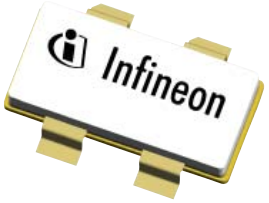
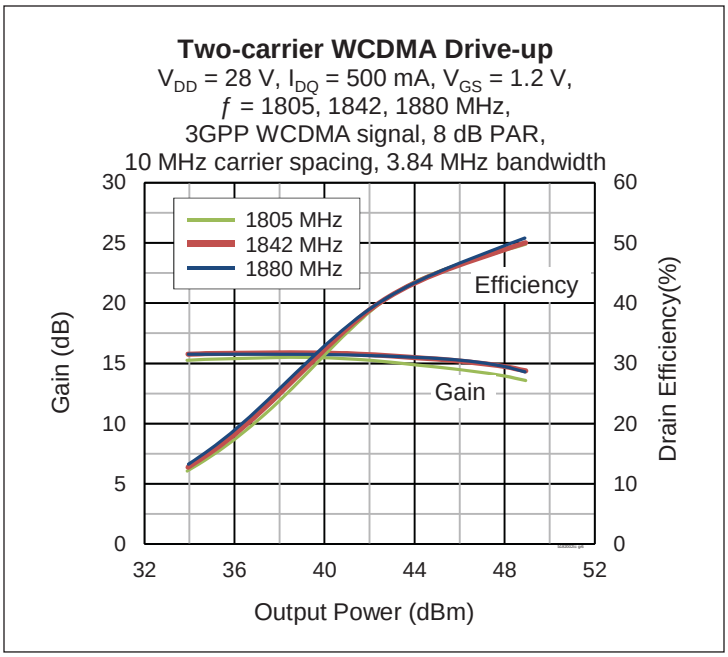
Thermally-Enhanced High Power RF LDMOS FET
180 W, 28 V, 1805 – 1880 MHz

Description

The PTAB182002TC is a 180-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 1805 to 1880 MHz frequency band. Features include input and output matching, high gain and a thermally-enhanced package with earless copper flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTAB182002TC
Package H-49248H-4
(formed leads)



Features

- Asymmetric Doherty design
  - Main: P_{1dB} = 70 W Typ
  - Peak: P_{1dB} = 120 W Typ
- Broadband internal matching
- Integrated ESD protection
- Capable of handling 3:1 VSWR @ 30 V, 50 W (average) output power (one-carrier WCDMA signal, 10 dB PAR, Doherty test fixture)
- Copper flange for enhanced thermal performance
- Pb-free and RoHS-compliant

RF Characteristics

Two-carrier Specifications (device with flat leads tested in an Infineon Doherty production test fixture)
V_{DD} = 28 V, V_{GSPK} = (V_{GS} at I_{DQ} = 900 mA)–1.90 V, I_{DQ} = 520 mA, P_{OUT} = 29 W avg., f_1 = 1870 MHz, f_2 = 1880 MHz. 3GPP WCDMA signal: 3.84 MHz bandwidth, 7.5 dB PAR @ 0.01% CCDF.

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	14.0	14.8	—	dB
Drain Efficiency	η_D	44	47	—	%
Intermodulation Distortion	IMD	—	–27.6	–24.0	dBc

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

Characteristic (each side)	**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
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
Gate Leakage Current	V_{GS} = 12 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA
On-state Resistance (main)	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.15	—	Ω
On-state Resistance (peak)	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.09	—	Ω
Operating Gate Voltage (main)	V_{DS} = 28 V, I_{DQ} = 520 mA	V_{GS}	2.5	3.0	3.5	V
Operating Gate Voltage (peak)	V_{DS} = 28 V, I_{DQ} = 0 mA	V_{GS}	0.7	1.1	1.5	V

