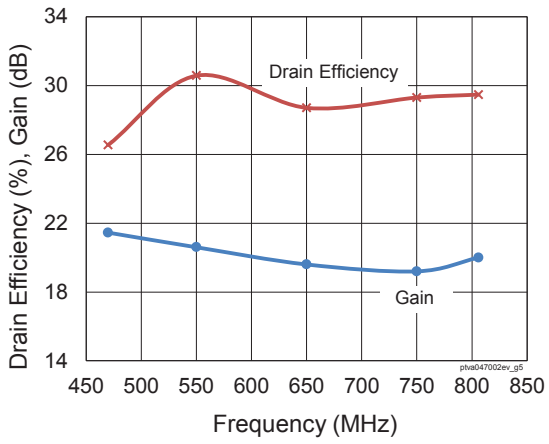
Thermally-Enhanced High Power RF LDMOS FET
700 W, 50 V, 470 – 806 MHz

Description

The PTVA047002EV LDMOS FET is designed for use in power amplifier applications in the 470 MHz to 806 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.

PTVA047002EV
Package H-36275-4

DVB-T Performance
Drain Efficiency, Gain vs Frequency
V_{DD}= 50 V, I_{DQ} = 1.2 A, P_{OUT} = 135 W avg



Features

- Input matched
- Integrated ESD protection
- Low thermal resistance
- High gain
- Thermally enhanced package
- RoHS compliant
- Capable of withstanding a 10:1 VSWR at 130 W average power under DVB-T signal condition
- Human Body Model Class 2 (per ANSI/ESDA/JEDEC JS-001)

RF Characteristics

DVB-T (8K OFDM, 64QAM) Characteristics (tested in Infineon test fixture, narrowband 806 MHz)
V_{DD} = 50 V, I_{DQ} = 1200 mA, f = 806 MHz, input PAR = 10.5 dB (unclipped), output PAR = 7.8 dB @ 0.01% CCDF probability

Characteristic	Symbol	Min	Typ	Max	Unit
Average Output Power	P_{OUT}	—	130	—	W
Gain	G_{ps}	16.5	17.5	—	dB
Drain Efficiency	η_D	24	29	—	%
Adjacent Channel Power Ratio	ACPR	—	–29.5	–25	dBc
(ACPR integrated over 200 KHz BW at + 4.3 MHz offset from center frequency)					

All published data at T_{CASE} = 25°C unless otherwise indicated

ESD: *Electrostatic discharge sensitive device—observe handling precautions!*

RF Characteristics

Typical DVB-T (8K OFDM, 64QAM) Performance (not subject to production test, verified by design/characterization in Infineon test fixture)

V_{DD} = 50 V, I_{DQ} = 600 mA per side, t_f = 25°C, DVB-T signal, BW = 8MHz, Mode = 8k, Modulation = 64-QAM, Guard = 1/4, Code rate = 1/2, PAR= 10.5 dB, ACPR integrated over 200 KHz BW at +4.3 MHz offset from center frequency

Freq (MHz)	Gain (dB)	IRL (dB)	I (A)	Eff (%)	P_{OUT} Avg (W)	ACPR Up	ACPR Low
470	21.45	3.35	10.4	26.5	138	32	33
550	20.6	4.6	9.03	30.6	138	29	29
650	19.6	4.26	9.53	28.7	137	31	31
750	19.2	3.92	9.25	29.3	136	30	31
806	20	6.36	9.07	29.5	134	28	29

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	105	—	—	V
Drain Leakage Current	V_{DS} = 50 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
	V_{DS} = 111 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	V_{DS} = 50 V, I_{DQ} = 1200 mA	V_{GS}	—	3.6	—	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA

