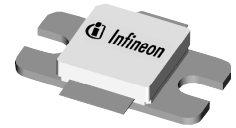


Thermally-Enhanced High Power RF LDMOS FETs 70 W, 1805 – 1880 MHz

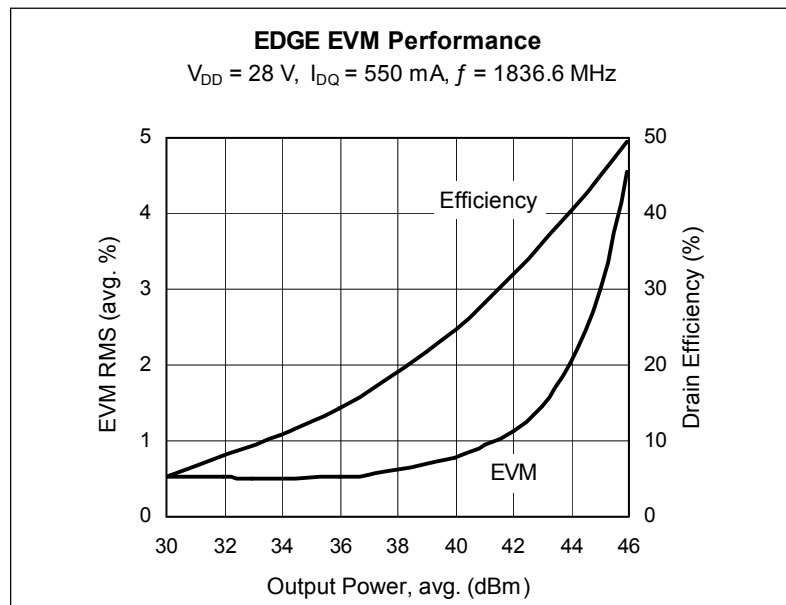
Description

The PTFA180701E and PTFA180701F are 70-watt LDMOS FETs designed for GSM and GSM EDGE power amplifier applications in the 1805 MHz to 1880 MHz band. Features include input and output matching, and thermally-enhanced packages with slotted or earless flanges. Manufactured with Infineon's advanced LDMOS process, these devices provide excellent thermal performance and superior reliability.

PTFA180701E
Package H-36265-2



PTFA180701F
Package H-37265-2



Features

- Thermally-enhanced packages, Pb-free and RoHS-compliant
- Broadband internal matching
- Typical EDGE performance
 - Average output power = 44 dBm
 - Gain = 16.5 dB
 - Efficiency = 40.5%
 - EVM = 2.0%
- Typical CW performance
 - Output power at P-1dB = 72 W
 - Gain = 15.5 dB
 - Efficiency = 59%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 70 W (CW) output power

RF Characteristics

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 550\text{ mA}$, $P_{OUT} = 44\text{ dBm}$, $f = 1836.6\text{ MHz}$

Characteristic		Symbol	Min	Typ	Max	Unit
Error Vector Magnitude		EVM RMS	—	2.0	—	%
Modulation Spectrum	@ 400 kHz	ACPR	—	-62	—	dBc
	@ 600 kHz	ACPR	—	-76	—	dBc
Gain		G_{ps}	—	16.5	—	dB
Drain Efficiency		η_D	—	40.5	—	%

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)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 550\text{ mA}$, $P_{OUT} = 60\text{ W PEP}$, $f = 1840\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15.5	16.5	—	dB
Drain Efficiency	η_D	44	45	—	%
Intermodulation Distortion	IMD	—	-30	-29	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	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.125	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_D = 550\text{ mA}$	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