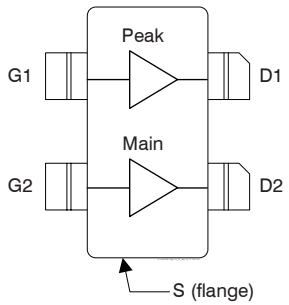
Maximum Ratings

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	°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 170 W CW)	R_{qJC}	0.34	°C/W

Ordering Information

Type and Version	**Order Code**	**Package and Description**	**Shipping**
PTAB182002TC V2 R250	PTAB182002TCV2R250XTMA1	H-49248H-4, ceramic open-cavity, formed leads, earless	Tape & Reel, 250 pcs

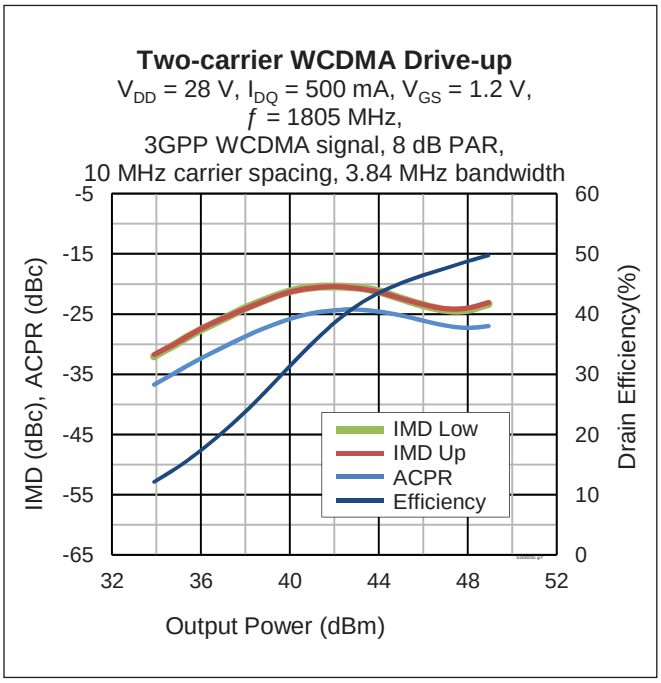
Pinout Diagram (top view)

