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PTFA142401EL
PTFA142401FL

green Product

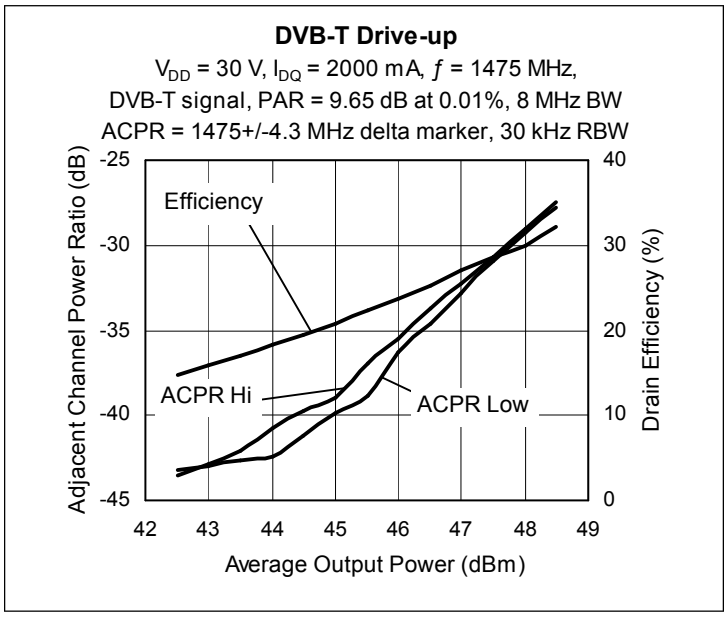
Thermally-Enhanced High Power RF LDMOS FET
240 W, 1450 – 1500 MHz

Description

The PTFA142401EL and PTFA142401FL are 240-watt LDMOS FETs designed for DVB and DAB applications in the 1450 to 1500 MHz frequency band. Features include internal I/O 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.

PTFA142401EL
Package H-33288-2

PTFA142401FL
Package H-34288-2



Features

- Pb-free, RoHS-compliant and thermally-enhanced packages with less than 0.25 micron Au plating
- Broadband internal matching
- Typical DVB-T performance at 1475 MHz, 30 V
  - Average output power = 47.0 dBm
  - Linear Gain = 16.0 dB
  - Efficiency = 27.5%
  - Adjacent channel power = –32 dBc
- Typical CW performance, 1475 MHz, 30 V
  - Output power at P–1dB = 240 W
  - Efficiency = 52%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 30 V, 200 W (CW) output power

RF Characteristics

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

V_{DD} = 30 V, I_{DQ} = 2.0 A, P_{OUT} = 50 W average
f = 1475 MHz DVB-T, channel bandwidth = 8.0 MHz , peak/average = 9.65 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	—	16.5	—	dB
Drain Efficiency	η_D	—	27.5	—	%
Adjacent Channel Power Ratio (±4.3 MHz offset, 30 kHz RBW)	ACPR	—	–32	—	dBc

All published data at T_{CASE} = 25°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 V, I_{DQ} = 2.0 A, P_{OUT} = 240 W PEP, f = 1500 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15.0	16.0	—	dB
Drain Efficiency	η_D	40	43	—	%
Intermodulation Distortion	IMD	—	–31	–29	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
Drain Leakage Current	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	V_{DS} = 30 V, I_{DQ} = 2.0 A	V_{GS}	2.0	2.5	3.0	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}	65	V
Gate-Source Voltage	V_{GS}	–0.5 to +12	V
Junction Temperature	T_J	200	°C
Total Device Dissipation	P_D	625	W
Above 25°C derate by		3.57	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 240 W CW)	$R_{\theta JC}$	0.28	°C/W

