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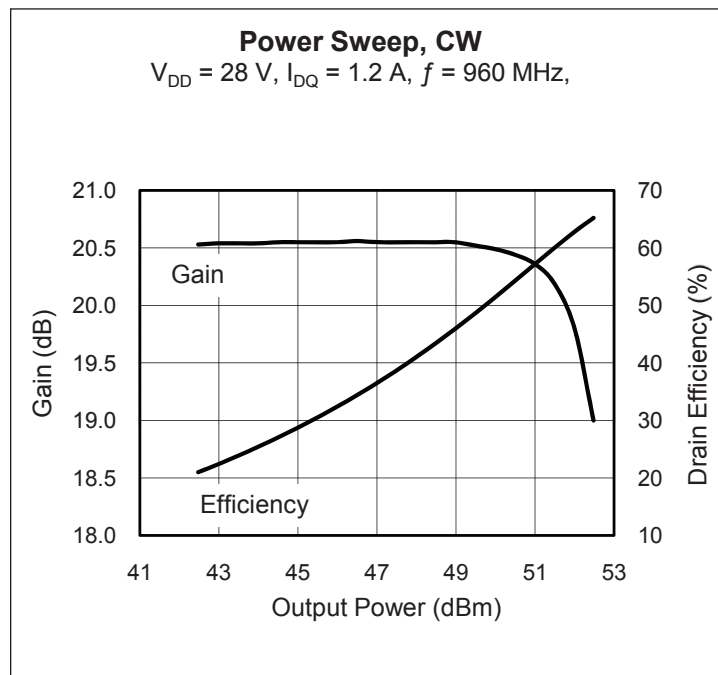
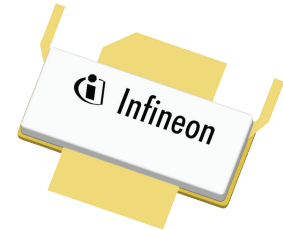


Thermally-Enhanced High Power RF LDMOS FET 160 W, 28 V, 920 – 960 MHz

Description

The PTFB091507FH is an LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 920 to 960 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PTFB091507FH
Package H-34288-4/2



Features

- Broadband internal matching
- Wide video bandwidth
- Typical CW performance, 960 MHz, 28 V
 - Average output power = 160 W
 - Gain = 19.5 dB
 - Efficiency = 60%
- Integrated ESD protection
- Low thermal resistance
- Thermally enhanced package is Pb-free and RoHS compliant
- Capable of handling 10:1 VSWR @ 28 V, 160 W (CW) output power

RF Characteristics

Single-carrier WCDMA Specifications (not subject to production test; verified by design/characterization in Infineon test fixture)
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$, $P_{OUT} = 50\text{ W}$ average
 $f = 960\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, PAR = 7.5 dB @ 0.01% CCDF probability

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	Gps	—	20	—	dB
Drain Efficiency	η_D	—	38	—	%
Adjacent Channel Power Ratio	ACPR	—	-36	—	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)

 $V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$, $P_{OUT} = 70\text{ W avg}$, $f = 960\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	Gps	19.5	20	—	dB
Drain Efficiency	η_D	43.5	45	—	%
Intermodulation Distortion	IMD	—	−30	−28	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$		—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$	V_{GS}	2.5	3.9	4.5	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

