GD080 50V, DC – 3.7GHz, 80W GaN HEMT

FEATURES

- Operating Frequency Range: DC to 3.7GHz
- Operating Drain Voltage: 28V & 50V
- Maximum Output Power (P_{SAT}): 100W
- Bare die shipped in Gel-Pak containers
- Suitable for CW, Pulsed, Linear applications
- 100% KGD DC Production Tested

2.748 X 0.82 mm Die

DESCRIPTION

The GD080 is a 100W (P3dB) unmatched discrete GaN-on-SiC HEMT which operates from DC to 3.7GHz on a 50V supply rail. The wide bandwidth of the GD080 makes it suitable for a variety of applications including cellular infrastructure, radar, communications, and test instrumentation, and can support CW, linear and pulse operations.

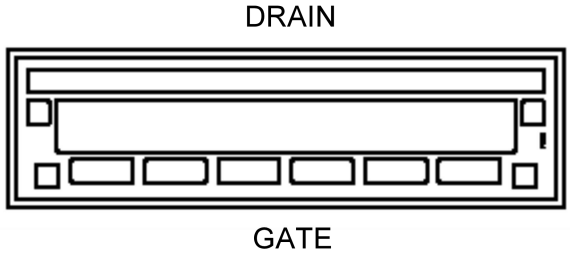
Bare die are shipped in Gel-Pak containers for safe transport and storage.

ABSOLUTE MAXIMUM RATINGS(1, 2)

Parameter	Rating	Symbols and Units
Drain Source Voltage	150	V_{DS} (V)
Gate Source Voltage	-8 to +2	V_{GS} (V)
Operating Voltage	55	V_{dsq} (V)
Junction Temperature	+225	T_{JUNC}(°C)
Storage Temperature	-65 to +150	$T_{STORAGE}$(°C)

1. Exceeding any of these limits may cause permanent damage to this device or seriously limit the life time (MTTF)
2. GalliumSemi does not recommend sustained operation above maximum operating conditions.

BLOCK DIAGRAM



ELECTRICAL SPECIFICATION: TA = 25°C

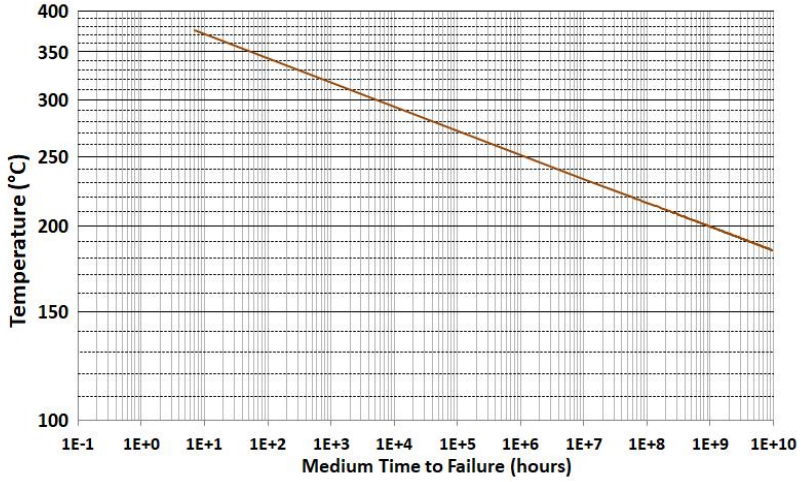
Parameter	Min.	Typ.	Max.	Symbols and Units	Test conditions
Frequency Range	DC		3700	MHz	
DC Characteristics					
Drain Source Breakdown Voltage	150			V_{BDSS} (V)	
Drain Source Leakage Current		4.4		I_{DLK} (mA)	Vgs = -8V, Vds = 50V
Gate Threshold Voltage	-3.4		-1.5	V_{GS} (V)	Vds = 50V
Operating Conditions					
Gate Bias Voltage		-2.5		V_{GSQ} (V)	
Drain Voltage		50		V_{DSQ} (V)	
Quiescent Drain Current		109		I_{DQ} (mA)	

THERMAL AND RELABILITY INFORMATION -CW [1, 2, 3]: T_c = 85°C

Rth(ºC/W) =0.0095 x Pdiss(W) + 1.1449

Parameter	Test condition	Value	Units
Channel Temperature, Tch	Pdiss 18 W	128.5	°C
Rth		1.33	ºC/W
Rsur		0.86	ºC/W
MTTF		>1.0E+10	Hrs
Channel Temperature, Tch	Pdiss 37 W	180.2	°C
Rth		1.47	ºC/W
Rsur		0.92	ºC/W
MTTF		1.0E+10	Hrs
Channel Temperature, Tch	Pdiss 56 W	242.2	°C
Rth		1.69	ºC/W
Rsur		1.02	ºC/W
MTTF		3.0E+06	Hrs

1.Assumes eutectic attach using 1mil low temp solder, mounted to a 8 mil DFN package.
2.Thermal Resistance using Finite Element Analysis (FEA) simulation, calibrated with Infrared measurement on surface temperature.
3.Rsur: Thermal resistance based on Surface Temperature, only provided as a reference.



