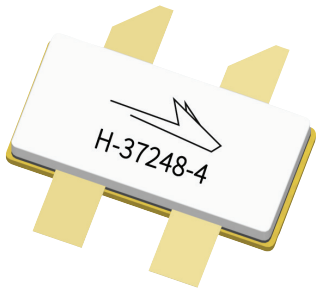
GTVA263202FC

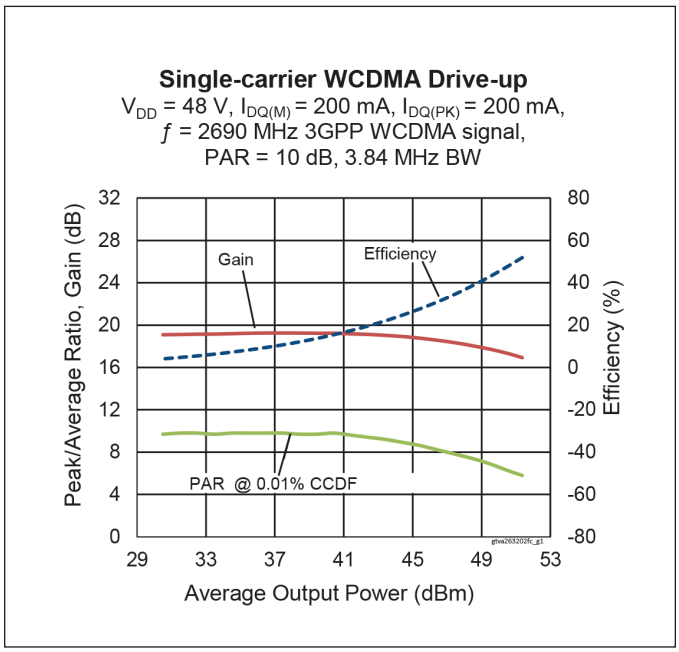
Thermally-Enhanced High Power RF GaN on SiC HEMT
340 W, 48 V, 2620 – 2690 MHz



Package Types: H-37248-4

Description

The GTVA263202FC is a 340-watt (P_{3dB}) GaN on SiC high electron mobility transistor (HEMT) for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced surface-mount package with earless flange.



Features

- GaN on SiC HEMT technology
- Input matched
- Typical pulsed CW performance, 2690 MHz, 48 V, combined outputs
  - Output power at P_{3dB} = 340 W
  - Drain efficiency = 70%
  - Gain = 16 dB
- Capable of handling 10:1 VSWR @48 V, 80 W (CW) output power
- Human Body Model Class 1B (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed production test fixture)
V_{DD} = 48 V, I_{DQ} = 200 mA (per side), P_{OUT} = 80 W avg, f = 2690 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Gain	G_{ps}	16	17	—	dB
Drain Efficiency	η_D	34	40	—	%
Adjacent Channel Power Ratio	ACPR	—	-29	-26.5	dBc

Note:
All published data at T_{CASE} = 25°C unless otherwise indicated
ESD: Electrostatic discharge sensitive device—observe handling precautions!

RoHS compliant

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DC Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain-source Breakdown Voltage	$V_{BR(DSS)}$	150	—	—	V	V_{GS} = -8 V, I_D = 21 mA
Drain-source Leakage Current	I_{DSS}	—	—	5	mA	V_{GS} = -8 V, V_{DS} = 10 V
Gate Threshold Voltage	$V_{GS(th)}$	–3.8	–3.0	–2.3	V	V_{DS} = 10 V, I_D = 21 mA

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain Operating Voltage	V_{DD}	0	—	50	V	
Gate Quiescent Voltage	$V_{GS(Q)}$	—	–2.8	—		V_{DS} = 50 V, I_D = 200 mA

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	125	V
Gate-source Voltage	V_{GS}	–10 to +2	
Gate Current	I_G	20	mA
Drain Current	I_D	7.5	A
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	

Operation above the maximum values listed here may cause permanent damage. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the component. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For reliable continuous operation, the device should be operated within the operating voltage range (V_{DD}) specified above.