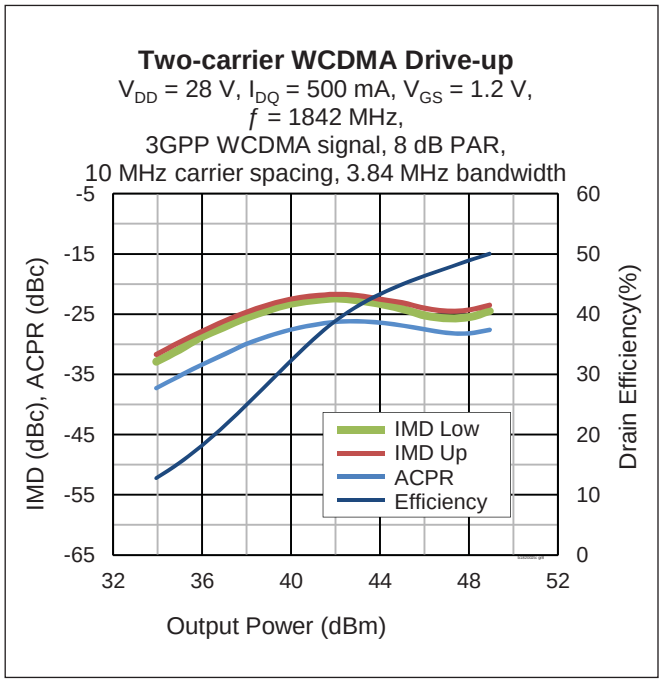


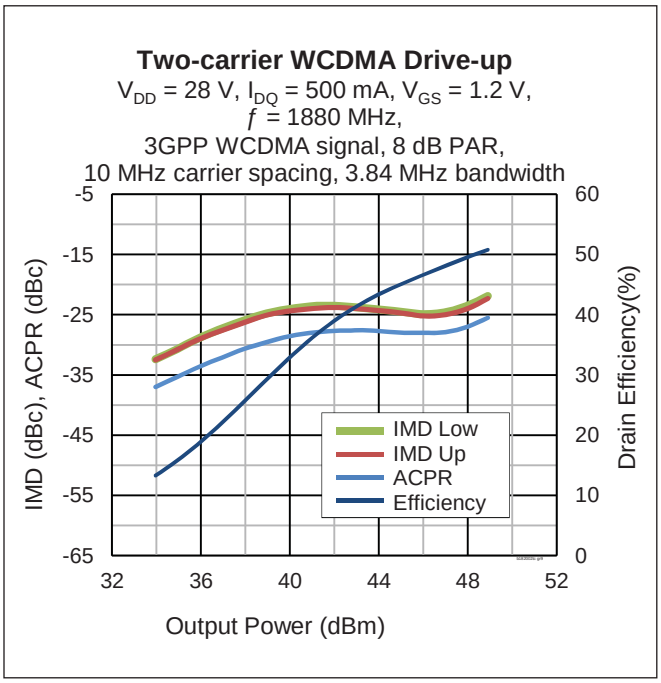
Pin	**Description**
D1	Peak Device Drain
D2	Main Device Drain
G1	Peak Device Gate
G2	Main Device Gate
S (flange)	Source

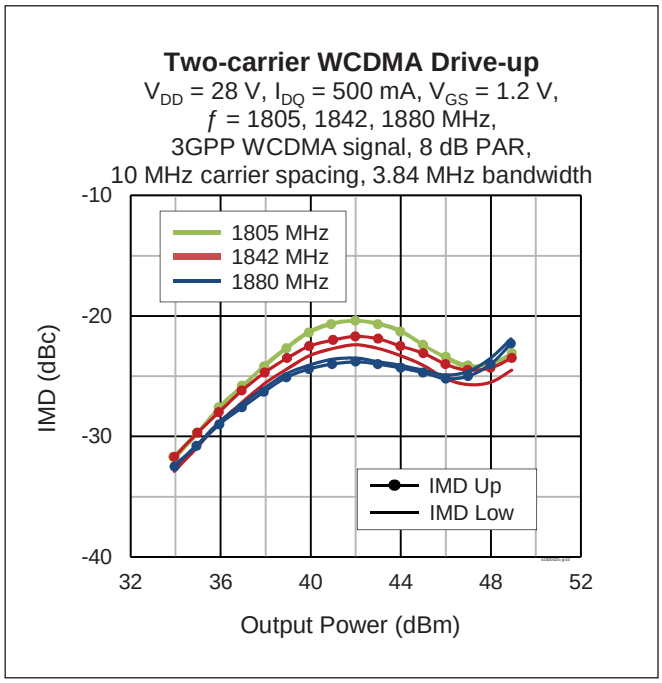
Lead connections for PTAB182002TC

Typical Performance (data taken in a production Doherty test fixture)



