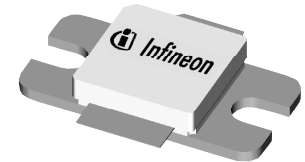


Thermally Enhanced High Power RF LDMOS FETs 55 W, 450 – 500 MHz

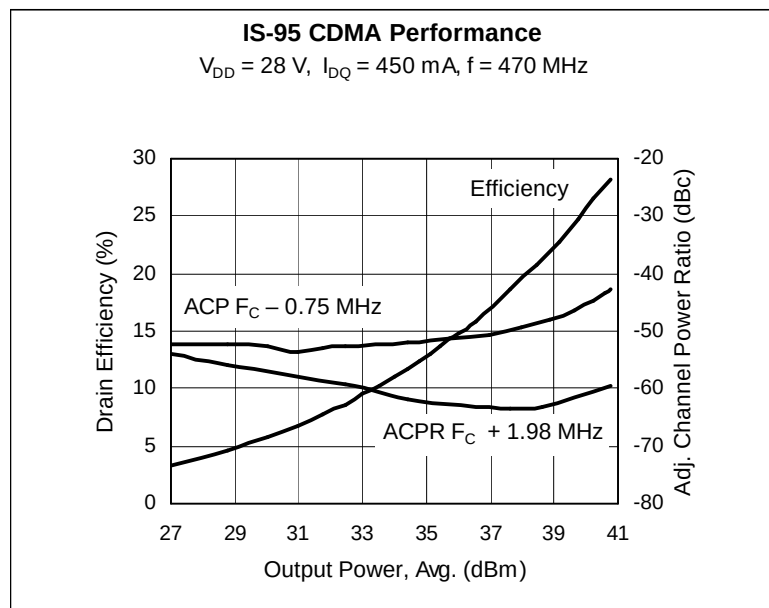
Description

The PTF040551E and PTF040551F are thermally-enhanced, 55-watt, internally matched **GOLDMOS®** FETs intended for CDMA applications in the 450 to 500 MHz band. Full gold metallization ensures excellent device lifetime and reliability.

PTF040551E
Package 30265



PTF040551F*
Package 31265



Features

- Thermally-enhanced packages
- Broadband internal matching
- Typical CW performance
 - Output power at P-1dB = 65 W
 - Gain = 20 dB
 - Efficiency = 57%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI drift
- Capable of handling 5:1 VSWR @ 28 V, 55 W (CW) output power

RF Characteristics

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT} = 10\text{ W}$, $f = 470\text{ MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	—	20	—	dB
Drain Efficiency	η_D	—	25	—	%
Adjacent Channel Power Ratio	ACPR	—	-45	—	dBc

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

*See Infineon distributor for future availability.

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-Tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT} = 55\text{ W PEP}$, $f = 470\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	19.0	20	—	dB
Drain Efficiency	η_D	41	44	—	%
Intermodulation Distortion	IMD	—	–30	–28	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ }\mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
On–State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$	V_{GS}	2.5	3.0	4	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	159 0.91	W W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	–40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	1.1	$^{\circ}\text{C/W}$

Ordering Information

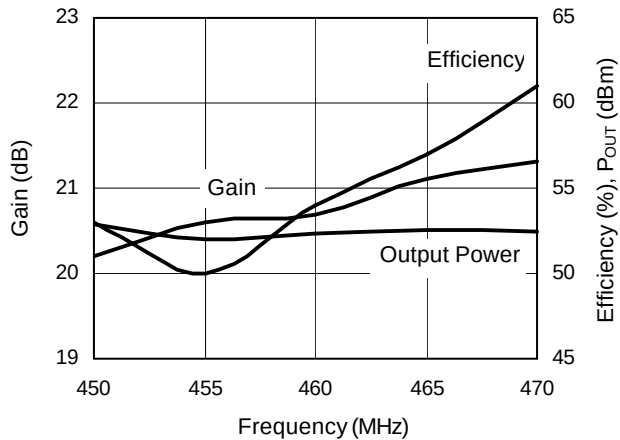
Type	Package Outline	Package Description	Marking
PTF040551E	30265	Thermally-enhanced slotted flange, single-ended	PTF040551E
PTF040551F*	31265	Thermally-enhanced earless flange, single-ended	PTF040551F

*See Infineon distributor for future availability.