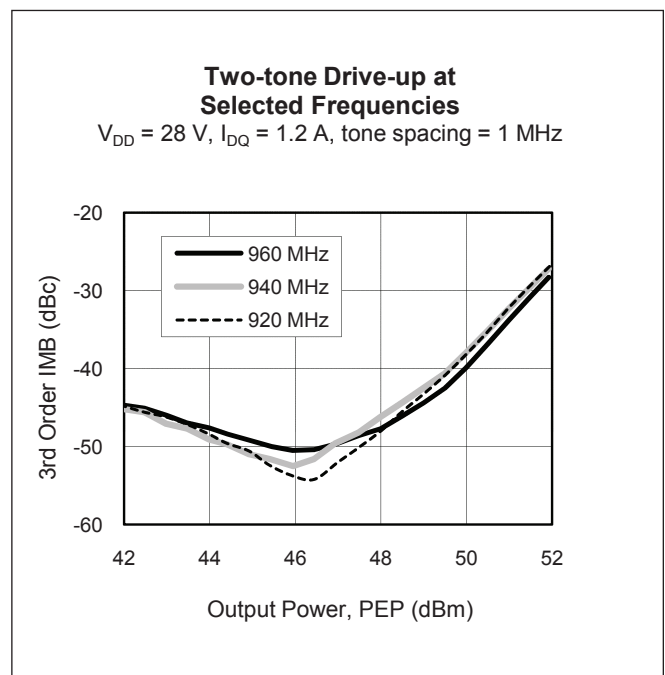
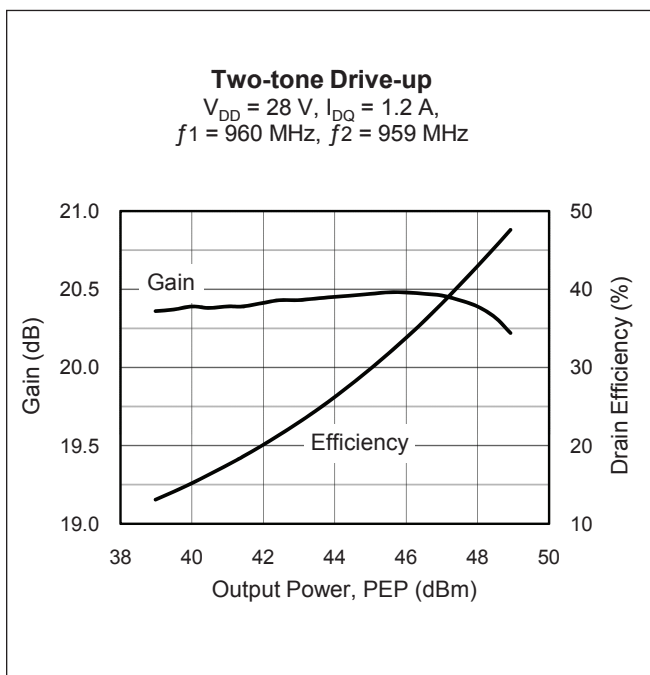
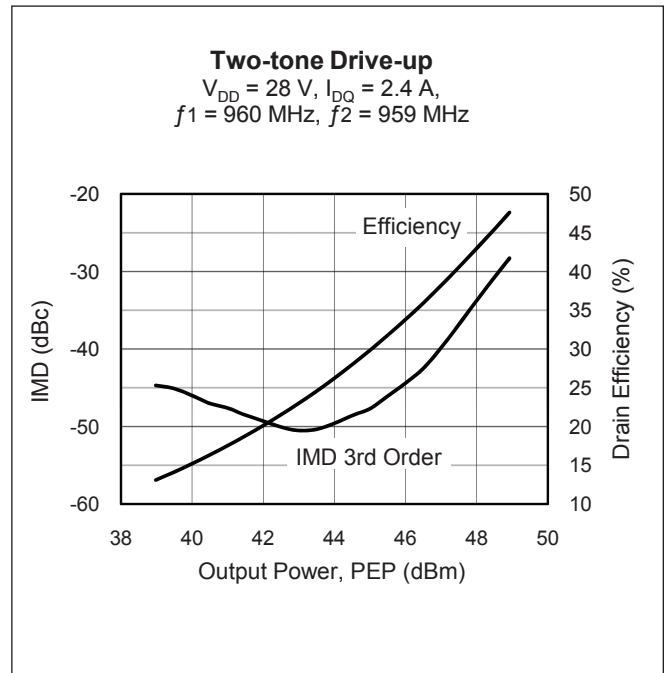
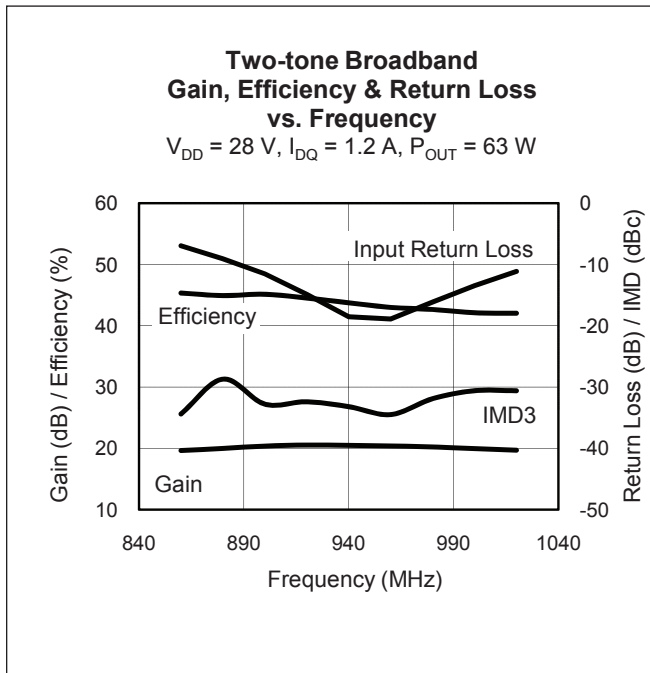
Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	−6 to +10	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	0.31	$^{\circ}\text{C/W}$

Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTFB091507FH V1 R0	PTFB091507FHV1R0XTMA1	H-34288-4/2, earless flange	Tape & Reel, 50 pcs
PTFB091507FH V1 R250	PTFB091507FHV1R250XTMA1	H-34288-4/2, earless flange	Tape & Reel, 250 pcs

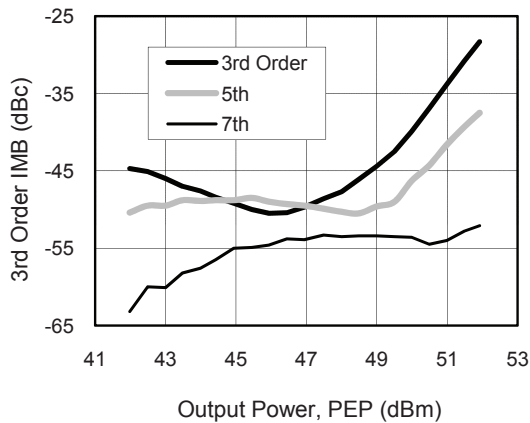
Typical Performance (data taken in Infineon test fixture)



Typical Performance (cont.)

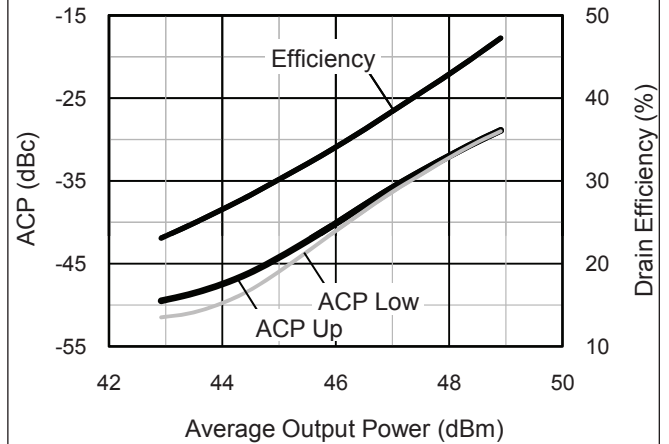
Intermodulation Distortion

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$,
 $f_1 = 960\text{ MHz}$, $f_2 = 959\text{ MHz}$