Maximum Ratings

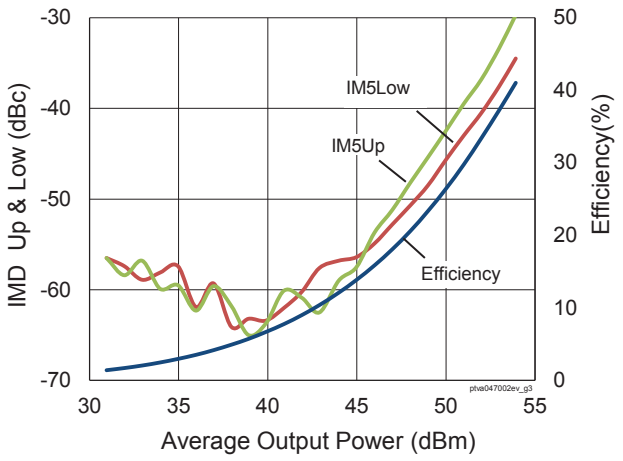
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	105	V
Gate-Source Voltage	V_{GS}	–6 to +12	V
Operating Voltage	V_{DD}	0 to +55	V
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 135 W CW)	$R_{\theta JC}$	0.215	°C/W

Ordering Information

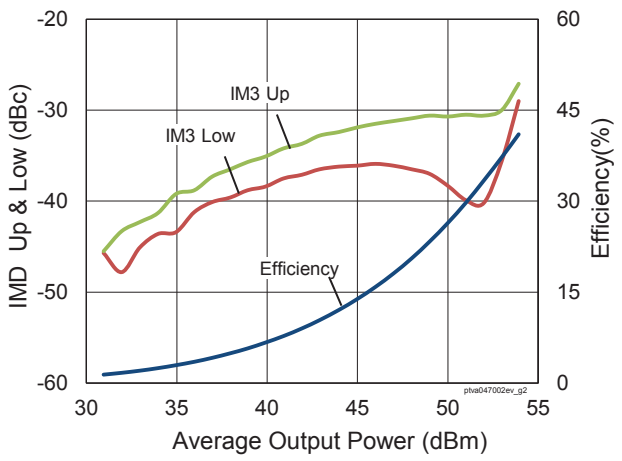
Type and Version	Order Code	Package Description	Shipping
PTVA047002EV V1 R0	PTVA047002EVV1R0XTMA1	H-36275-4, bolt-down	Tape & Reel, 50pcs
PTVA047002EV V1 R250	PTVA047002EVV1R250XTMA1	H-36275-4, bolt-down	Tape & Reel, 250pcs

Typical Performance

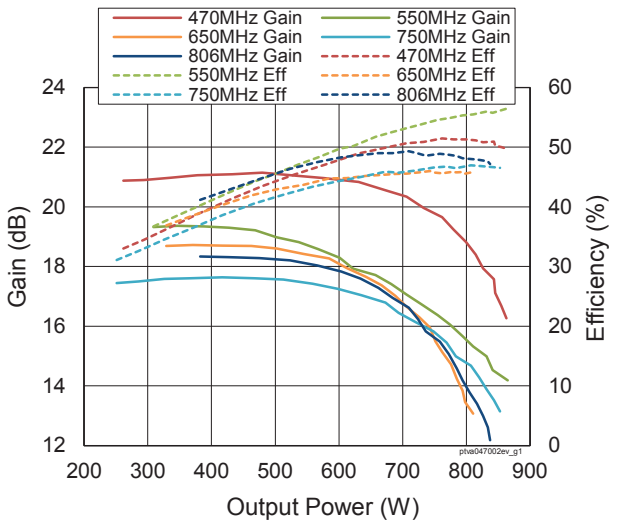
Two Tone Drive-up
V_{DD} = 50 V, I_{DQ} = 1250 mA, f = 806 MHz,
1MHz Tone Spacing



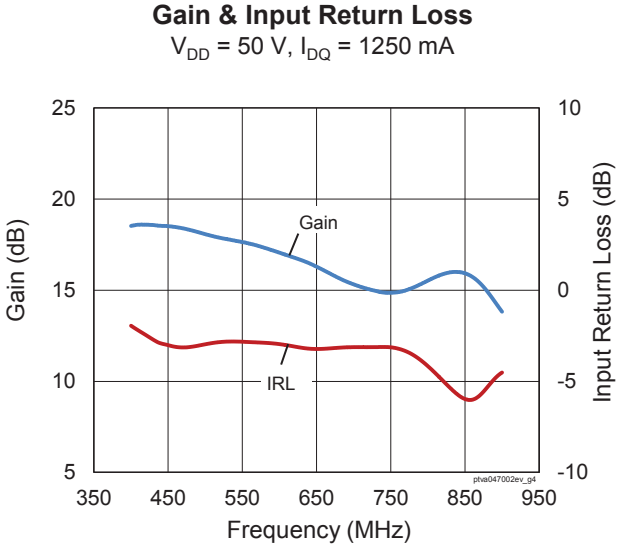
Two Tone Drive-up
V_{DD} = 50 V, I_{DQ} = 1250 mA, f = 806 MHz,
1MHz Tone Spacing



