

# FLL21E090IY

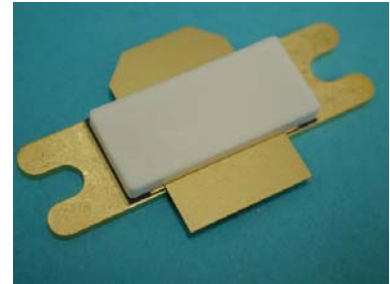
## L,S-band High Power GaAs FET

### FEATURES

- High Voltage Operation (VDS=28V) GaAs FET
- High Gain: 15.5dB(typ.) at Pout=43dBm(Avg.)
- Broad Frequency Range : 2110 to 2170MHz
- High Reliability

### DESCRIPTION

The FLL21E090IY is a high power GaAs FET that offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power L-band amplifiers. This device is targeted for high voltage, low current operation in digitally modulated base station amplifiers. This product is ideally suited for W-CDMA and Multi-carrier PCS base station amplifiers while offering high gain, long term reliability and ease of use.



### ABSOLUTE MAXIMUM RATING

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	T <sub>c</sub> =25°C (Case Temperature)	32	V
Gate-Source Voltage	V <sub>GS</sub>		-3	V
Total Power Dissipation	P <sub>T</sub>		134	W
Storage Temperature	T <sub>stg</sub>	-	65 to +175	°C
Channel Temperature	T <sub>ch</sub>	-	200	°C

### RECOMMENDED OPERATING CONDITION (Case Temperature Tc=25°C)

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V <sub>DS</sub>		<28	V
Forward Gate Current	I <sub>GF</sub>	R <sub>G</sub> =2Ω	<352	mA
Reverse Gate Current	I <sub>GR</sub>	R <sub>G</sub> =2Ω	>-31	mA
Channel Temperature	T <sub>ch</sub>		155	°C

### ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25°C)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V <sub>P</sub>	V <sub>DS</sub> =5V, I <sub>DS</sub> =151mA	-0.1	-0.2	-0.5	V
Gate-Source Breakdown Voltage	V <sub>GSO</sub>	I <sub>GS</sub> =-1.51mA	-5	-	-	V
3rd Order Intermodulation Distortion	IM <sub>3</sub>	V <sub>DS</sub> =28V	-	-33	-30	dBc
Power Gain	G <sub>P</sub>	I <sub>DS</sub> (DC)=750mA	14.5	15.5	-	dB
Drain Efficiency	η <sub>D</sub>	P <sub>out</sub> =43dBm(Avg.)	-	26	-	%
Adjacent Channel Leakage Power Ratio	ACLR	Note 1	-	-35	-	dBc
Thermal Resistance	R <sub>th</sub>	Channel to Case	-	1.1	1.3	°C/W

Note 1 : IM<sub>3</sub>, ACLR and Gain test conditions as follows

IM<sub>3</sub> & Gain : f<sub>0</sub>=2.1325GHz, f<sub>1</sub>=2.1475GHz W-CDMA(3GPP3.4 12-0) BS-1 64ch non clipping modulation measured over 3.84MHz at f<sub>0</sub>-15MHz and f<sub>1</sub>+15MHz.  
ACLR : f<sub>0</sub>=2.1325GHz W-CDMA (3GPP3.4 12-00) BS-1 64ch non clipping modulation, measured over 3.84MHz at f<sub>0</sub>+/-5MHz

ESD	CLASS III	2000V ~
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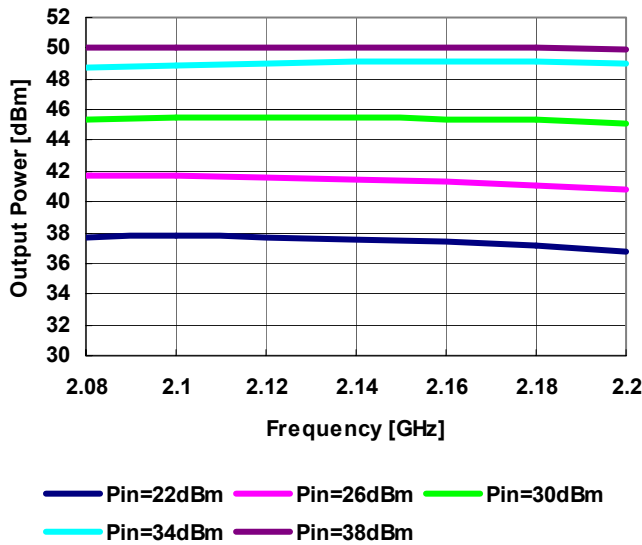
Note : Based on EIAJ ED-4701 C-111A(C=100pF, R=1.5kΩ)