Typical Performance (data taken in a production test fixture)

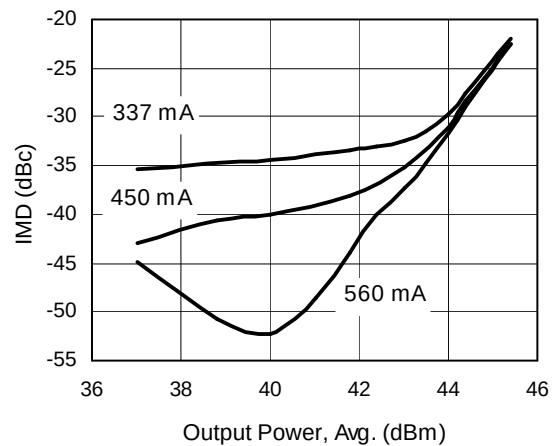
**Output Power, Gain & Efficiency (at P-1dB)
vs. Frequency**

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$



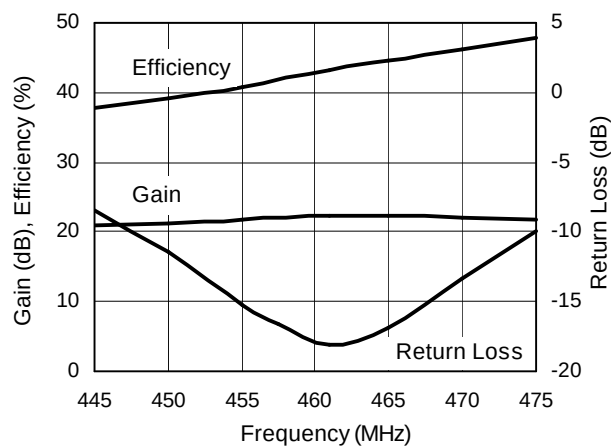
IM3 vs. Output Power at Selected Biases

$V_{DD} = 28\text{ V}$, $f_1 = 469\text{ MHz}$, $f_2 = 470\text{ MHz}$



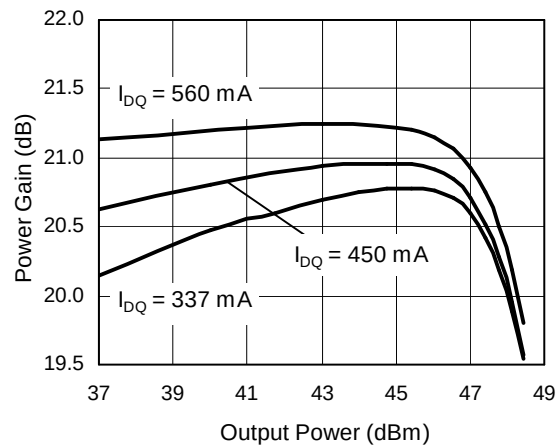
Broadband Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT\text{ Avg.}} = 44.39\text{ dBm}$



Power Sweep

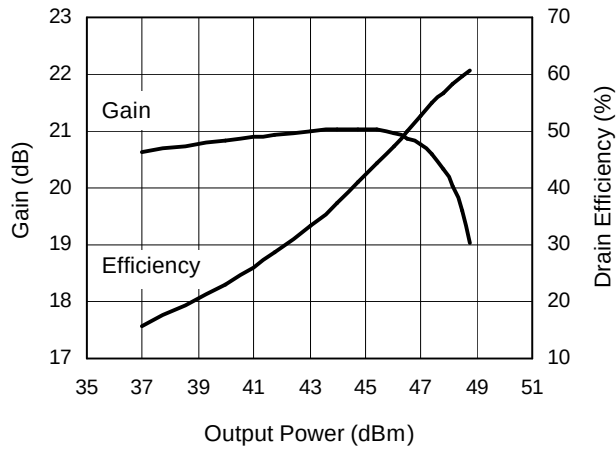
$V_{DD} = 28\text{ V}$, $f = 470\text{ MHz}$



Typical Performance (cont.)