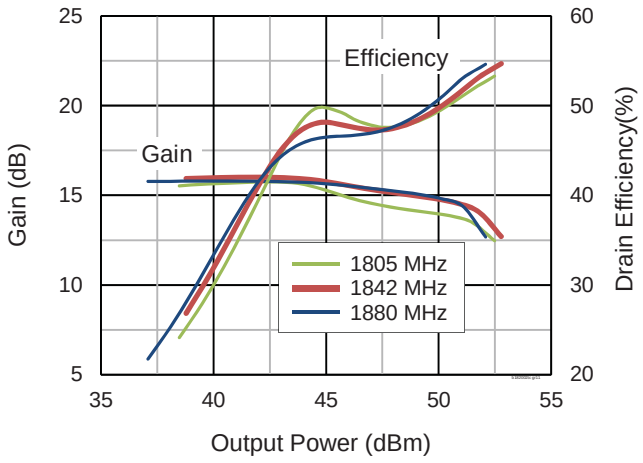




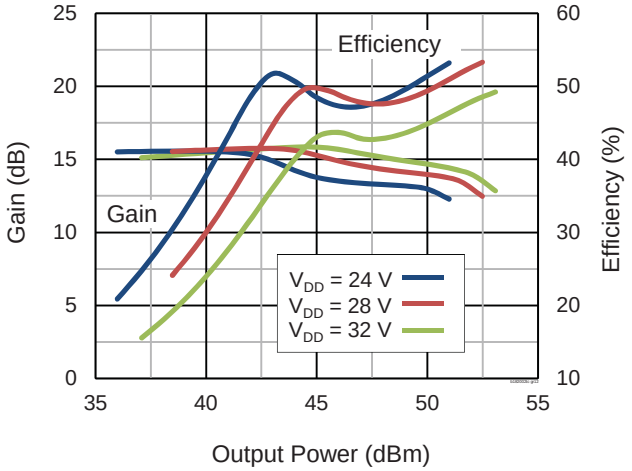


Typical Performance (cont.)

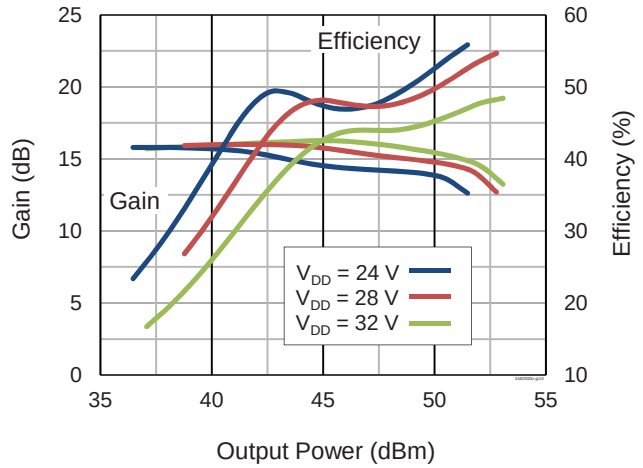
CW Performance
V_{DD} = 28 V, I_{DQ} = 500 mA,
f = 1805, 1842, 1880 MHz,



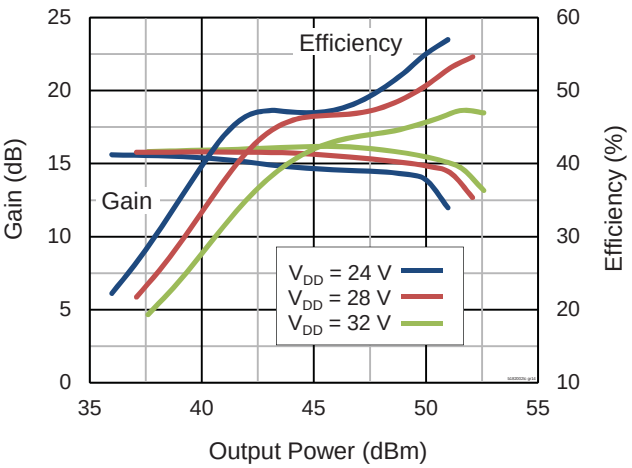
CW Performance
at selected V_{DD}
I_{DQ} = 500 mA, f = 1805 MHz



