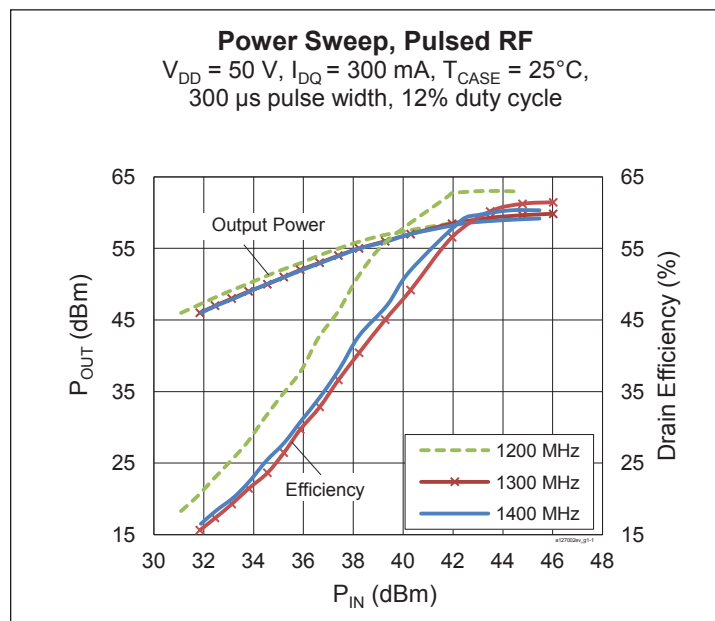


Thermally-Enhanced High Power RF LDMOS FETs 700 W, 50 V, 1200 – 1400 MHz

Description

The PTVA127002EV LDMOS FET is designed for use in power amplifier applications in the 1200 to 1400 MHz frequency band. Features include high gain and thermally-enhanced package with bolt-down flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PTVA127002EV
Package H-36275-4



Features

- Broadband input and output matching
- High gain and efficiency
- Integrated ESD protection
- Low thermal resistance
- Excellent ruggedness
- Pb-free and RoHS compliant
- Capable of withstanding a 10:1 load mismatch (all phase angles) at 700 W peak under RF pulse, 300 μs , 10% duty cycle.

RF Characteristics

Pulsed RF Performance (tested in Infineon test fixture)

$V_{DD} = 50\text{ V}$, $I_{DQ} = 150\text{ mA}$ per side, $P_{OUT} = 700\text{ W}$, $f_1 = 1200\text{ MHz}$, $f_2 = 1300\text{ MHz}$, $f_3 = 1400\text{ MHz}$, 300 μs pulse width, 12% duty cycle

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15	16	—	dB
Drain Efficiency	η_D	50	54	—	%
Gain Flatness	ΔG	—	1.0	1.5	dB
Return Loss	IRL	—	-16	-14	dB

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics

Typical RF Performance (not subject to production test, verified by design/characterization in Infineon test fixture)

$V_{DD} = 50\text{ V}$, $I_{DQ} = 150\text{ mA}$ per side, Input signal ($t_r = 7\text{ ns}$, $t_f = 5\text{ ns}$), $300\text{ }\mu\text{s}$ pulse width, 12% duty cycle, class AB test

Mode of Operation	f (MHz)	IRL (dB)	P_{1dB}			P_{3dB}			Max P_{droop} (pulse) @ P_{1dB}	t_r (ns) @ P_{1dB}	t_f (ns) @ P_{1dB}
			Gain (dB)	Eff (%)	P_{OUT} (W)	Gain (dB)	Eff (%)	P_{OUT} (W)			
300 μs , 12% Duty Cycle	1200	-20	16.6	57	710	14.6	57	810	0.2	5	<2
	1300	-16	15.8	54	840	13.8	55	950	0.3	5	<2
	1400	-20	15.7	54	730	13.7	53	820	0.2	5	<2

DC Characteristics (single side)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	105	—	—	V
Drain Leakage Current	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 105\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	$V_{DS} = 50\text{ V}$, $I_{DQ} = 150\text{ mA}$	V_{GS}	3	3.35	4	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

