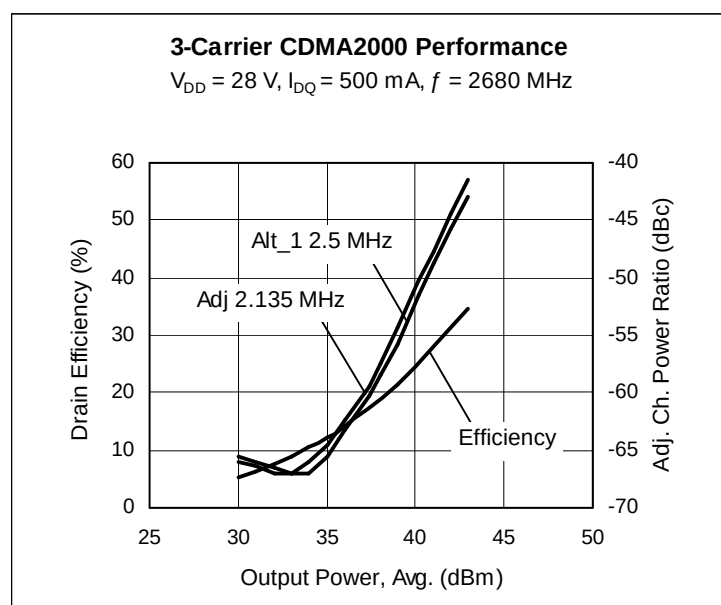


Thermally-Enhanced High Power RF LDMOS FET 45 W, 2.62 – 2.68 GHz

Description

The PTFA260451E is a thermally-enhanced 45-watt, internally-matched **GOLDMOS®** FET intended for CDMA2000, Super3G (3GPP TSG RAN), and WiMAX applications from 2.62 to 2.68 GHz. Thermally-enhanced packaging provide the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.

PTFA260451E
Package H-30265-2



Features

- Lead-free, RoHS-compliant and thermally-enhanced packaging
- Internal matching for wideband performance
- Typical three-carrier CDMA2000 performance
 - Average output power = 10 W
 - Gain = 14 dB
 - Efficiency = 24%
 - ACPR = -52 dBc
- Typical CW performance
 - Output power at P-1dB = 50 W
 - Efficiency = 46%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability
- Low HCI Drift
- Capable of handling 10:1 VSWR @ 28 V, 45 W (CW) output power

RF Performance

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 10\text{ W AVG}$, $f = 2680\text{ MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit
Adjacent Channel Power Ratio	ACPR	—	-45	—	dBc
Gain	G_{ps}	—	14	—	dB
Drain Efficiency	η_D	—	24	—	%

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Performance (cont.)

Two-tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 45\text{ W PEP}$, $f = 2680\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	14.0	15	—	dB
Drain Efficiency	η_D	36	37	—	%
Intermodulation Distortion	IMD	—	−30	−28	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 10\text{ mA}$	$V_{(BR)DSS}$	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	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.16	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$	V_{GS}	2.0	2.5	3	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