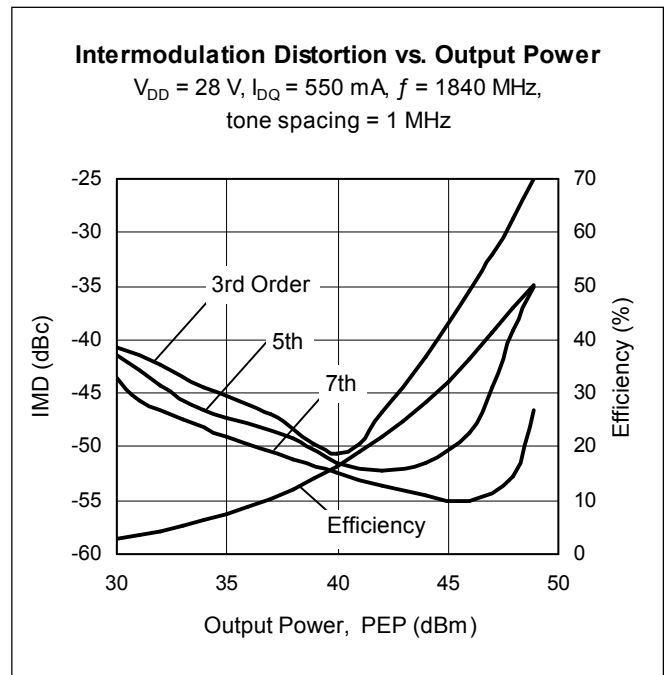
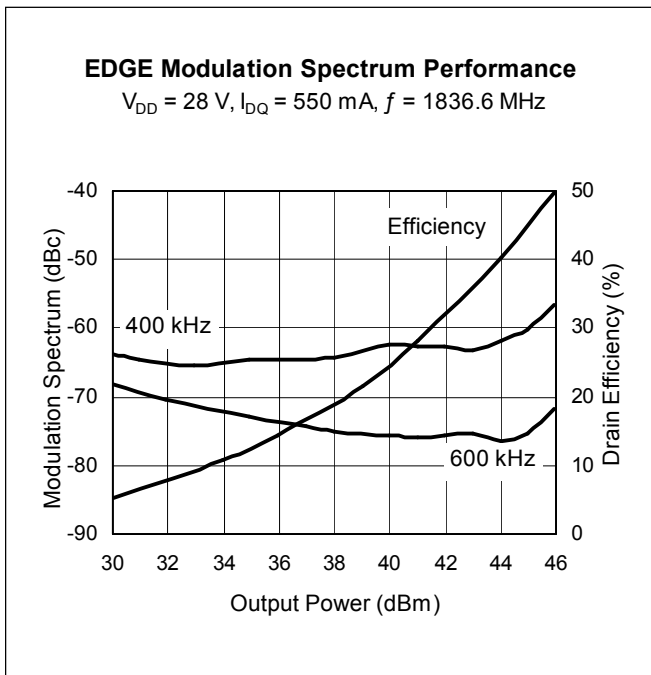
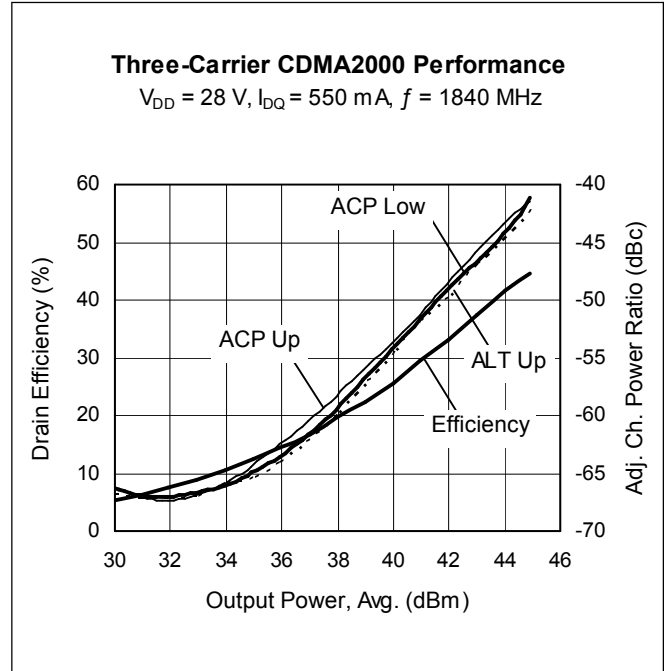
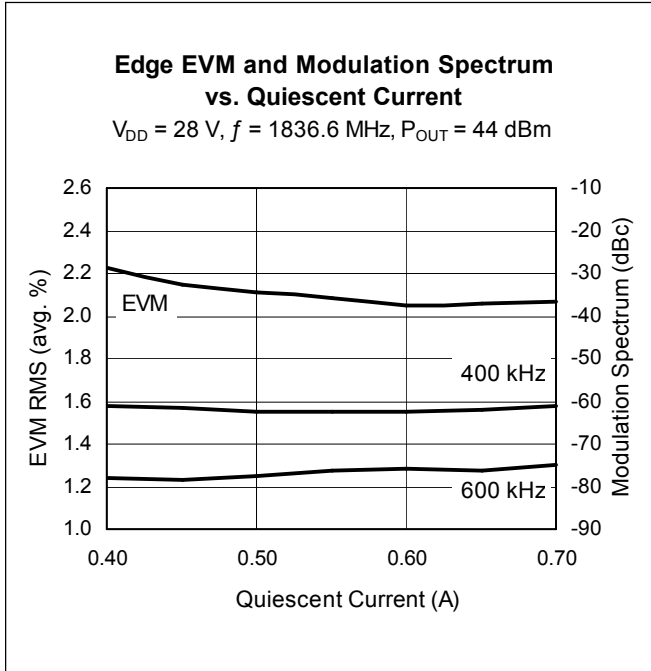
Maximum Ratings

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 Above 25 $^{\circ}\text{C}$ derate by	P_D	201	W
		1.15	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 70 W CW)	$R_{\theta JC}$	0.87	$^{\circ}\text{C/W}$