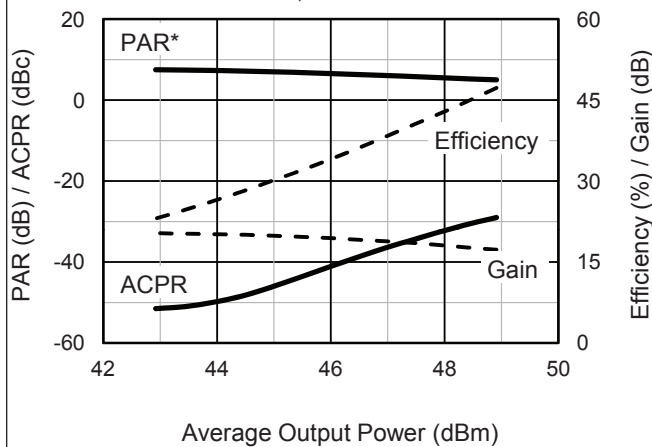
Single-carrier WCDMA 3GPP Drive-up 960 MHz

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$, $f = 960\text{ MHz}$,
 3GPP WCDMA signal,
 PAR = 7.5:1, BW = 3.84 MHz



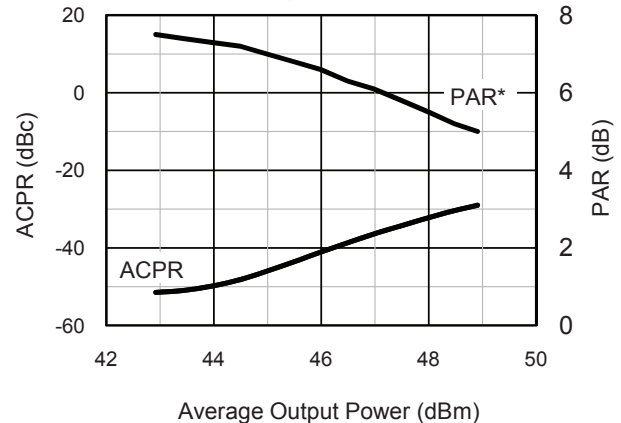
Single-carrier WCDMA Drive-up 960 MHz

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$, $f = 960\text{ MHz}$,
 3GPP WCDMA signal,
 PAR = 7.5:1, BW = 3.84 MHz



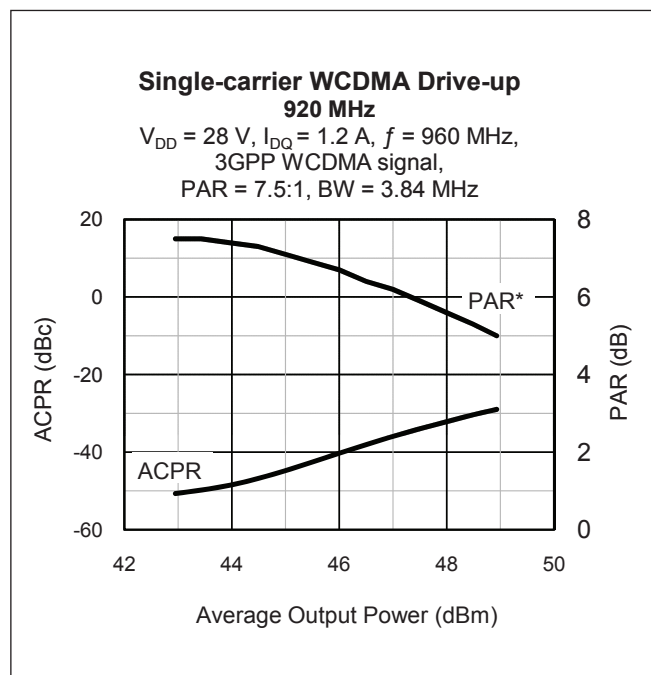
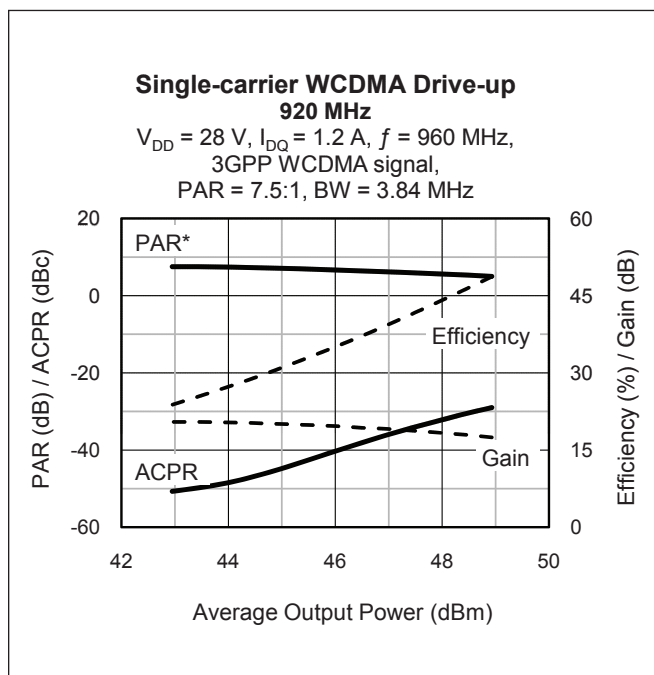
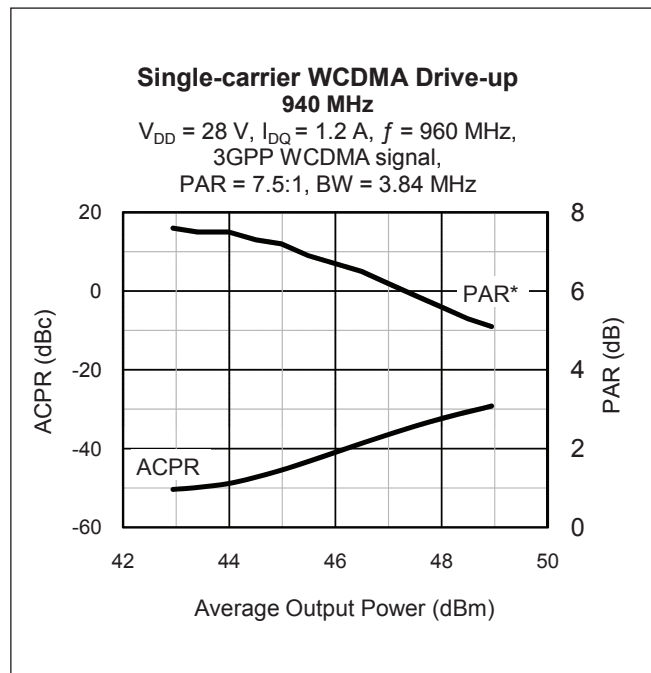
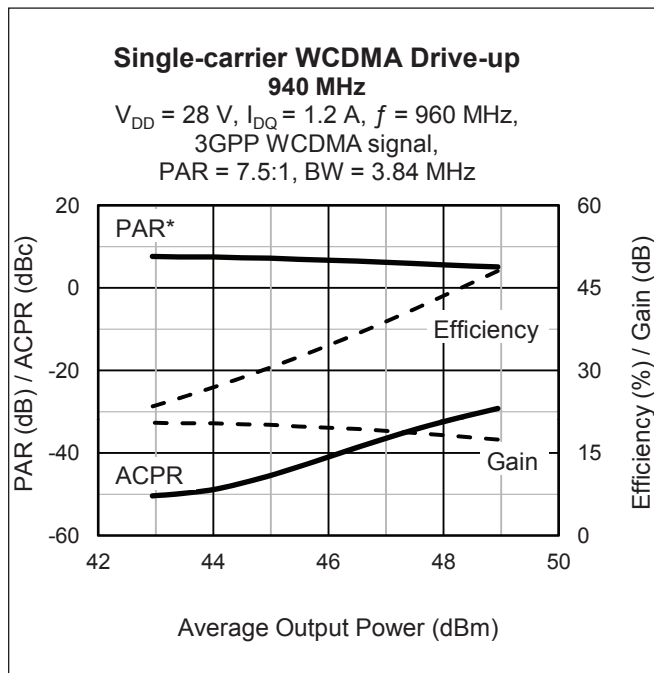
Single-carrier WCDMA Drive-up 960 MHz