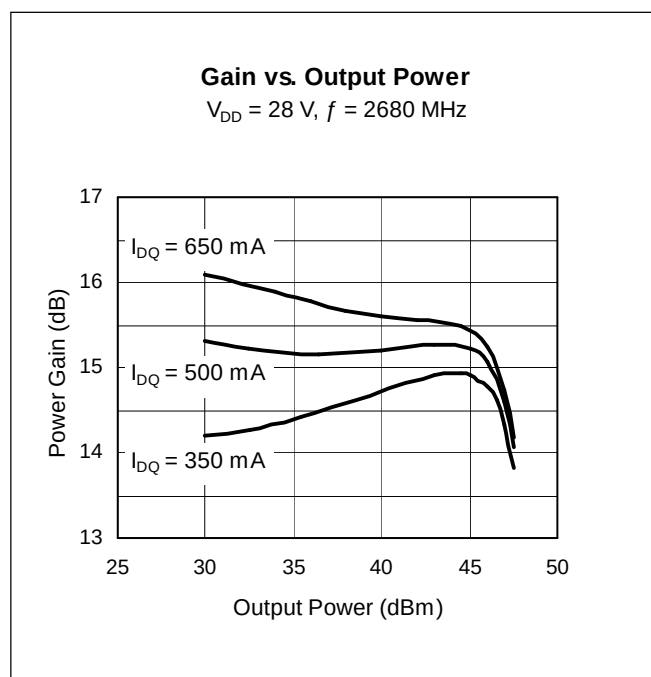
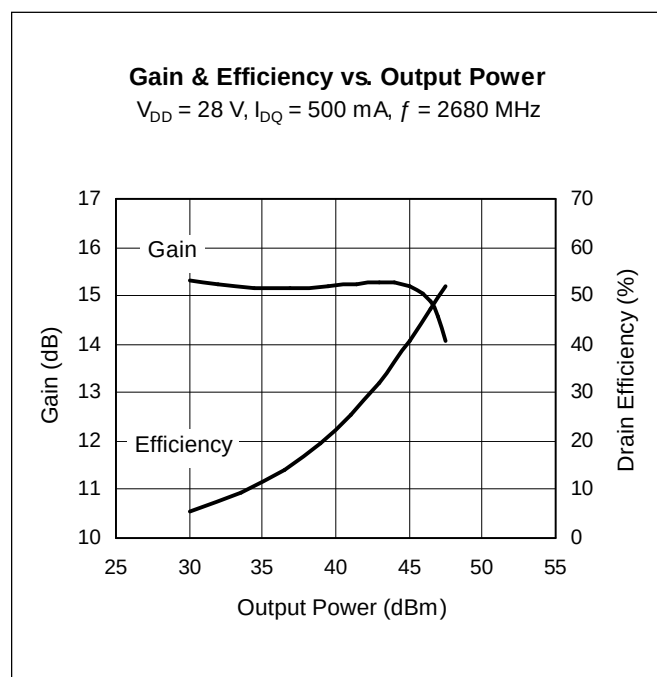
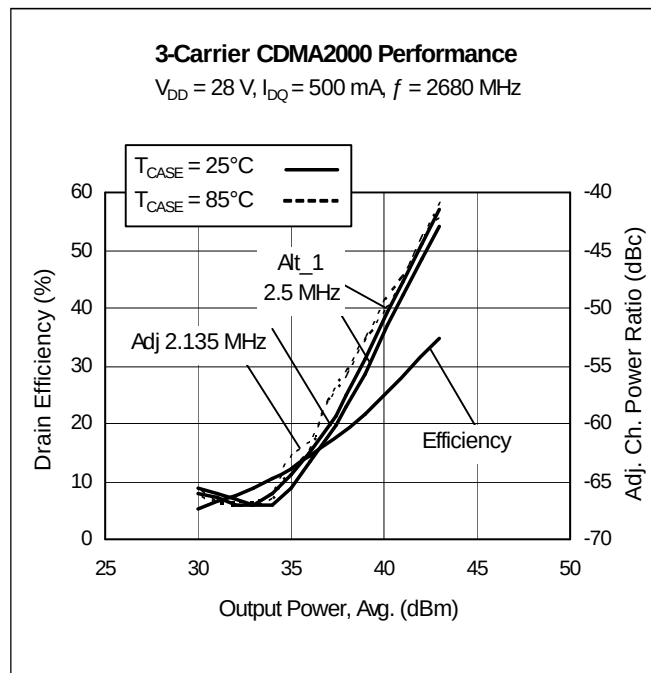
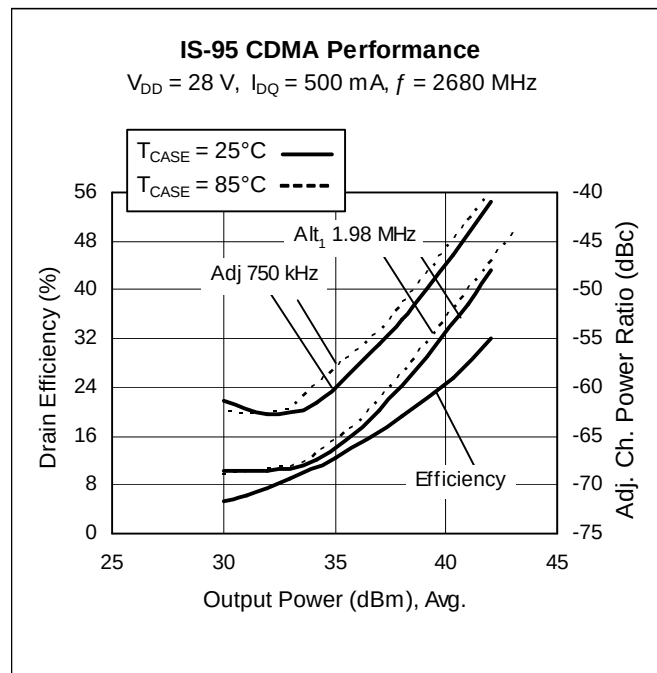
Maximum Ratings

