

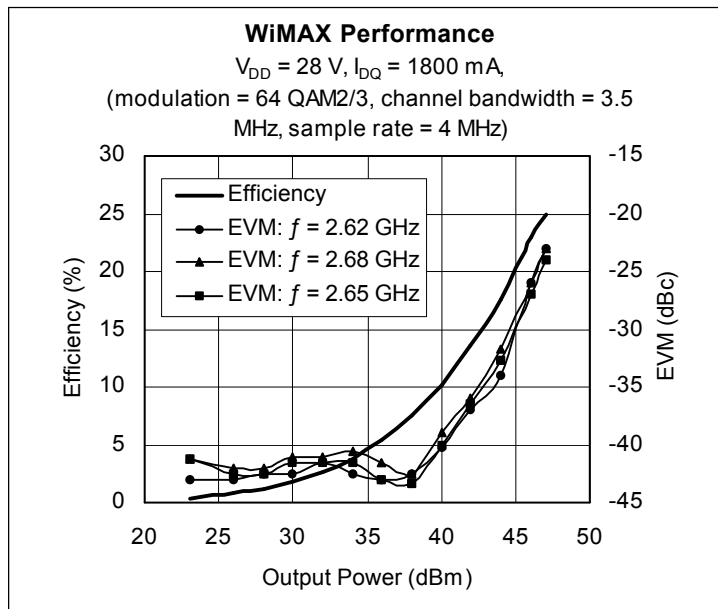
## Thermally-Enhanced High Power RF LDMOS FETs 170 W, 2500 – 2700 MHz

### 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	$\eta_D$	—	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	$\eta_D$	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	$\mu\text{A}$
	$V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	10.0	$\mu\text{A}$
On-State Resistance	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.08	—	$\Omega$
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	$\mu\text{A}$