Pulse CW Performance
V_{DD} = 50 V, I_{DQ} = 1250mA, 100us, 10% DC



Small Signal CW
Gain & Input Return Loss
V_{DD} = 50 V, I_{DQ} = 1250 mA

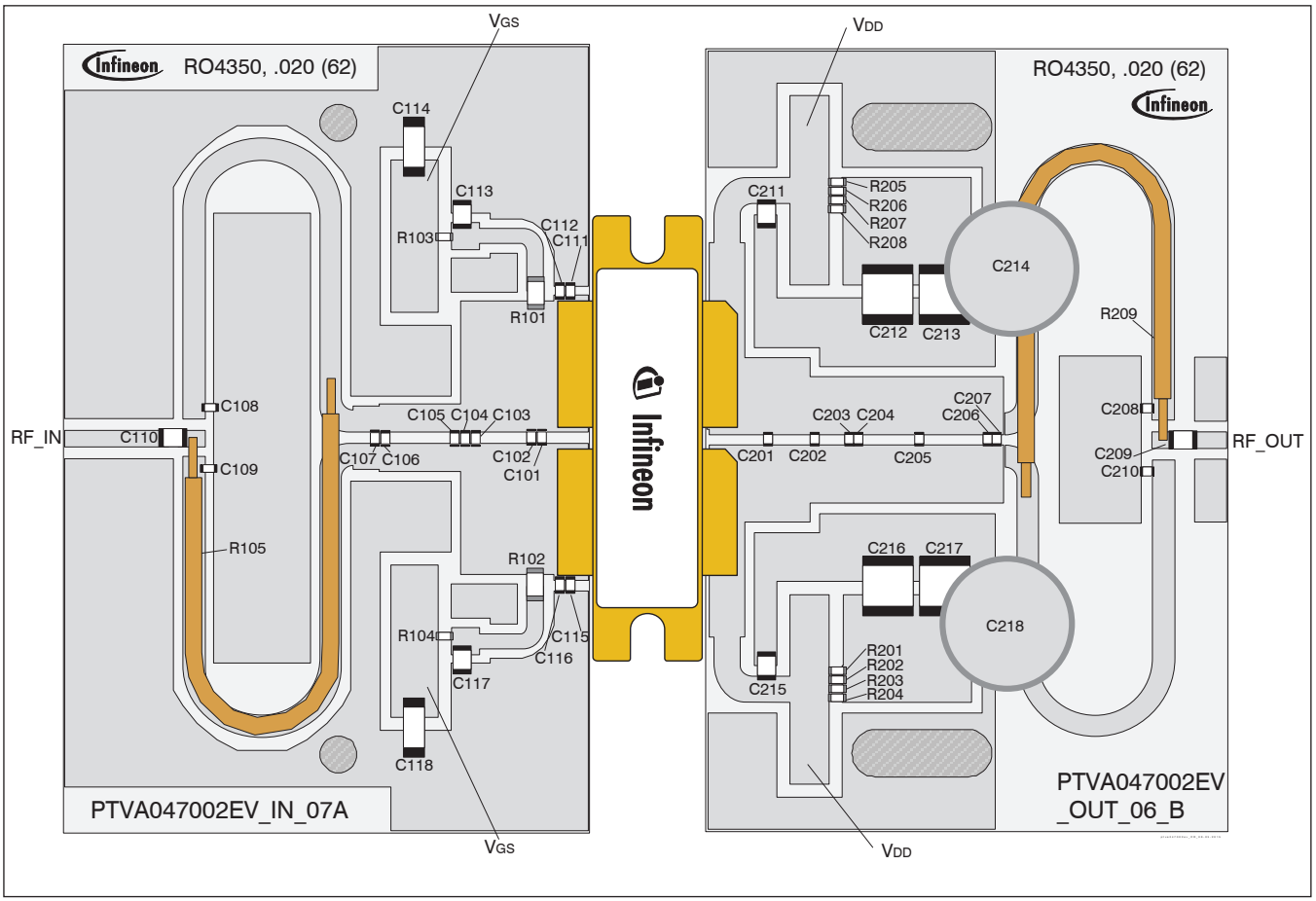


Load Pull Performance

Each Side Load Pull Performance – Pulsed CW signal: 16 µs, 10% duty cycle, 50 V, 600 mA

