

0912GN-120E/EL/EP

Datasheet

E-Series GaN 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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2 Product Overview

The 0912GN-120E/EL/EP device provides the following key features:

- 960 MHz–1215 MHz, 120 W pulsed output power
- Common-source, class-AB, 50 V_{DD} bias voltage
- >60% efficiency across the frequency band
- Extremely compact size
- 18 dB minimum power gain
- Excellent gain flatness
- Designed for L-Band avionics
- All-gold metallization and eutectic die attach for highest reliability
- 50 Ω 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 0912GN-120E/EL/EP device.

Figure 1 55-QQ Case Outline (0.160" × 0.550"—E)



Figure 2 55-QQP Case Outline (0.160" × 0.230"—EL)

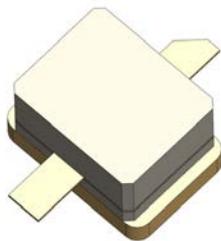
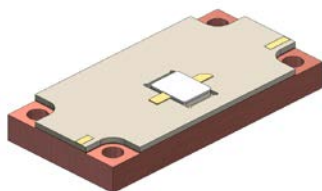


Figure 3 Pallet Outline (0.600" × 1.200"—EP)



3 Electrical Specifications

This section details the electrical specifications of the 0912GN-120E/EL/EP device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings of the 0912GN-120E/EL/EP device.

Table 1 Absolute Maximum Ratings

Rating	Parameter	Value	Units
Maximum power dissipation	Device dissipation at 25 °C	265	W
Maximum voltage and current	Drain-source voltage (V_{DSS})	125	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 0912GN-120E/EL/EP device at 25 °C, where the pulse width is 32 μ s–1 ms and the duty cycle is 2%–10%.

Table 2 Electrical Characteristics

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
P_{OUT}	Output power	$P_{IN} = 2$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz	120			W
G_P	Power gain	$P_{IN} = 2$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz	17.8	18.4		dB
η_D	Drain efficiency	$P_{IN} = 2$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz	55	65		%
D_r	Droop	$P_{IN} = 2$ W, Freq = 960 MHz, 1090 MHz, 1215 MHz		0.1	0.5	dB
VSWR-T	Load mismatch tolerance	$P_{IN} = 2$ W, Freq = 1090 MHz			5:1	

Bias Condition: $V_{DD} = 50$ V, $I_{DQ} = 30$ 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 0912GN-120E/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, $V_D = 50$ V			12	mA
$I_{G(off)}$	Gate leakage current	$V_{GS} = -8$ V, $V_D = 0$ V			4	mA

3.4 Critical Parameters

The following table shows the 1.03 GHz–1.09 GHz critical parameters of the 0912GN-120E/EL/EP device at $P_{IN} = 2\text{ W}$ (33 dBm).

Table 4 1.03 GHz–1.09 GHz Critical Parameters

Freq (GHz)	Test Condition	P_{OUT} (W)	G_P (dB)	Efficiency (%)	Droop (dB)
1.03	32 μ s, 2%	143	18.56	72	0.1
1.03	128 μ s, 10%	138	18.40	62	0.2
1.03	1 ms, 10%	140	18.45	62	0
1.09	32 μ s, 2%	141	18.50	71.6	0.1
1.09	128 μ s, 10%	137	18.37	64	0.2
1.09	1 ms, 10%	138	18.40	64	0

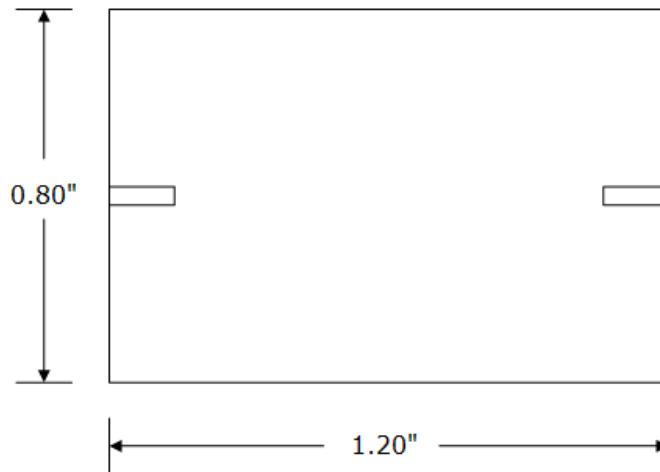
4 Package Information

This section details the package information of the 0912GN-120E/EL/EP device.

4.1 Transistor Test Fixture Dimensions

The following illustration shows the transistor test fixture dimensions of the 0912GN-120E/EL/EP device. The dimensions are in inches. Contact your Microsemi sales representative for test fixtures.

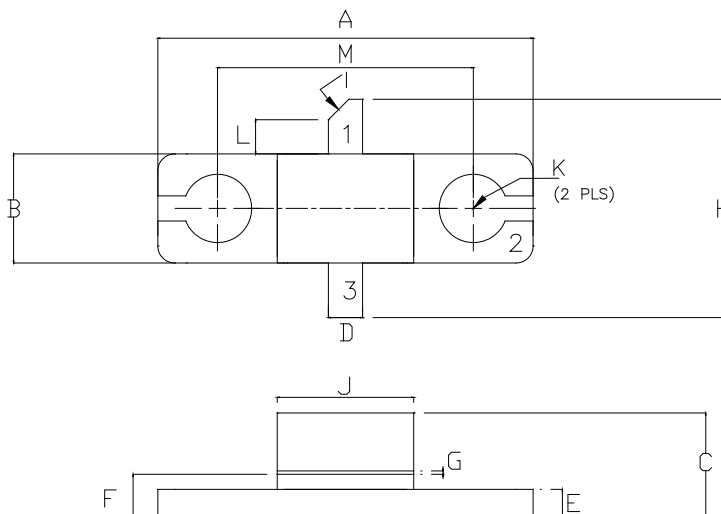
Figure 4 Transistor Test Fixture Dimensions



4.2 55-QQ Package

The following illustration shows the 55-QQ package outline of the 0912GN-120E/EL/EP device. PIN 1 is the drain, PIN 2 is the source, and PIN 3 is the gate.

Figure 5 55-QQ Package Outline



The following table shows the 55-QQ dimensions of the 0912GN-120E/EL/EP device, and it corresponds to [Figure 5](#) above.

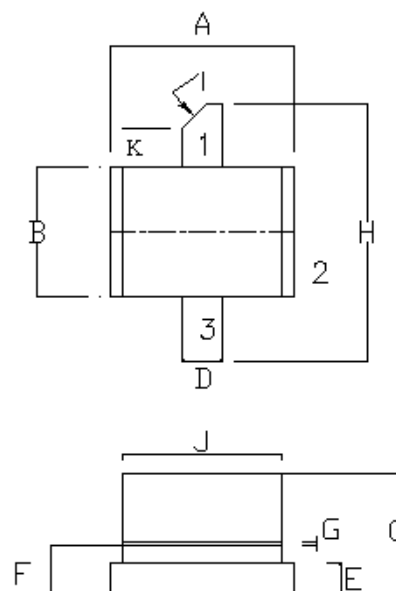
Table 5 55-QQ Package Dimensions

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 0912GN-120E/EL/EP device. PIN 1 is the drain, PIN 2 is the source, and PIN 3 is the gate.

Figure 6 55-QQP Package Outline



The following table shows the 55-QQP dimensions of the 0912GN-120E/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 0912GN-120E/EL/EP device. It is 1.200 inches long, 0.600 inches wide, and 0.150 inches high.

Figure 7 Pallet Package Outline

