

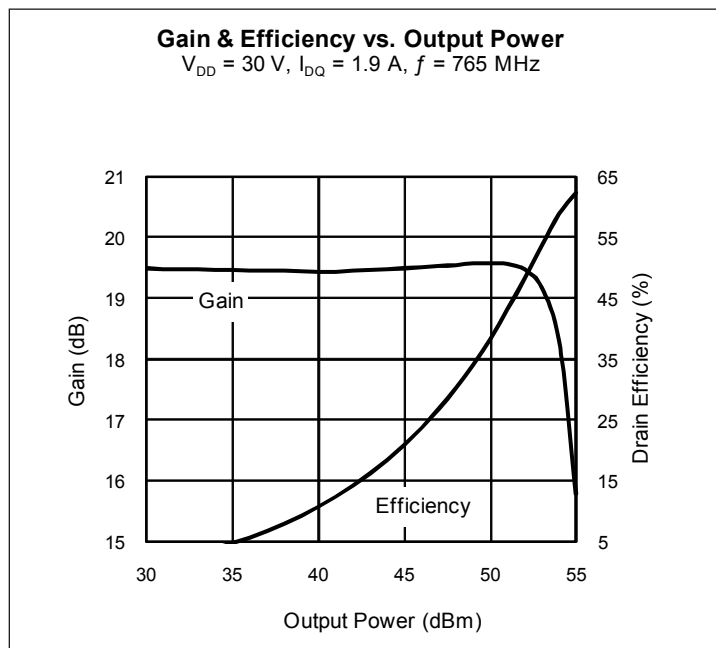
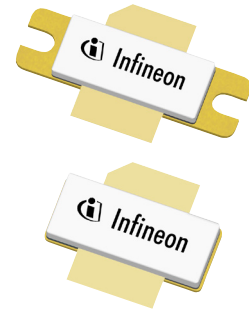
Thermally-Enhanced High Power RF LDMOS FETs 240 W, 725 – 770 MHz

Description

The PTFA072401EL and PTFA072401FL are 240-watt LDMOS FETs designed for use in cellular power amplifier applications in the 725 to 770 MHz frequency band. These devices feature internal I/O matching and thermally-enhanced, open-cavity ceramic packages. Manufactured with Infineon's advanced LDMOS process, these devices provide excellent thermal performance and superior reliability.

PTFA072401EL
Package H-33288-2

PTFA072401FL
Package H-34288-2



Features

- Broadband internal matching
- Typical two-carrier WCDMA performance at 770 MHz, 30 V
 - Average output power = 40 W
 - Linear Gain = 19 dB
 - Efficiency = 25%
 - Intermodulation distortion = -39 dBc
- Typical CW performance, 770 MHz, 30 V
 - Output power at P_{1dB} = 240 W
 - Efficiency = 58%
- Integrated ESD protection
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 30 V, 240 W (CW) output power
- Thermally-enhanced packages, Pb-free and RoHS compliant with low gold (<0.25 micron) plating

RF Characteristics

Two-carrier WCDMA Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)
 $V_{DD} = 30\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $P_{OUT} = 40\text{ W}$ average, $f_1 = 760\text{ MHz}$, $f_2 = 770\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8.1 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	—	19	—	dB
Drain Efficiency	η_D	—	25	—	%
Intermodulation Distortion	IMD	—	-39	—	dBc

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)

$V_{DD} = 30\text{ V}$, $I_{DQ} = 1800\text{ mA}$, $P_{OUT} = 220\text{ W PEP}$, $f = 765\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	18	19	—	dB
Drain Efficiency	η_D	43	45	—	%
Intermodulation Distortion	IMD	—	-29	-28	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	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	1.82	—	Ω
Operating Gate Voltage	$V_{DS} = 30\text{ V}$, $I_{DQ} = 1800\text{ mA}$	V_{GS}	2.0	2.5	3.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