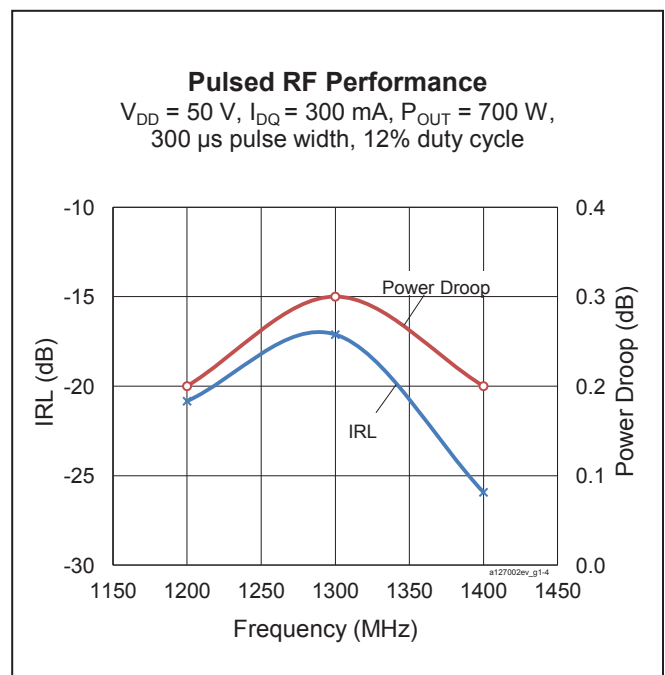
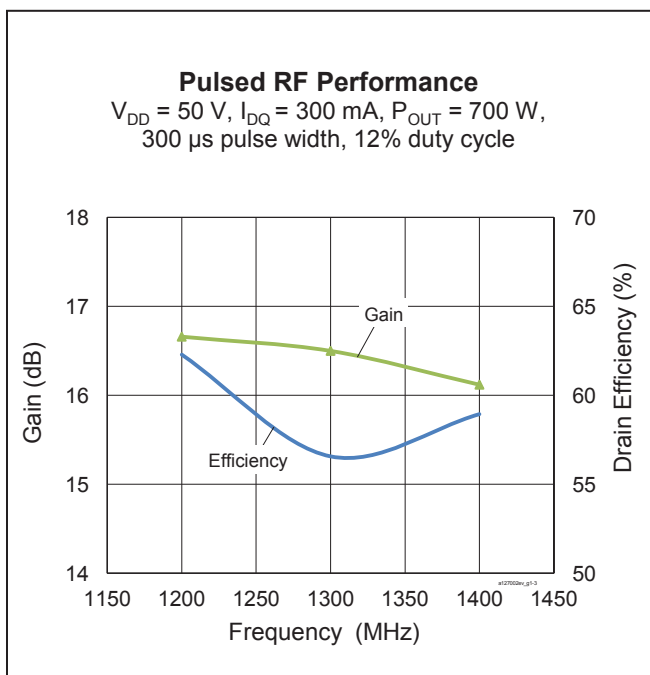
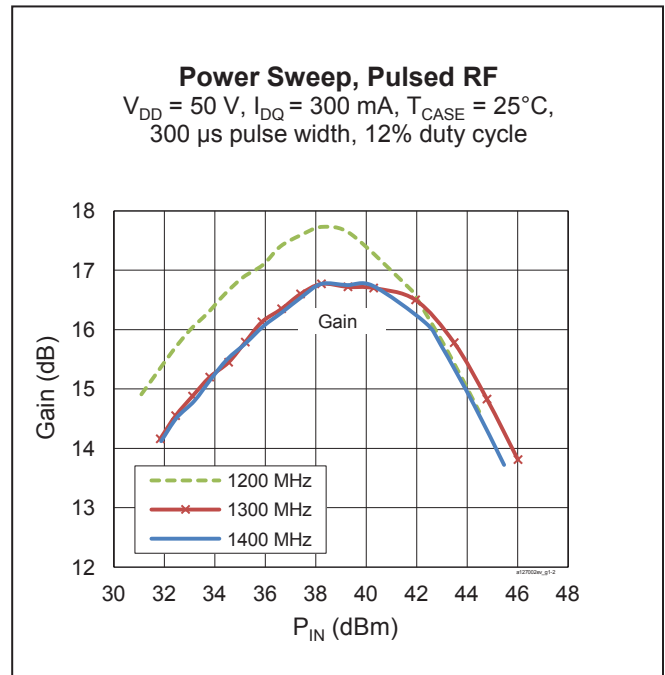
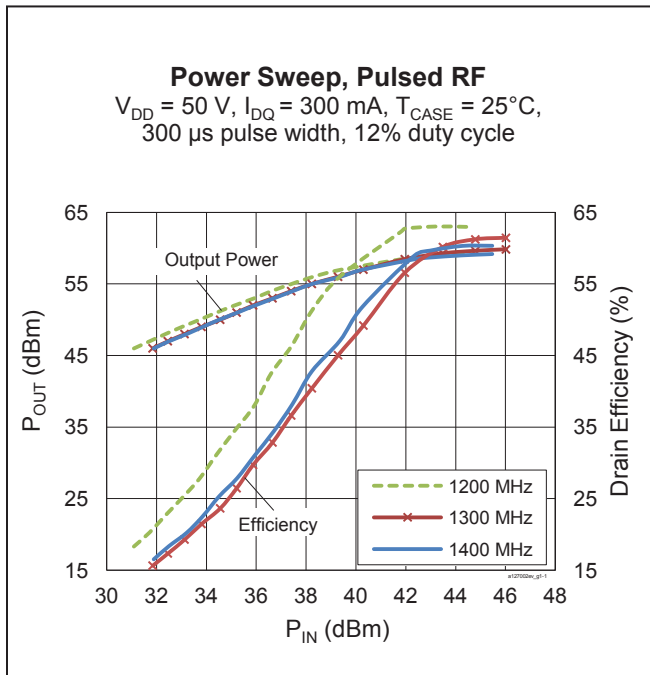
Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	105	V
Gate-Source Voltage	V_{GS}	-6 to +12	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-65 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 700 W CW)	$R_{\theta JC}$	~0.36	$^{\circ}\text{C/W}$