CASE STYLE : IY

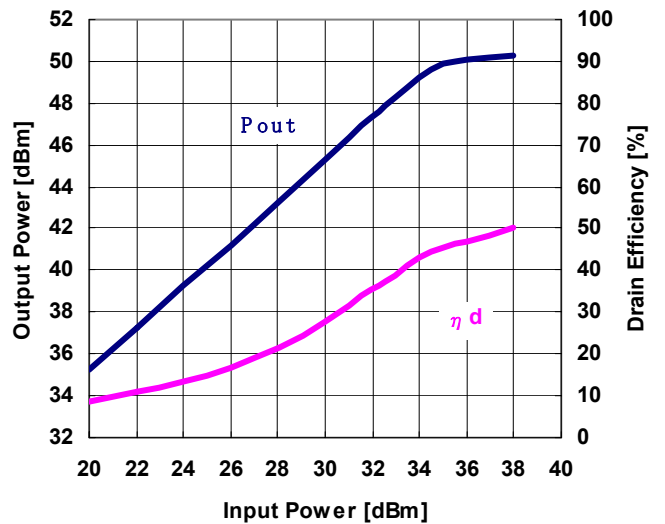
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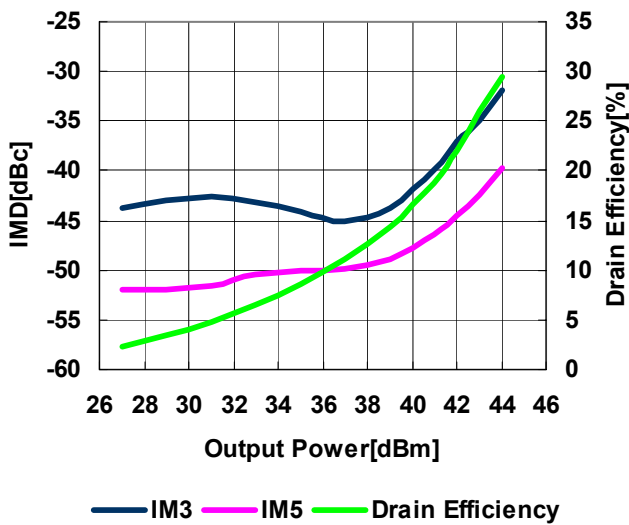
Output Power vs. Frequency  
VDS=28V, IDS=750mA



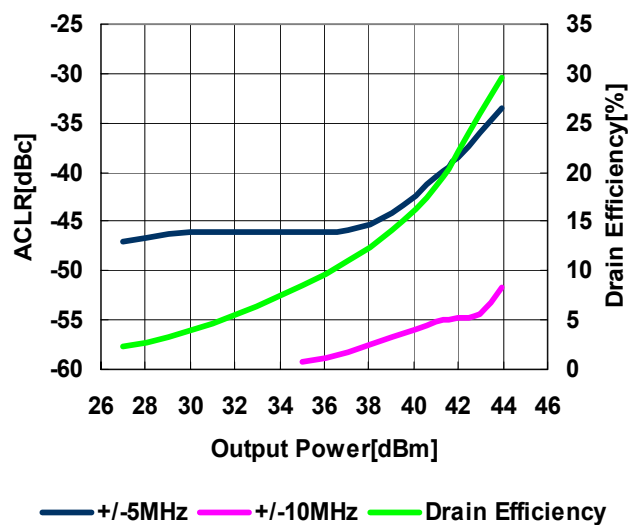
Output Power & Drain Efficiency vs. Input Power  
VDS=28V, IDS=750mA, f=2.14GHz