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.2\text{ A}$, $f = 960\text{ MHz}$,
 3GPP WCDMA signal,
 PAR = 7.5:1, BW = 3.84 MHz



*Peak-to-average ratio (PAR) compression at 0.01% probability on CCDF curve

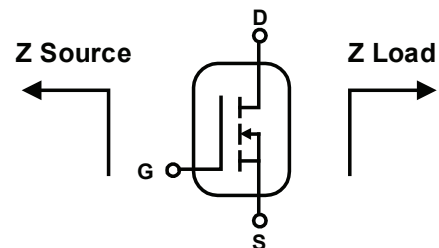
Typical Performance (cont.)



*Peak-to-average ratio (PAR) compression at 0.01% probability on CCDF curve

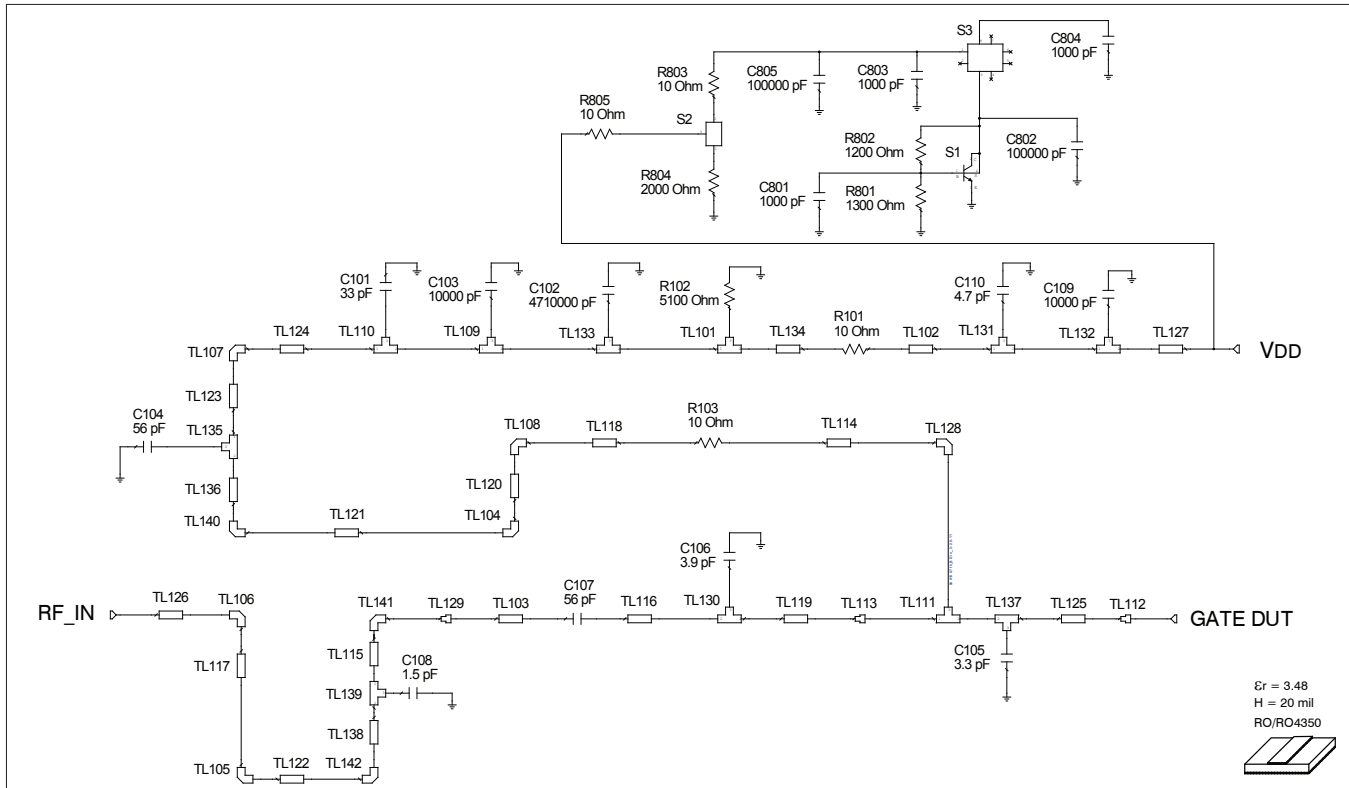
Broadband Circuit Impedance

Frequency	Z source (W)		Z Load (W)	
MHz	R	jX	R	jX
910	2.23	-3.12	1.53	-0.87
920	2.23	-3.03	1.52	-0.84
930	2.23	-2.95	1.50	-0.81
940	2.24	-2.87	1.49	-0.77
950	2.25	-2.80	1.46	-0.74
960	2.26	-2.73	1.44	-0.71
970	2.27	-2.65	1.42	-0.67

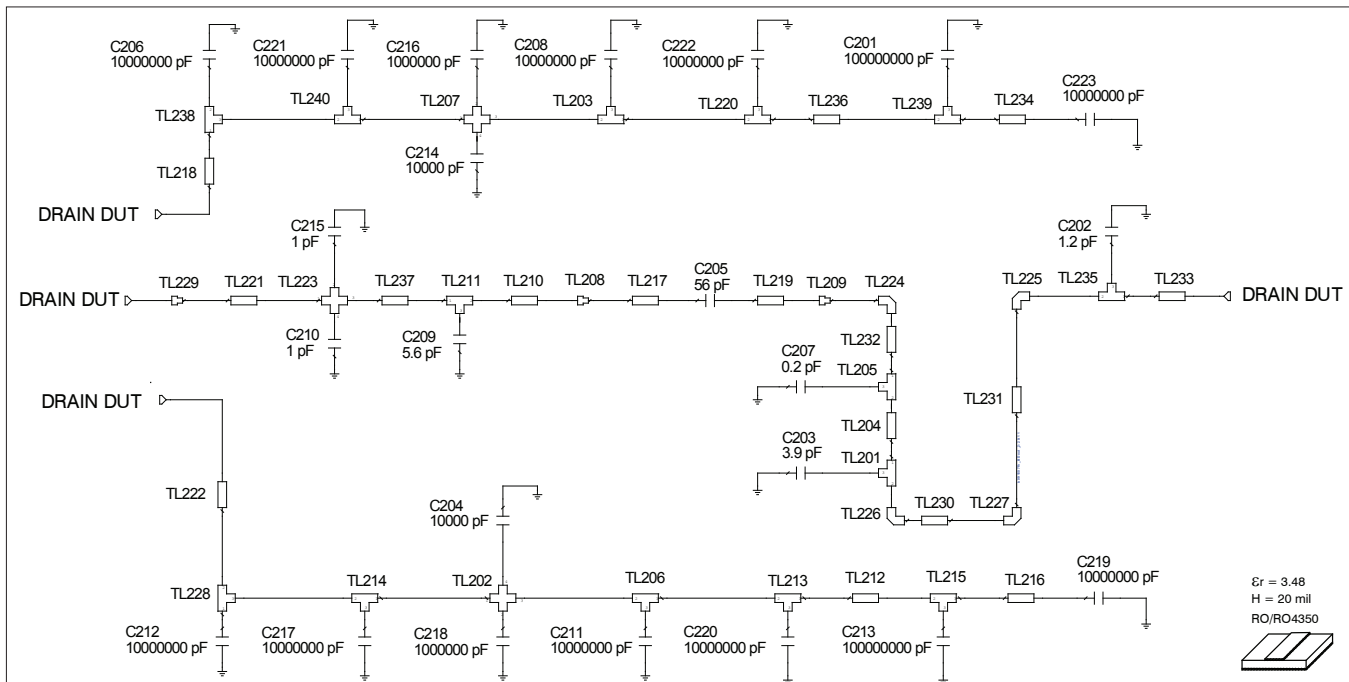


See next page for Reference Circuit information

Reference Circuit



Reference circuit input schematic for $f = 960$ MHz



Reference circuit output schematic for $f = 960$ MHz

Reference Circuit (cont.)

DUT	PTFB091507FH
Test Fixture Part No.	LTN/PTFB091507FH
PCB	Rogers RO4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.48$
Gerber Files	Find Gerber files for this test fixture on the Infineon Web site at www.infineon.com/rfpower