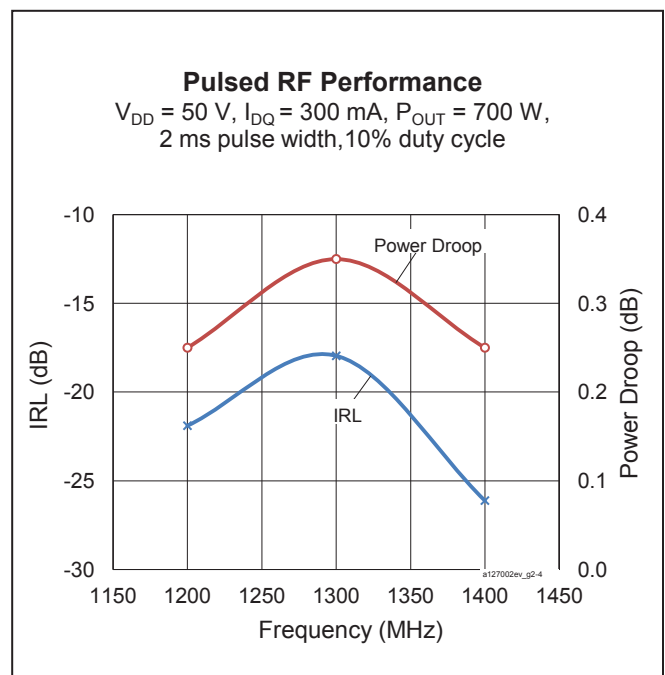
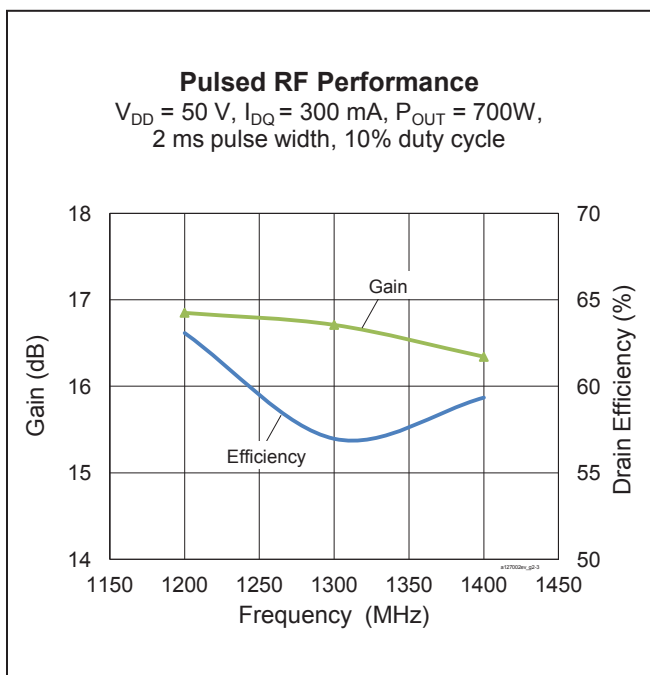
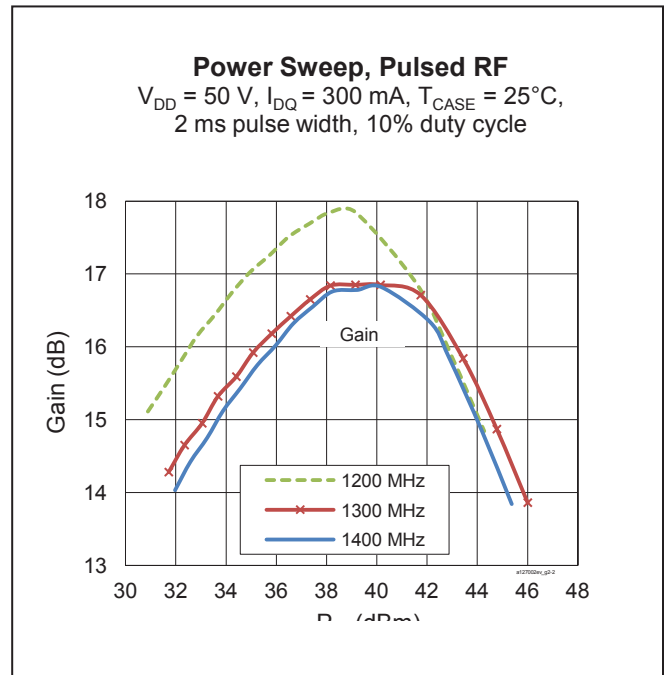
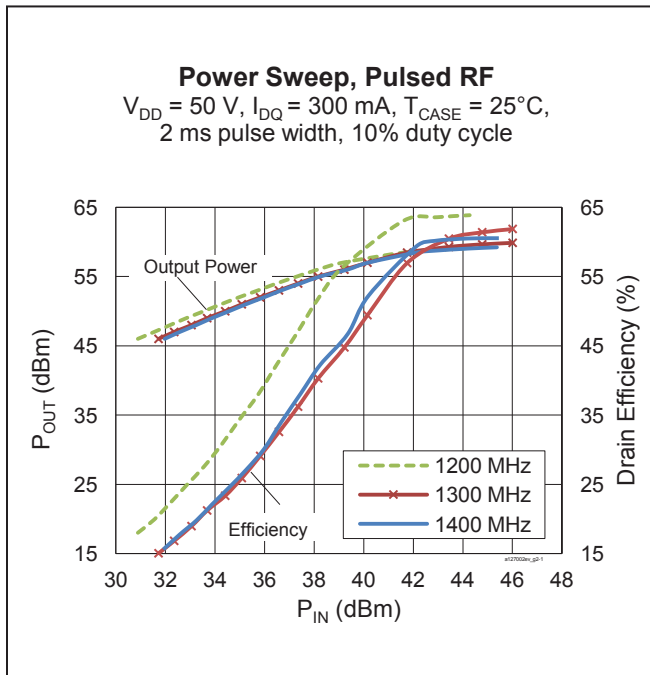
Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTVA127002EV V1	PTVA127002EVV1XWSA1	H-36275-4, bolt-down	Tray
PTVA127002EV V1 R250	PTVA127002EVV1R250XTMA1	H-36275-4, bolt-down	Tape & Reel, 250 pcs