Thermal Characteristics

Characteristic	Symbol	Value	Unit	Conditions
Thermal Resistance	$R_{\theta JC}$	0.5	°C/W	T_{CASE} = 70 °C, 80 W (CW)

Ordering Information

Type and Version	Order Code	Package Description	Shipping
GTVA263202FC V1 R0	GTVA263202FC-V1-R0	H-37248-4, earless flange	Tape & Reel, 50 pcs
GTVA263202FC V1 R2	GTVA263202FC-V1-R2	H-37248-4, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

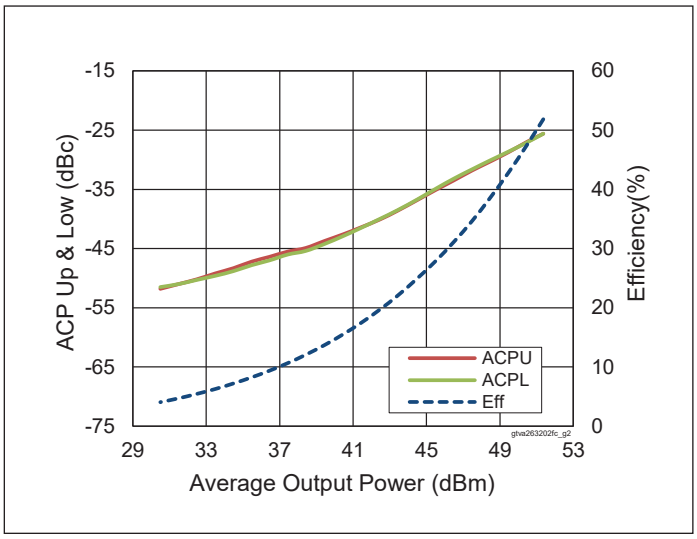


Figure 1. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, $I_{DQ(M)}$ = 200 mA, $I_{DQ(PK)}$ = 200 mA,
f = 2690 MHz, 3GPP WCDMA signal,
PAR = 10 dB, BW = 3.84 MHz

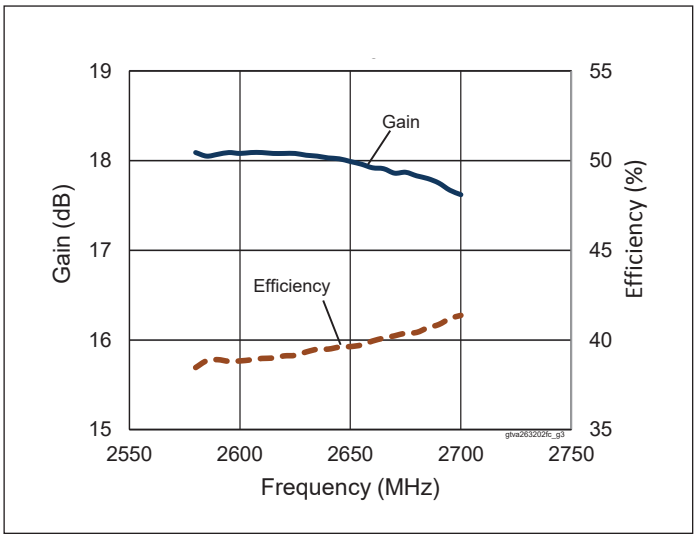


Figure 2. Single-carrier WCDMA Broadband Performance

V_{DD} = 48 V, $I_{DQ(M)}$ = 200 mA, $I_{DQ(PK)}$ = 200 mA,
P_{OUT} = 49.03 dBm, 3GPP WCDMA signal,
PAR = 10 dB

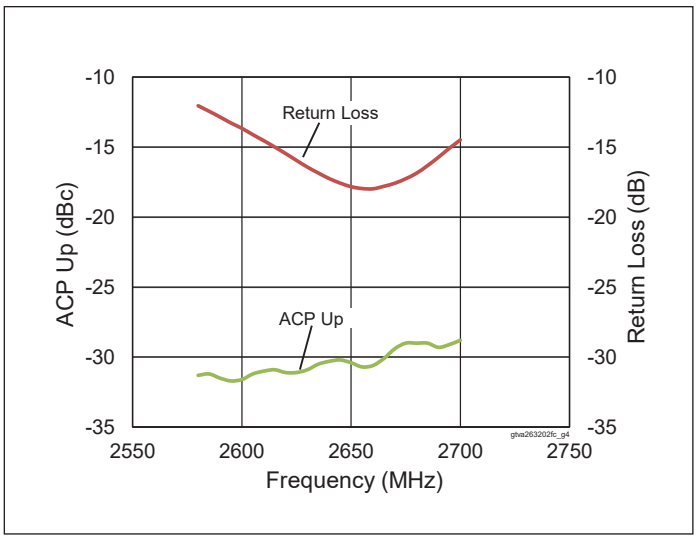


Figure 3. Single-carrier WCDMA Broadband Performance

V_{DD} = 48 V, $I_{DQ(M)}$ = 200 mA, $I_{DQ(PK)}$ = 200 mA,
P_{OUT} = 49.03 dBm, 3GPP WCDMA signal,
PAR = 10 dB