Electrical Characteristics at 960 MHz

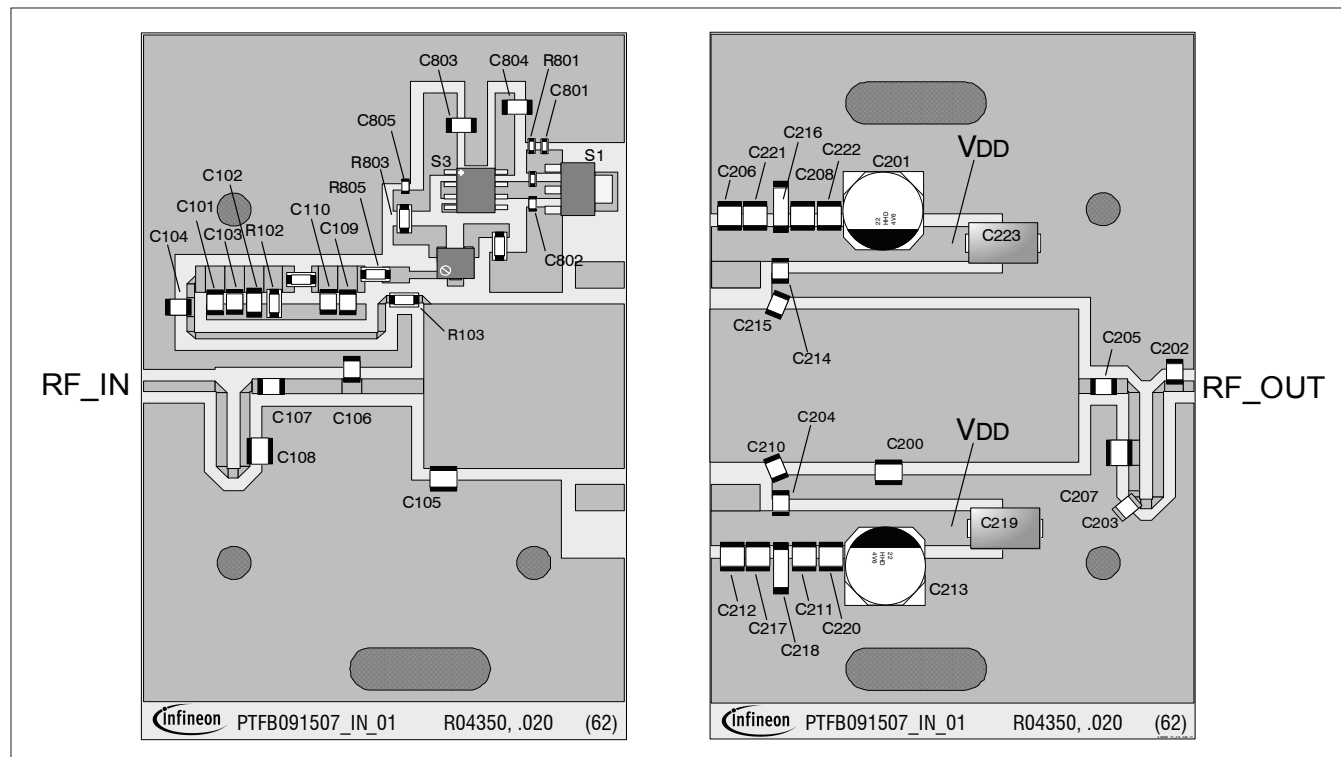
Microstrip	Characteristics	Dimensions: mm	Dimensions: mils
TL102	0.004λ , 26.8 Ω	$W = 2.79$, $L = 0.76$	$W = 110$, $L = 30$
TL103	0.007λ , 39.1 Ω	$W = 1.68$, $L = 1.27$	$W = 66$, $L = 50$
TL111	0.004λ , 5.3 Ω	$W1 = 17.78$, $W2 = 17.78$, $W3 = 0.76$	$W1 = 700$, $W2 = 700$, $W3 = 30$
TL114	0.003λ , 63.9 Ω	$W = 0.76$, $L = 0.51$	$W = 30$, $L = 20$
TL115	0.026λ , 51.5 Ω	$W = 1.10$, $L = 4.88$	$W = 44$, $L = 192$
TL116	0.036λ , 39.1 Ω	$W = 1.68$, $L = 6.74$	$W = 66$, $L = 266$
TL117	0.042λ , 51.5 Ω	$W = 1.10$, $L = 8.00$	$W = 44$, $L = 315$
TL118	0.007λ , 63.9 Ω	$W = 0.76$, $L = 1.27$	$W = 30$, $L = 50$
TL119	0.035λ , 39.1 Ω	$W = 1.68$, $L = 6.49$	$W = 66$, $L = 256$
TL120	0.015λ , 63.9 Ω	$W = 0.76$, $L = 2.92$	$W = 30$, $L = 115$
TL121	0.100λ , 63.9 Ω	$W = 0.76$, $L = 19.05$	$W = 30$, $L = 750$
TL122	0.005λ , 51.5 Ω	$W = 1.10$, $L = 1.02$	$W = 44$, $L = 40$
TL123	0.008λ , 63.9 Ω	$W = 0.76$, $L = 1.52$	$W = 30$, $L = 60$
TL124	0.006λ , 26.8 Ω	$W = 2.79$, $L = 1.04$	$W = 110$, $L = 41$
TL125	0.102λ , 5.3 Ω	$W = 17.78$, $L = 17.55$	$W = 700$, $L = 691$
TL126	0.040λ , 51.5 Ω	$W = 1.10$, $L = 7.57$	$W = 44$, $L = 298$
TL127	0.004λ , 26.8 Ω	$W = 2.79$, $L = 0.76$	$W = 110$, $L = 30$
TL130	0.011λ , 39.1 Ω	$W1 = 1.68$, $W2 = 1.68$, $W3 = 2.03$	$W1 = 66$, $W2 = 66$, $W3 = 80$
TL134	0.007λ , 26.8 Ω	$W = 2.79$, $L = 1.19$	$W = 110$, $L = 47$