Two-Carrier IMD(ACLR) vs. Output Power  
VDS=28V IDS=750mA fo=2.1325, f1=2.1475GHz  
W-CDMA 3-GPP BS-1 64ch Modulation



Single-Carrier ACLR vs. Output Power  
VDS=28V IDS=750mA fo=2.1325GHz  
W-CDMA 3GPP BS-1 64ch Modulation



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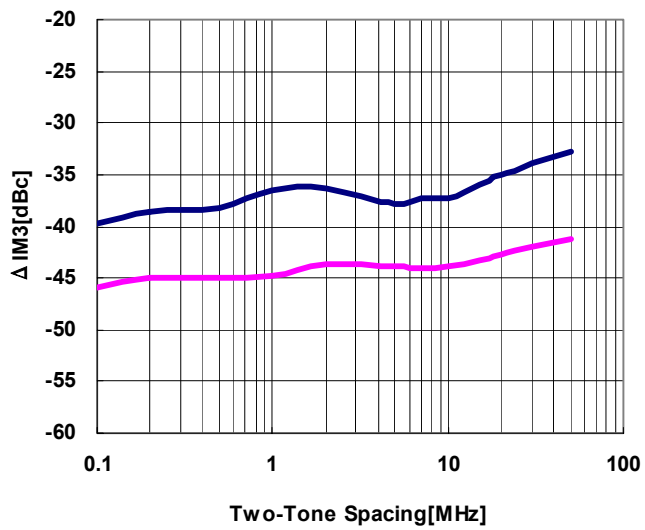
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L,S-band High Power GaAs FET

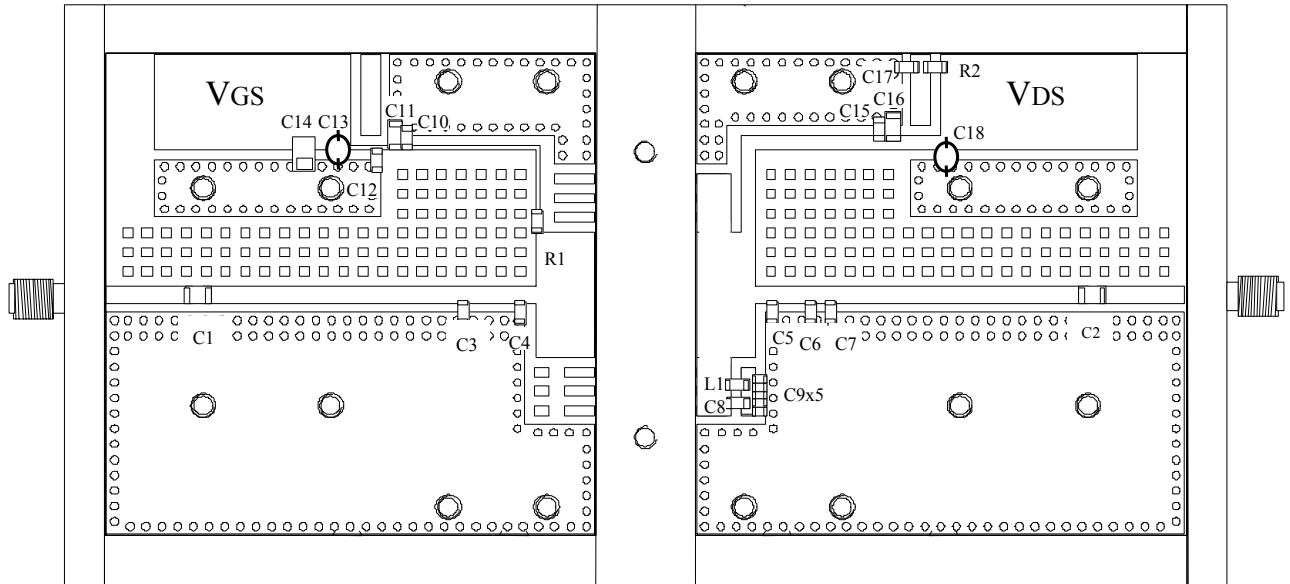
CW IMD vs. Tone Spacing  
@VDS=28V, IDS=750mA, fc=2.14GHz  
Pout=43dBm