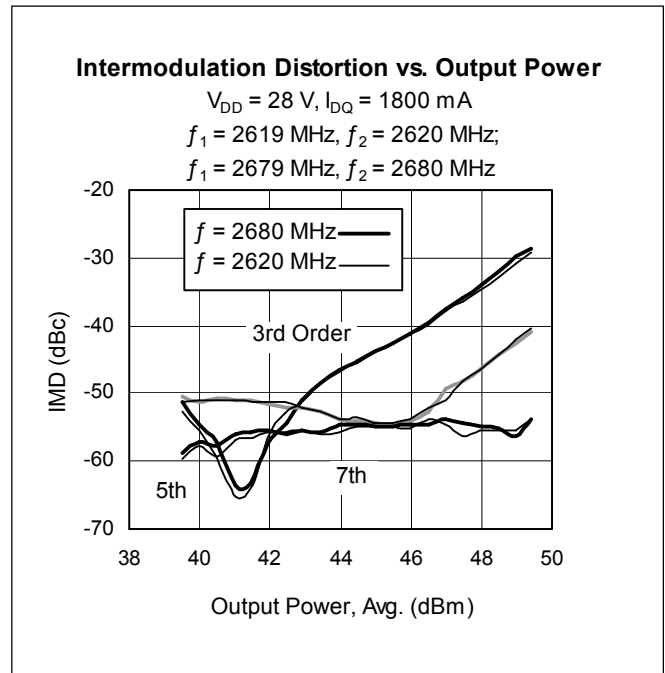
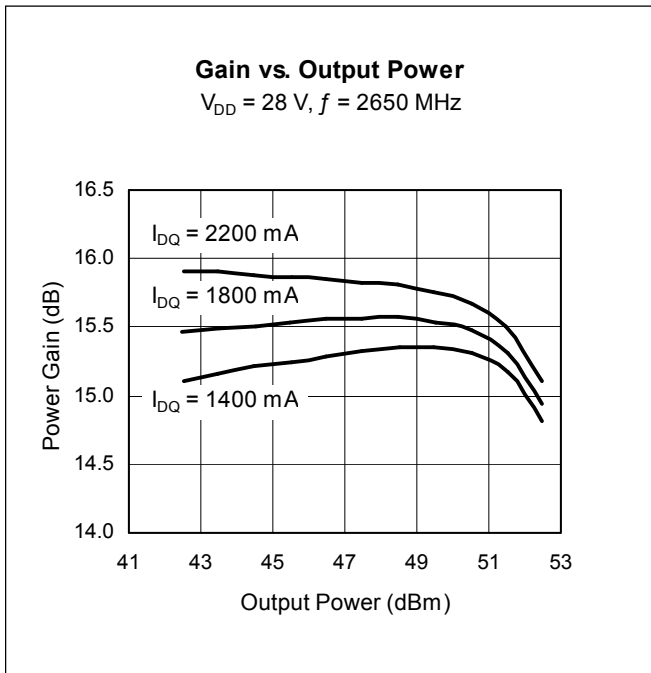
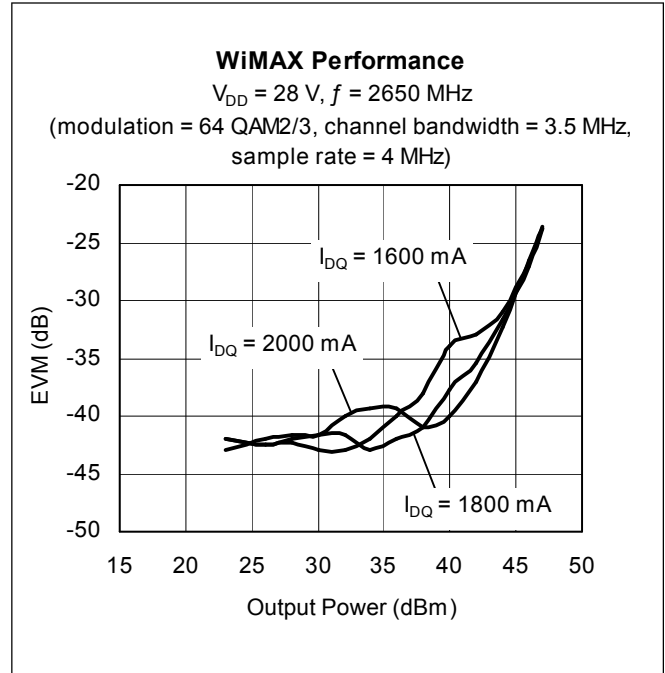
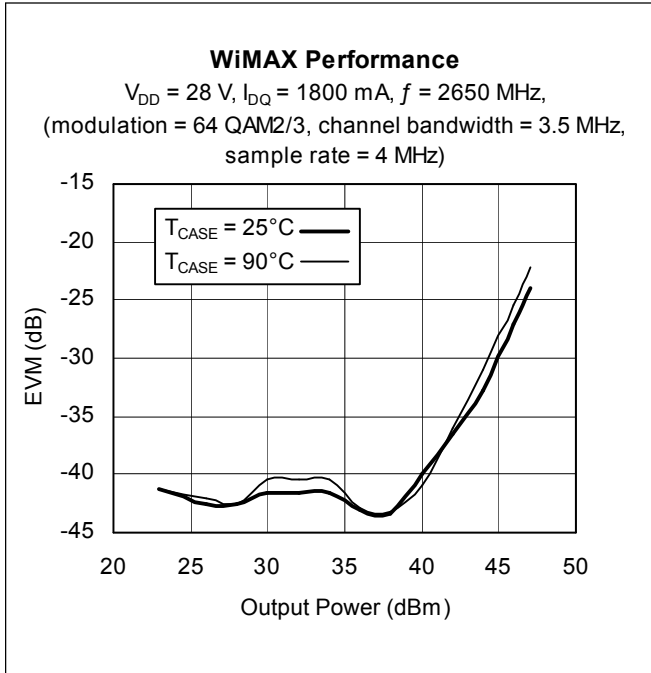
**Maximum Ratings**

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	$^{\circ}\text{C}$
Total Device Dissipation	$P_D$	643	W
		Above 25 $^{\circ}\text{C}$ derate by	3.68
Storage Temperature Range	$T_{STG}$	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ( $T_{CASE} = 70^{\circ}\text{C}$ , 170 W CW)	$R_{\theta JC}$	0.272	$^{\circ}\text{C/W}$