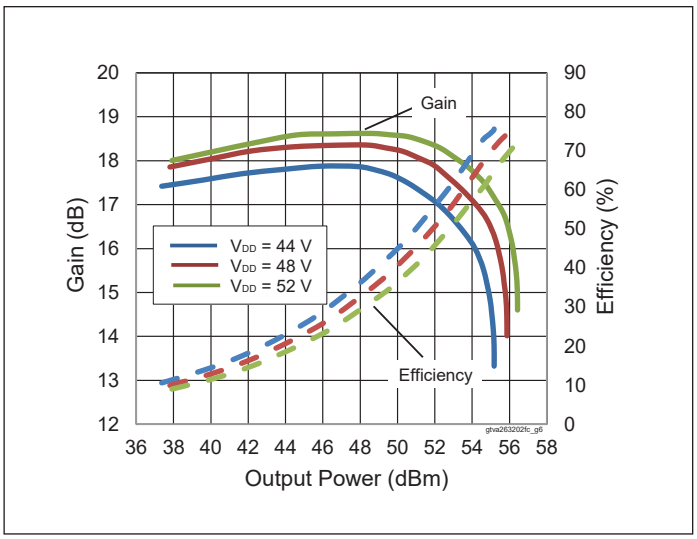


Figure 4. CW Performance at Various V_{DD}

$I_{DQ(M)}$ = 200mA, $I_{DQ(PK)}$ = 200mA, f = 2690 MHz

Typical Performance (cont.)

