

# FLL21E045IY

## L,S-band High Power GaAs FET

### FEATURES

- High Voltage Operation (VDS=28V) GaAs FET
- High Gain: 15.5dB(typ.) at Pout=40dBm(Avg.)
- Broad Frequency Range : 2110 to 2170MHz
- High Reliability

### DESCRIPTION

The FLL21E045IY 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. 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	$V_{DS}$	$T_C=25^{\circ}C$ (Case Temperature)	32	V
Gate-Source Voltage	$V_{GS}$		-3	V
Total Power Dissipation	$P_T$		92	W
Storage Temperature	$T_{stg}$	-	65 to +175	$^{\circ}C$
Channel Temperature	$T_{ch}$	-	200	$^{\circ}C$

### RECOMMENDED OPERATING CONDITION (Case Temperature $T_C=25^{\circ}C$ )

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	$V_{DS}$		<28	V
Forward Gate Current	$I_{GF}$	$R_G=2\Omega$	<176	mA
Reverse Gate Current	$I_{GR}$	$R_G=2\Omega$	>-15.9	mA
Channel Temperature	$T_{ch}$		155	$^{\circ}C$

### ELECTRICAL CHARACTERISTICS (Case Temperature $T_C=25^{\circ}C$ )

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	$V_P$	$V_{DS}=5V$ $I_{DS}=75.4mA$	-0.1	-0.2	-0.5	V
Gate-Source Breakdown Boltage	$V_{GSO}$	$I_{GS}=-754uA$	-5	-	-	V
3rd Order Intermodulation Distortion	$IM_3$	$V_{DS}=28V$	-	-33	-30	dBc
Power Gain	$G_P$	$I_{DS}(DC)=500mA$	14.5	15.5	-	dB
Drain Efficiency	$\eta_D$	$P_{out}=40dBm(Avg.)$	-	26	-	%
Adjacent Channel Leakage Power Ratio	ACLR	Note 1	-	-35	-	dBc
Thermal Resistance	$R_{th}$	Chammel to Case	-	1.7	1.9	$^{\circ}C/W$

Note 1 :  $IM_3$ , ACLR and Gain test conditions as follows

$IM_3$  & Gain :  $f_0=2.1325GHz$ ,  $f_1=2.1475GHz$  W-CDMA(3GPP3.4 12-0) BS-1 64ch non clipping modulation measured over 3.84MHz at  $f_0-15MHz$  and  $f_1+15MHz$ .

ACLR :  $f_0=2.1325GHz$  W-CDMA (3GPP3.4 12-00) BS-1 64ch non clipping modulation, measured over 3.84MHz at  $f_0+/-5MHz$

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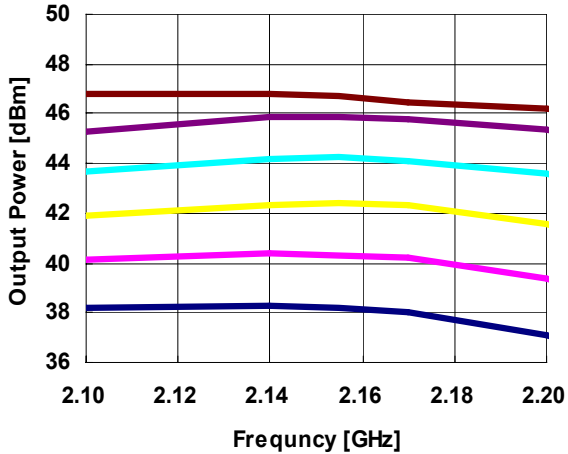
Note : Based on EIAJ ED-4701 C-111A(C=100pF, R=1.5k $\Omega$ )

### CASE STYLE : IY

# FLL21E045IY

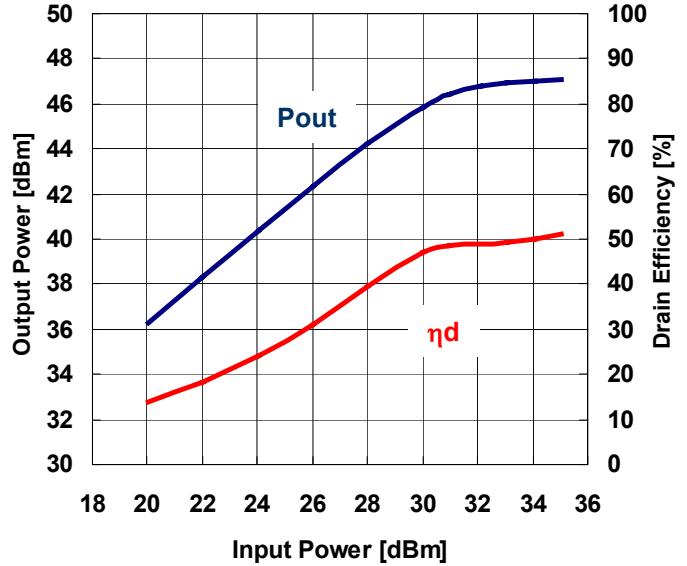
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Output Power vs. Frequency  
VDS=28V IDS=500mA