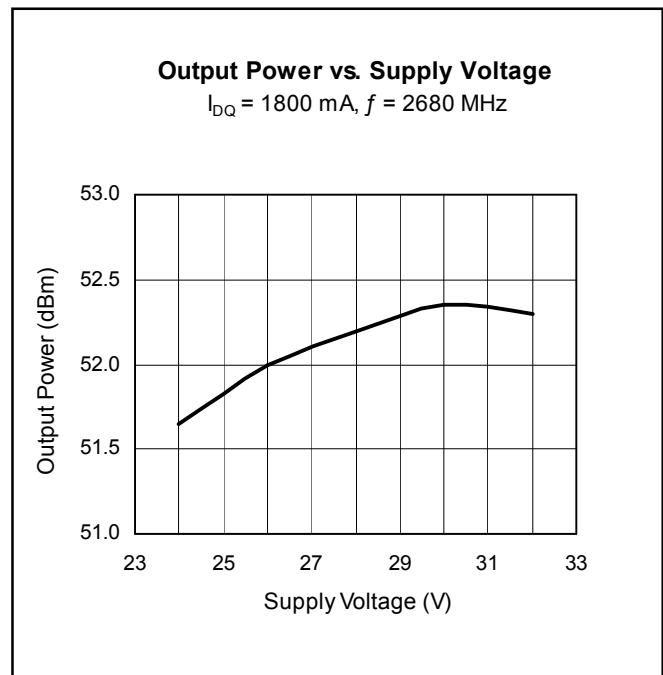
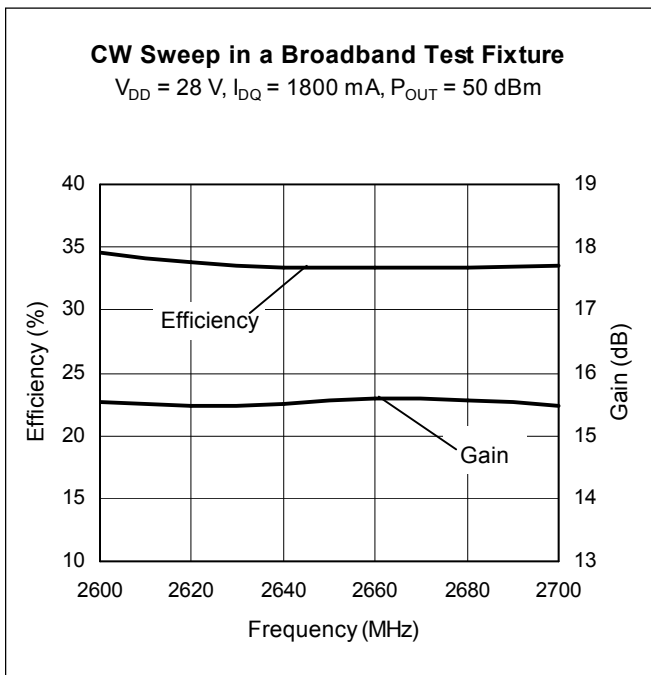
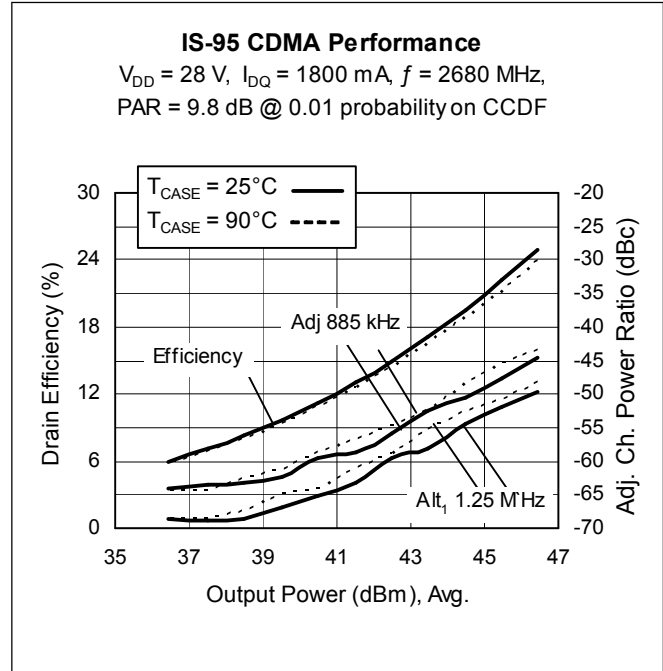
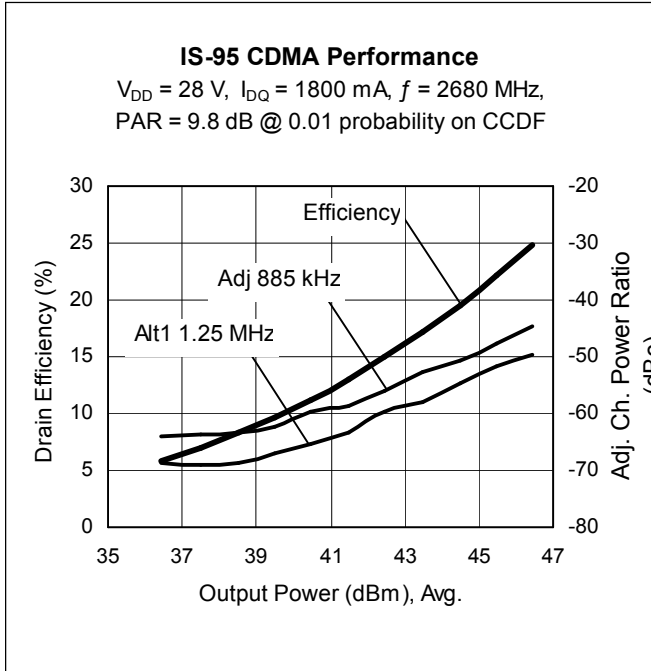
**Ordering Information**