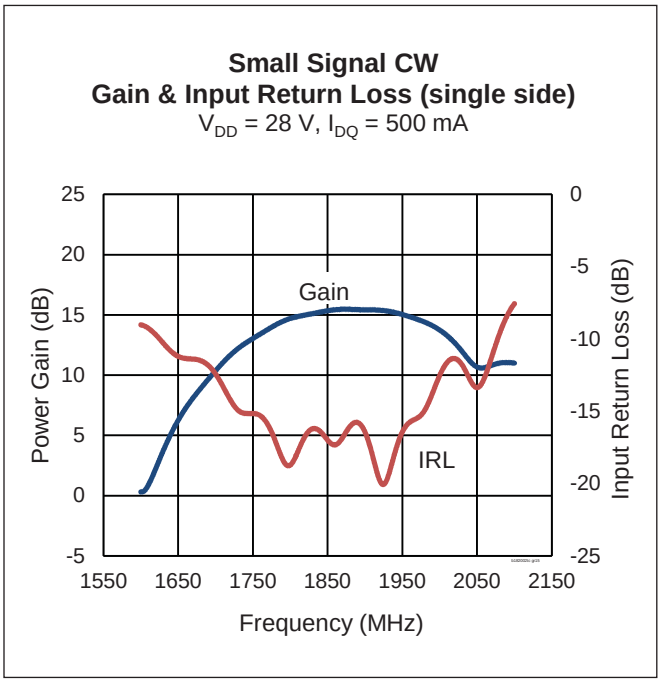
CW Performance
at selected V_{DD}
I_{DQ} = 500 mA, f = 1842 MHz



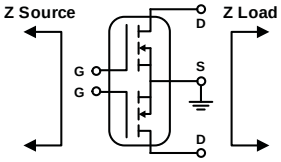
CW Performance
at selected V_{DD}
I_{DQ} = 500 mA, f = 1880 MHz



Typical Performance (cont.)



Load Pull Performance



Main Side Load Pull Performance – Pulsed CW signal: 16 µsec, 10% duty cycle; 28 V, 530 mA

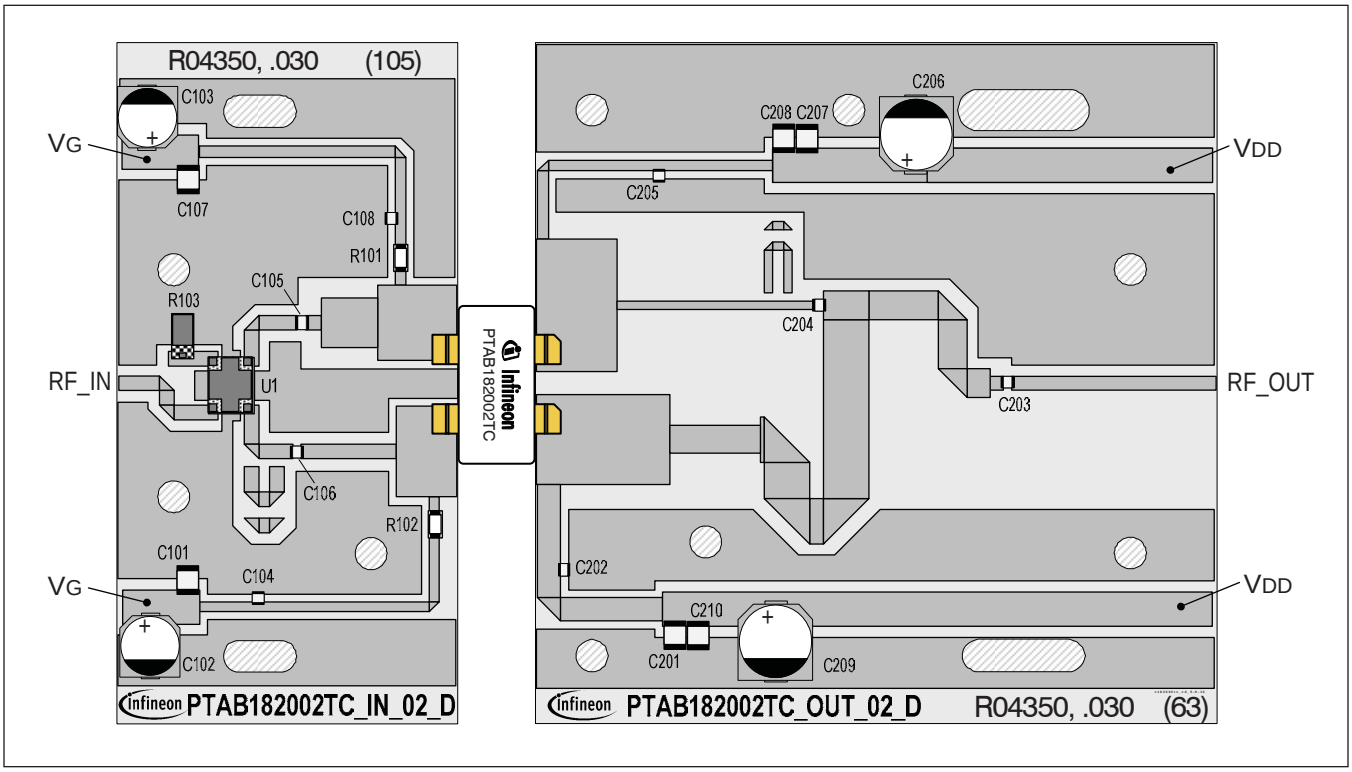
		P_{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z Source [Ω]	Z Load [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Z Load [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]
1805	5.6 – j6.1	2.3 – j9.4	16.4	49.89	97	54.4	6.6 – j9.5	18.9	48.16	65	65.0
1842	12.4 – j12.7	2.1 – j9.4	15.9	50.03	101	53.6	5.4 – j8.6	18.7	48.21	66	66.0
1880	15.1 – j14.5	2.1 – j9.8	16.2	50.06	101	54.7	5.0 – j9.0	18.8	48.34	68	68.0