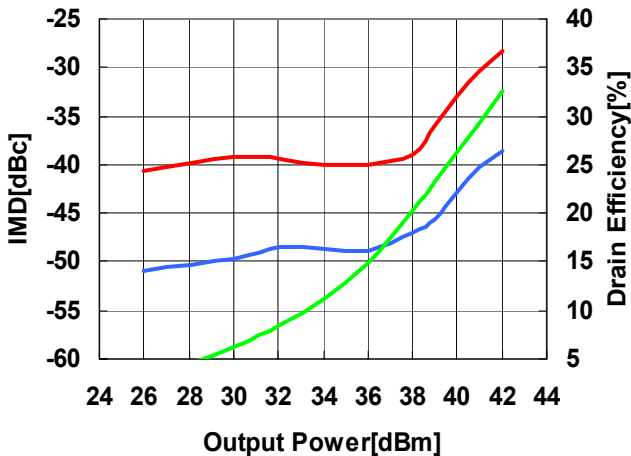


Pin=22dBm Pin=24dBm Pin=26dBm  
Pin=28dBm Pin=30dBm Pin=32dBm

Output Power & Drain Efficiency vs. Input Power  
VDS=28V IDS=500mA f=2.14GHz

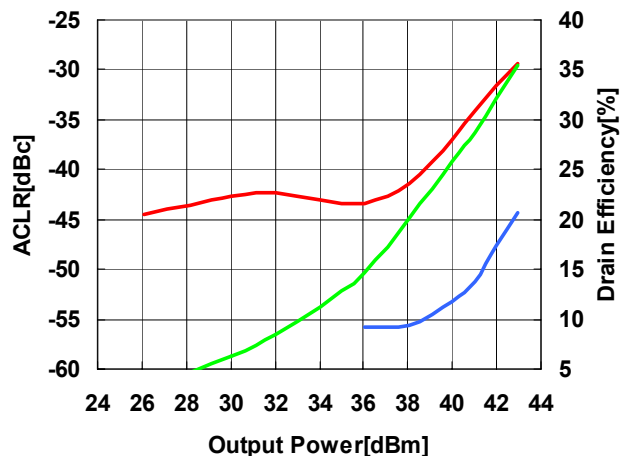


Two-Carrier IMD(ACLR) vs. Output Power  
VDS=28V IDS=500mA f<sub>0</sub>=2.135, f<sub>1</sub>=2.145GHz  
W-CDMA 3-GPP BS-1 64ch Modulation



IM3 IM5 Drain Efficiency

Single-Carrier ACLR vs. Output Power  
VDS=28V IDS=500mA f<sub>0</sub>=2.135GHz  
W-CDMA 3GPP BS-1 64ch Modulation