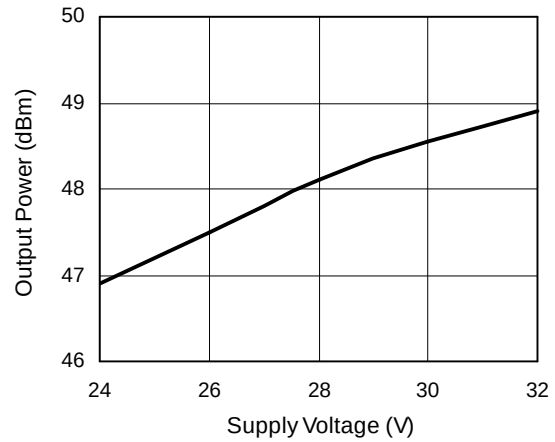
Gain & Efficiency vs. Output Power

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $f = 470\text{ MHz}$



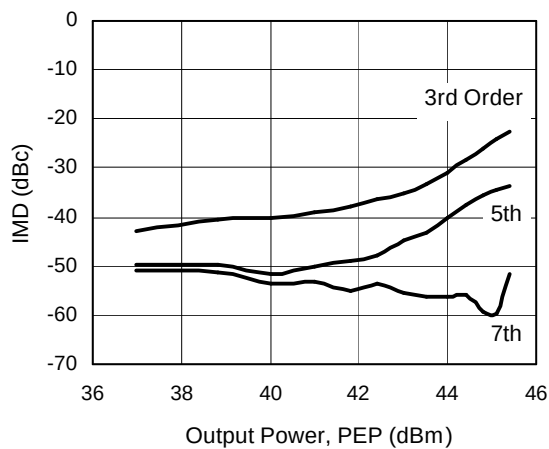
Output Power (at 1 dB compression) vs. Supply Voltage

$I_{DQ} = 450\text{ mA}$, $f = 470\text{ MHz}$



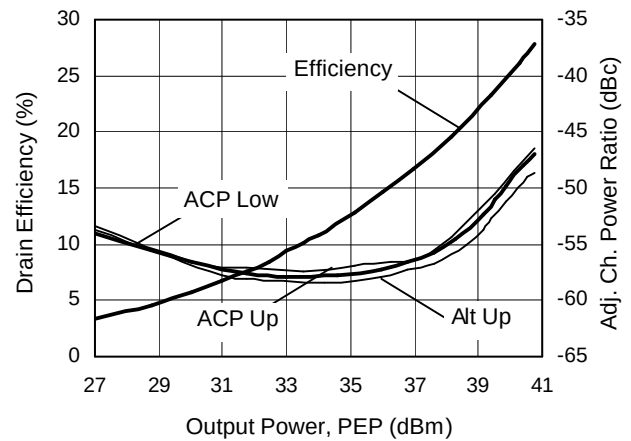
Intermodulation Distortion vs. Output Power
(as measured in a broadband circuit)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $f_1 = 469\text{ MHz}$, $f_2 = 470\text{ MHz}$