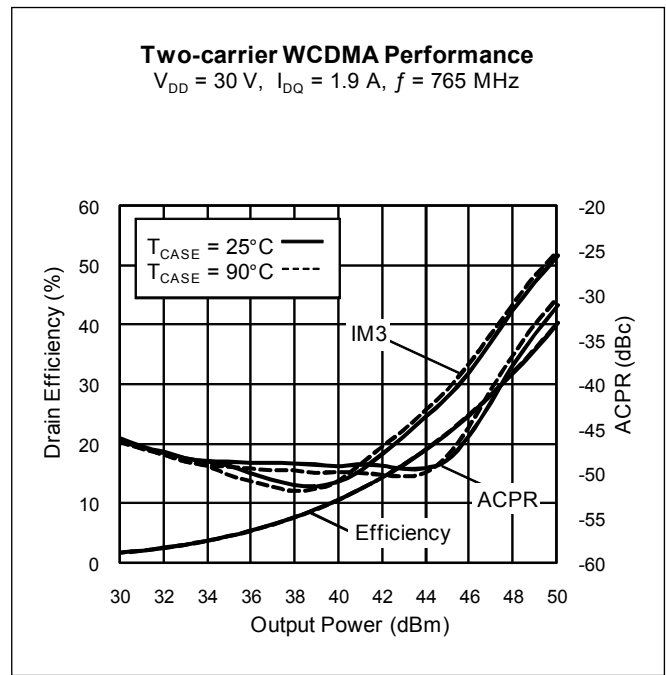
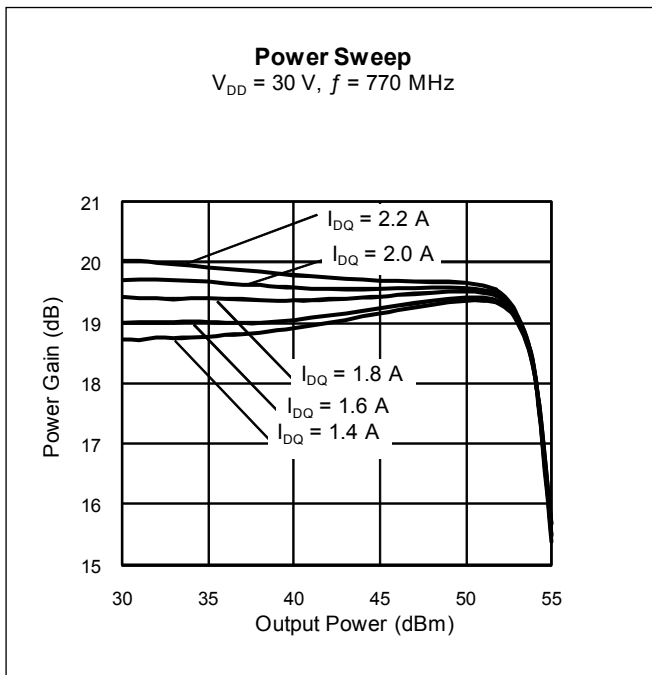
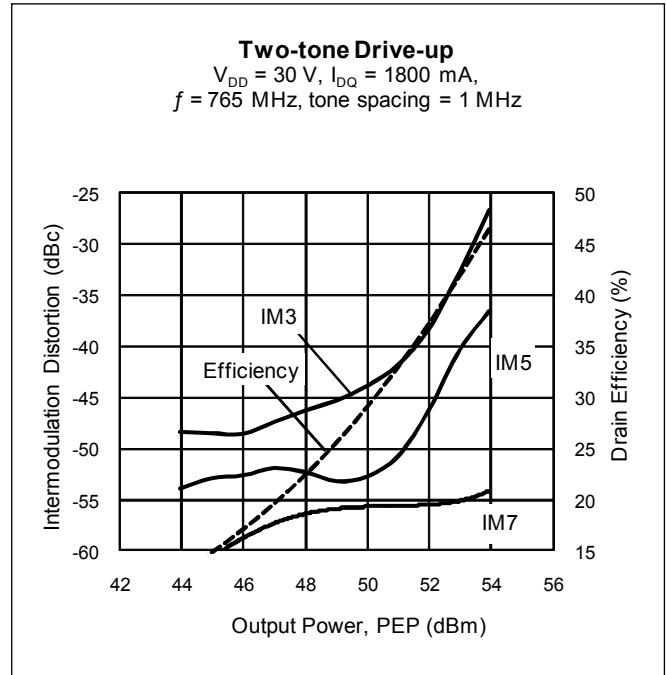
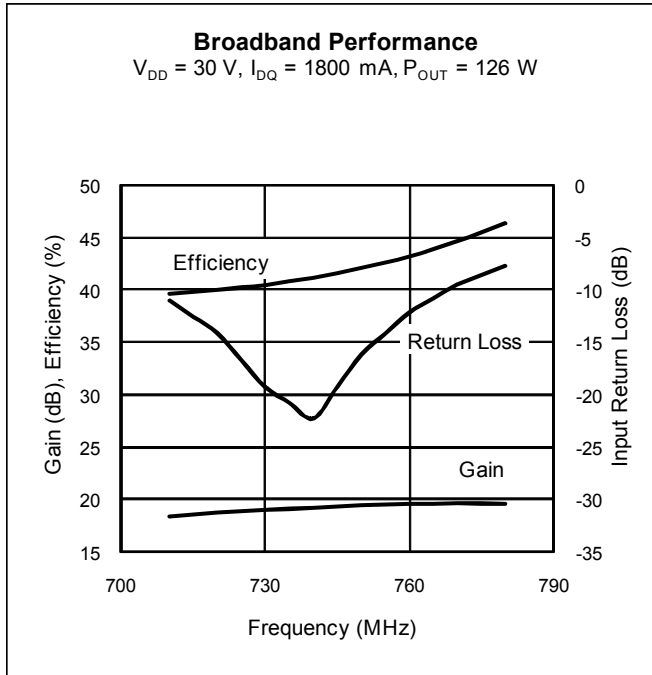
Maximum Ratings