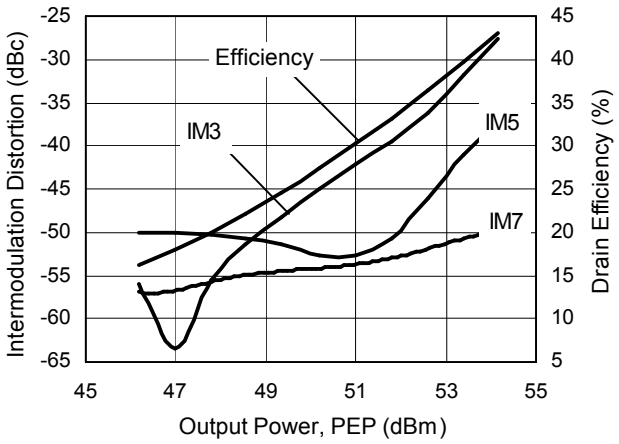
Ordering Information

Type and Version	Package Outline	Package Description	Shipping	Marking
PTFA142401EL V4	H-33288-2	Thermally-enhanced, slotted flange, single-ended	Tray	PTFA142401EL
PTFA142401FL V4	H-34288-2	Thermally-enhanced, earless flange, single-ended	Tray	PTFA142401FL

Typical Performance (data taken in an Infineon test fixture)