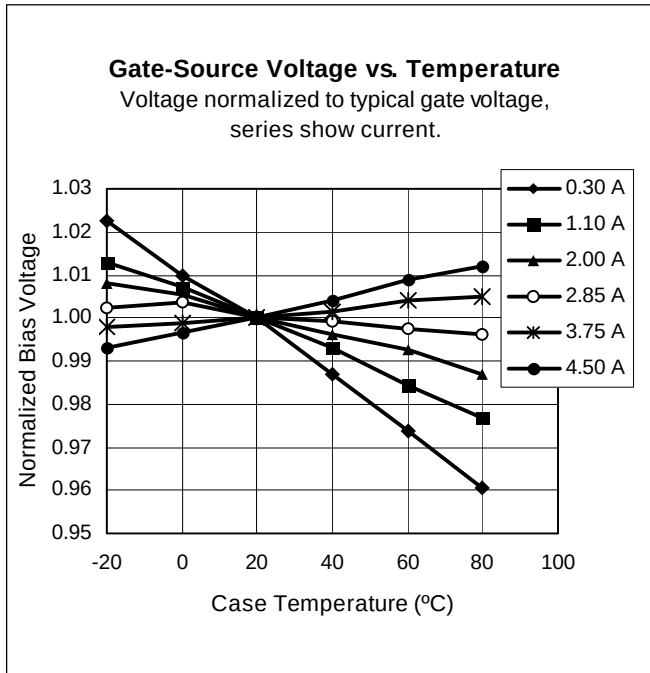


Three-Carrier CDMA2000 Performance

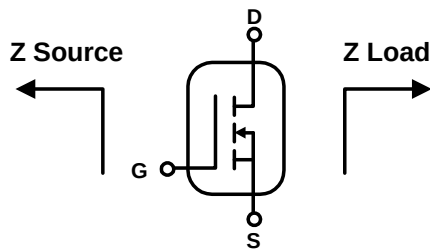
$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $f = 470\text{ MHz}$



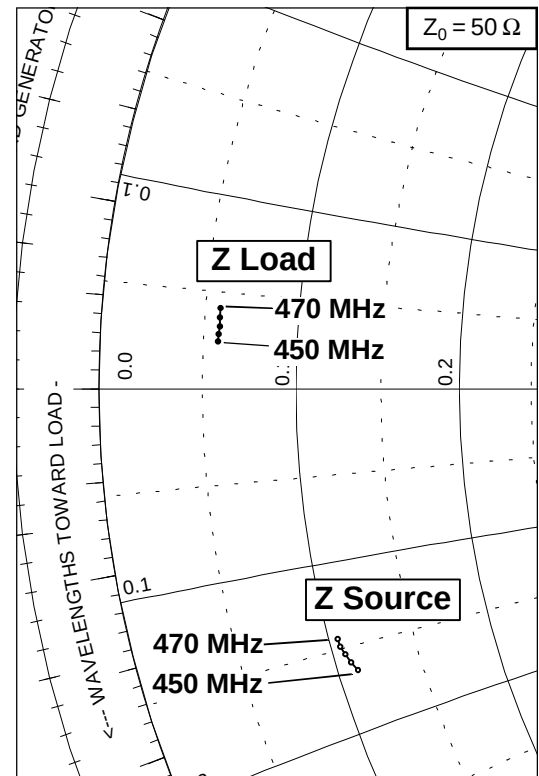
Typical Performance (cont.)