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	$^{\circ}\text{C}$
Total Device Dissipation Above 25 $^{\circ}\text{C}$ derate by	P_D	199	W
		1.14	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 45 W CW)	$R_{\theta JC}$	0.88	$^{\circ}\text{C/W}$

Ordering Information

Type and Version	Package Outline	Package Description	Marking
PTFA260451E V1	H-30265-2	Thermally-enhanced slotted flange, single-ended	PTFA260451E

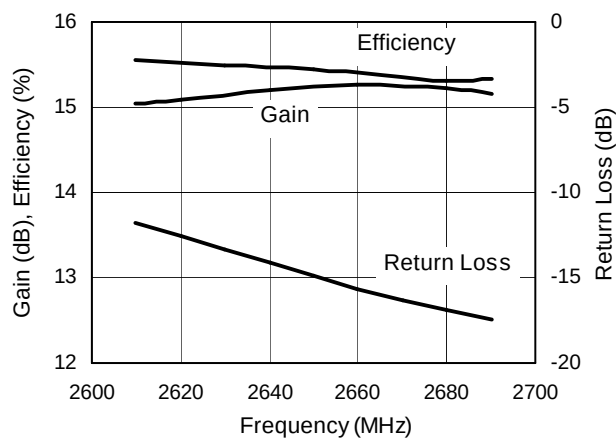
Typical Performance (data taken in production test fixture)



Typical Performance (cont.)

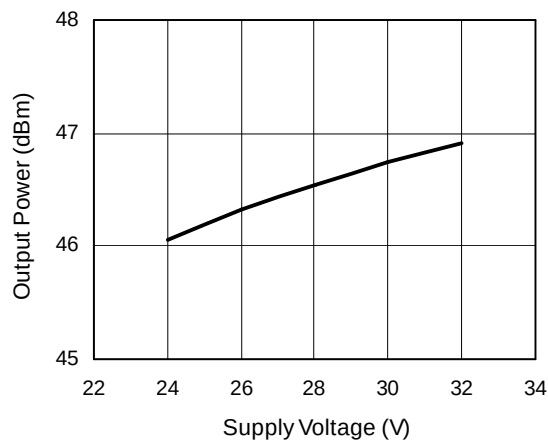
Broadband Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 4\text{ W}$



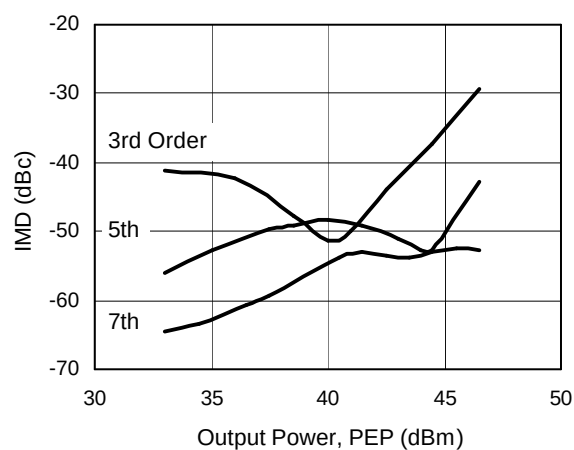
Output Power vs. Supply Voltage

$I_{DQ} = 500\text{ mA}$, $f = 2680\text{ MHz}$



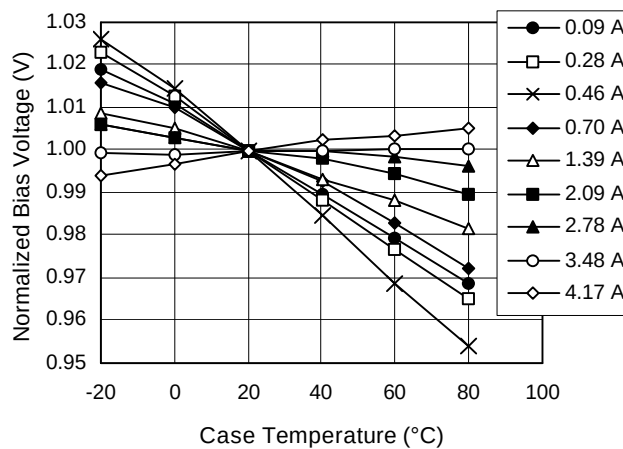
Intermodulation Distortion vs. Output Power