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	P_D	700	W
		Above 25 $^{\circ}\text{C}$ derate by	4.0
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 240 W CW)	$R_{\theta JC}$	0.28	$^{\circ}\text{C/W}$

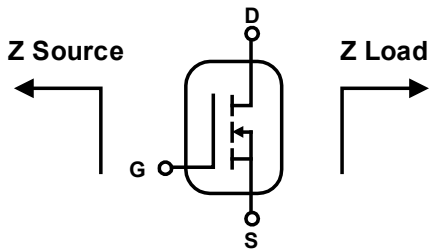
Ordering Information

Type and Version	Package Outline	Package Description	Shipping
PTFA072401EL V4	H-33288-2	Thermally-enhanced slotted flange, single-ended	Tray
PTFA072401FL V4	H-34288-2	Thermally-enhanced earless flange, single-ended	Tray

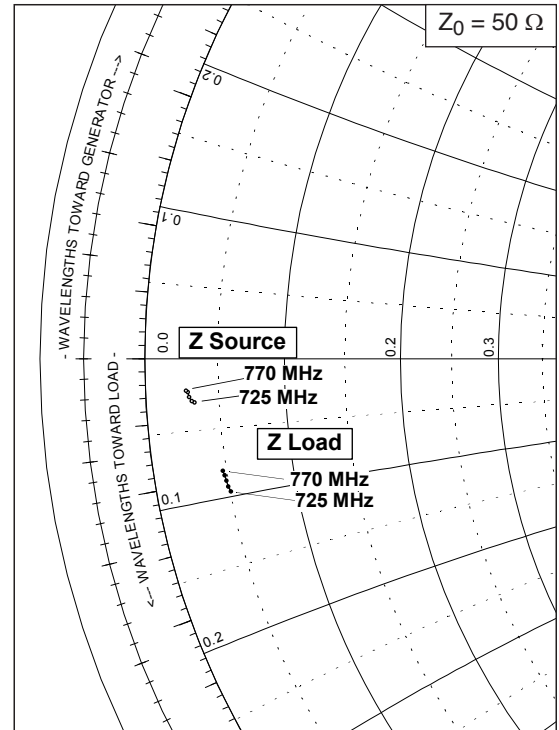
Typical Performance (data taken in a production test fixture)



