

1214GN-700V

Datasheet

Class-AB GaN-on-SiC HEMT Transistor



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Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 1.0

Revision 1.0 was published in March 2017. It was the first publication of this document.

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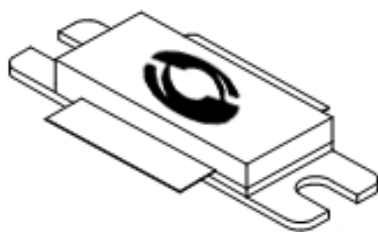
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2 Product Overview

The 1214GN-700V is an internally matched, common-source, class-AB GaN-on-SiC HEMT transistor capable of providing over 18 dB gain, 700 W of pulsed RF output power at 300 μ s pulse width, and 10% duty factor across the 960 MHz to 1215 MHz band. The transistor has internal pre-match for optimal performance. This hermetically sealed transistor is designed for the output stage of L-Band pulsed primary radar systems. It utilizes gold metallization and eutectic die attach to provide the highest reliability and superior ruggedness.

The export classification is EAR-99.

Figure 1 1214GN-700V Case Outline



3 Electrical Specifications

This section details the electrical specifications of the of the 1214GN-700V device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings of the 1214GN-700V device.

Table 1 Absolute Maximum Ratings

Rating	Parameter	Value	Units
Maximum power dissipation	Device dissipation at 25 °C		W
Maximum voltage and current	Drain-source voltage (V_{DSS})	150	V
	Gate-source voltage (V_{GS})	-8 to 0	V
Maximum temperatures	Storage temperature (T_{STG})	-55 to 125	°C
	Operating junction temperature	200	°C

3.2 Electrical Characteristics

The following table shows the typical electrical characteristics of the 1214GN-700V device at 25 °C.

Table 2 Electrical Characteristics

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
P_{OUT}	Output power	Freq = 960 MHz, 1090 MHz, 1215 MHz	700	750		W
G_P	Power gain	$P_{IN} = 12$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz	16	16.5		dB
η_D	Drain efficiency	$P_{IN} = 12$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz	60	63		%
D_r	Droop	$P_{IN} = 12$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz		0.5		dB
VSWR-T	Load mismatch tolerance	$P_{IN} = 12$ W, Freq = 1215 MHz			3:1	
θ_{JC}	Thermal resistance	Pulse width = 300 μ s; Duty = 10%			0.22	°C/W

Bias Condition: $V_{DD} = 50$ V, $I_{DQ} = 100$ mA constant current ($V_{GS} = -2.0$ V to -4.5 V) with constant gate bias

3.3 Functional Characteristics

The following table shows the typical functional characteristics of the 1214GN-700V device at 25 °C.

Table 3 Functional Characteristics

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
$I_{D(Off)}$	Drain leakage current	$V_{GS} = -8$ V, $V_D = 150$ V			64	mA
$I_{G(Off)}$	Gate leakage current	$V_{GS} = -8$ V, $V_D = 0$ V			22	mA

3.4 Typical Broadband Performance Data

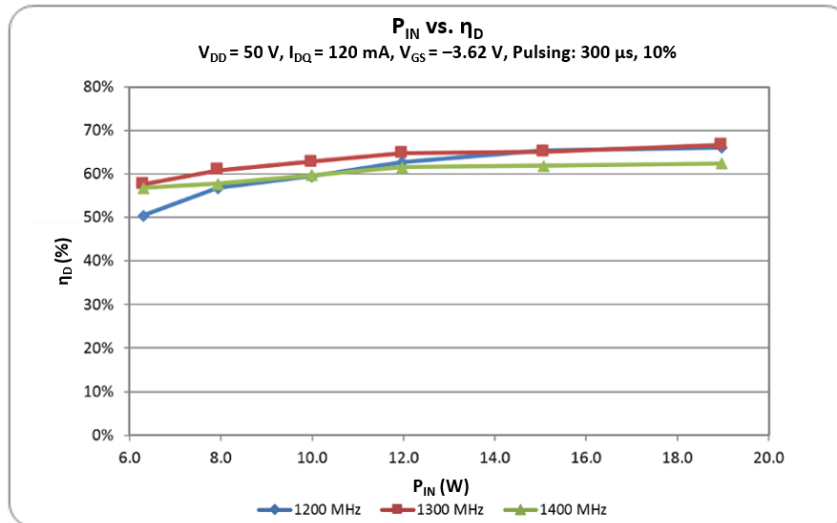
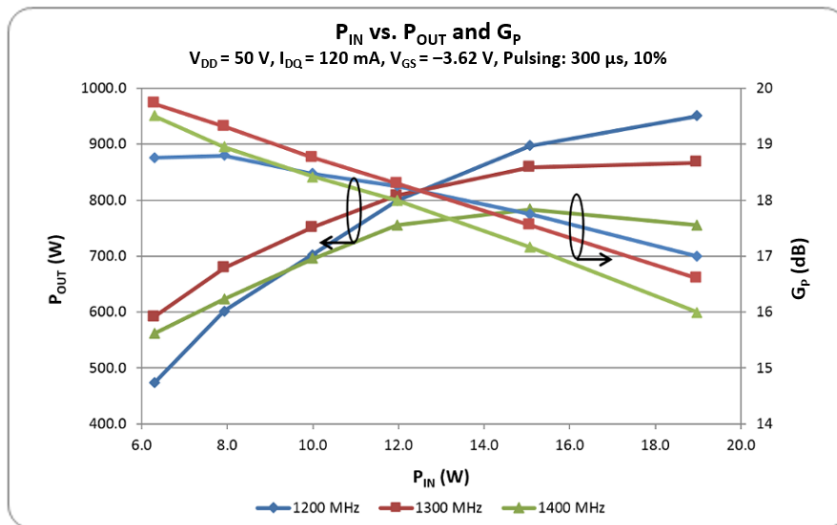
The following table shows the typical broadband performance data of the 1214GN-700V device, where the pulse width is 300 μs and the duty factor is 10%. In the following table, $V_{DD} = 50\text{ V}$, $V_{GS} = 3.62\text{ V}$, and $I_{DQ} = 120\text{ mA}$.