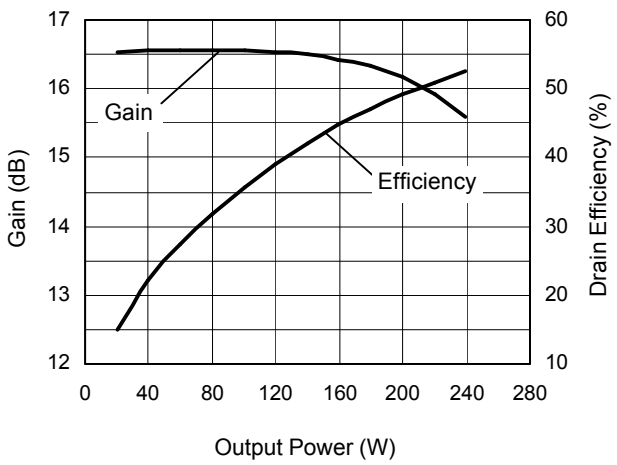
Two-tone Drive-up

V_{DD} = 30 V, I_{DQ} = 2000 mA,
f = 1475 MHz, tone spacing = 1 MHz



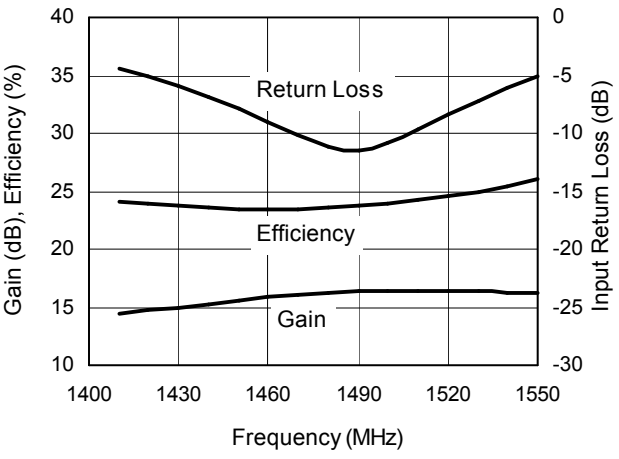
Power Sweep, CW Conditions

V_{DD} = 30 V, I_{DQ} = 2000 mA, f = 1475 MHz



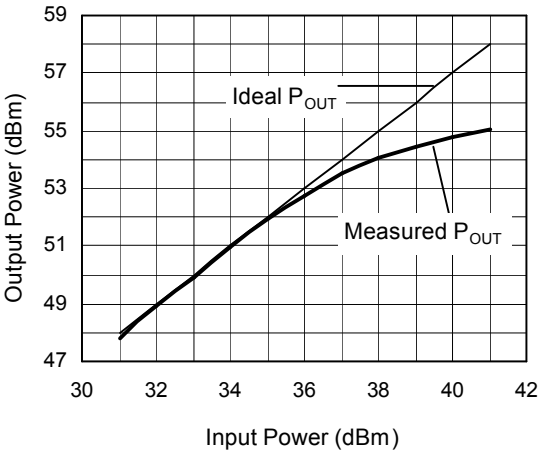
Broadband Performance

V_{DD} = 30 V, I_{DQ} = 2000 mA, P_{OUT} = 50 W



Pulsed CW Characteristics

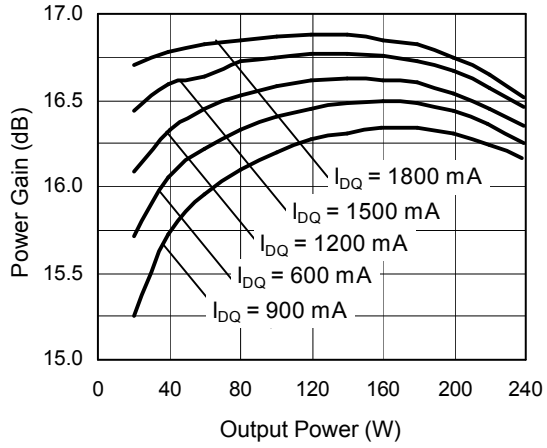
V_{DD} = 30 V, I_{DQ} = 1800 mA, f = 1475 MHz
10 µs pulse time, 10% duty cycle



Typical Performance (cont.)

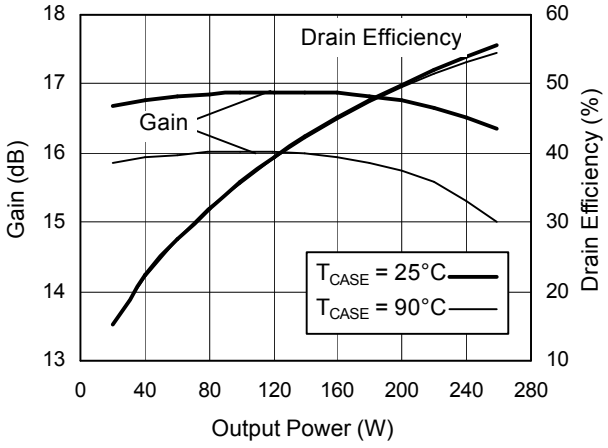
Gain vs. Output Power

V_{DD} = 30 V, f = 1500 MHz



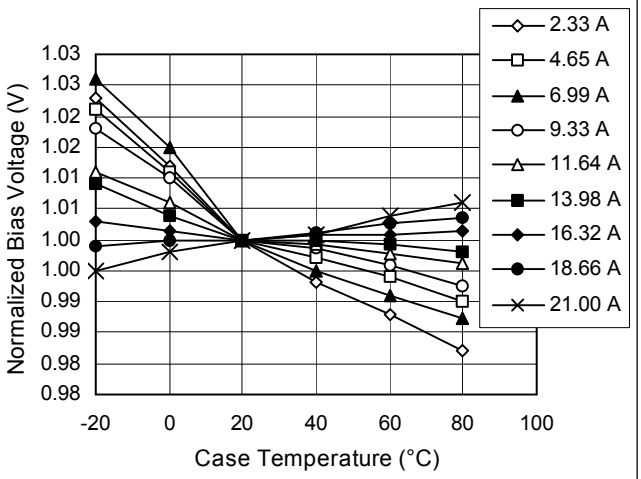
CW Power Sweep (P–1dB)

