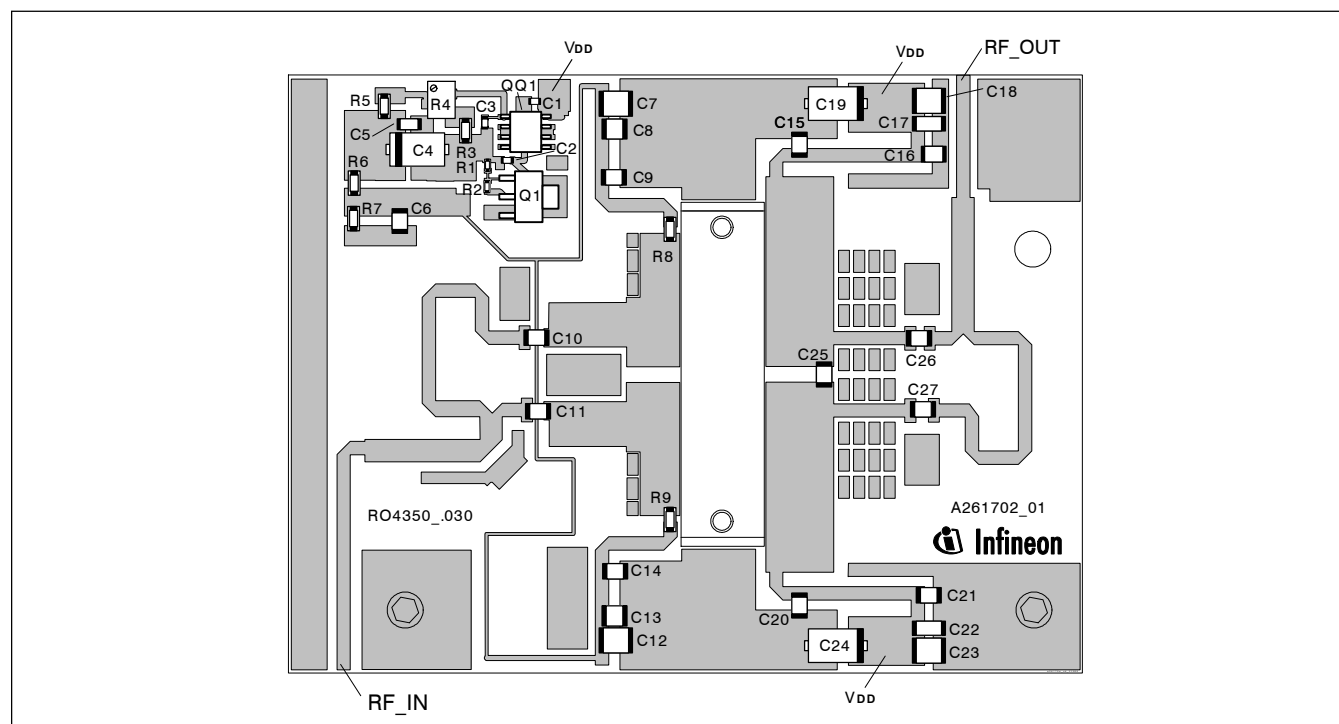
Reference Circuit (cont.)

Circuit Assembly Information

DUT	PTFA261702E	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 3.48$	Rogers RO4350	1 oz. copper