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

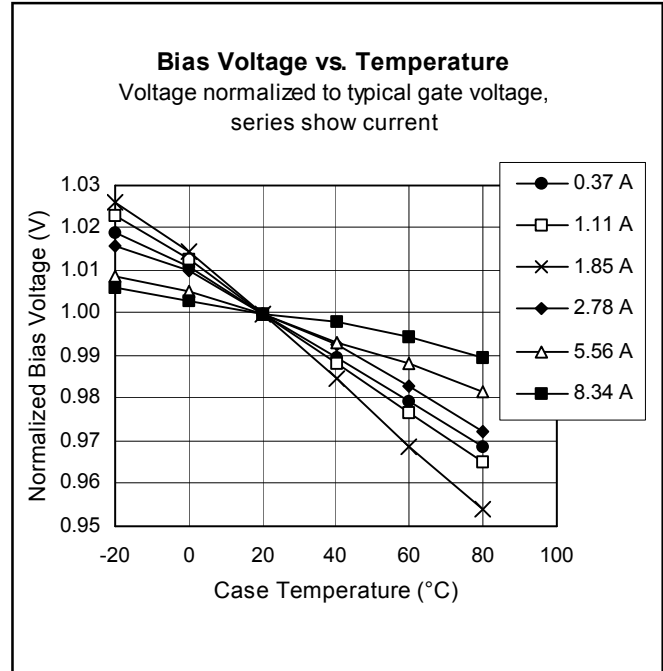
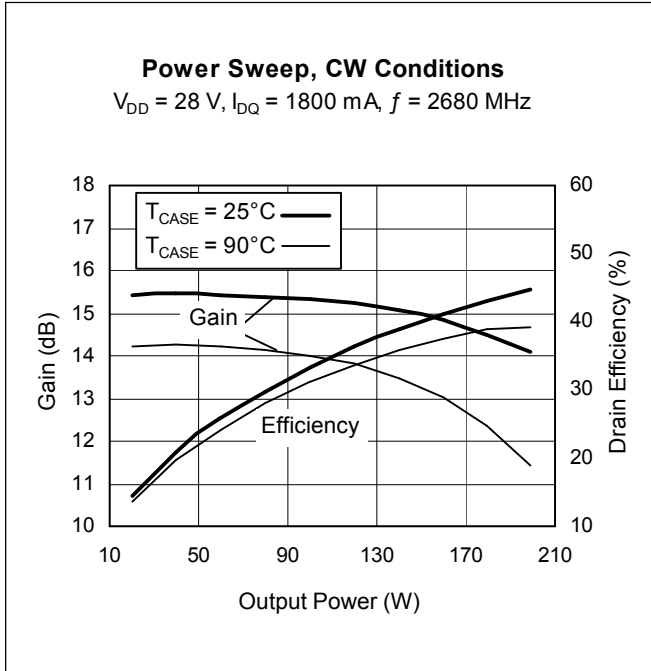
**Typical Performance** (data taken in a production test fixture)



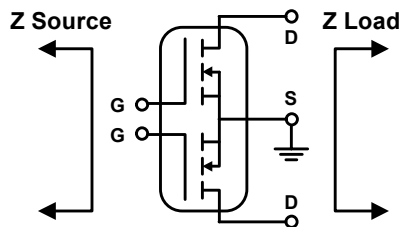
Typical Performance (cont.)