		P_{3dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Zs [Ω]	Zl [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Zl [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]
400	0.35–j1.06	1.35+j1.51	20.0	57.40	550	50.4	2.57+j5.13	24.1	53.00	200	75.1
500	0.69+j0.71	1.54–j0.06	19.7	57.30	537	56.8	2.00+j1.63	21.5	55.10	324	73.0
600	0.85–j0.46	1.10+j1.06	16.5	57.80	603	55.0	1.56+j2.24	19.3	55.80	380	71.0
700	0.97–j0.88	1.37+j1.18	17.3	57.50	562	53.2	1.38+j2.31	19.3	56.10	407	65.1
860	0.77–j0.80	1.08+j1.04	16.9	57.50	562	50.6	1.04+j1.82	19.7	55.30	339	64.0

Reference Circuit , 470 – 806 MHz



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

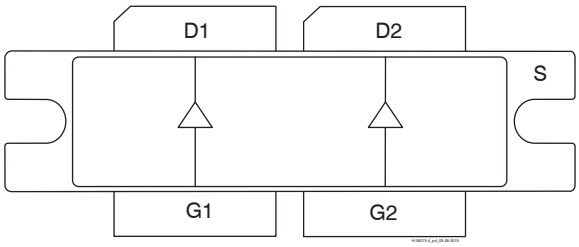
Reference Circuit Assembly

DUT	PTVA047002EV V1
Test Fixture Part No.	LTN/PTVA047002EV V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66, f = 470 – 806 MHz
Find Gerber files for this test fixture on the Infineon Web site at http://www.infineon.com/rfpower	

Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C102	Capacitor, 12 pF	ATC	ATC800A120JW150XB
C103, C104, C105, C106, C107	Capacitor, 10 pF	ATC	ATC100A100JW150XB
C108, C109	Capacitor, 100 pF	ATC	ATC100A101JW150XB
C110, C113, C117	Capacitor, 91 pF	ATC	ATC100B910JW500XB
C111, C112, C115, C116	Capacitor, 16 pF	ATC	ATC100A160JW150XB
C114, C118	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
R101, R102	Resistor, 10 Ω	Panasonic Electronic Components	ERJ-8GEYJ100V
R103, R104	Resistor, 5.6 Ω	Panasonic Electronic Components	ERJ-8GEYJ5R6V
R105	Coax, 25 Ω	Micro-coax	UT-090C-25
Output			
C201	Capacitor, 8.2 pF	ATC	ATC100A8R2JW150XB
C202	Capacitor, 6.8 pF	ATC	ATC100A6R8JW150XB
C203, C205	Capacitor, 4.7 pF	ATC	ATC100A4R7JW150XB
C204	Capacitor, 4.1 pF	ATC	ATC100A4R1JW150XB
C206	Capacitor, 2 pF	ATC	ATC100A2R0JW150XB
C207	Capacitor, 8.2 pF	ATC	ATC100A8R2JW150XB
C208, C210	Capacitor, 100 pF	ATC	ATC100A101JW150XB
C209, C211, C215	Capacitor, 91 pF	ATC	ATC100B910JW150XB
C212, C213, C216, C217	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
C214, C218	Capacitor, 100 µF	Cornell Dubilier Electronics (CDE)	SK101M100ST
R201, R202, R203, R204, R205, R206, R207,R208	Resistor, 1 Ω	Panasonic Electronic Components	ERJ-8GEYJ1R0V
R209	Coax, 25 Ω	Micro-coax	UT-090C-25

Pinout Diagram (top view)



Pin	Description
D1	Drain device 1
D2	Drain device 2
G1	Gate device 1
G2	Gate device 2
S	Source (Flange)