GaN HEMT BIASING SEQUENCE

To turn the transistor ON

1. Set V_{GS} to -5V
2. Turn on V_{DS} to normal operation voltage (50V)
3. Slowly increase V_{GS} to set I_{DQ} current (94mA)
4. Apply RF power

To turn the transistor OFF

1. Turn the RF power off
2. Decrease V_{GS} to -1.5V
3. Turn off $V_{D.}$ Wait a few seconds for drain capacitor to discharge
4. Turn off V_{GS}

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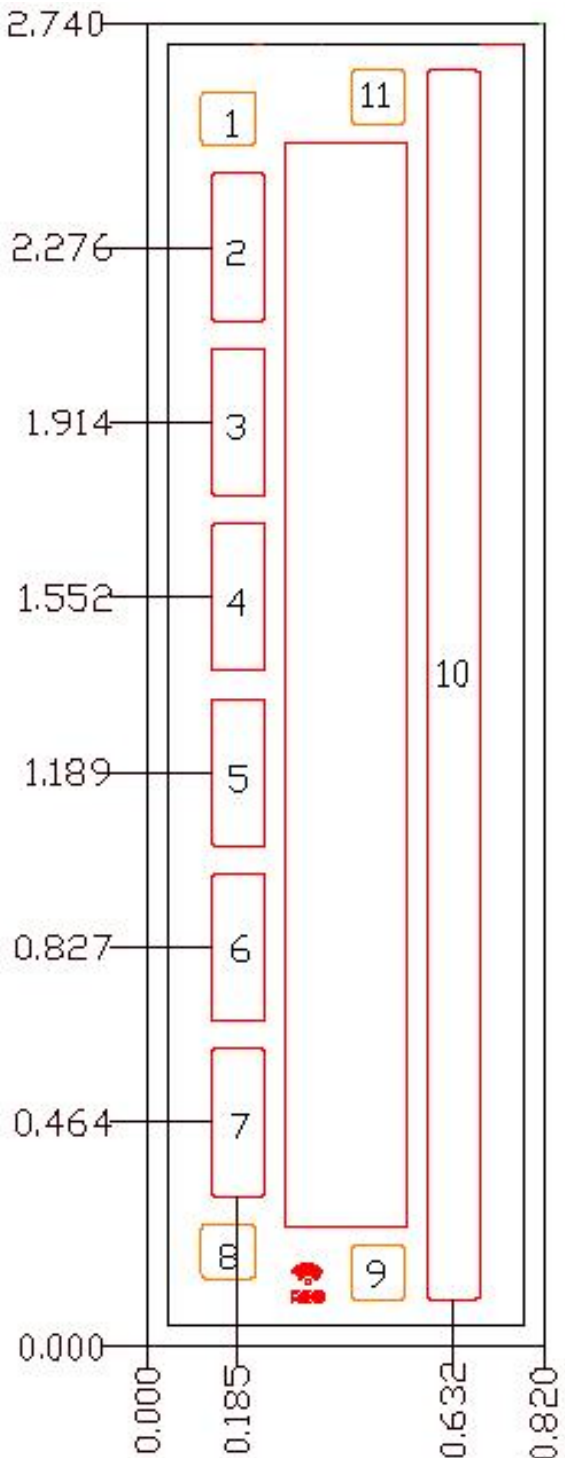
DIE DIMENSIONS



Bond Pads

Pad nb.	Description	Dimensions
1, 8, 9, 11	Not connected	
2, 3, 4, 5, 6, 7	RF Input / Gate Voltage	0.110 x 0.305
10	RF Output / Drain Voltage	0.110 x 2.543
Backside	Source/ Ground	0.820 x 2.740

Notes:
1. All dimensions are in millimeter
2. Die thickness is 75 um
3. Bond pad metallization: gold
4. Backside metallization: gold

HANDLING PRECAUTIONS

Parameter	Symbol	Class	Test Methodology
ESD* – Human Body Model	HBM	Class 1A (250 V)	ANSI/ESDA/JEDEC Standard JS-001
ESD* – Charged Device Model	CDM	Class C3 (1500 V)	ANSI/ESDA/JEDEC Standard JS-002

* Tested in DFN 3x6 package

REVISION HISTORY

Revision	Date	Datasheet Status	Modifications
A	02/22/2021	Advanced	Init
B	03/15/2021	Advanced	Updated bias voltage, added biassequecing, added Rth
C	04/12/2022	Advanced	Added die tickness and metalization
D	07/04/2022	Advanced	Corrected description section
E	12/08/2022	Advanced	Updated Thermal and Reliability section

CONTACT INFORMATION

To request latest information and samples, please contact us at:

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IMPORTANT NOTICE