Microstrip	Electrical Characteristics at 2680 MHz	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ_1	0.450λ , 49.9 Ω	30.45 x 1.70	1.199 x 0.067
ℓ_2	0.296λ , 35.5 Ω	19.56 x 2.84	0.770 x 0.112
ℓ_3	0.049λ , 49.9 Ω	3.30 x 1.70	0.130 x 0.067
ℓ_4 , ℓ_{12} , ℓ_{28} , ℓ_{29} , ℓ_{41} , ℓ_{42}	0.021λ , 34.0 Ω	1.40 x 3.02	0.055 x 0.119
ℓ_5 , ℓ_{13}	0.010λ , 40.6 Ω	0.69 x 2.34	0.027 x 0.092
ℓ_6 , ℓ_{14}	0.153λ , 21.0 Ω	9.80 x 5.66	0.386 x 0.223
ℓ_7 , ℓ_{15}	0.028λ , 14.6 Ω	1.78 x 8.81	0.070 x 0.347
ℓ_8 , ℓ_{16}	0.067λ , 8.2 Ω	4.11 x 16.94	0.162 x 0.667
ℓ_9 , ℓ_{17}	0.015λ , 8.2 Ω	0.94 x 16.94	0.037 x 0.667
ℓ_{10}	0.099λ , 44.6 Ω	6.65 x 2.03	0.262 x 0.080
ℓ_{11}	0.463λ , 49.9 Ω	31.32 x 1.70	1.233 x 0.067
ℓ_{18} , ℓ_{21}	0.193λ , 49.9 Ω	13.06 x 1.70	0.514 x 0.067
ℓ_{19} , ℓ_{22}	0.105λ , 49.9 Ω	7.11 x 1.70	0.280 x 0.067
ℓ_{20} , ℓ_{23}	0.043λ , 49.9 Ω	2.92 x 1.70	0.115 x 0.067
ℓ_{24} , ℓ_{37}	0.020λ , 5.9 Ω	1.24 x 24.16	0.049 x 0.951
ℓ_{25} , ℓ_{38}	0.101λ , 5.9 Ω	6.17 x 24.16	0.243 x 0.951
ℓ_{26} , ℓ_{39}	0.019λ , 5.9 Ω	1.19 x 24.16	0.047 x 0.951
ℓ_{27} , ℓ_{40}	0.132λ , 50.3 Ω	8.97 x 1.68	0.353 x 0.066
ℓ_{30}	0.044λ , 50.3 Ω	2.95 x 1.68	0.116 x 0.066
ℓ_{31}	0.258λ , 35.5 Ω	17.04 x 2.84	0.671 x 0.112
ℓ_{32}	0.229λ , 49.9 Ω	15.52 x 1.70	0.611 x 0.067
ℓ_{33} , ℓ_{44}	0.083λ , 49.9 Ω	5.64 x 1.70	0.222 x 0.067
ℓ_{34} , ℓ_{45}	0.225λ , 49.9 Ω	15.24 x 1.70	0.6 x 0.067
ℓ_{35} , ℓ_{46}	0.060λ , 49.9 Ω	4.06 x 1.70	0.16 x 0.067
ℓ_{36} , ℓ_{47}	0.043λ , 49.9 Ω	2.92 x 1.70	0.115 x 0.067
ℓ_{43}	0.553λ , 49.9 Ω	37.44 x 1.70	1.474 x 0.067

Reference Circuit (cont.)