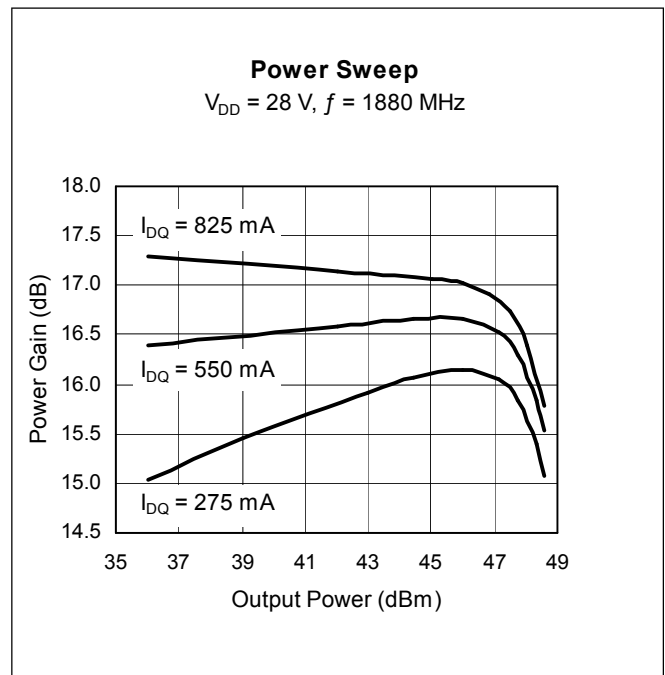
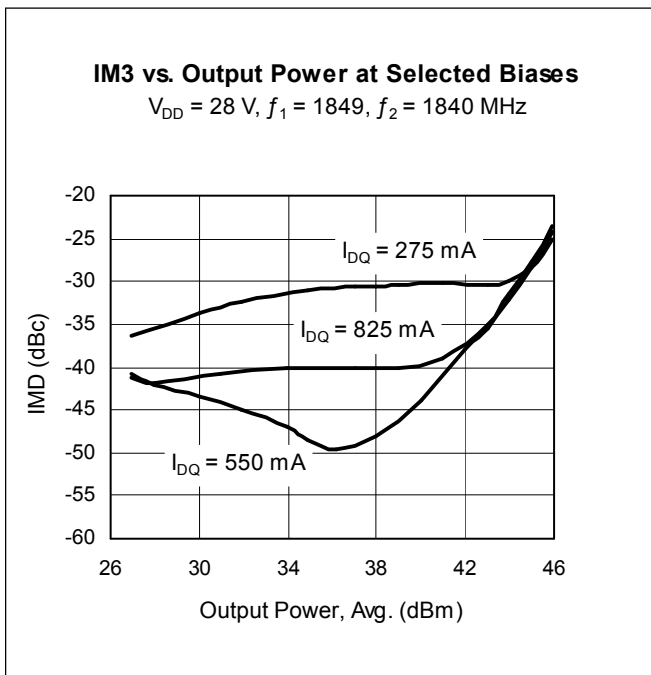
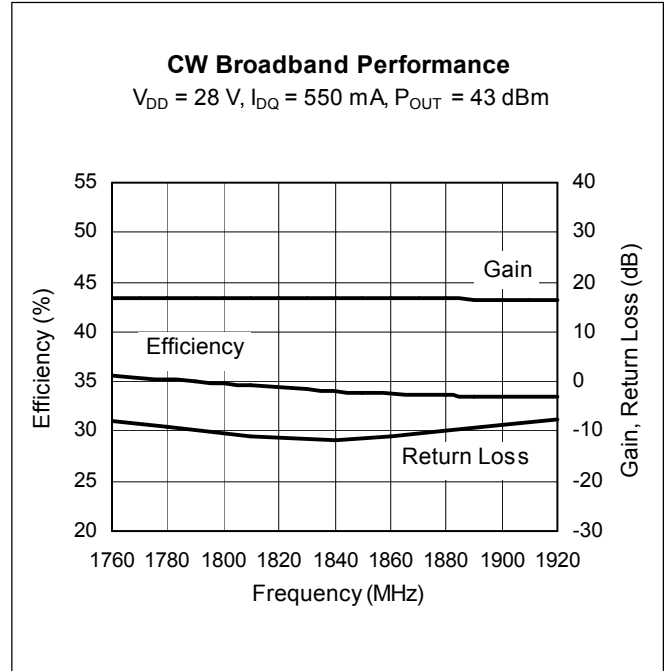
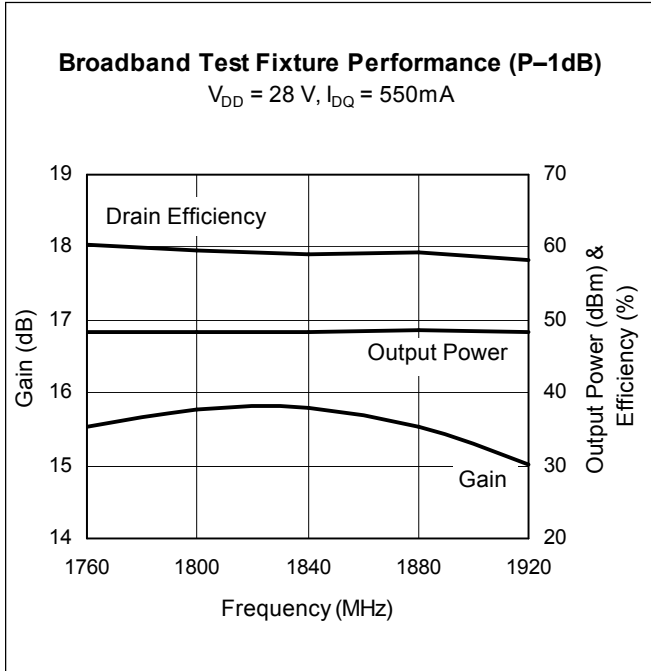
Ordering Information