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $f_1 = 2679\text{ MHz}$, $f_2 = 2680\text{ MHz}$

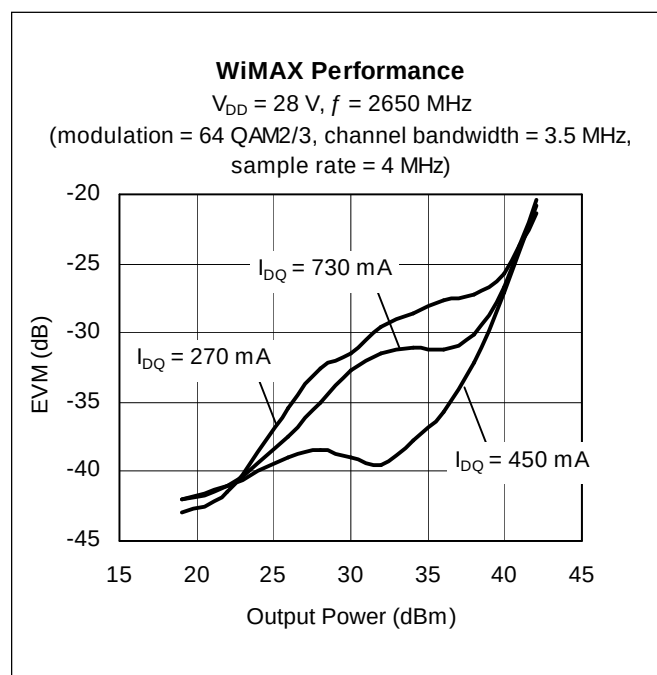
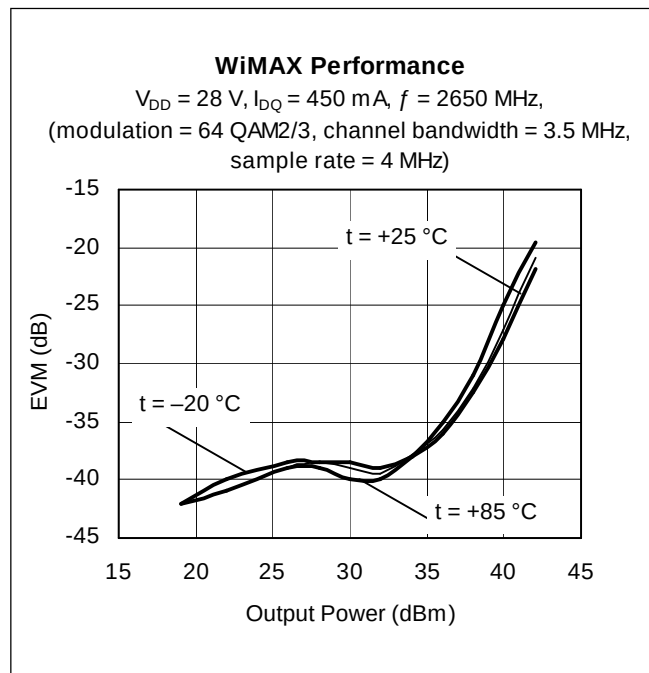
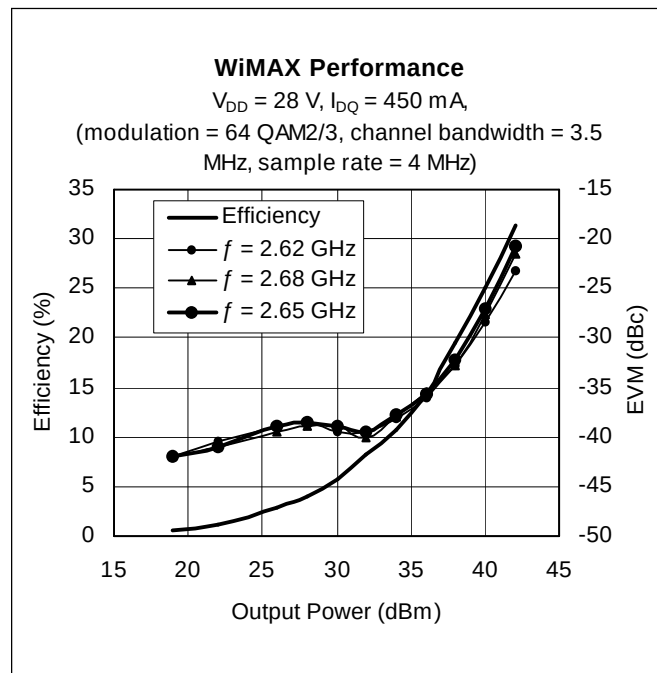