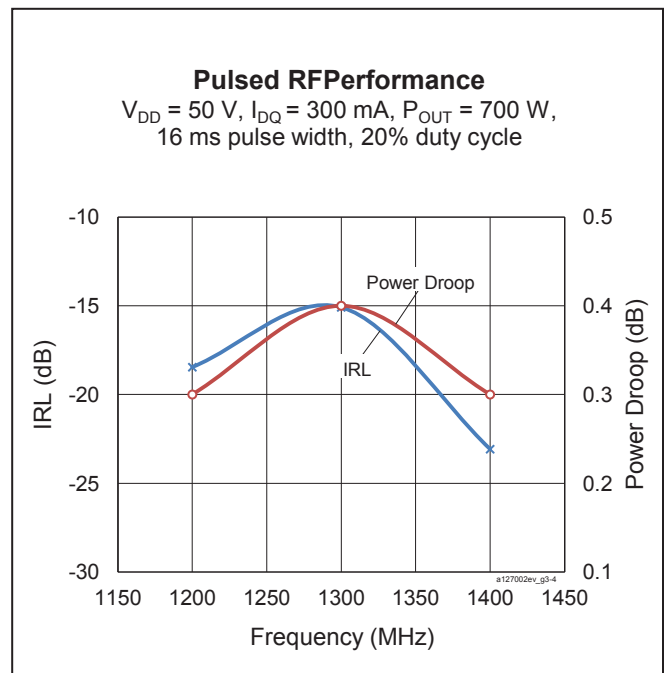
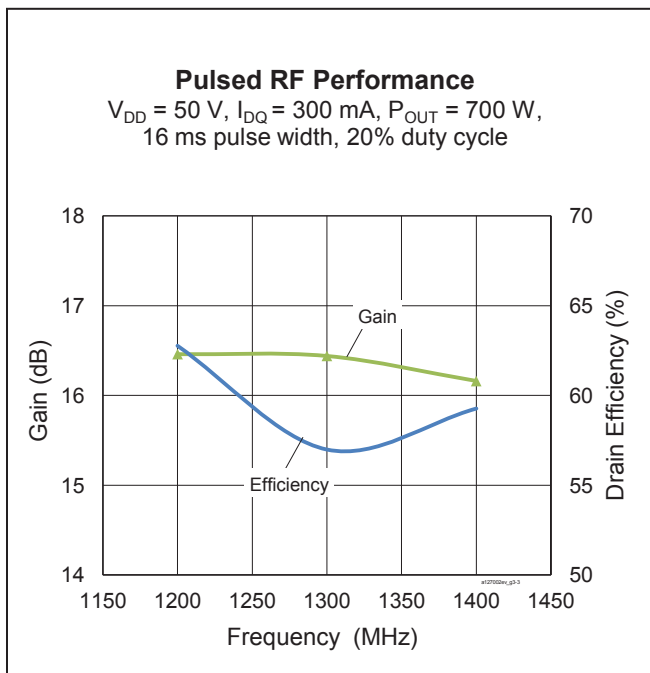
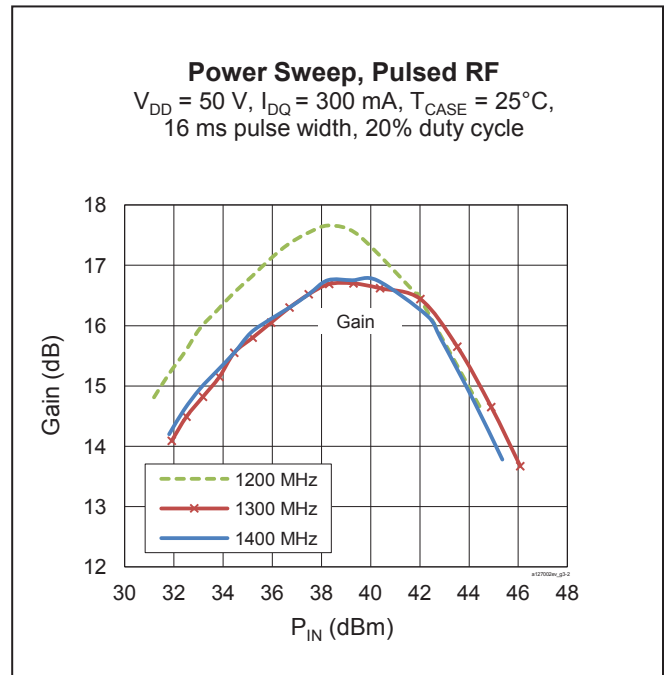
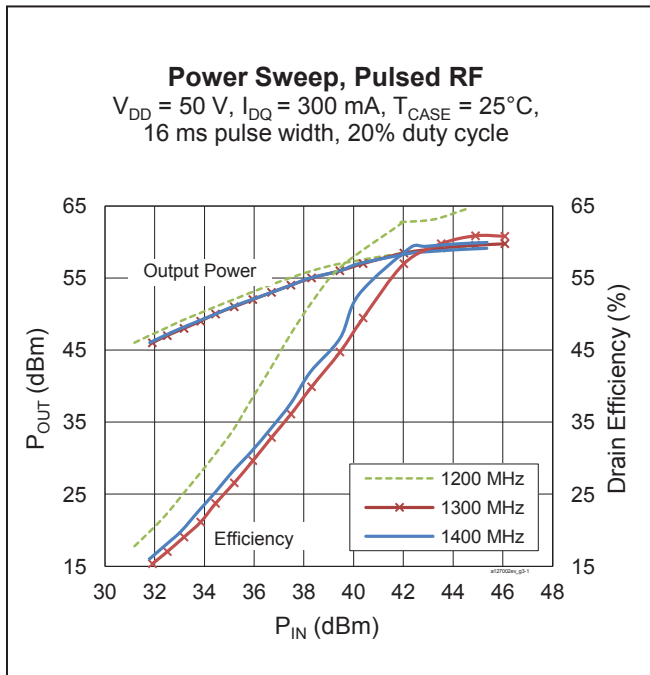
Typical RF Performance (data taken in production test fixture)