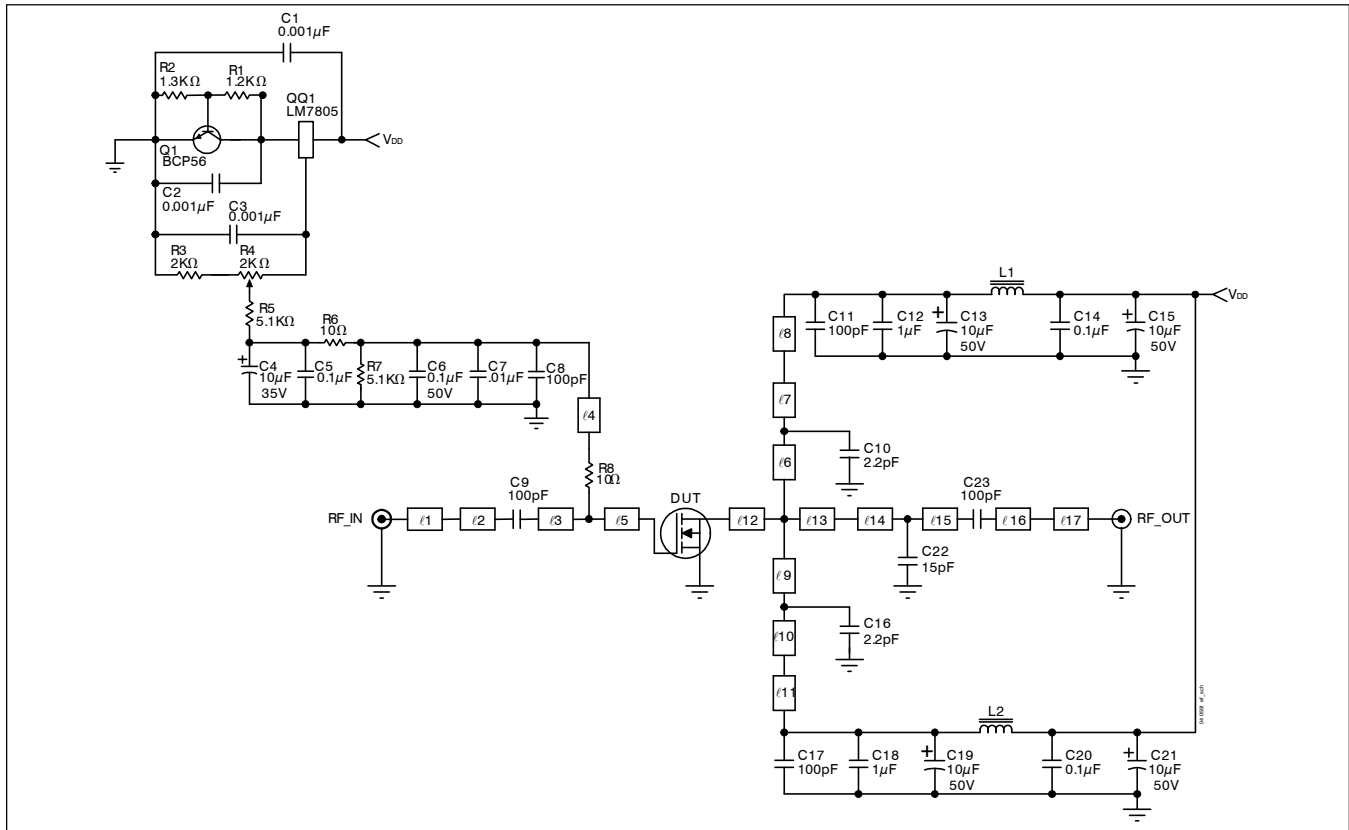
Broadband Circuit Impedance



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
450	5.58	-8.24	2.88	1.23
455	5.46	-7.96	2.90	1.42
460	5.36	-7.70	2.91	1.63
465	5.29	-7.44	2.90	1.86
470	5.27	-7.22	2.89	2.10