Broadband Circuit Impedance

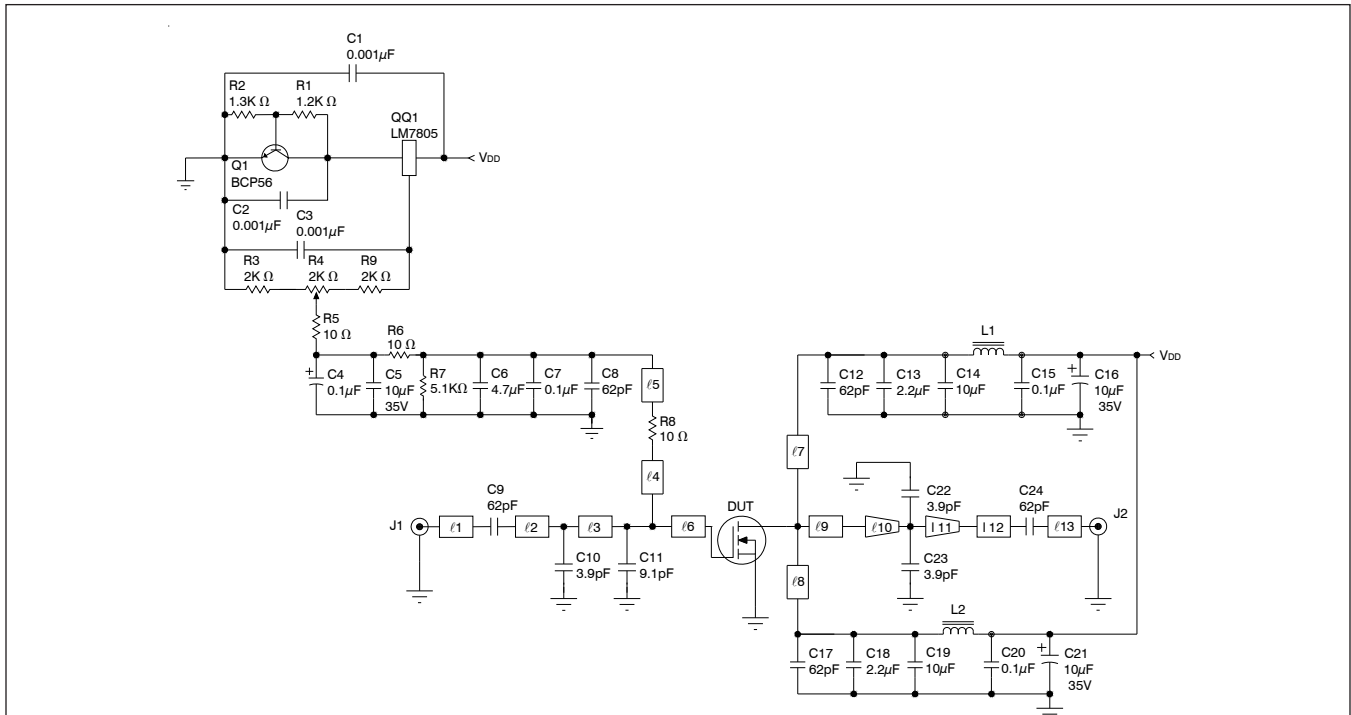


Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
725	2.53	-4.83	1.64	-1.54
736	2.48	-4.64	1.55	-1.48
748	2.44	-4.41	1.46	-1.33
759	2.41	-4.22	1.42	-1.17
770	2.37	-4.04	1.36	-1.11