Bias Voltage vs. Temperature

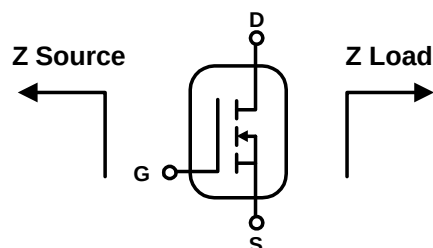
Voltage normalized to typical gate voltage, series show current



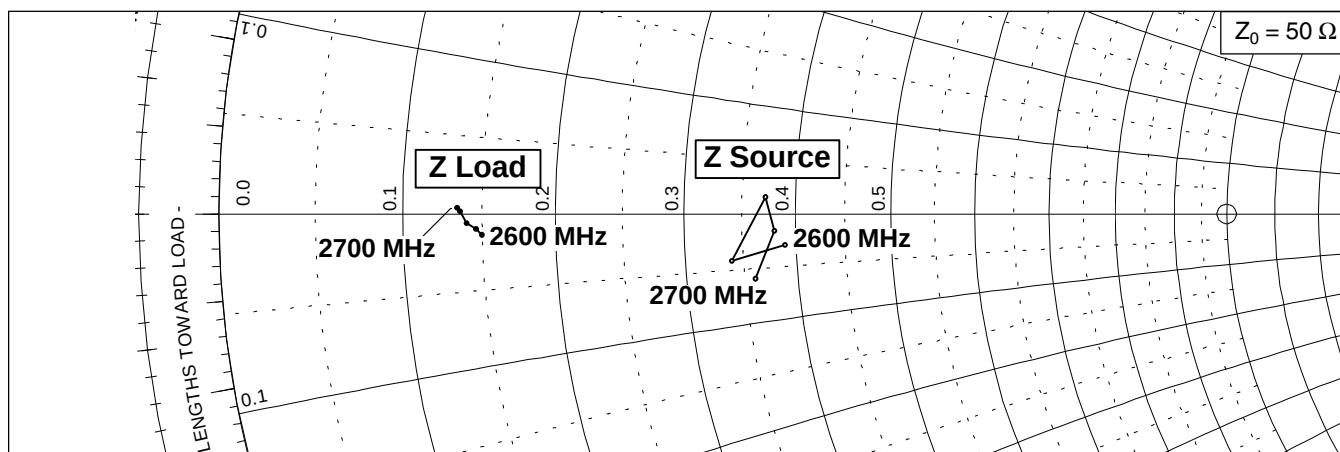
Typical WiMAX Performance



Broadband Circuit Impedance