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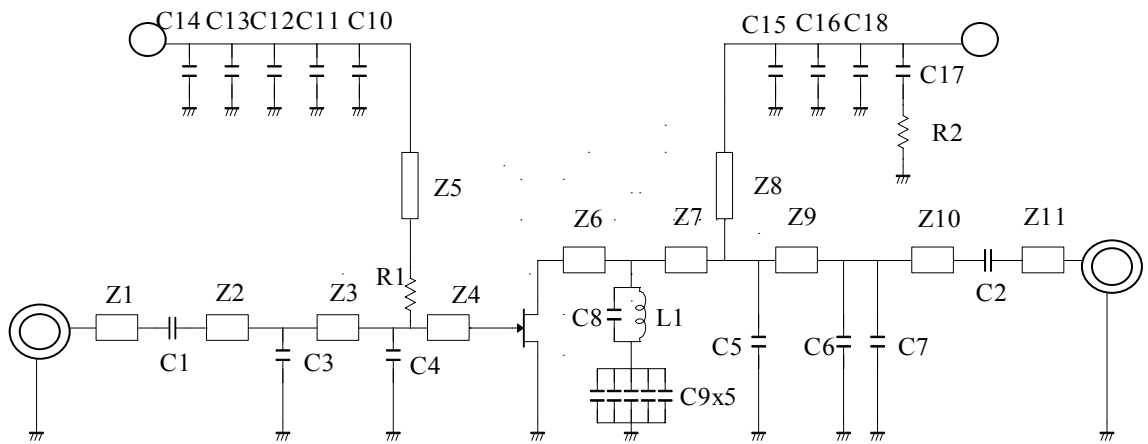
## L,S-band High Power GaAs FET

### Board Layout



$\epsilon_r=3.5$   $t=0.8$ mm

### Circuit Diagram of the Board



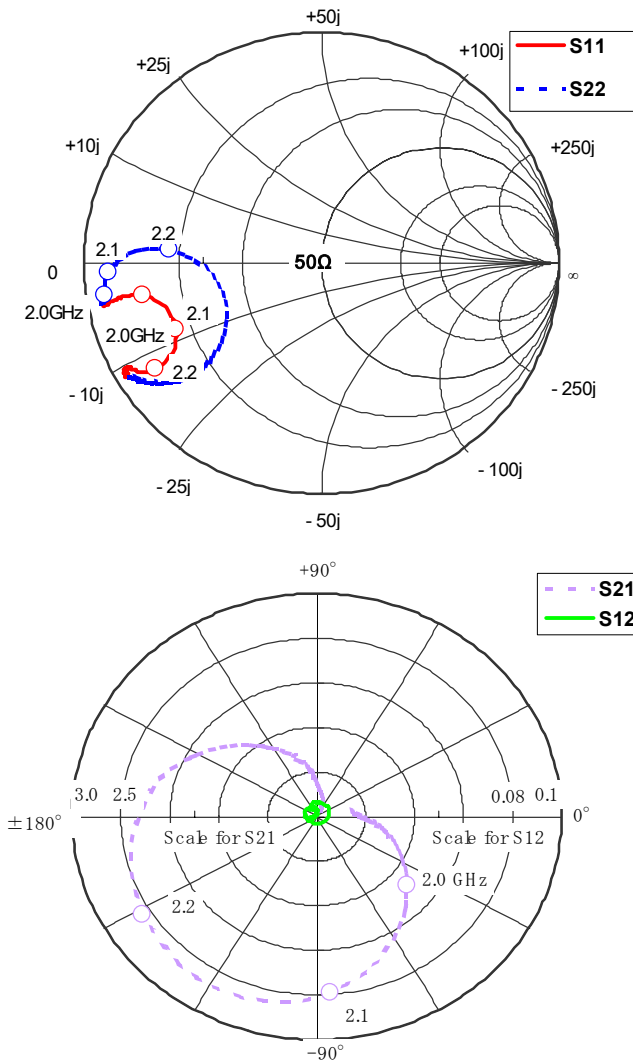
Z1, Z11	9.00mm x 1.78mm	Transmission Line
Z2	26.2mm x 1.78mm	Transmission Line
Z3	6.60mm x 1.78mm	Transmission Line
Z4	6.00mm x 13.0mm	Transmission Line
Z5	23.0mm x 0.50mm	Transmission Line
Z6	3.00mm x 25.0mm	Transmission Line
Z7	3.00mm x 13.0mm	Transmission Line
Z8	23.0mm x 1.50mm	Transmission Line
Z9	10.8mm x 1.78mm	Transmission Line
Z10	22.0mm x 1.78mm	Transmission Line