See next page for reference circuit information

Reference Circuit



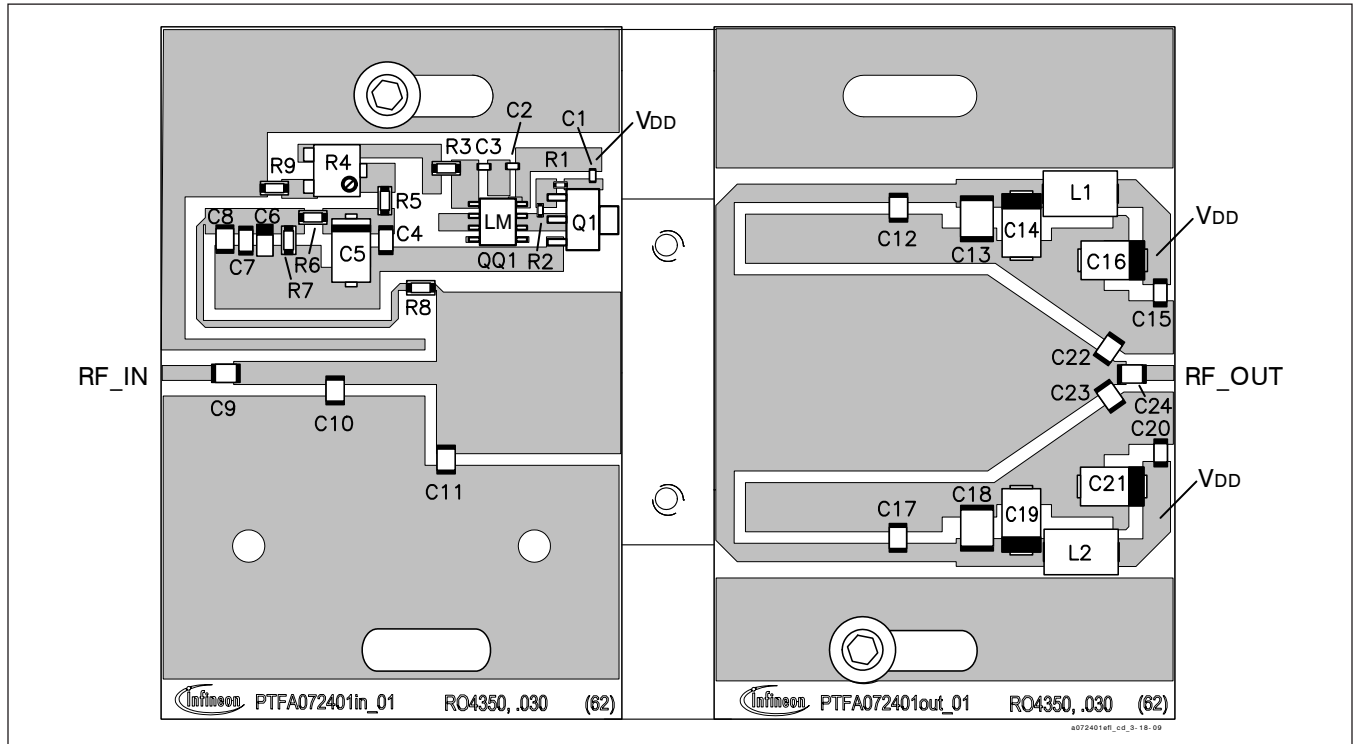
Reference circuit schematic for $f = 770 \text{ MHz}$

Circuit Assembly Information

DUT	PTFA072401EL or PTFA072401FL	LD MOS Transistor
PCB	LTN/PTFA072401E or LTN/PTFA072401F	Rogers RO4350: 0.76 mm [.030"] thick, $\epsilon_r = 3.48$, 1 oz. copper