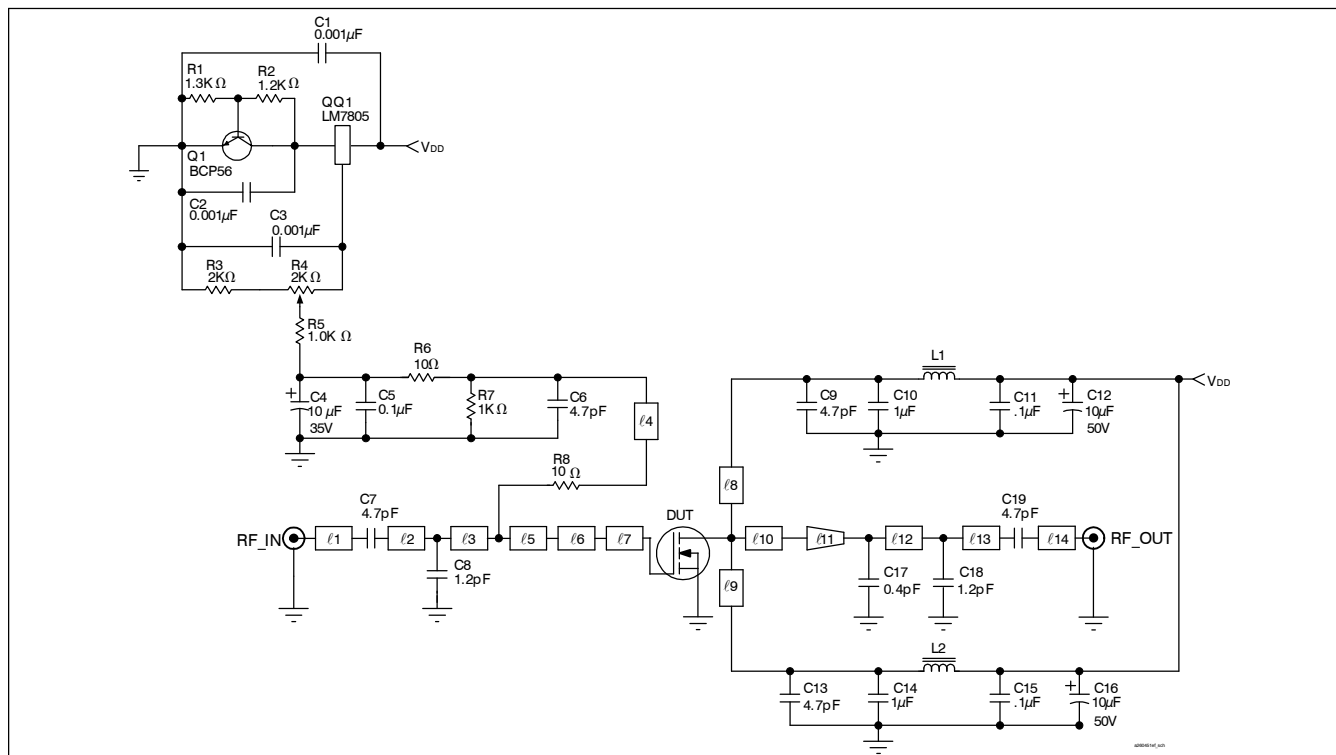


Frequency MHz	Z Source W		Z Load W	
	R	jX	R	jX
2600	19.5	-1.5	7.5	-0.7
2620	17.0	-2.1	7.3	-0.5
2650	18.6	0.8	7.0	-0.3
2680	19.0	-0.8	6.8	0.1
2700	18.0	-3.0	6.7	0.2