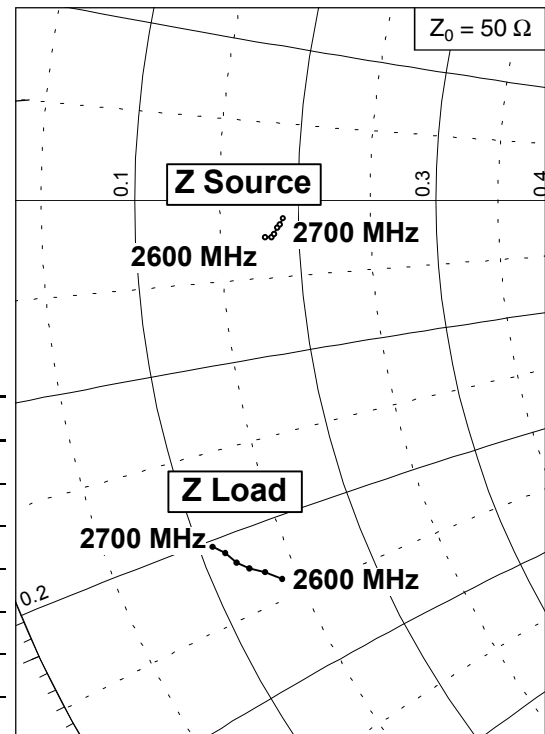
Typical Performance (cont.)