Reference Circuit



Reference Circuit Schematic for $f = 460 \text{ MHz}$

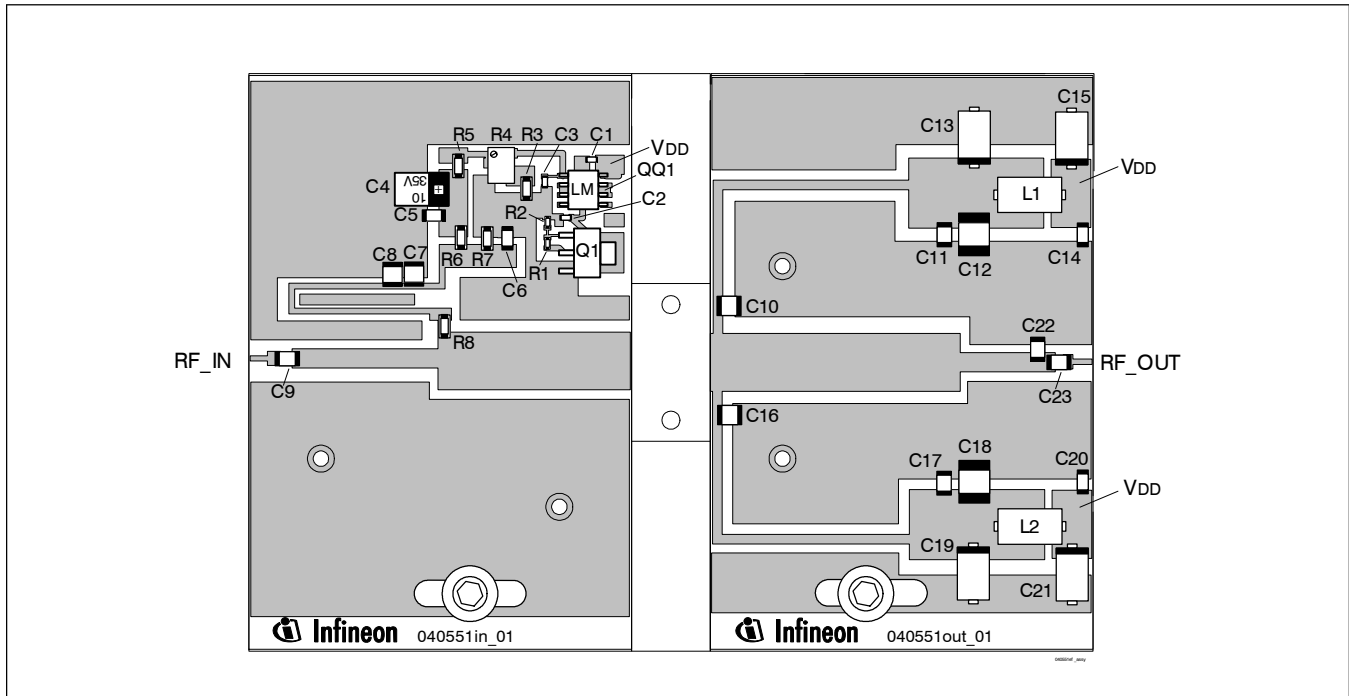
Circuit Assembly Information

DUT	PTF040551E or PTF040551F	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 10$	Rogers TMM10	2 oz. copper

Microstrip	Electrical Characteristics at 460 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ_1	0.010λ , 50.0 Ω	2.54 x 0.69	0.100 x 0.027
ℓ_2, ℓ_{16}	0.005λ , 30.0 Ω	1.14 x 1.78	0.045 x 0.070
ℓ_3	0.081λ , 25.0 Ω	19.18 x 2.34	0.755 x 0.092
ℓ_4	0.143λ , 53.6 Ω	37.08 x 0.58	1.460 x 0.023
ℓ_5	0.112λ , 10.2 Ω	25.27 x 7.47	0.995 x 0.294
ℓ_6, ℓ_9	0.015λ , 38.0 Ω	3.81 x 1.17	0.150 x 0.046
ℓ_7, ℓ_{10}	0.166λ , 38.0 Ω	41.05 x 1.17	1.616 x 0.046
ℓ_8, ℓ_{11}	0.030λ , 8.6 Ω	6.60 x 9.07	0.135 x 0.357
ℓ_{12}	0.004λ , 10.2 Ω	0.76 x 7.47	0.036 x 0.294
ℓ_{13}	0.143λ , 10.2 Ω	32.13 x 7.47	1.265 x 0.294
ℓ_{14}	0.044λ , 24.0 Ω	10.36 x 2.44	0.408 x 0.096
ℓ_{15}	0.007λ , 24.0 Ω	1.73 x 2.44	0.068 x 0.096
ℓ_{17}	0.010λ , 50.0 Ω	2.54 x 0.69	0.100 x 0.027

¹Electrical characteristics are rounded.

Reference Circuit (cont.)