See next page for reference circuit information

Reference Circuit



Reference circuit schematic for $f = 2680$ MHz

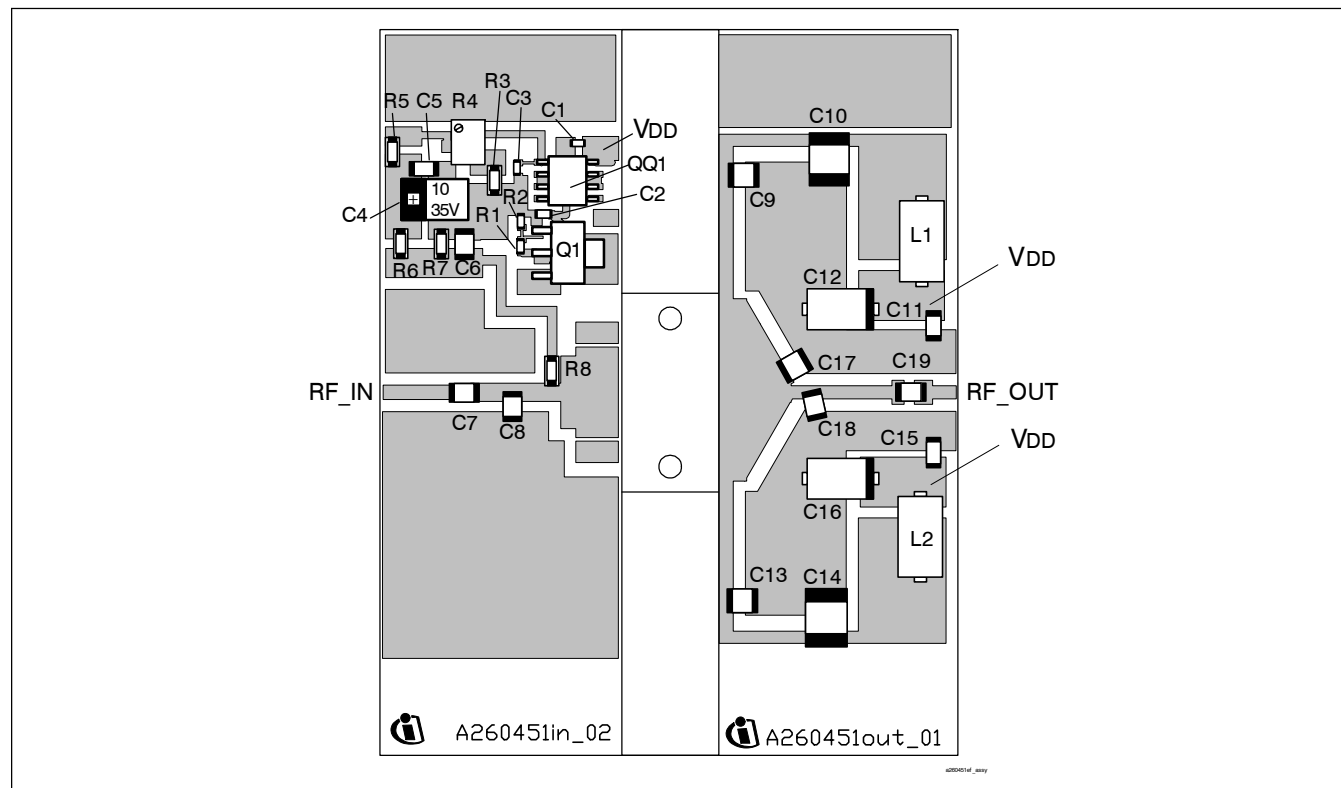
Circuit Assembly Information

DUT	PTFA260451E	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 4.5$	Rogers TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 2680 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
l_1	0.130λ , 50.0 Ω	7.87 x 1.47	0.310 x 0.058
l_2	0.061λ , 44.0 Ω	3.68 x 1.83	0.145 x 0.072
l_3	0.065λ , 44.0 Ω	3.91 x 1.83	0.154 x 0.072
l_4	0.299λ , 62.0 Ω	18.44 x 1.02	0.726 x 0.040
l_5	0.018λ , 44.0 Ω	1.09 x 1.83	0.043 x 0.072
l_6	0.029λ , 15.0 Ω	1.65 x 7.62	0.065 x 0.300
l_7	0.077λ , 12.5 Ω	4.32 x 9.45	0.170 x 0.372
l_8	0.234λ , 55.0 Ω	14.33 x 1.27	0.564 x 0.050
l_9	0.218λ , 55.0 Ω	13.36 x 1.27	0.526 x 0.050
l_{10}	0.050λ , 6.6 Ω	2.74 x 19.10	0.108 x 0.752
l_{11} (taper)	0.080λ , 6.6 Ω / 50.0 Ω	4.90 x 19.10 / 1.32	0.193 x 0.752 / 0.052
l_{12}	0.053λ , 50.0 Ω	3.25 x 1.32	0.128 x 0.052
l_{13}	0.133λ , 50.0 Ω	8.13 x 1.32	0.320 x 0.052
l_{14}	0.070λ , 50.0 Ω	4.27 x 1.32	0.168 x 0.052

¹Electrical characteristics are rounded.

Reference Circuit (cont.)