C1,C2	10pF	C18	22uF
C3	1.0pF	L1	3.3nF
C4	2.0pF	R1	2.0ohm
C5,C6,C7	0.5pF	R2	51ohm
C8	1.5pF	Board	
C9	0.1uF	input size	$\epsilon_r=3.5$ $t=0.8$ mm
C10,C15	20pF		50mm x 50mm
C11,C16	100nF	output size	$\epsilon_r=3.5$ $t=0.8$ mm
C12,C17	1000pF		50mm x 50mm
C13,C14	10uF		

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## L,S-band High Power GaAs FET

■S-Parameters @VDS=28V, IDS=750mA, f=1.0 to 3.0 GHz

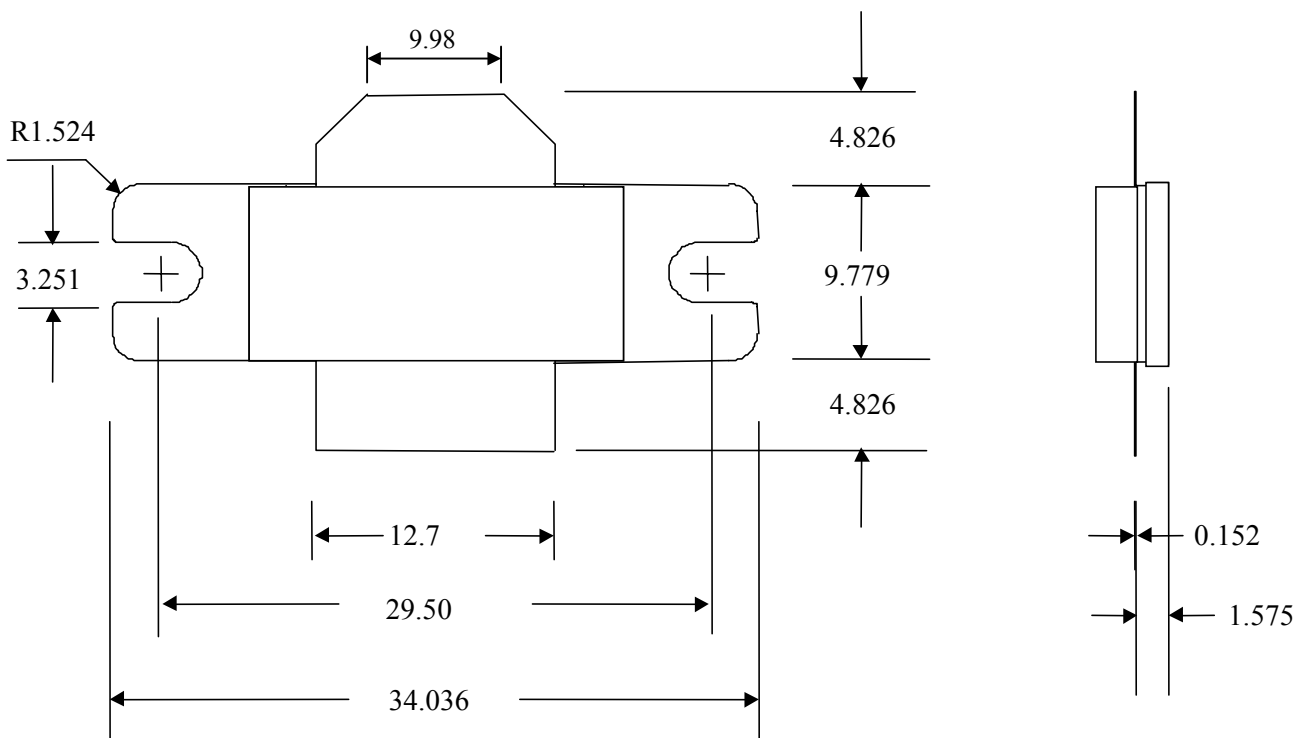


[GHz]	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.00	0.9634	-172.52	0.185	21.926	0.0011	91.071	0.9638	-171.69
1.10	0.9567	-171.64	0.1738	22.708	0.0012	105.34	0.9571	-171.44
1.20	0.9592	-170.81	0.1796	23.891	0.0014	106.3	0.9589	-170.97
1.30	0.9583	-170.19	0.1856	22.494	0.0016	119.39	0.9571	-170.73
1.40	0.9524	-169.69	0.2063	23.295	0.0016	112.69	0.9566	-170.11
1.50	0.9571	-168.96	0.2399	20.502	0.0026	122.64	0.9558	-169.73
1.60	0.9465	-168.85	0.3019	19.887	0.0031	127.43	0.9539	-169.55
1.70	0.9396	-168.87	0.4171	9.7863	0.0039	122.24	0.9461	-169.47
1.80	0.918	-169.14	0.5432	-0.3251	0.004	113.26	0.9385	-169.79
1.90	0.8744	-169.91	0.8481	-13.596	0.0056	111.46	0.9276	-170.16
2.00	0.7691	-169.68	1.4267	-39.755	0.0064	73.076	0.9273	-171.5
2.10	0.6787	-155.22	2.3705	-86.126	0.0054	15.023	0.9018	-177.51
2.11	0.6782	-153.28	2.4453	-92.117	0.0049	4.6718	0.8894	-178.55