Microstrip	Electrical Characteristics at 770 MHz	Dimensions: L x W (mm)	Dimensions: L x W (in.)
l1	0.025λ , 50.7 Ω	5.84 x 1.65	0.230 x 0.065
l2, l3	0.048λ , 38.4 Ω	11.18 x 2.54	0.440 x 0.100
l4	0.002λ , 76.8 Ω	0.51 x 0.76	0.020 x 0.030
l5	0.145λ , 76.8 Ω	35.43 x 0.76	1.395 x 0.030
l6	0.094λ , 7.8 Ω	20.32 x 17.78	0.800 x 0.700
l7, l8	0.108λ , 44.5 Ω	25.40 x 2.03	1.000 x 0.080
l9	0.140λ , 6.5 Ω	29.97 x 21.59	1.180 x 0.850
l10 (taper)	0.058λ , 6.5 Ω / 29.4 Ω	13.13 x 21.59 / 3.68	0.517 x 0.850 / 0.145
l11 (taper)	0.004λ , 29.4 Ω / 38.4 Ω	0.84 x 3.68 / 2.54	0.033 x 0.145 / 0.100
l12	0.005λ , 38.4 Ω	1.27 x 2.54	0.050 x 0.100
l13	0.016λ , 50.7 Ω	3.76 x 1.65	0.148 x 0.065

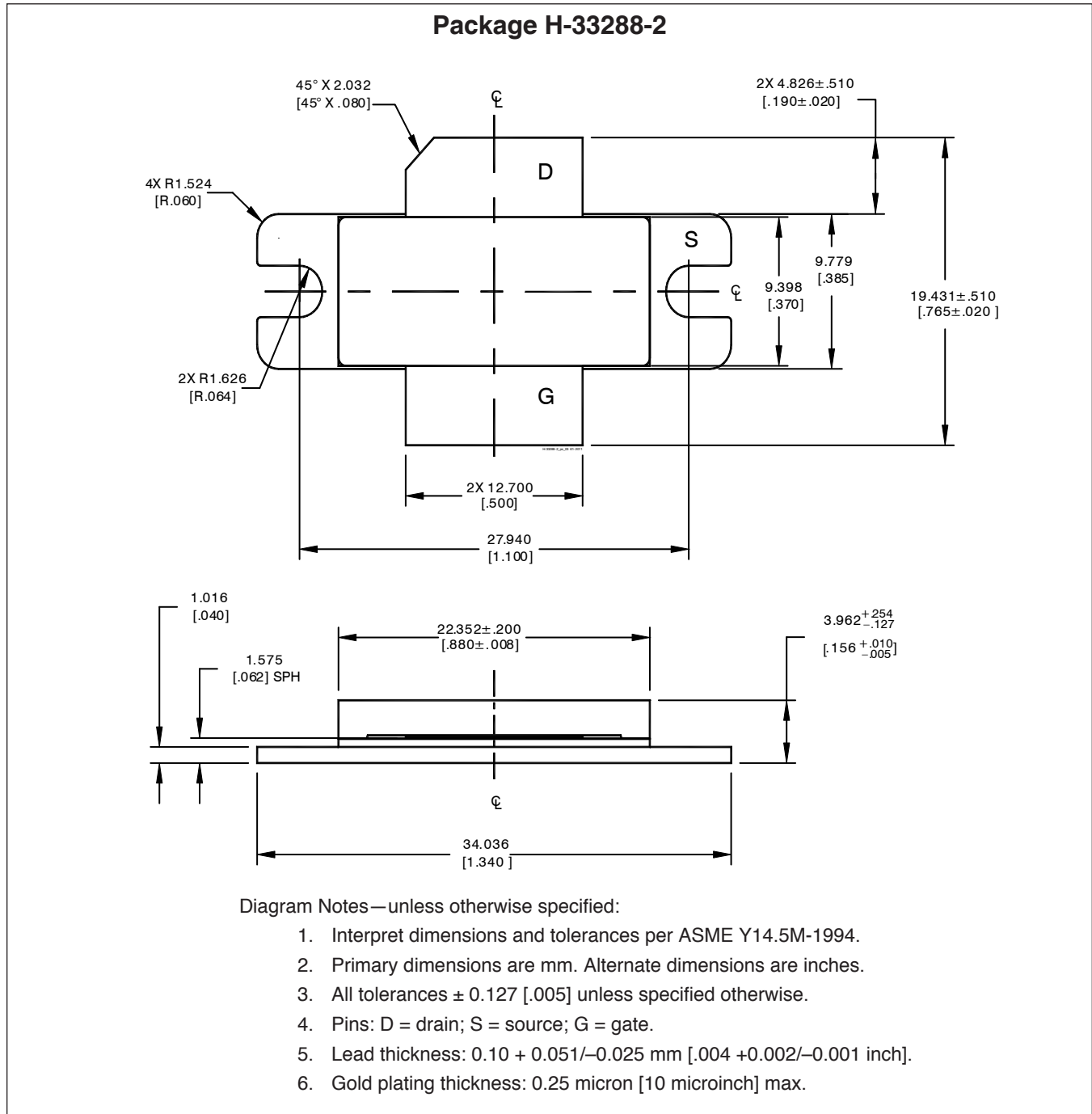
Reference Circuit (cont.)