V_{DD} = 30 V, I_{DQ} = 1.8 A, f = 1500 MHz

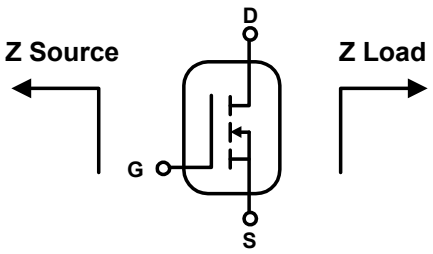


Bias Voltage vs. Temperature

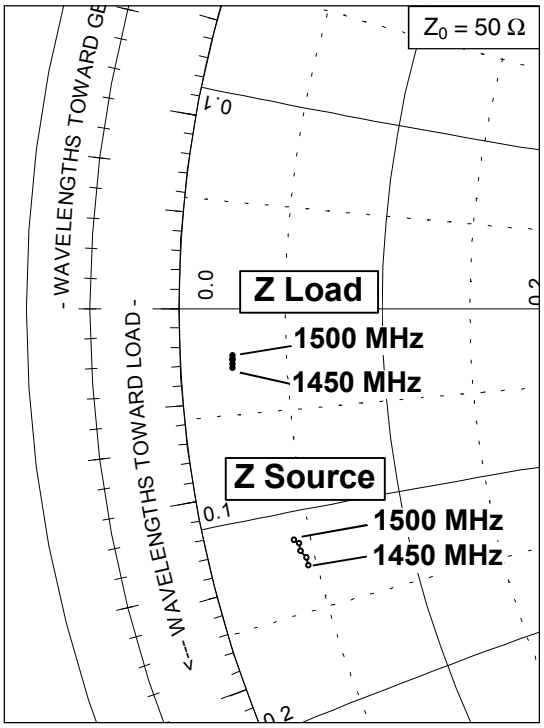
Voltage normalized to typical gate voltage,
series show current