Typical RF Performance (cont.)

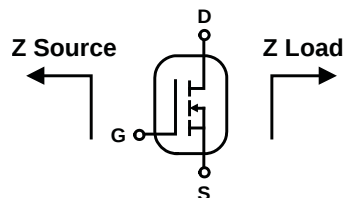


Typical RF Performance (cont.)



Broadband Circuit Impedance

Freq [MHz]	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1200	0.84	-1.27	0.90	-0.97
1300	0.97	-1.06	0.72	-0.47
1400	1.35	-1.12	0.63	0.03



Load Pull Performance (single side)

Load Pull at Max P_{OUT} Point – 16 μ s pulse width, 10% duty cycle, class AB, $V_{DD} = 50$ V, 150 mA

Freq [MHz]	ZI [Ω]	P _{IN} [dBm]	P _{OUT} [dBm]	P _{OUT} [W]	P _G [dB]	PAE Eff [%]	Z _{OUT} [Ω]
1200	1.91 – j2.04	41.40	56.40	436.52	15	53.80	1.30 – j2.03
1300	2.72 – j3.13	42.24	56.54	450.82	14.30	54.48	1.25 – j1.94
1400	4.83 – j1.46	41.66	56.31	427.56	14.65	53.27	1.03 – j1.94

Load Pull at Max G_T Point – 16 μ s pulse width, 10% duty cycle, class AB, $V_{DD} = 50$ V, 150 mA

Freq [MHz]	ZI [Ω]	P _{IN} [dBm]	P _{OUT} [dBm]	P _{OUT} [W]	P _G [dB]	PAE Eff [%]	Z _{OUT} [Ω]
1200	1.91 – j2.04	38.10	54.72	296.48	16.62	57.89	3.03 – j3.11
1300	2.72 – j3.13	38.84	54.83	304.09	15.99	62.54	3.22 – j1.63
1400	4.83 – j1.46	37.21	53.42	219.79	16.21	57.25	2.30 – j0.09