Peak Side Load Pull Performance – Pulsed CW signal: 16 µsec, 10% duty cycle; 28 V, 850 mA

		P_{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z Source [Ω]	Z Load [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Z Load [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]
1805	7.5 – j8.9	1.5 – j9.3	18.2	51.47	140	52.8	2.4 – j8.3	20.1	50.17	104	62.5
1842	6.7 – j5.2	1.2 – j9.2	18.2	51.68	147	53.1	2.4 – j8.3	20.3	50.09	102	62.9
1880	5.5 – j6.8	1.4 – j9.7	18.7	51.35	136	54.0	2.4 – j8.3	20.5	49.95	99	62.2

Reference Circuit (1880 MHz)

DUT	PTAB182002TC
Reference Circuit Part No.	LTA/PTAB182002TC V2
PCB	Rogers 4350, 0.762 mm [.030"] thick, 2 oz. copper, ε_r = 3.66
Find Gerber files for this test fixture on the Infineon Web site at (**http://www.infineon.com/rfpower**)	



Reference circuit assembly diagram (not to scale)

Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C107	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C102, C103	Capacitor, 10 µF	Panasonic Electronic Components – ECG	EEV-HD1H100P
C104, C105, C106, C108	Chip capacitor, 24 pF	ATC	ATC100A240JW150XB
R101, R102	Resistor, 10 Ω	Panasonic Electronic Components – ECG	ERJ-8GEYJ100V
R103	Resistor, 50 Ω	Anaren	C16A50Z4
U1	RF Directional Coupler	Anaren	X3C19P1-05S
Output			
C201, C207, C208, C210	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C202, C203, C204, C205	Chip capacitor, 24 pF	ATC	ATC100A240JW150XB
C206, C209	Capacitor, 220 µF	Panasonic Electronic Components – ECG	EEE-FP1V221AP

Package Outline Specifications

Package H-49248H-4 (formed leads)

