

**1214GN-50E/EL/EP**

**Datasheet**

**E-Series GaN Transistor Driver**



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## Revision History

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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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## 2 Product Overview

The 1214GN-50E/EL/EP device provides the following key features:

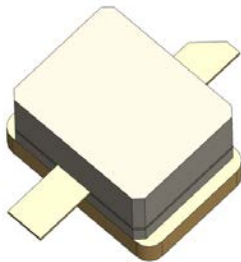
- 1200 MHz–1400 MHz, 50 W output power at 300  $\mu$ s and 10% pulsing
- Common source, class AB, 50 V bias voltage
- >60% typical efficiency across the frequency band
- Extremely compact size
- Over 16 dB typical power gain
- Excellent gain flatness
- Ideal for radar, L-Band avionics, communications, and industrial applications
- All-gold metallization and eutectic die attach for highest reliability
- 50  $\Omega$  IN/OUT lumped element, very small footprint, plug-and-play pallets available
- Export classification: EAR-99

The following illustrations show the case outlines of the 1214GN-50E/EL/EP device.

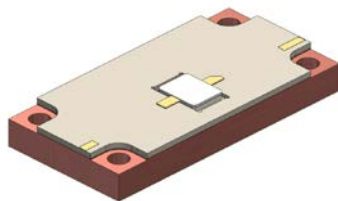
**Figure 1 55-QQ Case Outline (E)**



**Figure 2 55-QQP Case Outline (EL)**



**Figure 3 Pallet Outline (EP)**



## 3 Electrical Specifications

This section details the electrical specifications of the 1214GN-50E/EL/EP device.

### 3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings of the 1214GN-50E/EL/EP device.

**Table 1 Absolute Maximum Ratings**

Rating	Parameter	Value	Units
Maximum power dissipation	Device dissipation at 25 °C	100	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-50E/EL/EP device at 25 °C.

**Table 2 Electrical Characteristics**

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
$P_{OUT}$	Output power	$P_{IN} = 1.6$ W, Freq = 1200 MHz, 1300 MHz, 1400 MHz	50	58		W
$G_P$	Power gain	$P_{IN} = 1.6$ W, Freq = 1200 MHz, 1300 MHz, 1400 MHz	15.2	15.9		dB
$\eta_D$	Drain efficiency	$P_{IN} = 1.6$ W, Freq = 1200 MHz, 1300 MHz, 1400 MHz	55	60		%
$Dr$	Droop	$P_{IN} = 1.6$ W, Freq = 1200 MHz, 1300 MHz, 1400 MHz		0.2	0.6	dB
VSWR-T	Load mismatch tolerance	$P_{OUT} = 50$ W, Freq = 1300 MHz, 300 $\mu$ s, 10%			5:1	

**Bias Condition:**  $V_{DD} = 50$  V,  $I_{DQ} = 10$  mA constant current ( $V_{GS} = -2.0$  V to  $-4.5$  V typical)

### 3.3 Functional Characteristics

The following table shows the typical functional characteristics of the 1214GN-50E/EL/EP 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			4	mA
$I_{G(off)}$	Gate leakage current	$V_{GS} = -8$ V, $V_D = 0$ V			0.5	mA