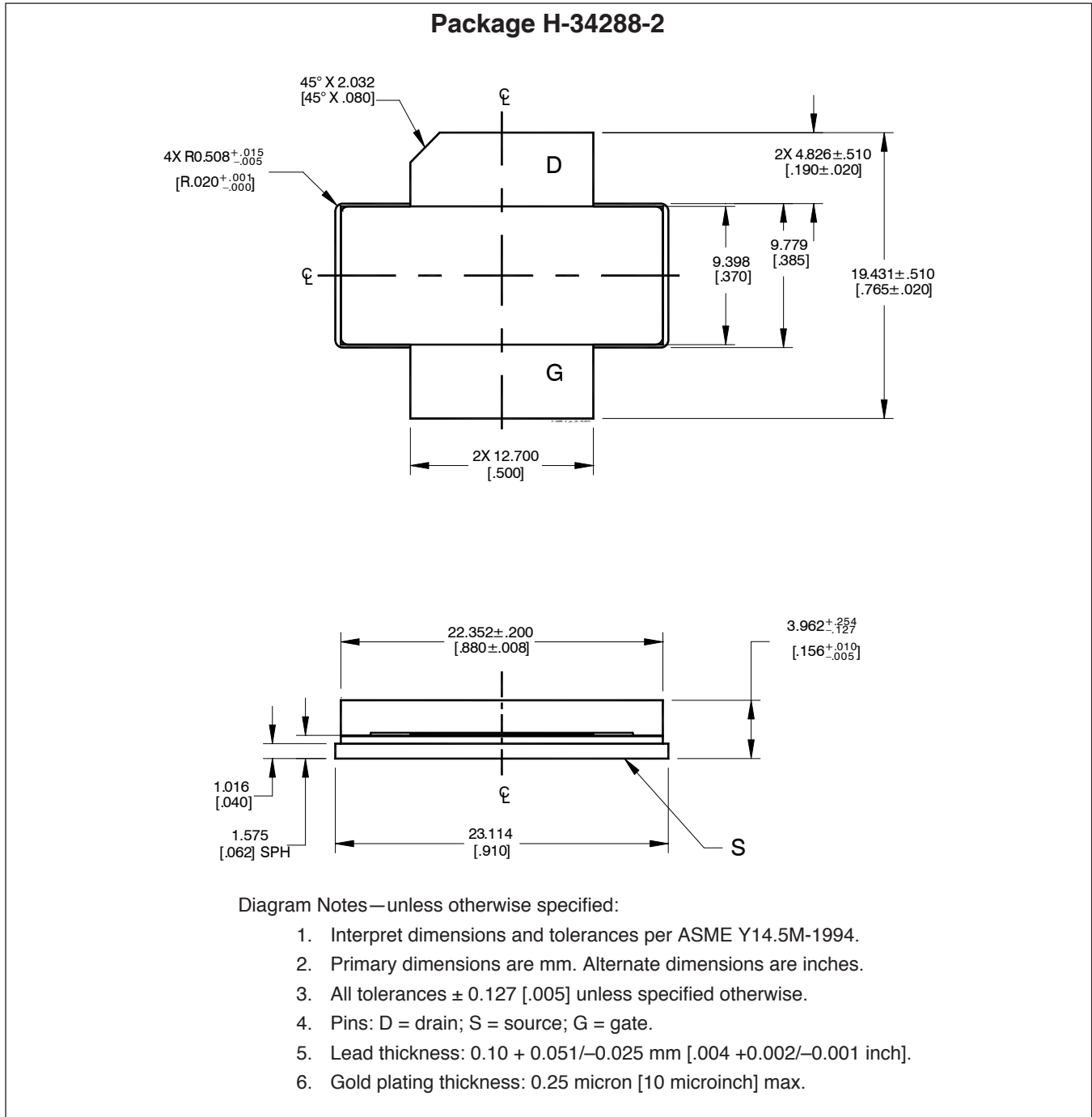
Reference circuit assembly diagram (not to scale)