Type and Version	Package Type	Package Description	Marking
PTFA180701E V4	H-36265-2	Thermally-enhanced slotted flange, single-ended	PTFA180701E
PTFA180701E V4	H-37265-2	Thermally-enhanced earless flange, single-ended	PTFA180701F

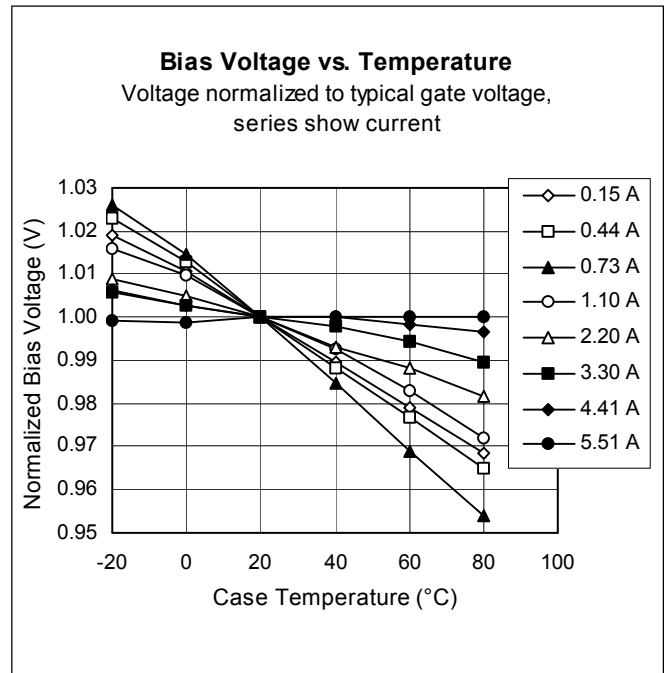
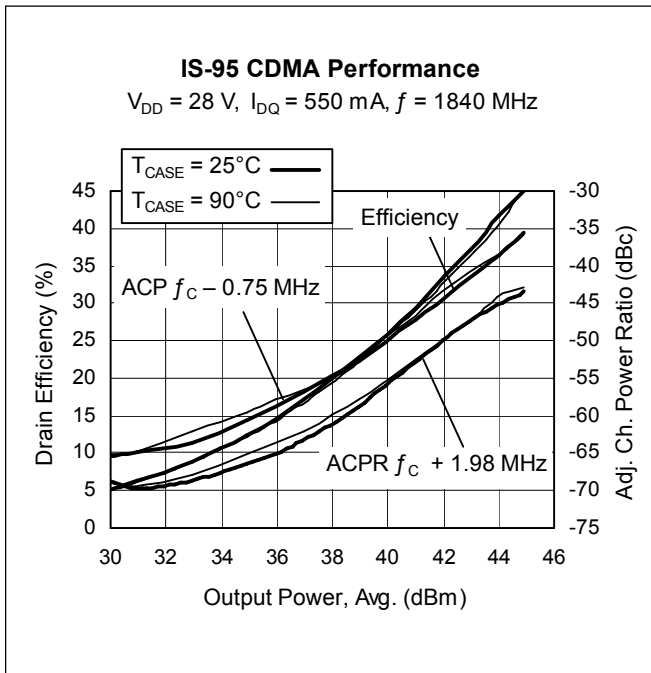
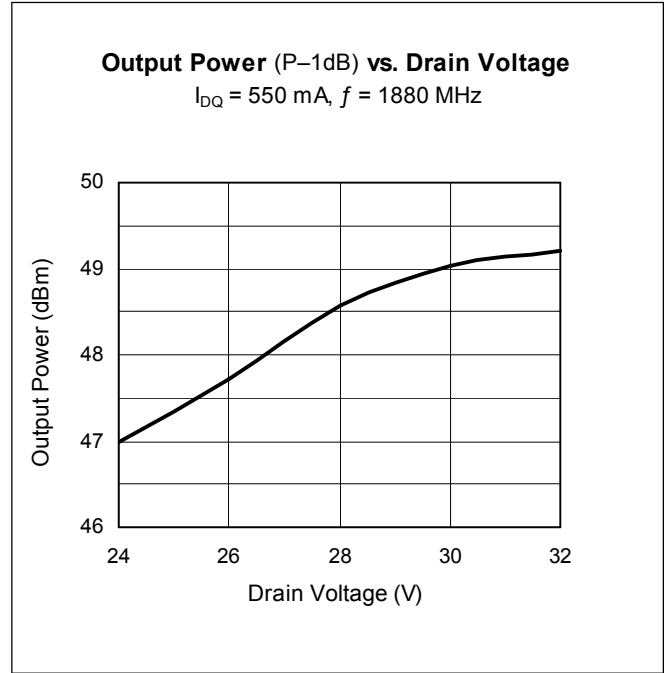
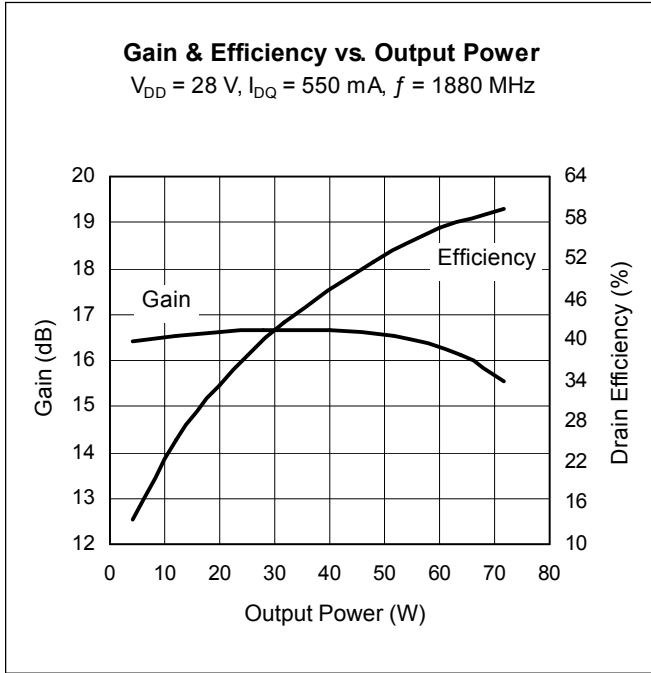
Typical Performance (measurements taken in production test fixture)