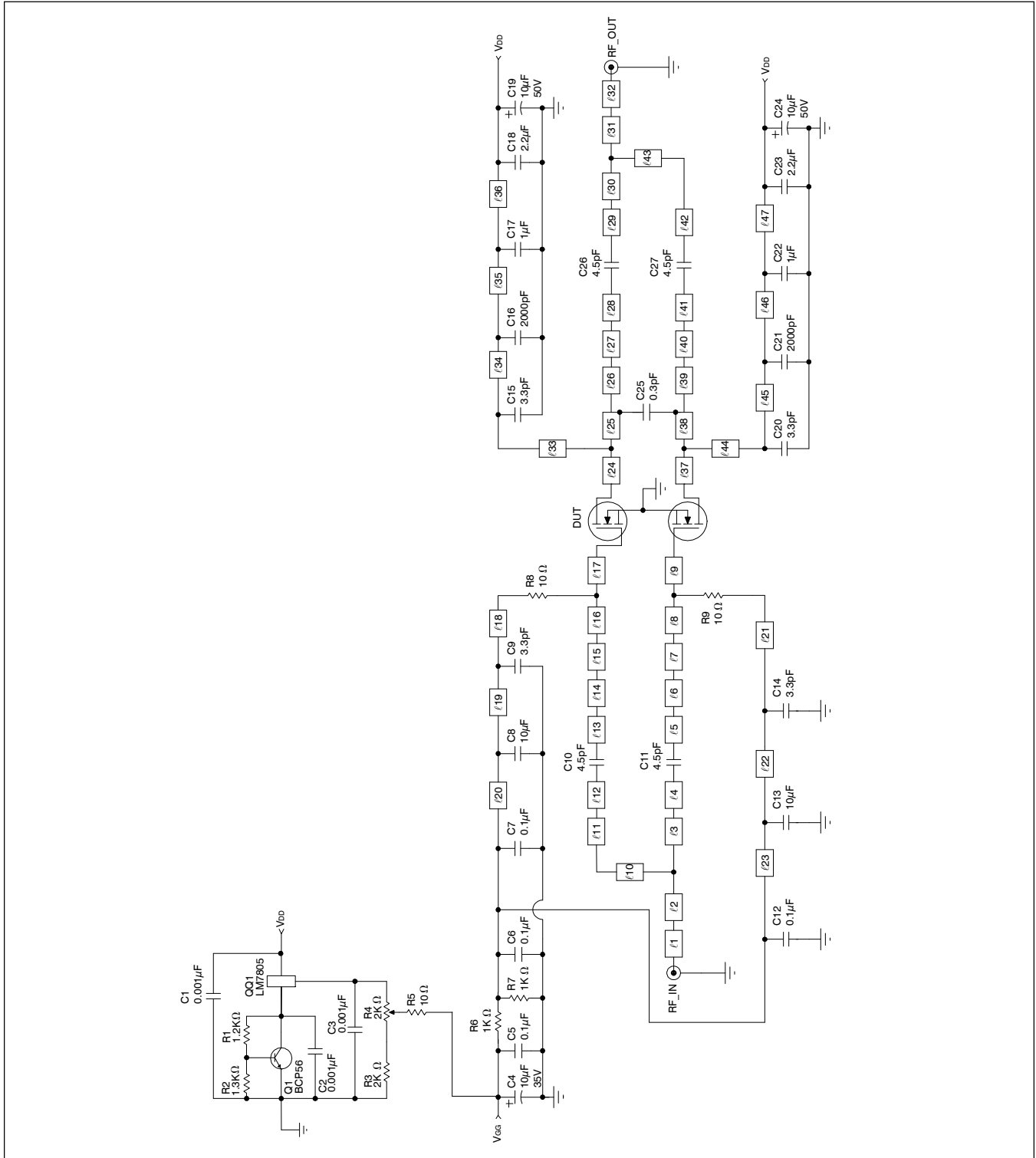
Broadband Circuit Impedance



Frequency MHz	Z Source W		Z Load W	
	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  $f = 2680 \text{ MHz}$

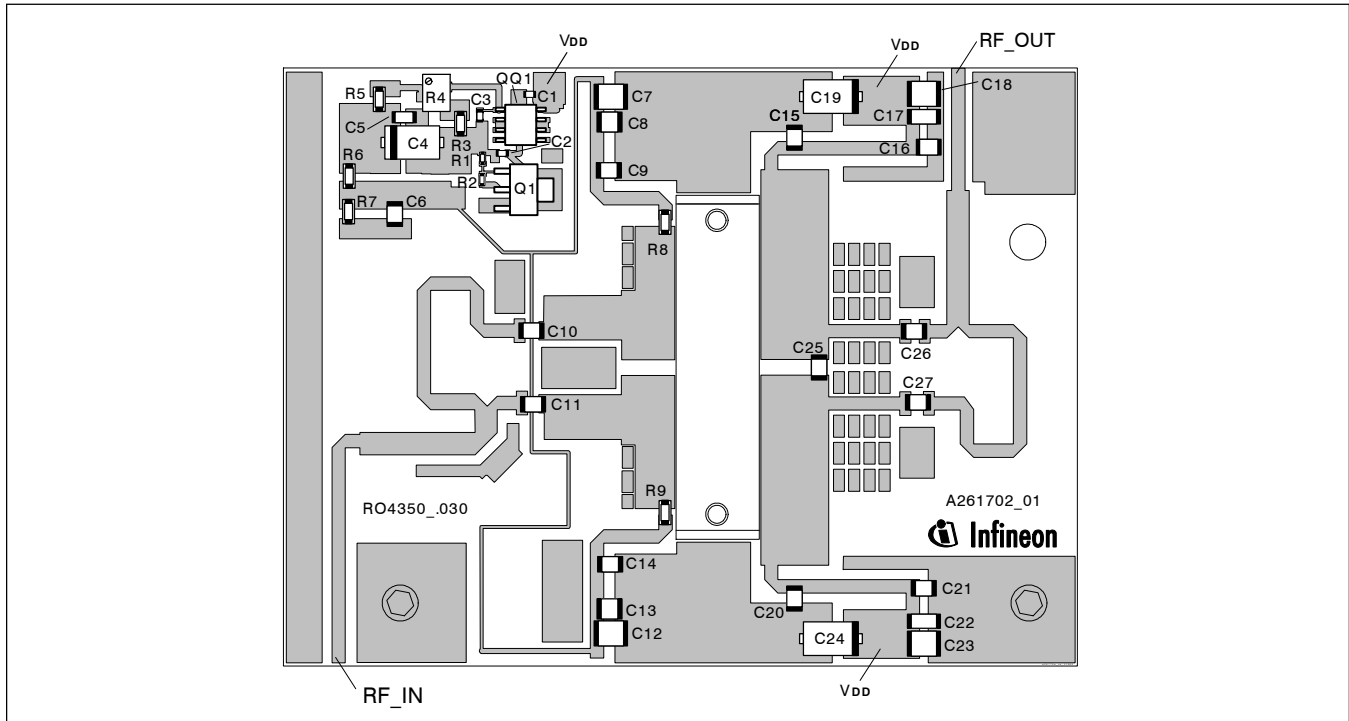
**Reference Circuit** (cont.)