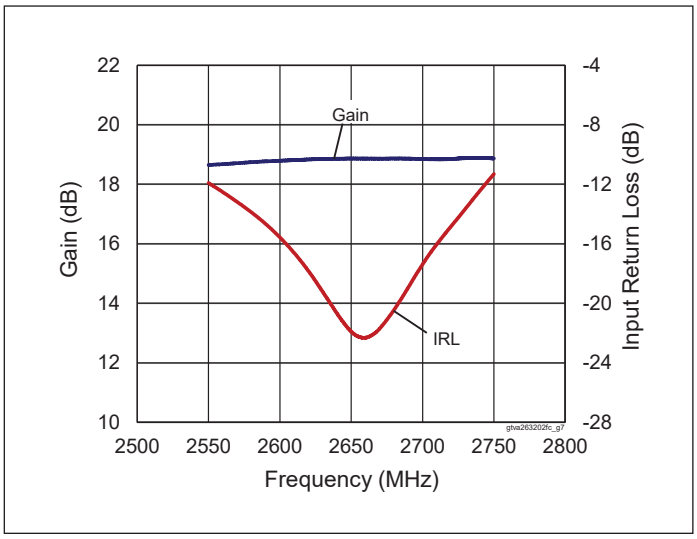


Figure 5. Small Signal CW Gain & Input Return Loss

V_{DD} = 48 V, $I_{DQ(M)}$ = 200 mA, $I_{DQ(PK)}$ = 200 mA

Load Pull Performance

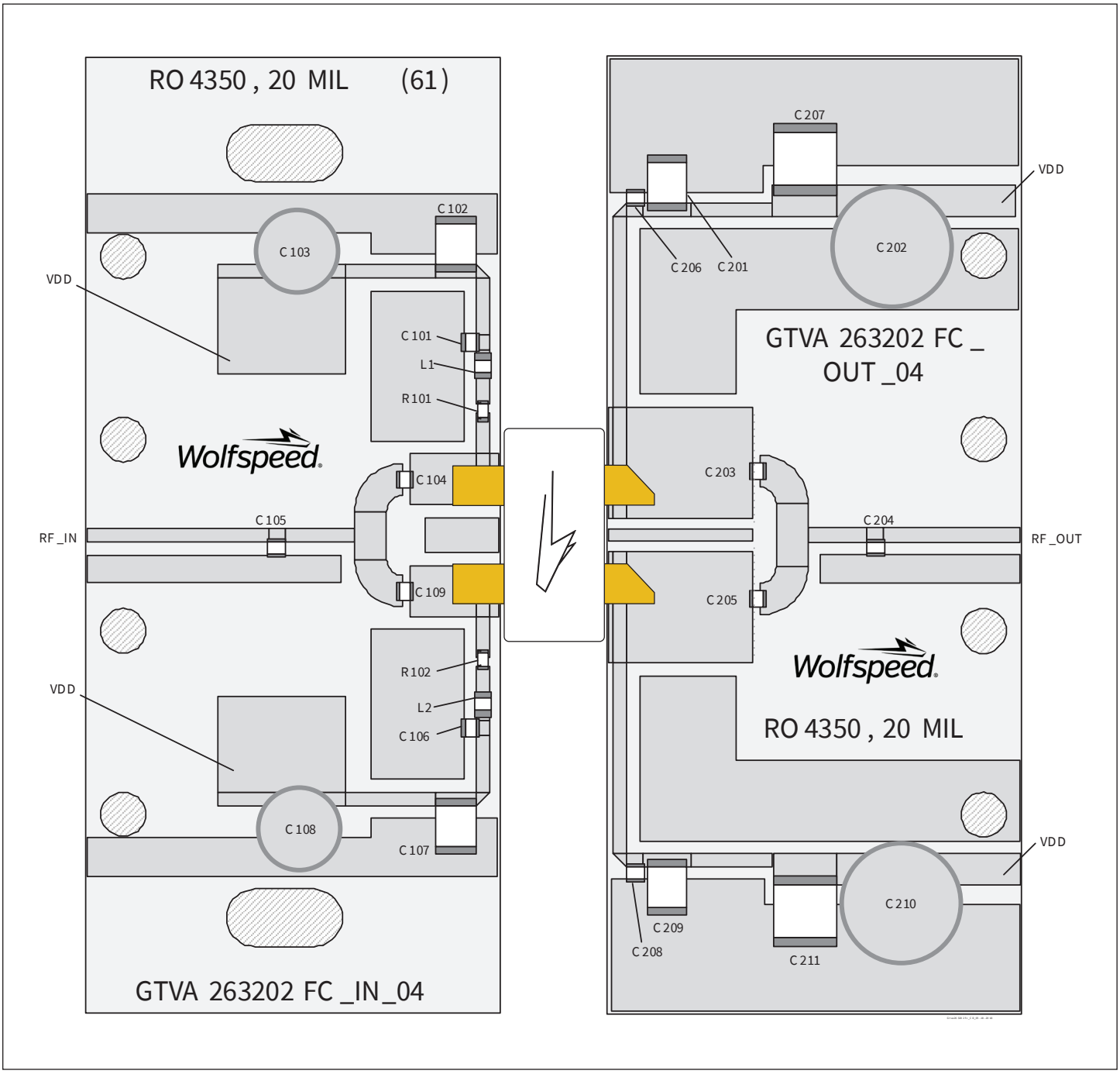
Load Pull Performance (per side) – Pulsed CW signal: 10 µs, 10% duty cycle, 48 V, I_{DQ} = 200 mA

		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 [%]
2620	8.5 – j7	2.45 – j3.5	14.95	53.75	237	65.9	2.0 – j1.1	16.36	51.13	130	77.3
2655	8.9 – j8.5	2.96 – j3.6	14.67	53.77	238	67.7	2.43 – j1.8	15.88	52.39	173	77.2
2690	9.7 – j9.7	3.0 – j3.86	14.5	53.75	237	68.2	2.17 – j1.9	15.84	52.02	159	77.6

Evaluation Board, 2620 – 2690 MHz

Evaluation Board Part Number	LTN/GTVA263202FC-V1
PCB Information	Rogers 4350, 0.508 mm [0.020”] thick, 2 oz. copper, ε_r = 3.66, f = 2620 - 2690 MHz

Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF



Reference circuit assembly diagram (not to scale)

Components Information

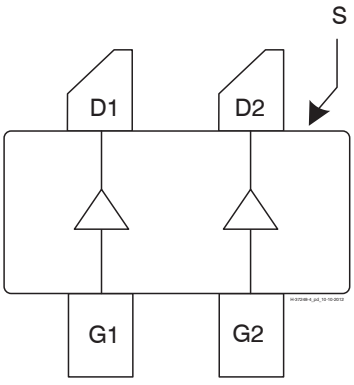
Component	Description	Manufacturer	P/N
Input			
C101, C104, C106, C109	Capacitor, 10 pF	ATC	ATC800A100JT250T
C102, C107	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C103, C108	Capacitor, 10 µF	Panasonic Electronic Components	EEE-HB1H100AP
C105	Capacitor, 1 pF	ATC	ATC800A1R0CT250T
L1, L2	Inductor, 12 nH	Coilcraft	0908SQ-12NGLB
R101, R102	Resistor, 5.6 ohms	Panasonic Electronic Components	ERJ-3GEYJ5R6V
Output			
C201, C209	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C202, C210	Capacitor, 220 µF	Panasonic Electronic Components	ECA-2AHG221
C203, C205, C206, C208	Capacitor, 10 pF	ATC	ATC800A100JT250T
C204	Capacitor, 1.4 pF	ATC	ATC800A1R4CT250T
C207, C211	Capacitor, 10 µF	TDK Corporation	C5750X7S2A106M230KB