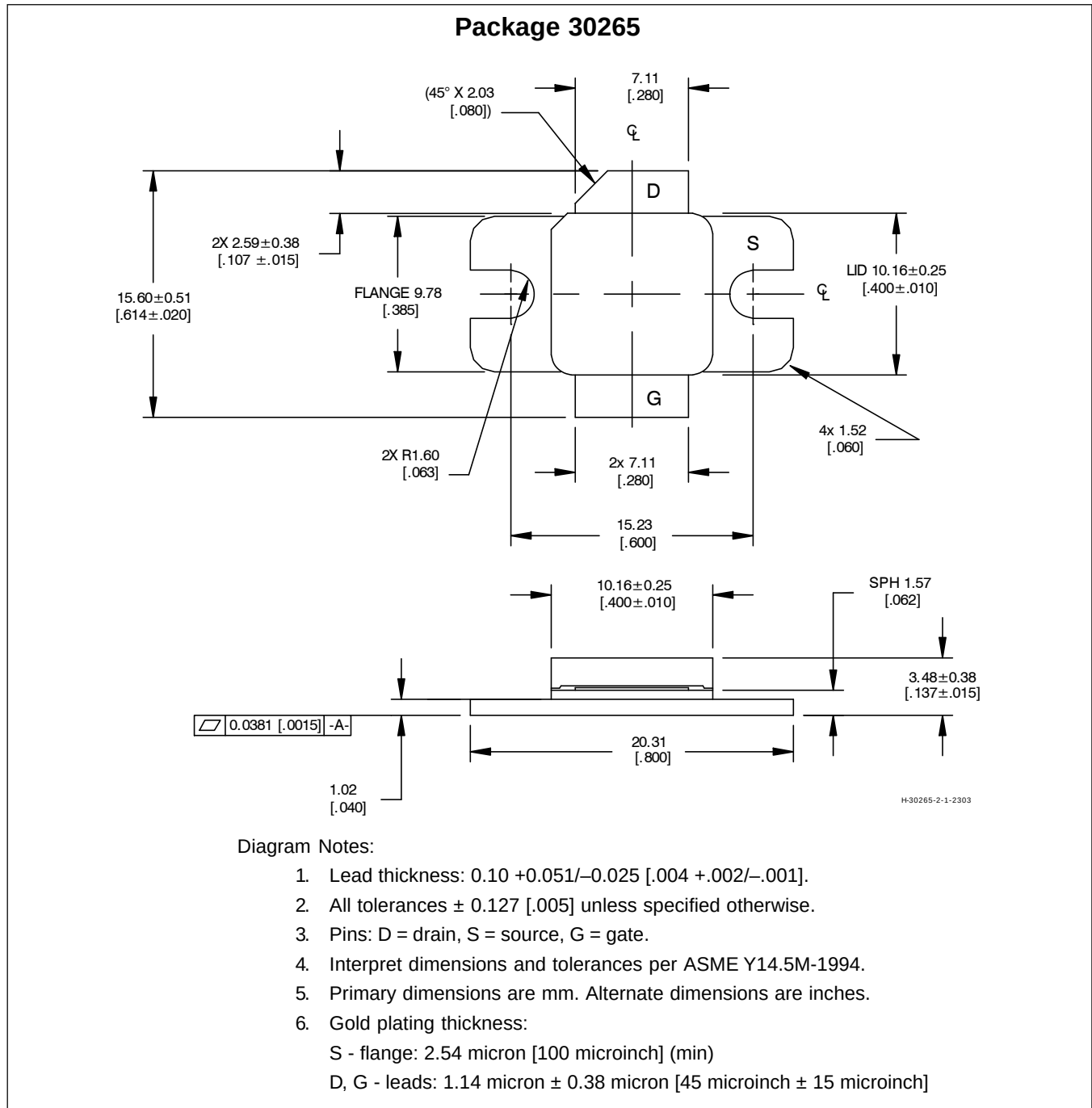


Reference Circuit Assembly (not to scale)*

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, C6, C14, C20	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C7	Capacitor, 0.01 μ F	ATC	200B 103
C8, C9, C11, C17, C23	Ceramic capacitor, 100 pF	ATC	100B 101
C10, C16	Ceramic capacitor, 2.2 pF	ATC	100B 2R2
C12, C18	Capacitor, 1.0 μ F	ATC	920C105
C13, C15, C19, C21	Tantalum capacitor, 10 μ F, 50 V	Garrett Electronics	TPS106K050R0400
C22	Ceramic capacitor, 15 pF	ATC	100B 150
L1, L2	Ferrite, 6 mm	Ferroxcube	53/3/4.6-452
Q1	Transistor	Infineon	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor, 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3	Chip resistor, 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer, 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R7	Chip resistor, 5.1 k-ohms	Digi-Key	P5.1KECT-ND
R6, R8	Chip resistor, 10 ohms	Digi-Key	P10ECT-ND