Broadband Circuit Impedance

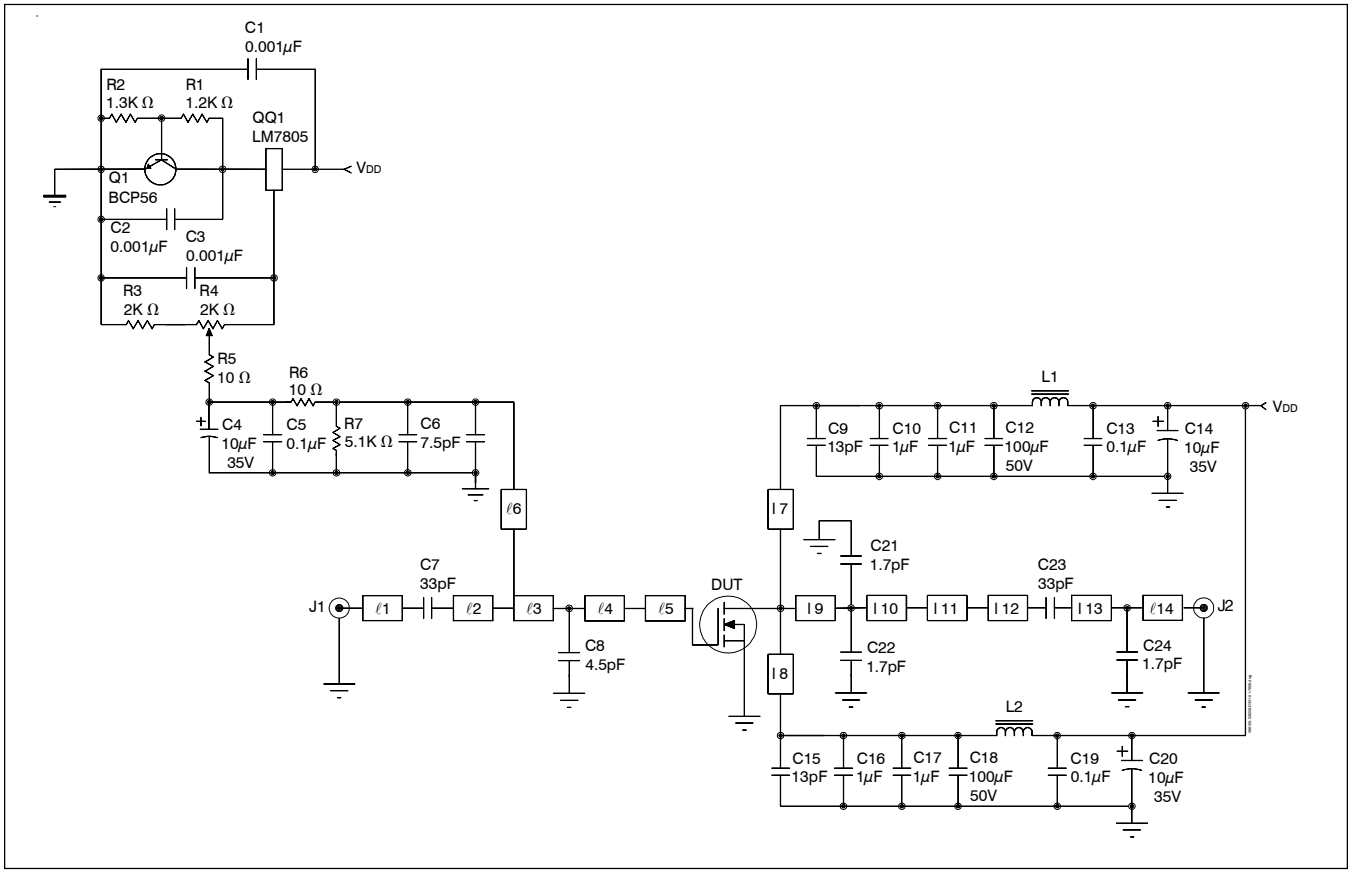


Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
1450	2.3	–6.4	1.2	–1.4
1463	2.3	–6.2	1.2	–1.3
1475	2.2	–6.0	1.2	–1.2
1488	2.2	–5.8	1.2	–1.2
1500	2.1	–5.7	1.2	–1.1