### 3.4 Typical Broadband Performance Data

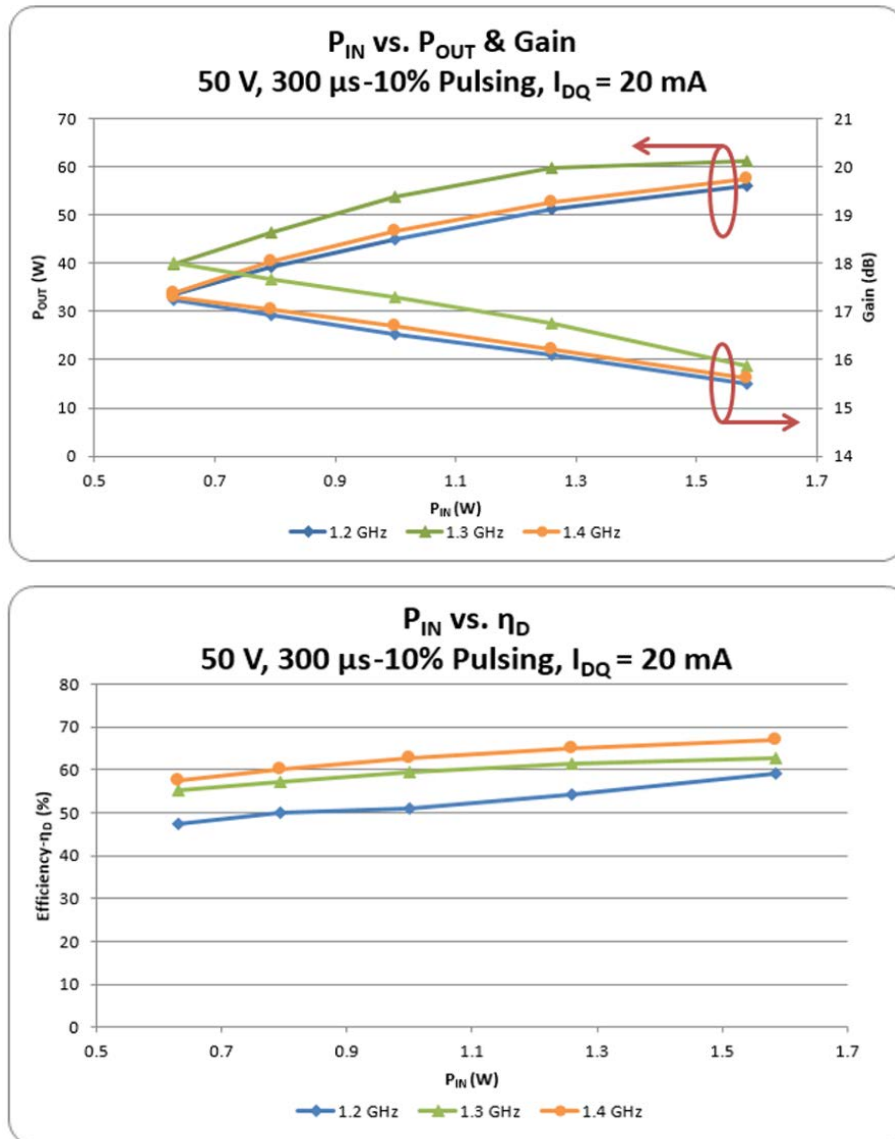
The following table shows the typical broadband performance data of the 1214GN-50E/EL/EP device at 50 V, 300  $\mu$ s, and 10% pulsing, and  $I_{DQ} = 20$  mA.

**Table 4 Typical Broadband Performance Data**

Freq (MHz)	$P_{IN}$ (dBm)	$P_{IN}$ (W)	$P_{OUT}$ (dBm)	$P_{OUT}$ (W)	$G_P$ (dB)	RL (dB)	$I_D$ (A)	Droop (dB)	$\eta_D$ (%)
960	32	1.6	47.5	56.2	15.5	-8	0.210	0.30	59
1090	32	1.6	47.9	61.4	15.9	-18	0.216	0.25	63
1215	32	1.6	47.6	57.7	15.6	-7.6	0.192	0.20	67

The following graphs show the typical broadband performance of the 1214GN-50E/EL/EP device.

**Figure 4 Typical Broadband Performance Data Graphs**



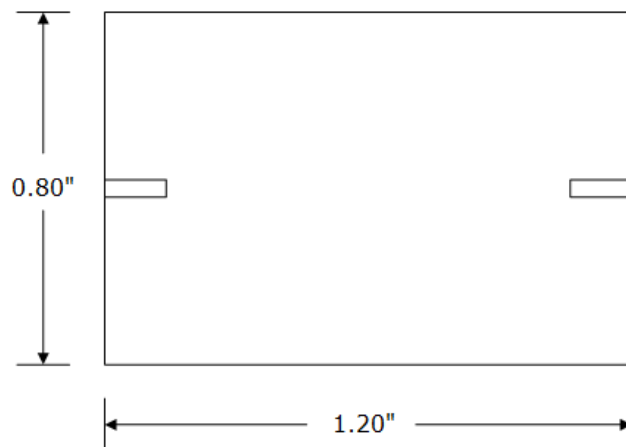
## 4 Package Information

This section details the package information of the 1214GN-50E/EL/EP device.

### 4.1 Transistor Test Fixture Overall Dimension

The following illustration shows the overall transistor test fixture dimensions of the 1214GN-50E/EL/EP device. The dimensions are in inches. Contact your Microsemi sales representative for test fixtures.