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 μ F	Digi-Key	PCC1772CT-ND
C4, C7, C15, C20	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C5,	Tantalum Capacitor, 10 μ F, 35 V	Digi-Key	399-1655-2-ND
C6	Capacitor, 4.7 μ F, 16 V	Digi-Key	PCS3475CT-ND
C8, C9, C12, C17, C24	Ceramic capacitor, 62 pF	ATC	100B 620
C10, C22, C23	Ceramic capacitor, 3.9 pF	ATC	100B 3R9
C11	Ceramic capacitor, 9.1 pF	ATC	100B 9R1
C13, C18	Capacitor, 2.2 μ F	Digi-Key	445-1447-2-ND
C14, C16, C19, C21	Tantalum Capacitor, 10 μ F, 35 V	Digi-Key	PCS6106TR-ND
L1, L2	Ferrite, 8.9 mm	Digi-Key	240-2511-2-ND
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage Regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.2k Ω	Digi-Key	P1.2KGCT-ND
R2	Chip resistor, 1.3k Ω	Digi-Key	P1.3KGCT-ND
R3, R9	Chip resistor, 2k Ω	Digi-Key	P2KECT-ND
R4	Variable Resistor 2k Ω	Digi-Key	3224W-202ETR-ND
R5, R6, R8	Chip resistor, 10 Ω	Digi-Key	P10ECT-ND
R7	Chip resistor 5.1k Ω	Digi-Key	P5.1KECT-ND

Package Outline Specifications



Package Outline Specifications (cont.)



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

Revision History: 2011-04-01 Data Sheet

Previous Version: 2009-03-27, Data Sheet

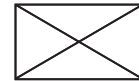
Page	Subjects (major changes since last revision)
1	Updated ESD protection feature
2	Corrected DC Characteristics table
3	Removed CW performance at selected drain voltages graph
4	Removed bias voltage vs. temperature graph

We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all?
 Your feedback will help us to continuously improve the quality of this document.
 Please send your proposal (including a reference to this document) to:

highpowerRF@infineon.com

To request other information, contact us at:
 +1 877 465 3667 (1-877-GO-LDMOS) USA
 or +1 408 776 0600 International



Edition 2011-04-01

Published by
 Infineon Technologies AG
 81726 Munich, Germany

© 2009 Infineon Technologies AG
 All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com/rfpower).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.