See next page for circuit information

Reference Circuit

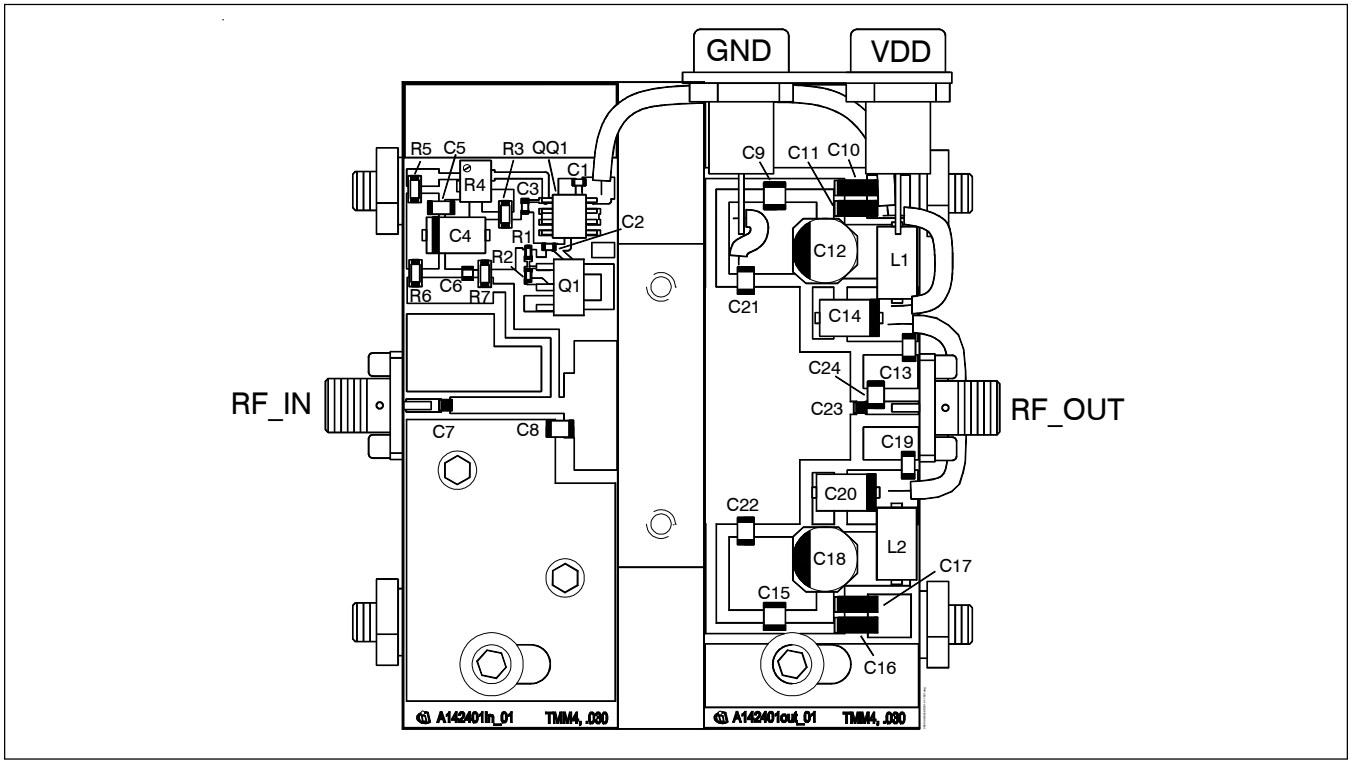


Reference circuit schematic for ƒ = 1475 MHz

Circuit Assembly Information			
DUT	PTFA142401EL or PTFA142401FL	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, ε_r = 4.5	TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 1475 MHz	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.038 λ, 53.1, Ω	4.17 x 1.52	0.164 x 0.060
ℓ2	0.108 λ, 47.5, Ω	11.86 x 1.91	0.467 x 0.075
ℓ3	0.014 λ, 47.5, Ω	1.57 x 1.91	0.062 x 0.075
ℓ4	0.012 λ, 16.3, Ω	1.22 x 7.62	0.048 x 0.300
ℓ5	0.051 λ, 8.9, Ω	5.08 x 15.24	0.200 x 0.600
ℓ6	0.171 λ, 66.9, Ω	19.10 x 1.02	0.752 x 0.040
ℓ7, ℓ8	0.177 λ, 60.0, Ω	19.66 x 1.27	0.774 x 0.050
ℓ9	0.049 λ, 5.0, Ω	4.80 x 27.94	0.189 x 1.100
ℓ10	0.065 λ, 5.0, Ω	6.38 x 27.94	0.251 x 1.100
ℓ11	0.059 λ, 10.6, Ω	5.97 x 12.70	0.235 x 0.500
ℓ12	0.006 λ, 53.1, Ω	0.71 x 1.52	0.028 x 0.060
ℓ13	0.011 λ, 53.1, Ω	1.19 x 1.52	0.047 x 0.060
ℓ14	0.046 λ, 53.1, Ω	5.05 x 1.52	0.199 x 0.060

Reference Circuit (cont.)



*Reference circuit assembly diagram * (not to scale)*

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 µF	Digi-Key	PCC1772CT-ND
C4, C14, C20	Tantalum capacitor, 10 µF, 35 V	Digi-Key	399-1655-2-ND
C5, C13, C19	Capacitor, 0.1 µF	Digi-Key	PCC104BCT-ND
C6	Ceramic capacitor, 7.5 pF	ATC	100B 7R5
C7, C23	Ceramic capacitor, 33 pF	ATC	100B 330
C8	Ceramic capacitor, 4.5 pF	ATC	100B 4R5
C9, C15	Ceramic capacitor, 13 pF	ATC	100B 130
C10, C11, C16, C17	Capacitor, 1 µF	ATC	920C105
C12, C18	Electrolytic capacitor, 100 µF, 50 V	Digi-Key	PCE3718CT-ND
C21, C22, C24	Ceramic capacitor, 1.7 pF	ATC	100B 1R7
L1, L2	Ferrite, 8.9 mm	Elna Magnetics	BDS 4.6/3/8.9-4S2
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.2k ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor, 1.3k ohms	Digi-Key	P1.3KGCT-ND
R3	Chip resistor, 2k ohms	Digi-Key	P2KECT-ND
R4	Potentiometer, 2k ohms	Digi-Key	3224W-202ETR-ND
R5, R7	Chip resistor, 5.1k ohms	Digi-Key	P5.1KECT-ND
R6	Chip resistor, 10 ohms	Digi-Key	P10ECT-ND