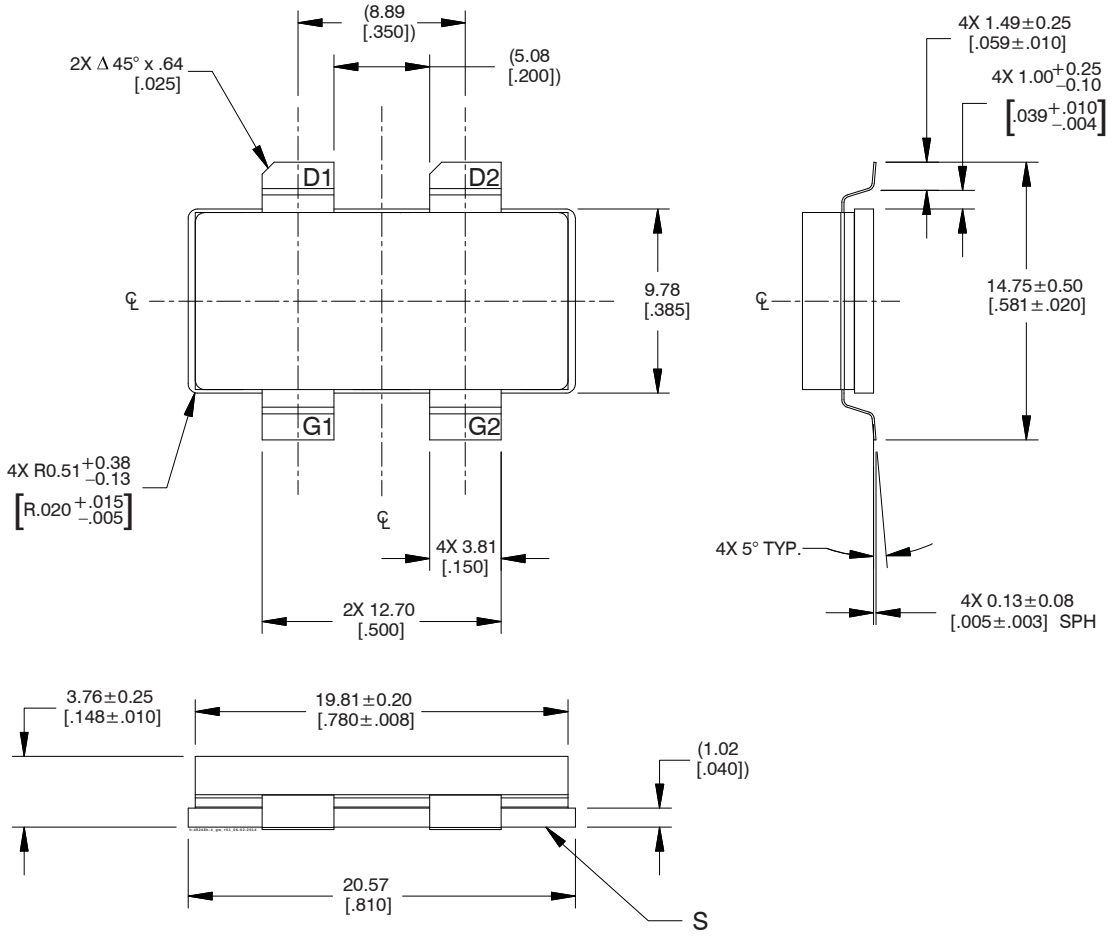


Diagram Notes—unless otherwise specified:

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].
4. Pins: D1 - peak side drain; G1 - peak side gate; D2 - main side drain, G2 - main side gate; S - source (flange).
5. Lead thickness: 0.10 +0.051/–0.025 [0.004+0.002/–0.001].
6. Gold plating thickness:
   flange – 0.25 micron [10 microinch] max;
   leads – 1.14 ± 0.38 micron [45 ± 15 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

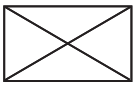
Revision	Date	Data Sheet	Page	Subjects (major changes in comparison with previous revisions)
01	2012-12-03	Advance	all	Preliminary specifications for this product
02	2012-12-21	Preliminary	all	Product further developed
03	2013-06-02	Producttion	all	Final characterization of production-released product
04	2014-07-01	Production	all	Product now Version 2 due to package change
			1, 2	Features and tables updated

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To request other information, contact us at:
+1 877 465 3667 (1-877-GO-LDMOS) USA
or +1 408 776 0600 International



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