Table 4 Typical Broadband Performance Data

Freq (GHz)	P_{IN} (W)	P_{OUT} (W)	G_P (dB)	I_D (mA)	Droop (dB)	η_D (%)
1.2	12.0	799.8	18.25	2.67	0.5	71
1.3	12.0	809.1	18.30	2.62	0.45	63
1.4	12.0	755.1	18	2.57	0.4	62

The following graphs show the typical broadband performance of the 1214GN-700V device.

Figure 2 Typical Broadband Performance Data Graphs



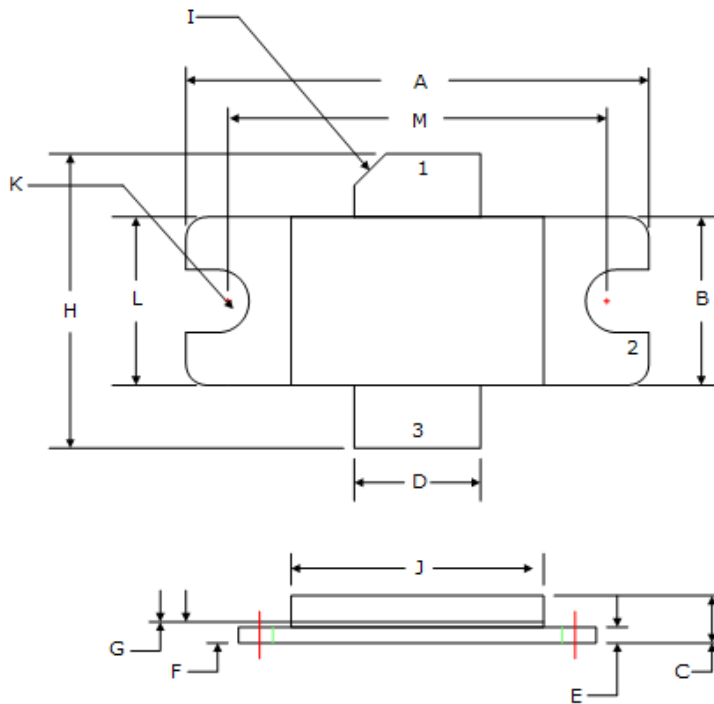
4 Package Information

This section details the package information of the 1214GN-700V device.

4.1 55-Q03 Package

The following illustration shows the 55-Q03 package outline of the 1214GN-700V device. PIN 1 is the drain, PIN 2 is the source, and PIN 3 is the gate.

Figure 3 55-Q03 Package Outline



The following table shows the 55-Q03 dimensions of the 1214GN-700V device.

Table 5 55-Q03 Package Dimensions

Dimension	Millimeters	Tol (mm)	Inches	Tol (in.)
A	34.03	0.25	1.340	0.010
B	9.78	0.25	0.385	0.010
C	3.55	0.19	0.140	0.007
D	12.70	0.13	0.500	0.005
E	1.02	0.13	0.040	0.005
F	1.65	0.13	0.065	0.005
G	0.13	0.03	0.005	0.001
H	19.43	0.76	0.765	0.030
I	45°	5°	45°	5°

Dimension	Millimeters	Tol (mm)	Inches	Tol (in.)
J	19.81	0.25	0.780	0.030
K	3.30 DIA	0.13	0.130 DIA	0.005
L	9.40	0.13	0.370	0.005
M	27.94	MAX	1.100	MAX