**Gerber Files for this circuit available on request*

Package Outline Specifications

Package H-33288-2

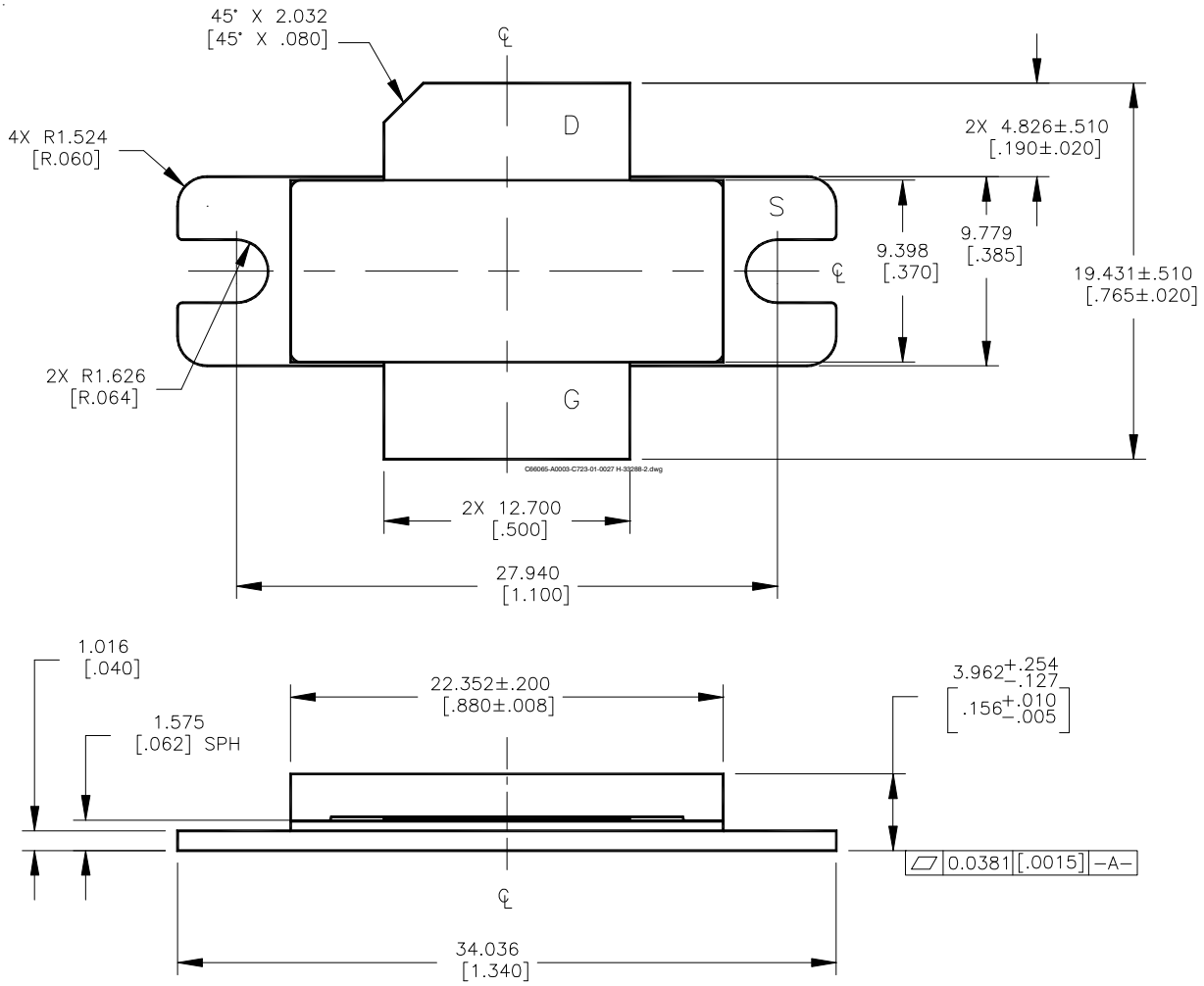


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D = drain, S = source, G = gate.
5. Lead thickness: 0.102 +0.051/–0.025 [.004 +.002/–.001].
6. Gold plating less than 0.25 micron [10 microinch].