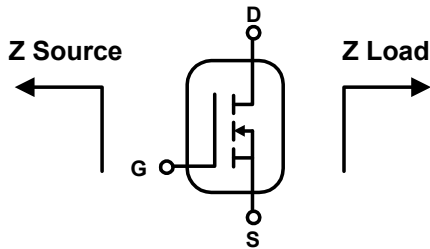
Typical Performance (cont.)



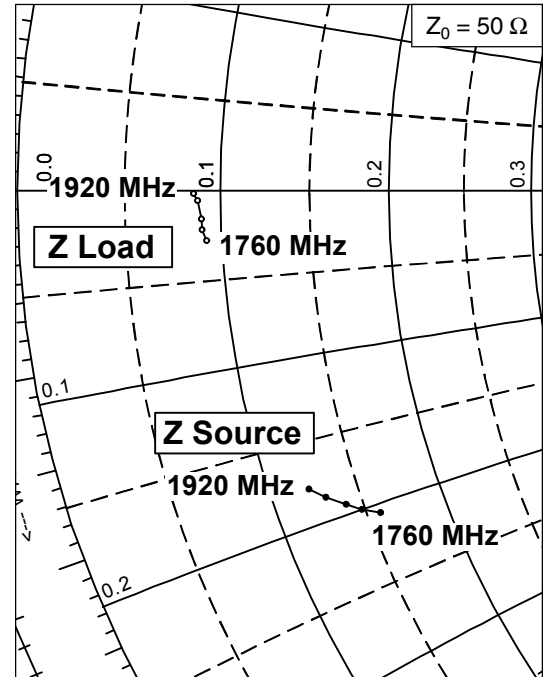
Typical Performance (cont.)