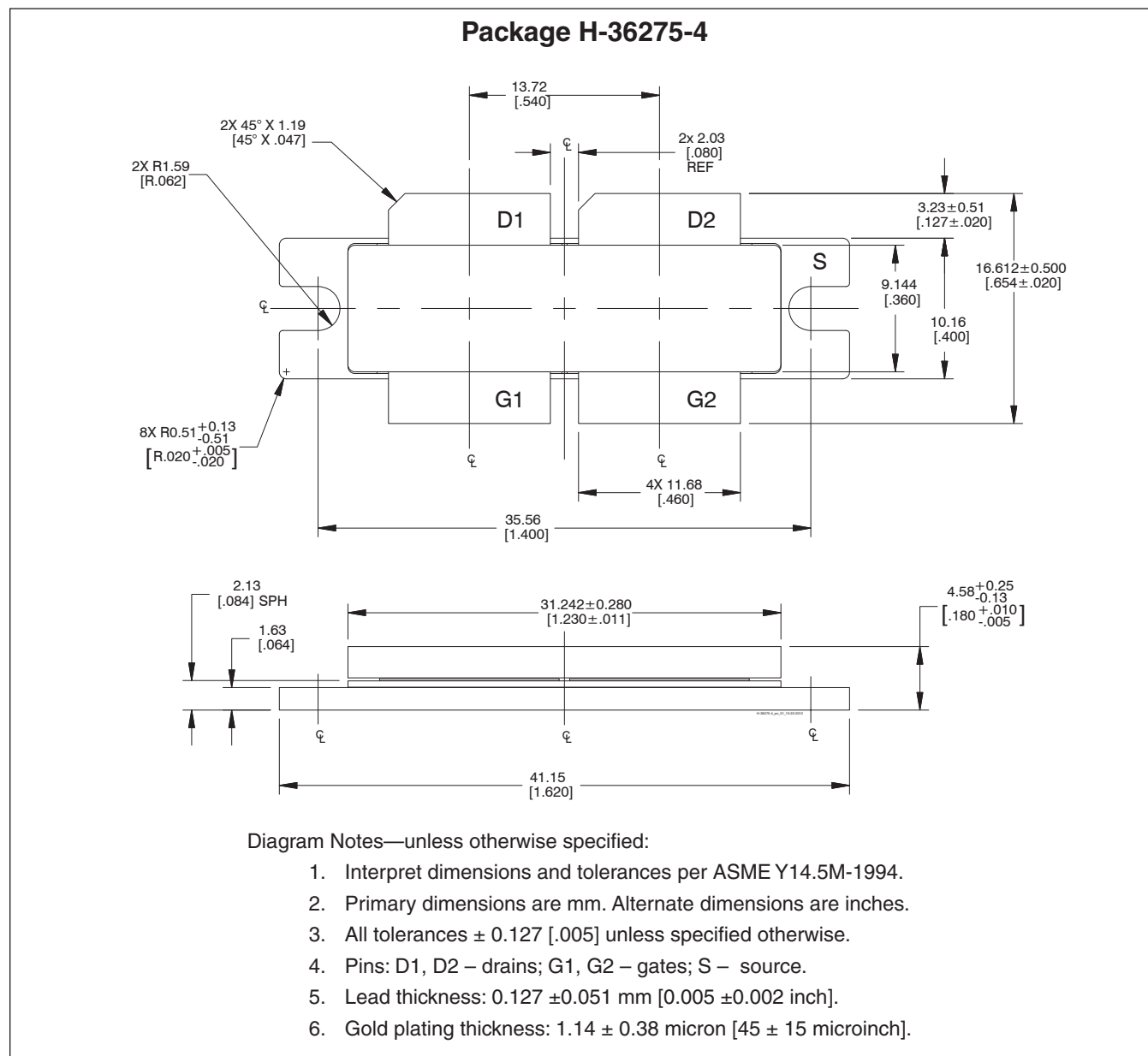
Load Pull at Max Efficiency Point – 16 μ s pulse width, 10% duty cycle, class AB, $V_{DD} = 50$ V, 150 mA

Freq [MHz]	ZI [Ω]	P _{IN} [dBm]	P _{OUT} [dBm]	P _{OUT} [W]	P _G [dB]	PAE Eff [%]	Z _{OUT} [Ω]
1200	1.91 – j2.04	39.60	55.80	380.19	16.20	60.71	2.22 – j2.43
1300	2.72 – j3.13	39.44	55.23	333.43	15.79	63.71	2.81 – j1.90
1400	4.83 – j1.46	39.39	55.19	330.37	15.80	62.26	2.40 – j1.45

Z Optimum – 16 μ s pulse width, 10% duty cycle, class AB, $V_{DD} = 50$ V, 150 mA

Freq [MHz]	ZI [Ω]	P _{IN} [dBm]	P _{OUT} [dBm]	P _{OUT} [W]	P _G [dB]	PAE Eff [%]	Z _{OUT} [Ω]
1200	1.91 – j2.04	39.18	55.58	361.41	16.4	60.5	2.41 – j2.50
1300	2.72 – j3.13	39.50	55.30	338.84	15.8	62.6	2.73 – j1.51
1400	4.83 – j1.46	40	55.60	363.08	15.6	60.7	1.86 – j1.37

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

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2013-10-01	Advance	All	Data Sheet reflects advance specification for product development
02	2014-03-04	Preliminary	All	Data Sheet reflects preliminary specification

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