Bias Sequencing

Bias On
1. Ensure RF is turned off
2. Apply pinch-off voltage of –5 V to the gate
3. Apply nominal drain voltage
4. Bias gate to desired quiescent drain current
5. Apply RF

Bias Off
1. Turn RF off
2. Apply pinch-off voltage to the gate
3. Turn-off drain voltage
4. Turn-off gate voltage

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)

Package Outline Specifications – Package H-37248-4

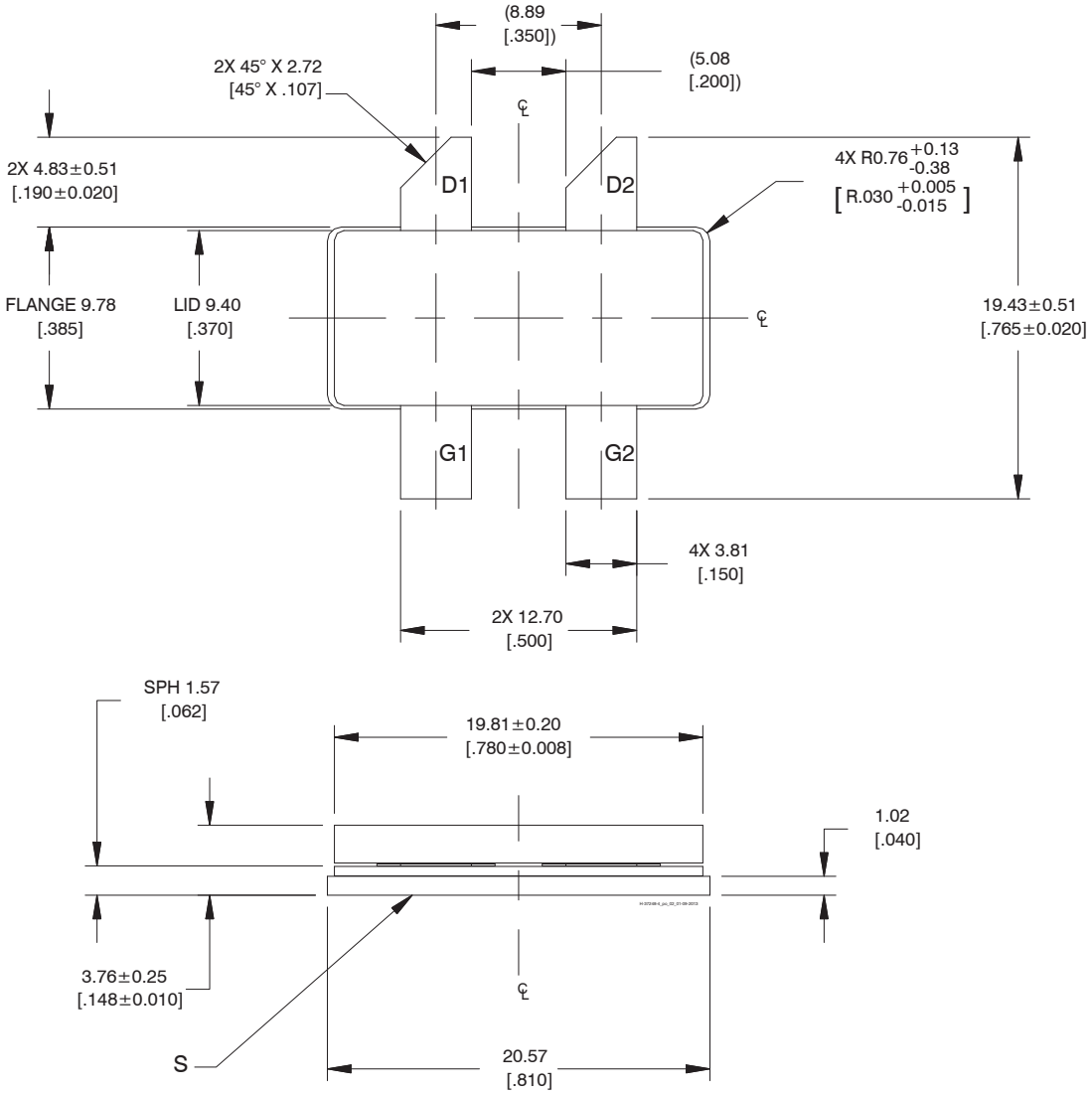


Diagram Notes—unless otherwise specified:

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: 0.10 + 0.076/–0.025 mm [0.004+0.003/–0.001 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

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