Broadband Circuit Impedance

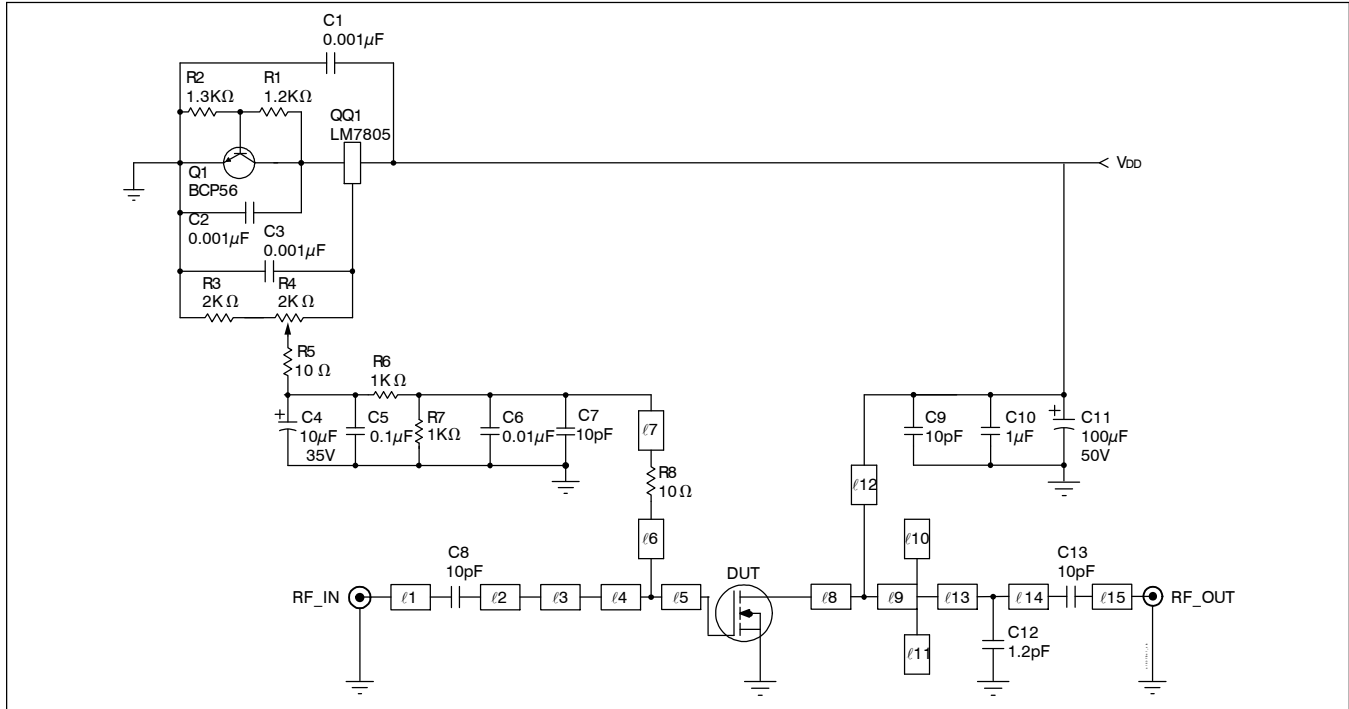


Frequency MHz	Z Source W		Z Load W	
	R	jX	R	jX
1760	7.9	-10.3	4.6	-1.4
1800	7.4	-10.0	4.5	-1.1
1840	7.0	-9.7	4.5	-0.8
1880	6.5	-9.3	4.4	-0.3
1920	6.1	-8.9	4.3	-0.1



See next page for circuit information

Reference Circuit



Reference circuit schematic for 1840 MHz

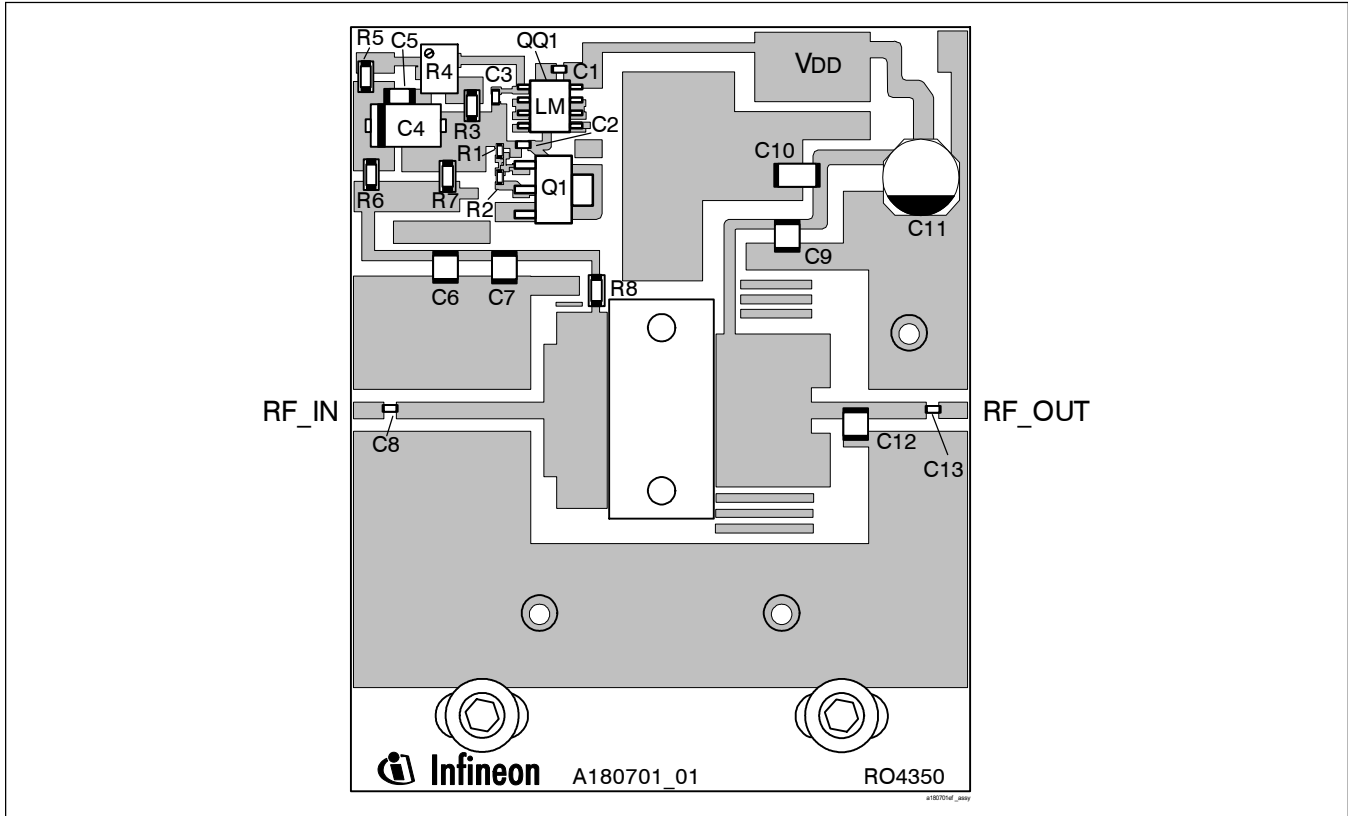
Circuit Assembly Information

DUT	PTFA180701E or PTFA180701F	LDMOS Transistor	
PCB	0.76 mm [.030"], $\epsilon_r = 3.48$	Rogers, RO4350	1 oz. copper