**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.)
$\ell 1$	0.450 $\lambda$ , 49.9 $\Omega$	30.45 x 1.70	1.199 x 0.067
$\ell 2$	0.296 $\lambda$ , 35.5 $\Omega$	19.56 x 2.84	0.770 x 0.112
$\ell 3$	0.049 $\lambda$ , 49.9 $\Omega$	3.30 x 1.70	0.130 x 0.067
$\ell 4, \ell 12, \ell 28, \ell 29, \ell 41, \ell 42$	0.021 $\lambda$ , 34.0 $\Omega$	1.40 x 3.02	0.055 x 0.119
$\ell 5, \ell 13$	0.010 $\lambda$ , 40.6 $\Omega$	0.69 x 2.34	0.027 x 0.092
$\ell 6, \ell 14$	0.153 $\lambda$ , 21.0 $\Omega$	9.80 x 5.66	0.386 x 0.223
$\ell 7, \ell 15$	0.028 $\lambda$ , 14.6 $\Omega$	1.78 x 8.81	0.070 x 0.347
$\ell 8, \ell 16$	0.067 $\lambda$ , 8.2 $\Omega$	4.11 x 16.94	0.162 x 0.667
$\ell 9, \ell 17$	0.015 $\lambda$ , 8.2 $\Omega$	0.94 x 16.94	0.037 x 0.667
$\ell 10$	0.099 $\lambda$ , 44.6 $\Omega$	6.65 x 2.03	0.262 x 0.080
$\ell 11$	0.463 $\lambda$ , 49.9 $\Omega$	31.32 x 1.70	1.233 x 0.067
$\ell 18, \ell 21$	0.193 $\lambda$ , 49.9 $\Omega$	13.06 x 1.70	0.514 x 0.067
$\ell 19, \ell 22$	0.105 $\lambda$ , 49.9 $\Omega$	7.11 x 1.70	0.280 x 0.067
$\ell 20, \ell 23,$	0.043 $\lambda$ , 49.9 $\Omega$	2.92 x 1.70	0.115 x 0.067
$\ell 24, \ell 37$	0.020 $\lambda$ , 5.9 $\Omega$	1.24 x 24.16	0.049 x 0.951
$\ell 25, \ell 38$	0.101 $\lambda$ , 5.9 $\Omega$	6.17 x 24.16	0.243 x 0.951
$\ell 26, \ell 39$	0.019 $\lambda$ , 5.9 $\Omega$	1.19 x 24.16	0.047 x 0.951
$\ell 27, \ell 40$	0.132 $\lambda$ , 50.3 $\Omega$	8.97 x 1.68	0.353 x 0.066
$\ell 30$	0.044 $\lambda$ , 50.3 $\Omega$	2.95 x 1.68	0.116 x 0.066
$\ell 31$	0.258 $\lambda$ , 35.5 $\Omega$	17.04 x 2.84	0.671 x 0.112
$\ell 32$	0.229 $\lambda$ , 49.9 $\Omega$	15.52 x 1.70	0.611 x 0.067
$\ell 33, \ell 44$	0.083 $\lambda$ , 49.9 $\Omega$	5.64 x 1.70	0.222 x 0.067
$\ell 34, \ell 45$	0.225 $\lambda$ , 49.9 $\Omega$	15.24 x 1.70	0.6 x 0.067
$\ell 35, \ell 46$	0.060 $\lambda$ , 49.9 $\Omega$	4.06 x 1.70	0.16 x 0.067
$\ell 36, \ell 47$	0.043 $\lambda$ , 49.9 $\Omega$	2.92 x 1.70	0.115 x 0.067
$\ell 43$	0.553 $\lambda$ , 49.9 $\Omega$	37.44 x 1.70	1.474 x 0.067

Reference Circuit (cont.)