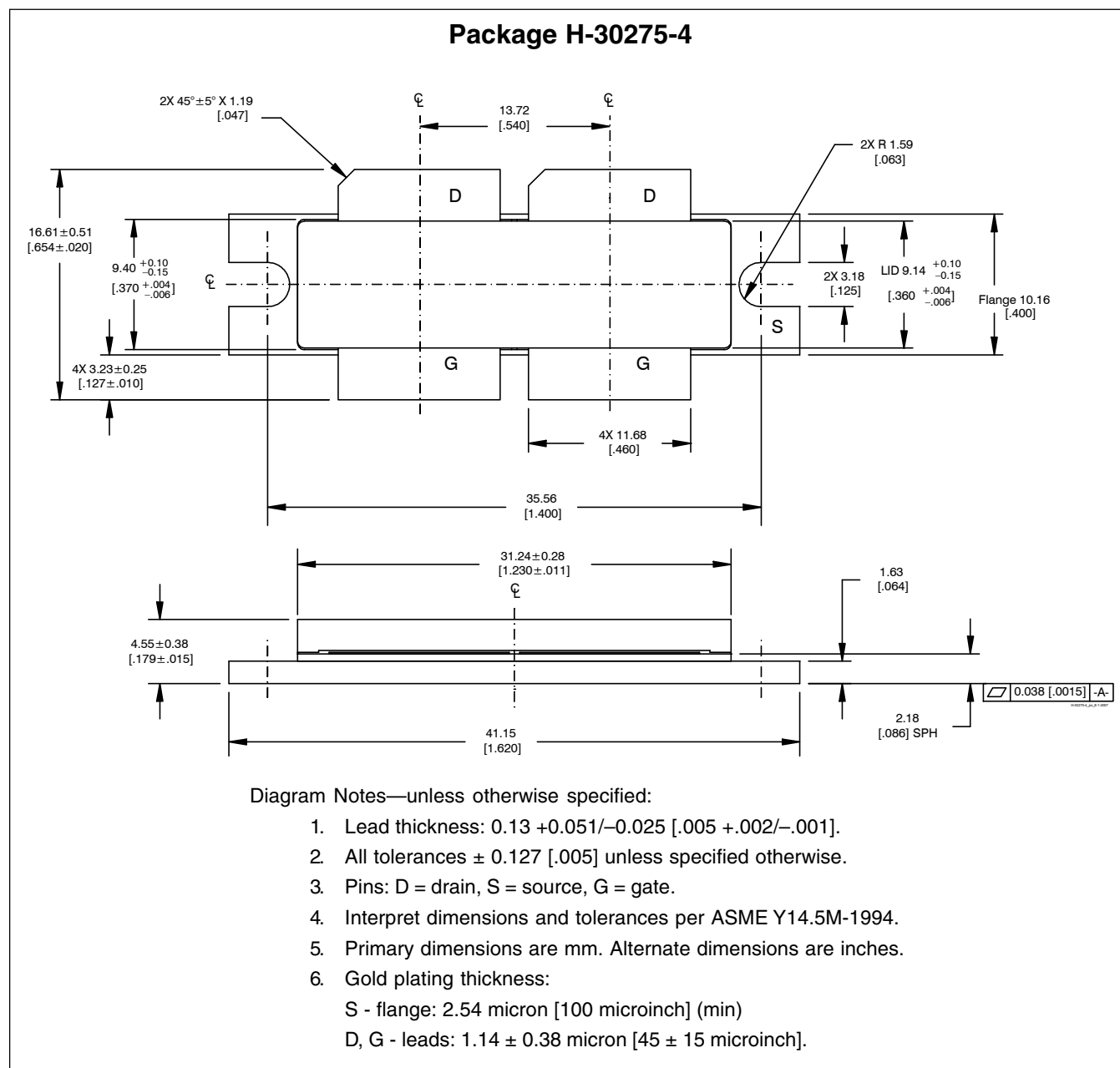


Reference circuit assembly diagram (not to scale)*

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 μ F	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 μ F, 35 V	Digi-Key	399-1655-2-ND
C5, C6, C7, C12	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C8, C13	Capacitor, 10 μ F	Digi-Key	490-1819-2-ND
C9, C14, C15, C20	Ceramic capacitor, 3.3 pF	ATC	100B 3R3
C10, C11, C26, C27	Ceramic capacitor, 4.5 pF	ATC	100B 4R5
C16, C21	Capacitor, 2000 pF	ATC	100B 203JW
C17, C22	Ceramic capacitor, 1 μ F	Digi-Key	445-1411-2-ND
C18, C23	Capacitor, 2.2 μ F	Digi-Key	445-1447-2-ND
C19, C24	Tantalum capacitor, 10 μ F, 50 V	Garrett Electronics	TPSE106K050R0400
C25	Ceramic capacitor, 0.3 pF	ATC	100B 0R3
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip resistor 1.2K ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor 1.3K ohms	Digi-Key	P1.3KGCT-ND
R3	Chip resistor 2K ohms	Digi-Key	P2KECT-ND
R4	Potentiometer 2K ohms	Digi-Key	3224W-202ETR-ND
R5, R8, R9	Chip resistor 10 ohms	Digi-Key	P10ECT-ND
R6, R7	Chip resistor 1K ohms	Digi-Key	P1KECT-ND

*Gerber files for this circuit available on request.

Package Outline Specifications



Find the latest and most complete information about products and packaging at the Infineon Internet page
<http://www.infineon.com/products>

Revision History: 2009-02-20

Data Sheet

Previous Version: none

Page	Subjects (major changes since last revision)
8	Fixed typing error

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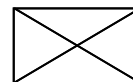
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