Microstrip	Electrical Characteristics at 1840 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.034 λ, 50.0	3.33 x 1.70	0.131 x 0.067
ℓ2	0.149 λ, 50.0	14.68 x 1.70	0.578 x 0.067
ℓ3	0.014 λ, 10.2	1.27 x 13.28	0.050 x 0.523
ℓ4	0.044 λ, 7.1	3.86 x 19.61	0.152 x 0.772
ℓ5	0.014 λ, 7.1	1.27 x 19.61	0.050 x 0.772
ℓ6	0.012 λ, 78.0	1.22 x 0.74	0.048 x 0.029
ℓ7	0.115 λ, 65.0	11.51 x 1.07	0.453 x 0.042
ℓ8	0.016 λ, 8.9	1.37 x 15.34	0.054 x 0.604
ℓ9	0.090 λ, 8.9	8.13 x 15.34	0.320 x 0.604
ℓ10, ℓ11	0.020 λ, 21.8	1.91 x 5.36	0.075 x 0.211
ℓ12	0.162 λ, 64.0	16.18 x 1.12	0.637 x 0.044
ℓ13	0.042 λ, 50.0	4.11 x 1.70	0.162 x 0.067
ℓ14	0.074 λ, 50.0	7.29 x 1.70	0.287 x 0.067
ℓ15	0.032 λ, 50.0	3.12 x 1.70	0.123 x 0.067

¹Electrical characteristics are rounded

Reference Circuit (cont.)

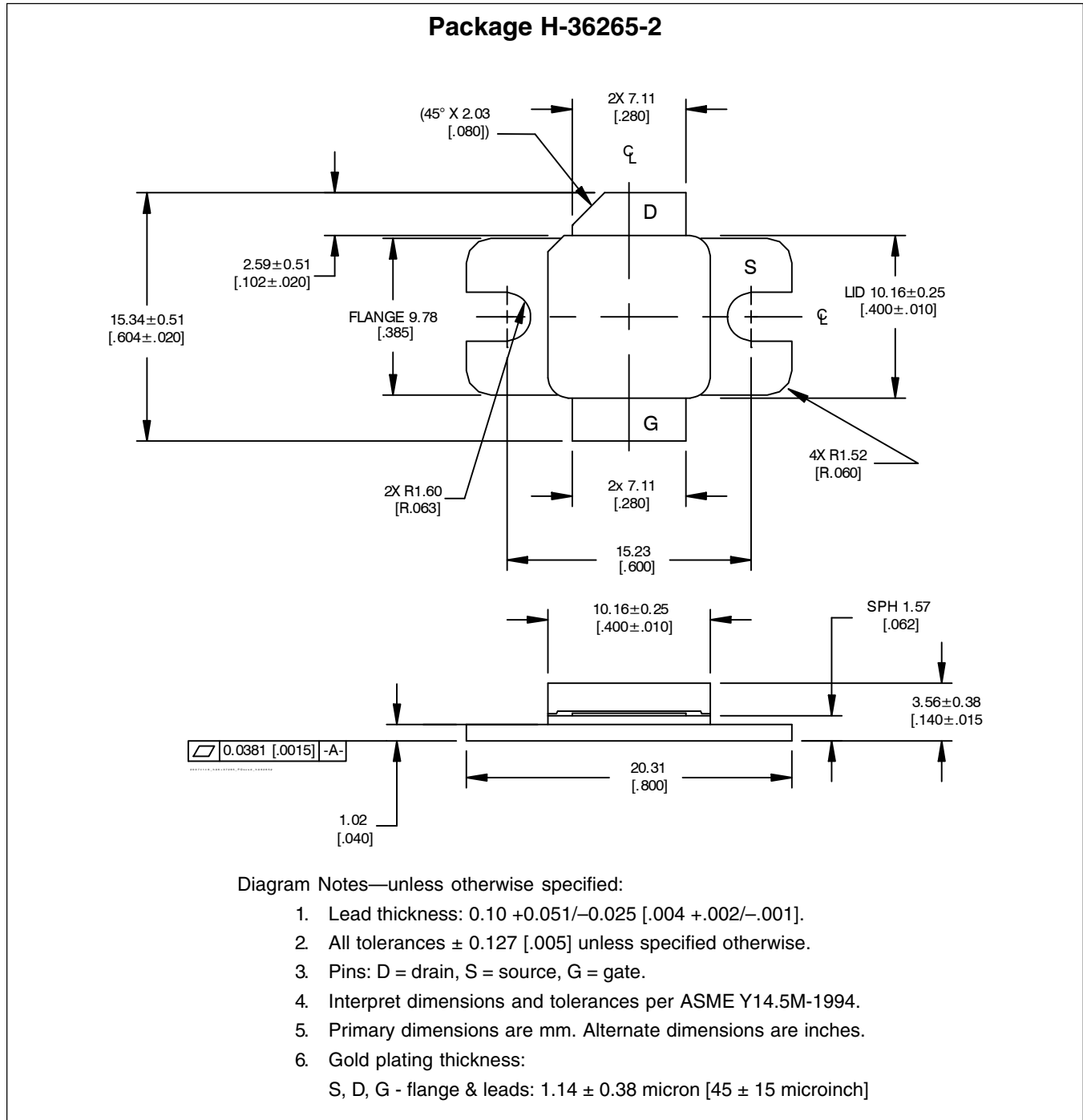


Reference circuit assembly diagram* (not to scale)