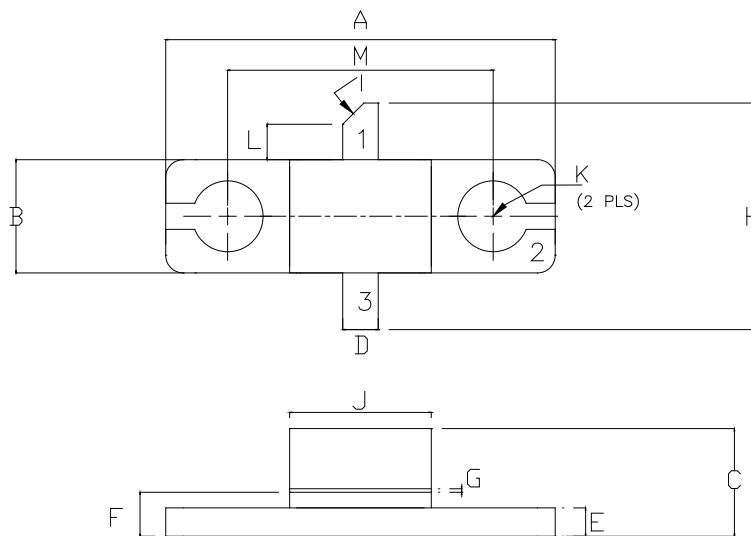
**Figure 5 Transistor Test Fixture Dimensions**



### 4.2 55-QQ Package

The following illustration shows the 55-QQ package outline of the 1214GN-50E/EL/EP device. PIN 1 is the drain, PIN 2 is the source, and PIN 3 is the gate.

**Figure 6 55-QQ Package Outline**



The following table shows the 55-QQ dimensions of the 1214GN-50E/EL/EP device, and it corresponds to [Figure 5](#) above.

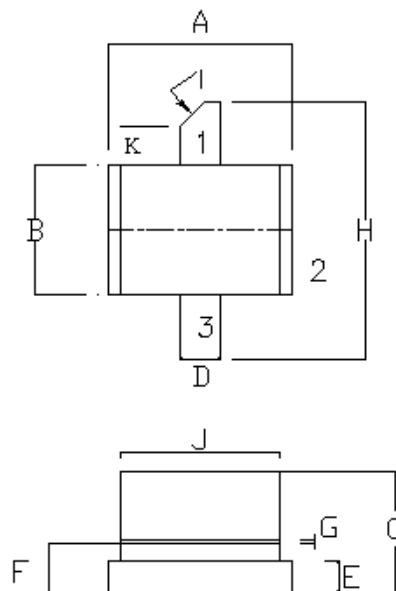
**Table 5 55-QQ Package Dimensions**

Dimension	Millimeters	Tol (mm)	Inches	Tol (in.)
A	13.970	0.250	0.550	0.010
B	4.570	0.250	0.160	0.010
C	3.860	0.330	0.152	0.013
D	1.270	0.130	0.050	0.005
E	1.020	0.130	0.040	0.005
F	1.700	0.130	0.067	0.005
G	0.130	0.025	0.005	0.001
H	8.130	0.250	0.320	0.010
I	45°	5°	45°	5°
J	5.080	0.250	0.200	0.010
K	2.54 DIA	0.130	0.100 DIA	0.005
L	1.270	0.130	0.050	0.005
M	9.530	0.130	0.375	0.005

### 4.3 55-QQP Package

The following illustration shows the 55-QQP package outline of the 1214GN-50E/EL/EP device. PIN 1 is the drain, PIN 2 is the source, and PIN 3 is the gate.

**Figure 7 55-QQP Package Outline**



The following table shows the 55-QQP dimensions of the 1214GN-50E/EL/EP device, and it corresponds to [Figure 6](#) above.

**Table 6 55-QQP Package Dimensions**

Dimension	Millimeters	Tol (mm)	Inches	Tol (in.)
A	5.840	0.250	0.230	0.010
B	4.060	0.250	0.160	0.010
C	3.170	0.050	0.125	0.002
D	1.270	0.130	0.050	0.005
E	1.020	0.130	0.040	0.005
F	1.570	0.130	0.062	0.005
G	0.130	0.020	0.005	0.001
H	8.120	0.250	0.320	0.010
I	45°	5°	45°	5°
J	5.080	0.250	0.200	0.010
K	1.400	0.130	0.055	0.005

## 4.4 Pallet Package

The following illustration shows the pallet outline and the overall pallet dimensions of the 1214GN-50E/EL/EP device. It is 1.200 inches long, 0.600 inches wide, and 0.150 inches high.

**Figure 8 Pallet Package Outline**