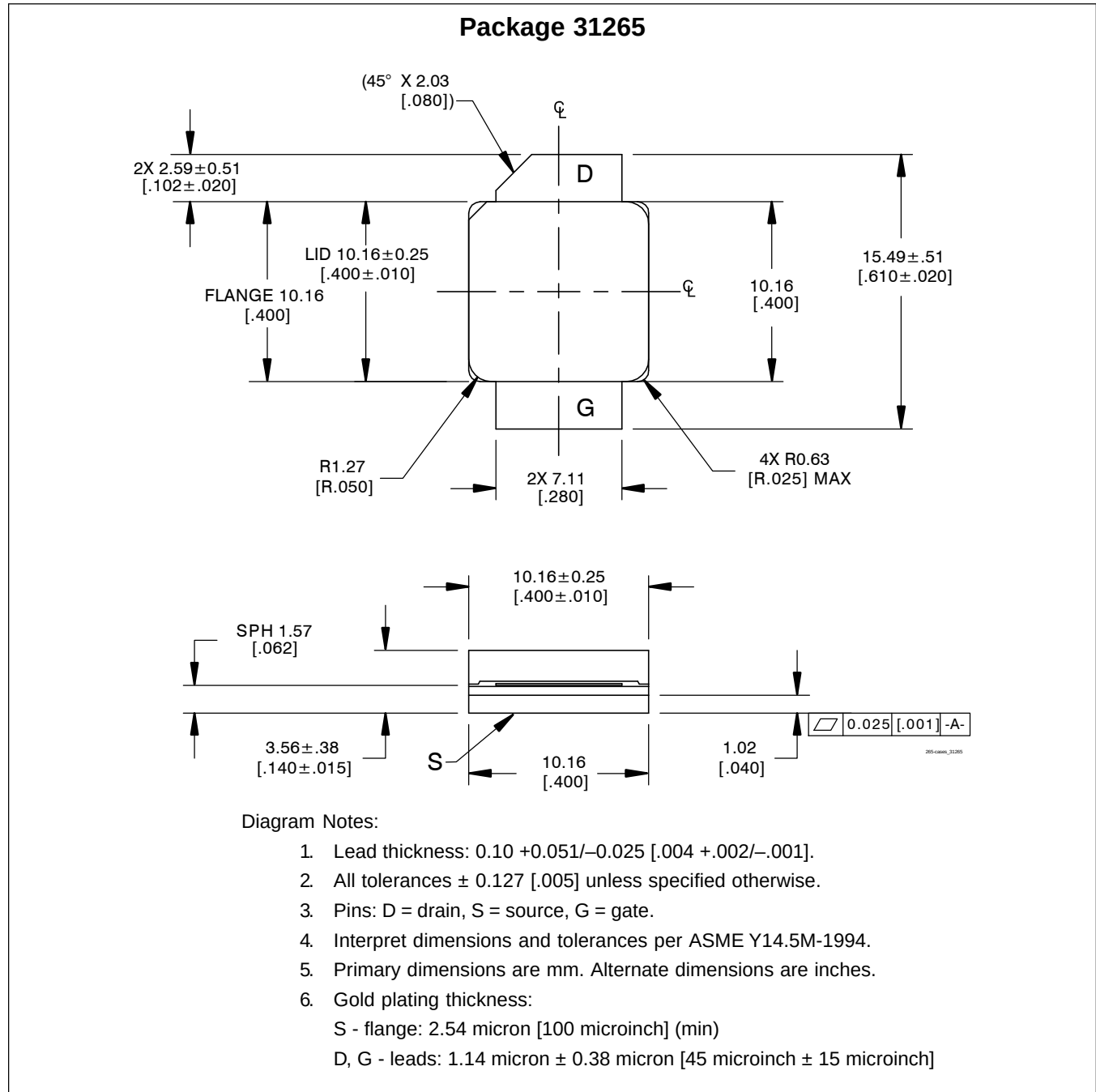
*Gerber Files for this circuit available on request

Package Outline Specifications



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

Package Outline Specifications (cont.)



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Revision History: 2005-08-22

Data Sheet

Previous Version: 2005-04-15, Preliminary Data Sheet

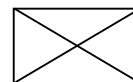
Page	Subjects (major changes since last revision)
3 – 7	Add tables, graphs, impedance and circuit information
8 – 9	Add and update package information
all	Remove Preliminary designation

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