Lead connections for PTVA047002EV

See next page for package outline information

Package Outline Specifications

Package H-36275-4

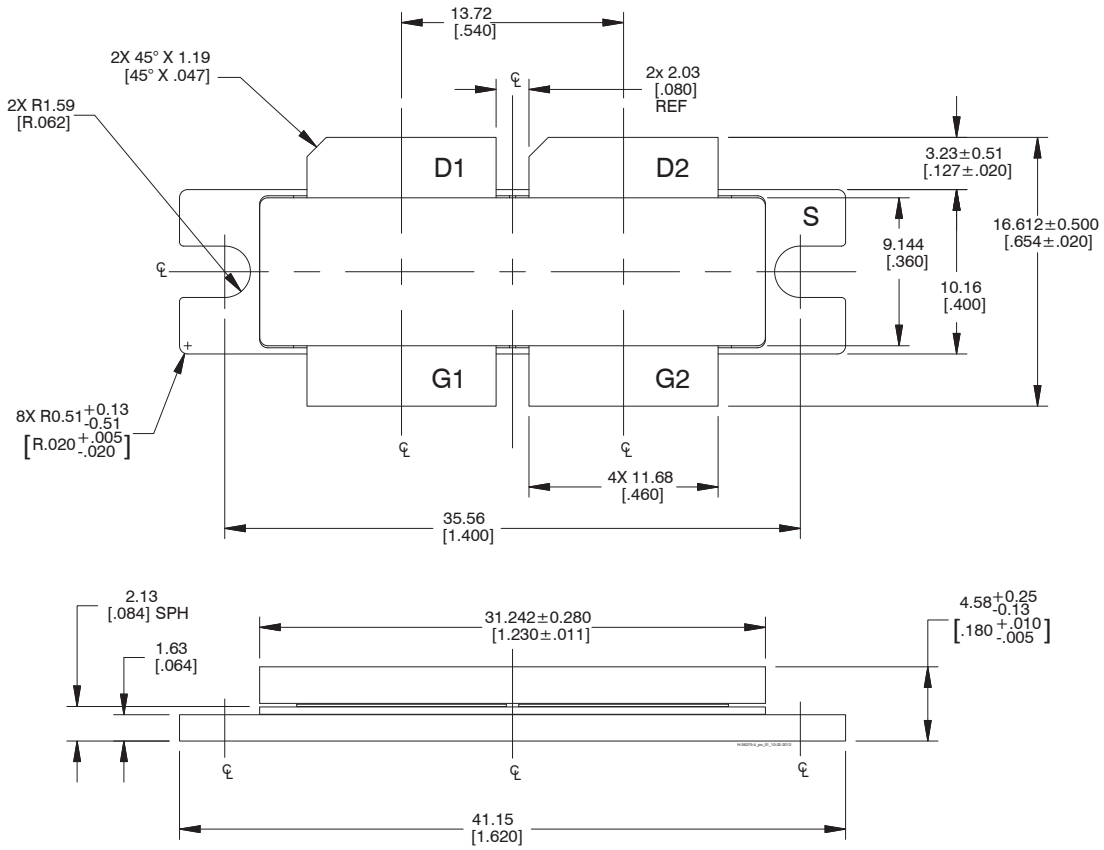


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D1, D2 – drains; G1, G2 – gates; S – source.
5. Lead thickness: 0.127 ±0.051 mm [0.005 ±0.002 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

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	2012-05-08	Preliminary	All	Data Sheet reflects preliminary specification
02	2012-05-10	Preliminary	1	Updated DVB-T Characteristics table
03	2013-10-03	Preliminary	1, 2, 3	Updated DVB-T Characteristics table, eliminate two-tone specification, added DVB-T performance graphs
03.1	2013-10-15	Preliminary	1, 3	Revised frequency in Pulsed CW specifications, removed two-tone and Pulsed CW graphs
04	2015-06-18	Production	All	Data Sheet reflects released product specification Includes loadpull, impedance information & reference circuits, updated test specs & graphs
04.1	2015-07-08	Production	2	Updated ordering information to include Tape & Reel, 50pcs.
04.2	2017-02-08	Production	2	Updated operating voltage and junction temperature

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