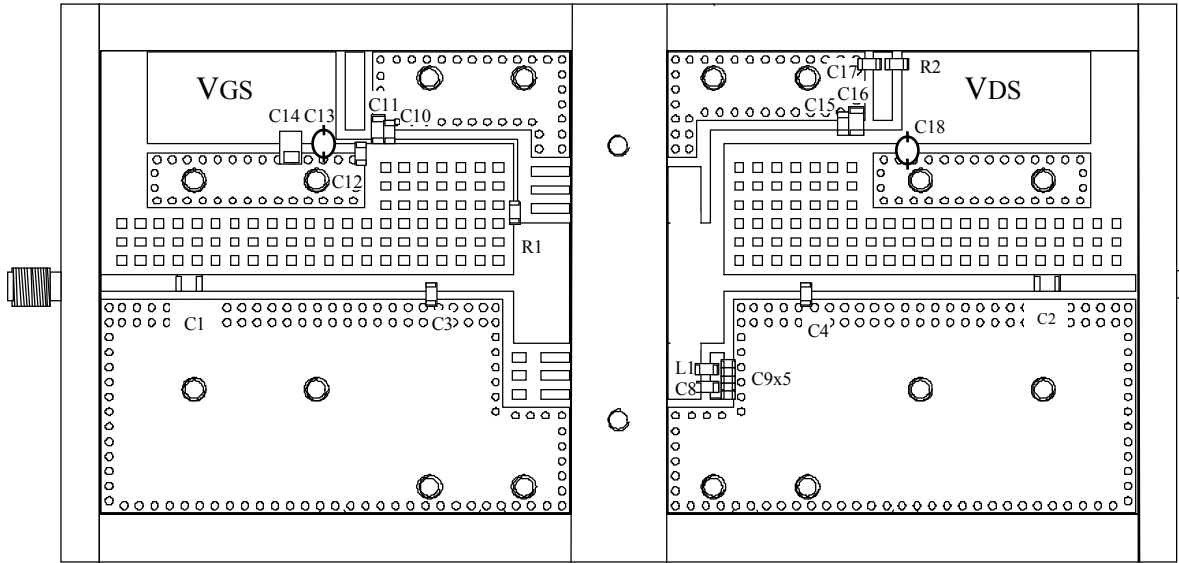


+/-5MHz +/-10MHz Drain Efficiency

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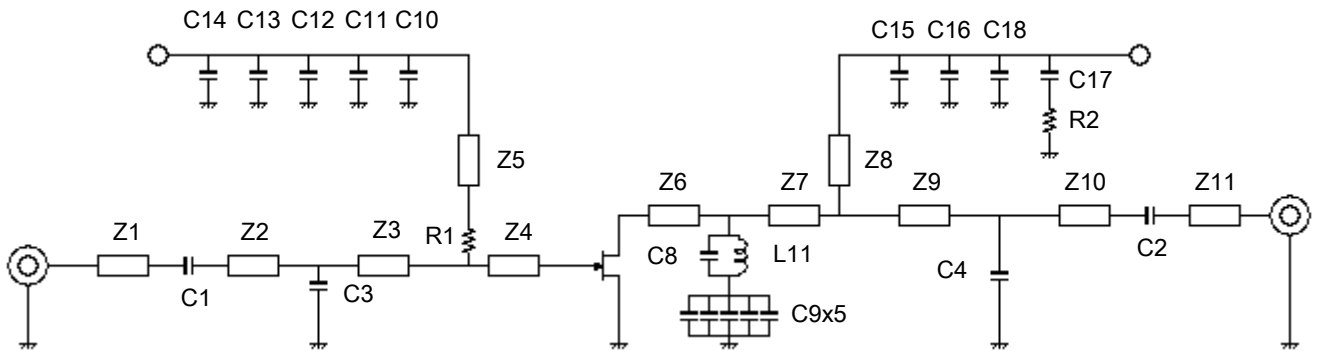
## L,S-band High Power GaAs FET

### Board Layout



$\epsilon_r=3.5$   $t=0.8\text{mm}$

### Circuit Diagram of the Board



Z1, Z11	9.00mm x 1.78mm	Transmission Line
Z2	25.5mm x 1.78mm	Transmission Line
Z3	7.30mm 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	7.30mm x 1.78mm	Transmission Line
Z10	25.5mm x 1.78mm	Transmission Line

C1, C2	10pF
C3	1.5pF
C4	2.0pF
C8	1.5pF
C9	0.1uF
C10, C15	20pF
C11, C16	100nF
C12, C17	1000pF
C13, C14	10uF

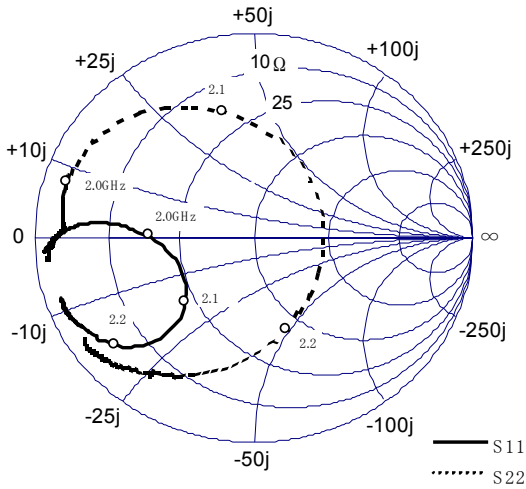
C18	22uF
L1	3.3nF
R1	2.0ohm
R2	51ohm

Board  
input size  $\epsilon_r=3.5$   $t=0.8\text{mm}$   
50mm x 50mm  
output size  $\epsilon_r=3.5$   $t=0.8\text{mm}$   
50mm x 50mm