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	399-1655-2-ND
C5	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C6	Capacitor, 0.01 μ F	ATC	200B 103
C7, C9	Ceramic capacitor, 10 pF	ATC	100B 100
C8, C13	Ceramic capacitor, 10 pF	ATC	100A 100
C10	Ceramic capacitor, 1 μ F	Digi-Key	445-1411-1-ND
C11	Electrolytic capacitor, 100 μ F, 50 V	Digi-Key	PCE3718CT-ND
C12	Ceramic capacitor, 1.2 pF	ATC	100B 1R2
Q1	Transistor	Infineon Technologies	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, R8	Chip resistor 10 ohms	Digi-Key	P10ECT-ND
R6, R7	Chip resistor 1 k-ohms	Digi-Key	P1KECT-ND

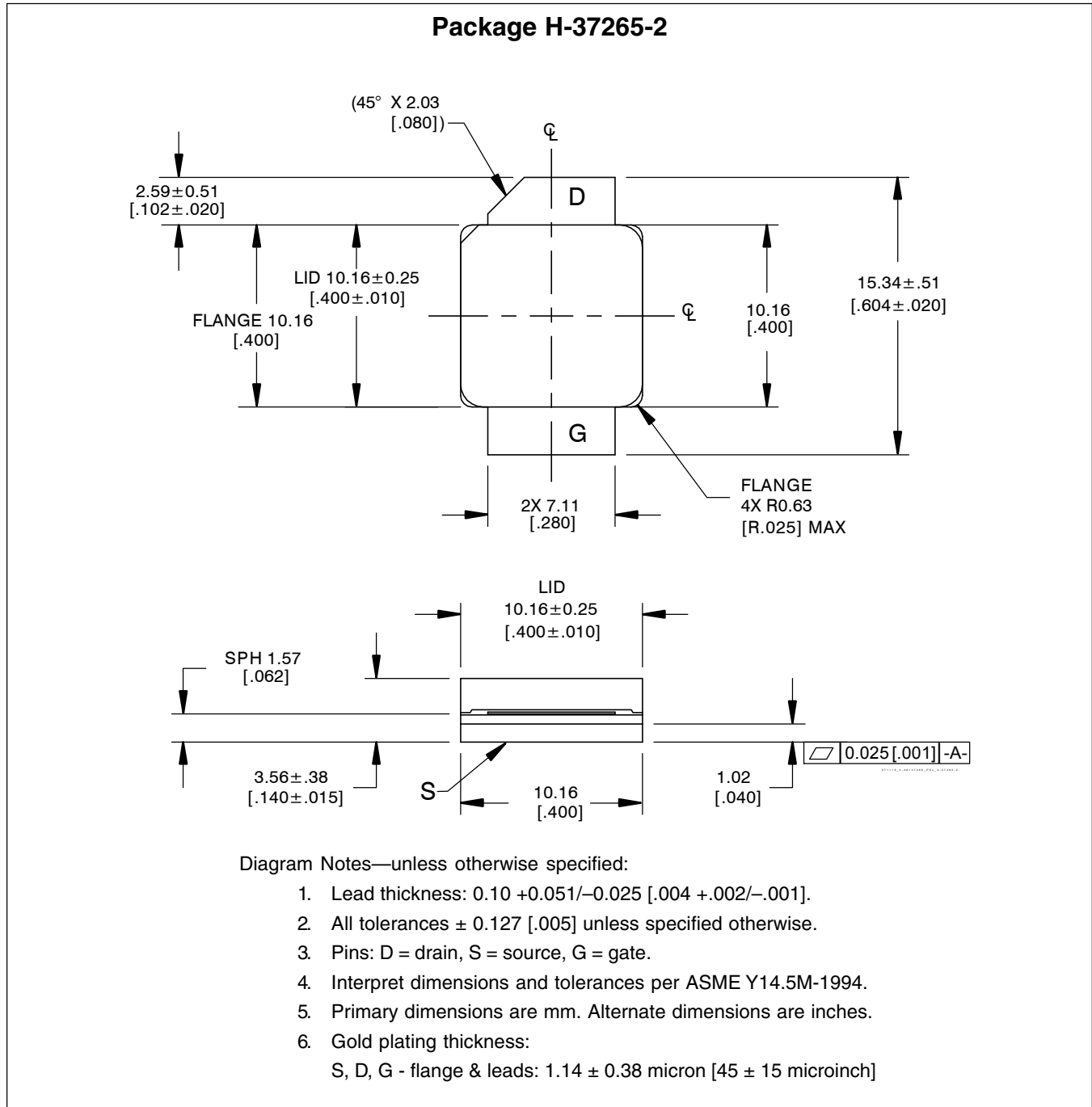
*Gerber files for this circuit available on request.

Package Outline Specifications



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

Package Outline Specifications (cont.)



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

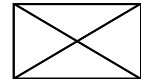
Page	Subjects (major changes since last revision)
1, 3, 9, 10	Update to product V4, with new package technologies. Update package outline diagrams.
8	Fixed typing error

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 2009-02-20****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.