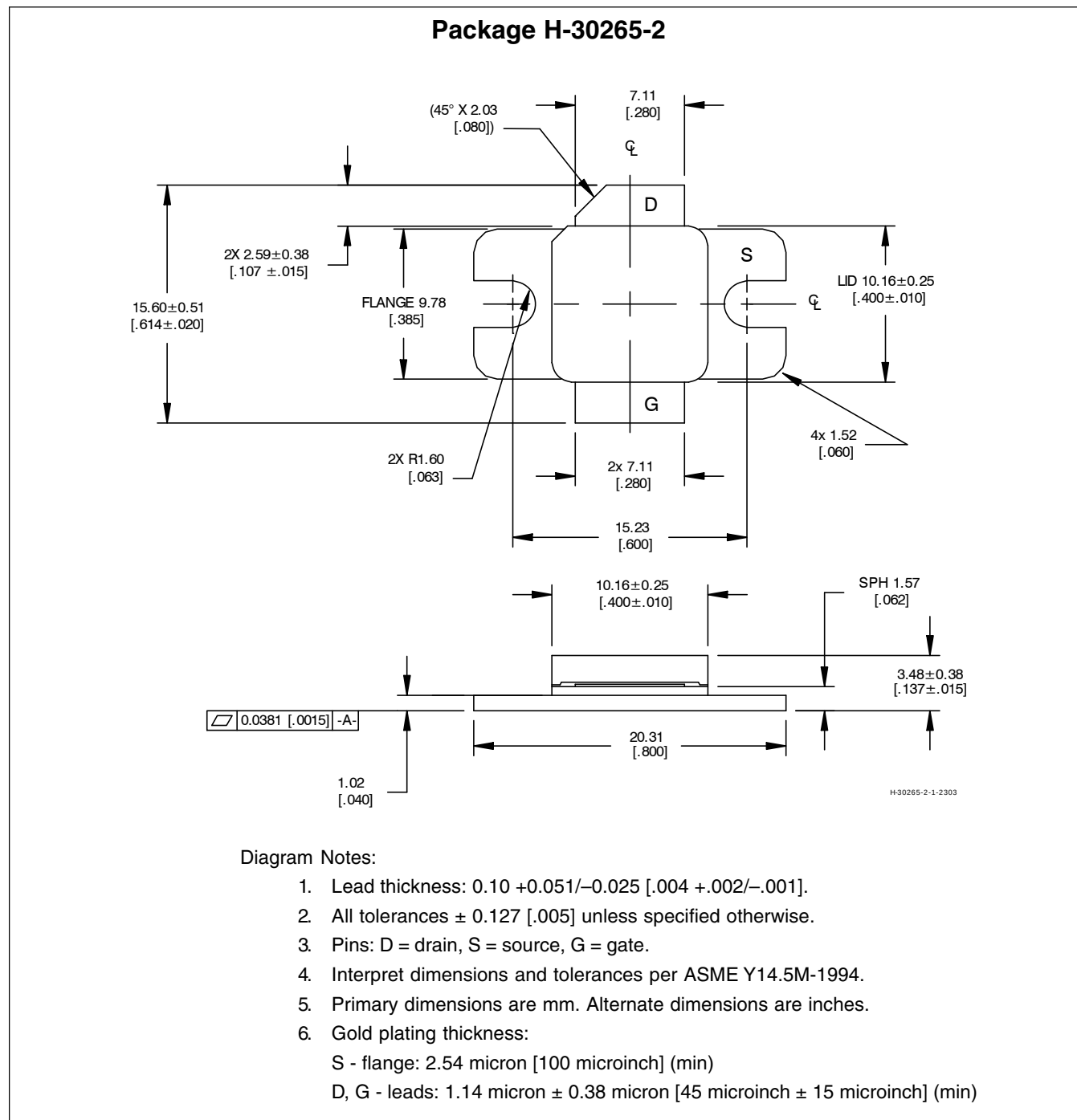


Reference circuit assembly diagram* (not to scale)

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	PCS6106TR-ND
C5, C11, C15	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C6, C7, C9, C13, C19	Ceramic capacitor, 4.7 pF	ATC	100B 4R7
C8, C18	Ceramic capacitor, 1.2 pF	ATC	100B 1R2
C10, C14	Capacitor, 1 μ F	ATC	920C105KW
C12, C16	Tantalum capacitor, 10 μ F, 50 V	Garrett Electronics	TPSE106K050R0400
C17	Ceramic capacitor, 0.4 pF	ATC	100B 0R4
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R2	Chip resistor, 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R3	Chip resistor, 2 k-ohms	Digi-Key	P2.0KECT-ND
R4	Potentiometer, 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R7	Chip resistor, 1 k-ohms	Digi-Key	P1.0KECT-ND
R6, R8	Chip resistor, 10 ohms	Digi-Key	P10ECT-ND
L1, L2	Ferrite	Philips	BDS46/3.8.8-452

*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/rfpower>

Revision History: 2008-03-04

Data Sheet

Previous version: 2006-07-05, Data Sheet

Page	Subjects (major changes since last revision)
All	Remove references to alternate products.

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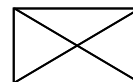
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