TL136	0.008λ , 63.9 Ω	$W = 0.76$, $L = 1.52$	$W = 30$, $L = 60$
TL137	0.016λ , 5.3 Ω	$W1 = 17.78$, $W2 = 17.78$, $W3 = 2.79$	$W1 = 700$, $W2 = 700$, $W3 = 110$
TL138	0.002λ , 51.5 Ω	$W = 1.10$, $L = 0.33$	$W = 44$, $L = 13$
TL139	0.015λ , 51.5 Ω	$W1 = 1.10$, $W2 = 1.10$, $W3 = 2.79$	$W1 = 44$, $W2 = 44$, $W3 = 110$
TL201	0.004λ , 51.5 Ω	$W1 = 1.10$, $W2 = 1.10$, $W3 = 0.76$	$W1 = 44$, $W2 = 44$, $W3 = 30$
TL202, 207	0.010λ , 20.9 Ω	$W1 = 3.81$, $W2 = 1.83$, $W3 = 3.81$, $W4 = 1.83$	$W1 = 150$, $W2 = 72$, $W3 = 150$, $W4 = 72$
TL203	0.016λ , 20.9 Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 2.79$	$W1 = 150$, $W2 = 150$, $W3 = 110$
TL204	0.014λ , 51.5 Ω	$W = 1.10$, $L = 2.67$	$W = 44$, $L = 105$
TL205	0.015λ , 51.5 Ω	$W1 = 1.10$, $W2 = 1.10$, $W3 = 2.79$	$W1 = 44$, $W2 = 44$, $W3 = 110$
TL206	0.016λ , 20.9 Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 2.79$	$W1 = 150$, $W2 = 150$, $W3 = 110$
TL210	0.109λ , 5.7 Ω	$W = 16.51$, $L = 18.62$	$W = 650$, $L = 733$
TL211	0.016λ , 5.7 Ω	$W1 = 16.51$, $W2 = 16.51$, $W3 = 2.79$	$W1 = 650$, $W2 = 650$, $W3 = 110$
TL212	0.014λ , 20.9 Ω	$W = 3.81$, $L = 2.51$	$W = 150$, $L = 99$
TL213	0.016λ , 20.9 Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 2.79$	$W1 = 150$, $W2 = 150$, $W3 = 110$
TL214	0.007λ , 20.9 Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 1.27$	$W1 = 150$, $W2 = 150$, $W3 = 50$