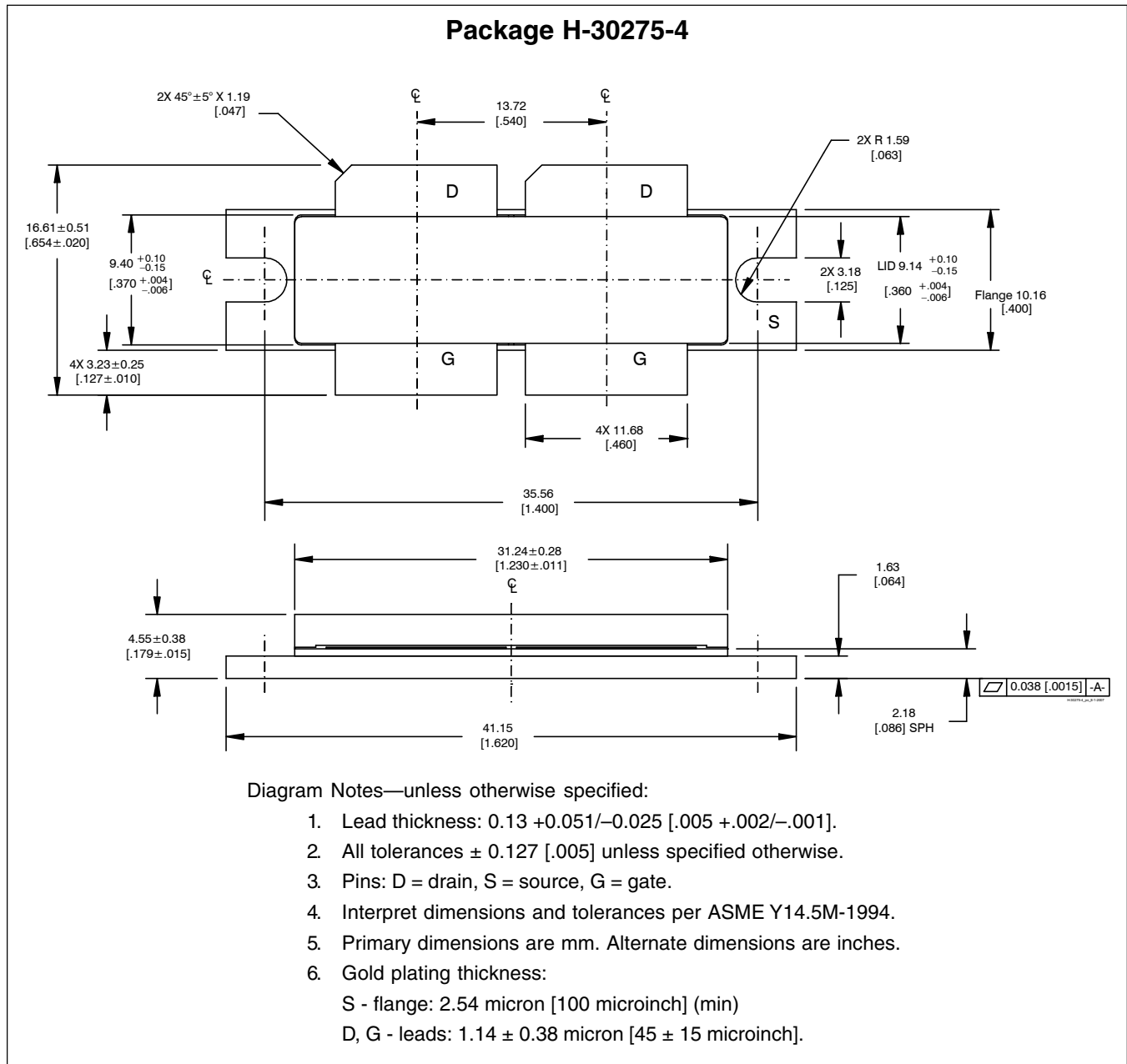
Reference circuit assembly diagram (not to scale)\*

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 $\mu$ F	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 $\mu$ F, 35 V	Digi-Key	399-1655-2-ND
C5, C6, C7, C12	Capacitor, 0.1 $\mu$ F	Digi-Key	PCC104BCT-ND
C8, C13	Capacitor, 10 $\mu$ 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 $\mu$ F	Digi-Key	445-1411-2-ND
C18, C23	Capacitor, 2.2 $\mu$ F	Digi-Key	445-1447-2-ND
C19, C24	Tantalum capacitor, 10 $\mu$ 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>

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

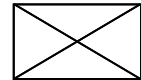
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