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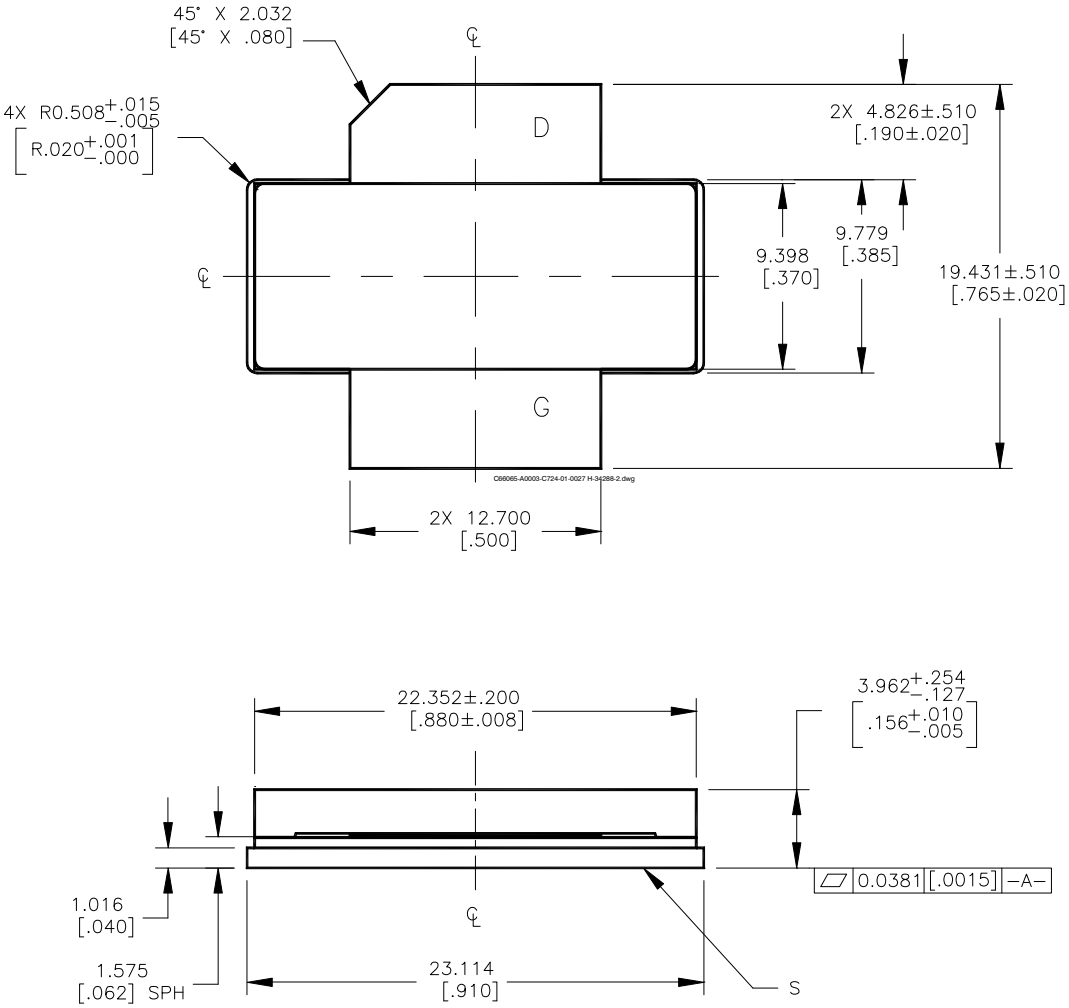
Package Outline Specifications (cont.)

Package H-34288-2



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Revision History:	2009-07-16	Data Sheet
Previous Version:	2009-03-31, Data Sheet	

Page	Subjects (major changes since last revision)
6, 7	Fixed typing error

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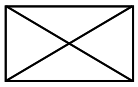

Edition 2009-07-16

Published by
Infineon Technologies AG
81726 Munich, Germany

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