table continued on next page

Reference Circuit (cont.)

Microstrip	Characteristics	Dimensions: mm	Dimensions: mils
TL215	0.021λ , 20.9Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 3.81$	$W1 = 150$, $W2 = 150$, $W3 = 150$
TL216	0.041λ , 20.9Ω	$W = 3.81$, $L = 7.29$	$W = 150$, $L = 287$
TL217	0.008λ , 39.1Ω	$W = 1.68$, $L = 1.52$	$W = 66$, $L = 60$
TL218	0.016λ , 16.5Ω	$W = 5.08$, $L = 2.90$	$W = 200$, $L = 114$
TL219	0.011λ , 39.1Ω	$W = 1.68$, $L = 2.03$	$W = 66$, $L = 80$
TL220	0.016λ , 20.9Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 2.79$	$W1 = 150$, $W2 = 150$, $W3 = 110$
TL221	0.037λ , 5.7Ω	$W = 16.51$, $L = 6.38$	$W = 650$, $L = 251$
TL222	0.016λ , 16.5Ω	$W = 5.08$, $L = 2.89$	$W = 200$, $L = 114$
TL223	0.011λ , 5.7Ω	$W1 = 16.51$, $W2 = 1.83$, $W3 = 16.51$, $W4 = 1.83$	$W1 = W1$, $W2 = 72$, $W3 = 650$, $W4 = 72$
TL228	0.021λ , 16.5Ω	$W1 = 5.08$, $W2 = 5.08$, $W3 = 3.81$	$W1 = 200$, $W2 = 200$, $W3 = 150$
TL230	0.006λ , 51.5Ω	$W = 1.10$, $L = 1.14$	$W = 44$, $L = 45$
TL231	0.060λ , 51.5Ω	$W = 1.10$, $L = 11.3$	$W = 44$, $L = 445$
TL232	0.027λ , 51.5Ω	$W = 1.10$, $L = 5.08$	$W = 44$, $L = 200$
TL233	0.006λ , 51.5Ω	$W = 1.10$, $L = 1.12$	$W = 44$, $L = 44$
TL234	0.041λ , 20.9Ω	$W = 3.81$, $L = 7.29$	$W = 150$, $L = 287$
TL235	0.010λ , 51.5Ω	$W1 = 1.10$, $W2 = 1.10$, $W3 = 1.91$	$W1 = 44$, $W2 = 44$, $W3 = 75$
TL236	0.014λ , 20.9Ω	$W = 3.81$, $L = 2.51$	$W = 150$, $L = 99$
TL237	0.052λ , 5.7Ω	$W = 16.51$, $L = 8.89$	$W = 650$, $L = 350$
TL238	0.021λ , 16.5Ω	$W1 = 5.08$, $W2 = 5.08$, $W3 = 3.81$	$W1 = 200$, $W2 = 200$, $W3 = 150$
TL239	0.021λ , 20.9Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 3.81$	$W1 = 150$, $W2 = 150$, $W3 = 150$
TL240	0.007λ , 20.9Ω	$W1 = 3.81$, $W2 = 3.81$, $W3 = 1.27$	$W1 = 150$, $W2 = 150$, $W3 = 50$

Reference Circuit (cont.)



Reference circuit board layout (not to scale)

Component	Description	Suggested Supplier	P/N or Comment
C101	Chip capacitor, 33 pF	ATC	ATC100B330JW500XB
C102	Chip capacitor, 4.71 μ F	Digi-Key	493-2372-2-ND
C103	Capacitor, 10 nF	ATC	ATC200B103MW50XC
C104, C107	Chip capacitor, 56 pF	ATC	ATC100B560JW500XB
C105	Chip capacitor, 3.3 pF	ATC	ATC100B3R3CW500XB
C106, C203	Chip capacitor, 3.9 pF	ATC	ATC100B3R9CW500XB
C108	Chip capacitor, 1.5 pF	ATC	ATC100B1R5CW500XB
C109	Capacitor, 10 nF	ATC	ATC200B103MW50XC
C110	Chip capacitor, 4.7 pF	ATC	ATC100B4R7CW500XB
C201, C213	Electrolytic cap., 100 μ F, 50 V	Digi-Key	PCE4442TR-ND
C202	Chip capacitor, 1.2 pF	ATC	ATC100B1R2CW500XB
C204	Capacitor, 10 nF	ATC	ATC200B103MW50XC
C205	Chip capacitor, 56 pF	ATC	ATC100B560JW500XB
C206, C208, C211, C212, C217, C220, C221, C222	Capacitor, 10 μ F	Digi-Key	587-1818-2-ND
C207	Chip capacitor, 0.2 pF	ATC	ATC100B0R2CW500XB
C209	Chip capacitor, 5.6 pF	ATC	ATC100B5R6CW500XB
C210	Chip capacitor, 1 pF	ATC	ATC100B1R0CW500XB

table continued on next page

Reference Circuit (cont.)