2.12	0.6957	-151.96	2.5065	-98.556	0.0047	-10.341	0.8739	-179.66
2.13	0.7087	-150.22	2.5554	-104.83	0.0044	-21.605	0.8562	179.2
2.14	0.7284	-148.84	2.5928	-111.25	0.0038	-31.755	0.8371	178.16
2.15	0.749	-147.98	2.6012	-117.67	0.0035	-51.932	0.8094	177.06
2.16	0.7702	-147.49	2.6085	-124.11	0.0032	-66.043	0.7809	176.19
2.17	0.785	-146.95	2.5937	-130.41	0.0034	-81.24	0.7498	175.39
2.18	0.8009	-146.8	2.5666	-136.59	0.0032	-99.392	0.7194	174.76
2.19	0.8271	-146.95	2.5421	-142.62	0.0033	-115.92	0.6822	174.43
2.20	0.84	-146.99	2.5068	-148.63	0.0033	-139.05	0.6444	174.64
2.30	0.9158	-149.95	1.781	154.66	0.0048	129.47	0.4764	-147.42
2.40	0.9361	-151.12	0.9958	115.92	0.0035	97.983	0.7412	-138.53
2.50	0.9386	-151.16	0.5194	93.577	0.0019	94.352	0.8586	-142.64
2.60	0.9455	-150.74	0.3276	82.725	0.0013	88.626	0.9035	-145.25
2.70	0.9501	-150.74	0.1998	72.912	0.001	-156.21	0.9267	-147.06
2.80	0.9493	-149.64	0.1465	77.149	0.0019	-171.48	0.9347	-147.9
2.90	0.9576	-149.8	0.1235	67.632	0.0022	-161.33	0.947	-148.56
3.00	0.9579	-149.24	0.0903	65.358	0.004	-162.61	0.947	-148.91

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L,S-band High Power GaAs FET

## ■IY Package Outline



Unit : mm

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## **FLL21E090IY**

### **L,S-band High Power GaAs FET**

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