Component	Description	Suggested Supplier	P/N or Comment
C214	Capacitor, 10 nF	ATC	ATC200B103MW50XC
C215	Chip capacitor, 1 pF	ATC	ATC100B1R0CW500XB
C216, C218	Chip capacitor, 1 μ F	Digi-Key	478-3993-2-ND
C219, C223	Tantalum capacitor, 10 μ F, 35 V	Garrett Electronics	281M5002106K
C801, C803, C804	Chip capacitor, 1 nF	Digi-Key	PCC1772CT-ND
C802, 805	Chip capacitor, 100 nF	Digi-Key	PCC104BCT-ND
R101	Resistor, 10 Ω	Digi-Key	P10ECT-ND
R102	Resistor, 5.1 Ω	Digi-Key	P5.1KECT-ND
R103	Resistor, 10 Ω	Digi-Key	P10ECT-ND
R801	Resistor, 1.3k Ω	Digi-Key	P1.3KGCT-ND
R802	Resistor, 1.2k Ω	Digi-Key	P1.2KGCT-ND
R803, R805	Resistor, 10 Ω	Digi-Key	P10ECT-ND
R804	Resistor, 2k Ω	Digi-Key	P2.0KECT-ND
S1	Transistor	Digi-Key	BCP5616-ND
S2	Potentiometer, 2k Ω	Digi-Key	3224W-202ECT-ND
S3	Voltage regulator	Digi-Key	LM78L05ACM-ND

See package outline specifications on next page

Package Outline Specifications

Package H-34288-4/2

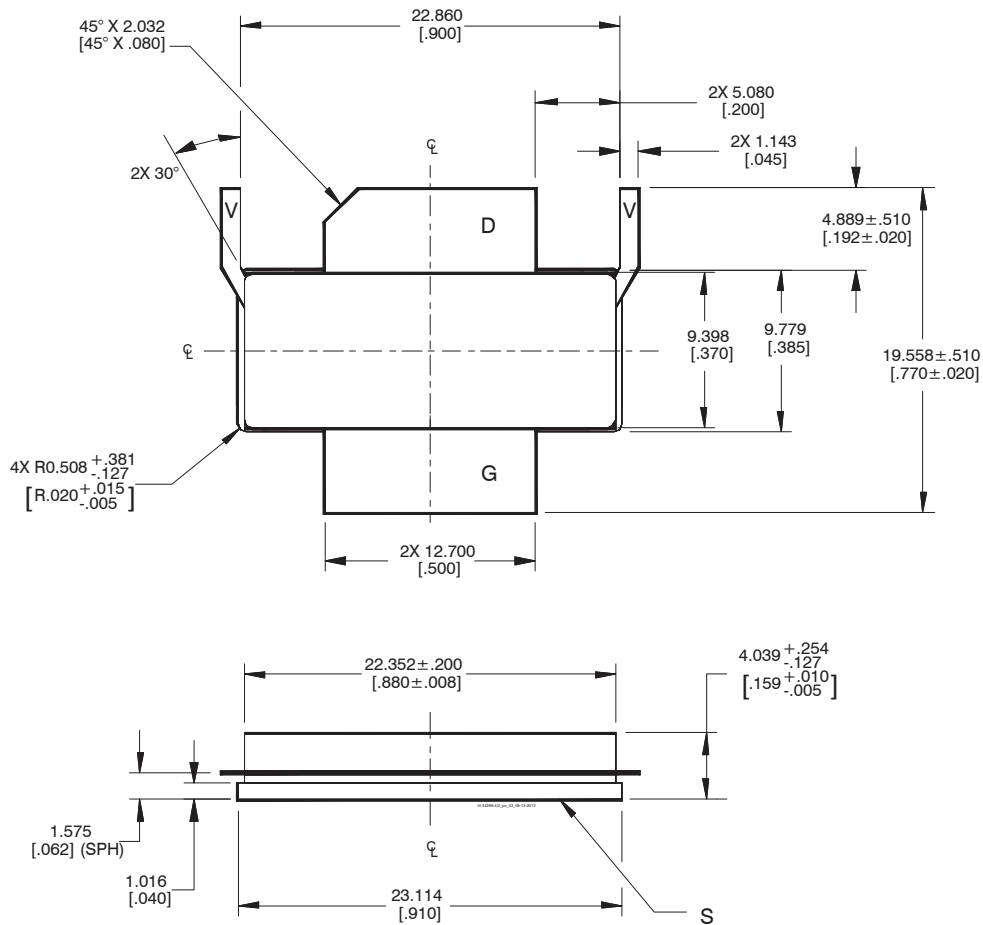


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [0.005] unless specified otherwise.
4. Pins: D - drain; S - source; G - gate; V - V_{DD}.
5. Lead thickness: 0.10 +0.051/-0.025 mm [0.004 +0.002/-0.001 inch].
6. Gold plating thickness: 0.25 micron [10 microinch] max.

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

Revision History: 2016-06-09

Data Sheet

Previous Revision: 2011-03-14, Data sheet

Page	Subjects (major changes since last revision)
2	updated ordering code to R0

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