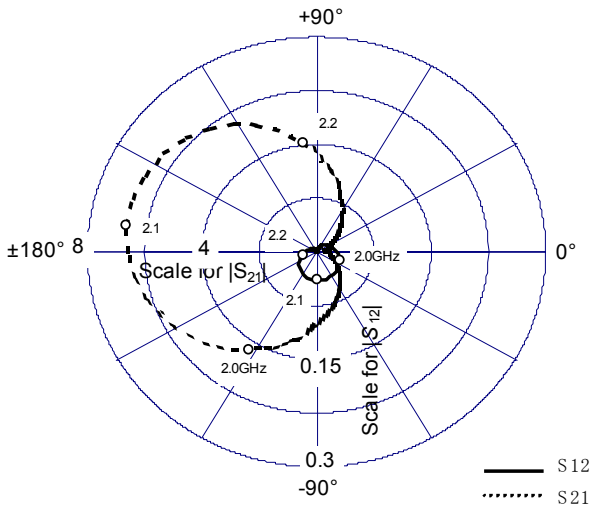
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## L,S-band High Power GaAs FET

### ■ S-Parameters @VDS=28V IDS=500mA f=1.0 to 3.0 GHz



[GHz]	S11(mag)	S11(ang)	S21(mag)	S21(ang)	S12(mag)	S12(ang)	S22(mag)	S22(ang)
1	0.961	-176.09	0.475	0.09	0.002	72.44	0.941	-173.21
1.1	0.955	-176.12	0.465	-4.08	0.003	72.31	0.941	-174.11
1.2	0.955	-176.17	0.474	-8.51	0.003	73.23	0.938	-174.90
1.3	0.946	-176.41	0.512	-13.28	0.004	78.24	0.939	-175.61
1.4	0.938	-177.38	0.574	-19.09	0.005	73.43	0.937	-176.50
1.5	0.929	-178.32	0.676	-25.53	0.007	68.02	0.928	-177.31
1.6	0.903	-179.71	0.858	-34.12	0.008	60.18	0.922	-178.49
1.7	0.868	178.18	1.156	-46.13	0.011	51.50	0.901	179.94
1.8	0.802	175.71	1.676	-62.08	0.015	37.37	0.877	178.21
1.9	0.676	173.72	2.636	-86.18	0.022	13.74	0.879	174.82
2	0.482	178.20	4.384	-122.79	0.033	-20.98	0.898	162.03
2.1	0.441	-135.80	6.693	171.86	0.040	-88.96	0.634	102.88
2.11	0.490	-131.54	6.712	162.88	0.039	-97.96	0.560	90.14
2.12	0.540	-130.55	6.645	154.26	0.038	-107.99	0.484	75.71
2.13	0.596	-130.03	6.434	145.37	0.036	-116.93	0.414	58.35
2.14	0.649	-130.79	6.205	136.83	0.034	-127.37	0.353	36.86
2.15	0.692	-132.19	5.853	128.55	0.031	-133.60	0.323	12.79
2.16	0.731	-133.90	5.525	121.00	0.028	-145.32	0.321	-11.35
2.17	0.761	-135.91	5.126	113.86	0.026	-151.02	0.345	-32.46
2.18	0.783	-137.02	4.769	107.68	0.023	-156.69	0.384	-48.97
2.19	0.811	-138.98	4.402	101.97	0.021	-162.23	0.426	-61.84
2.2	0.823	-140.79	4.071	96.45	0.018	-168.12	0.472	-72.06
2.3	0.883	-148.92	1.953	62.43	0.006	140.62	0.742	-115.08
2.4	0.907	-152.47	1.125	44.59	0.003	131.01	0.838	-128.68
2.5	0.919	-154.44	0.742	32.86	0.002	67.07	0.885	-135.53
2.6	0.923	-156.00	0.539	24.36	0.000	145.10	0.909	-139.52
2.7	0.928	-157.30	0.423	17.45	0.001	-166.69	0.920	-141.86
2.8	0.930	-158.48	0.353	10.90	0.002	133.58	0.925	-143.60
2.9	0.929	-159.87	0.310	6.75	0.003	143.82	0.928	-145.78
3	0.925	-161.40	0.292	0.72	0.002	121.54	0.916	-147.36



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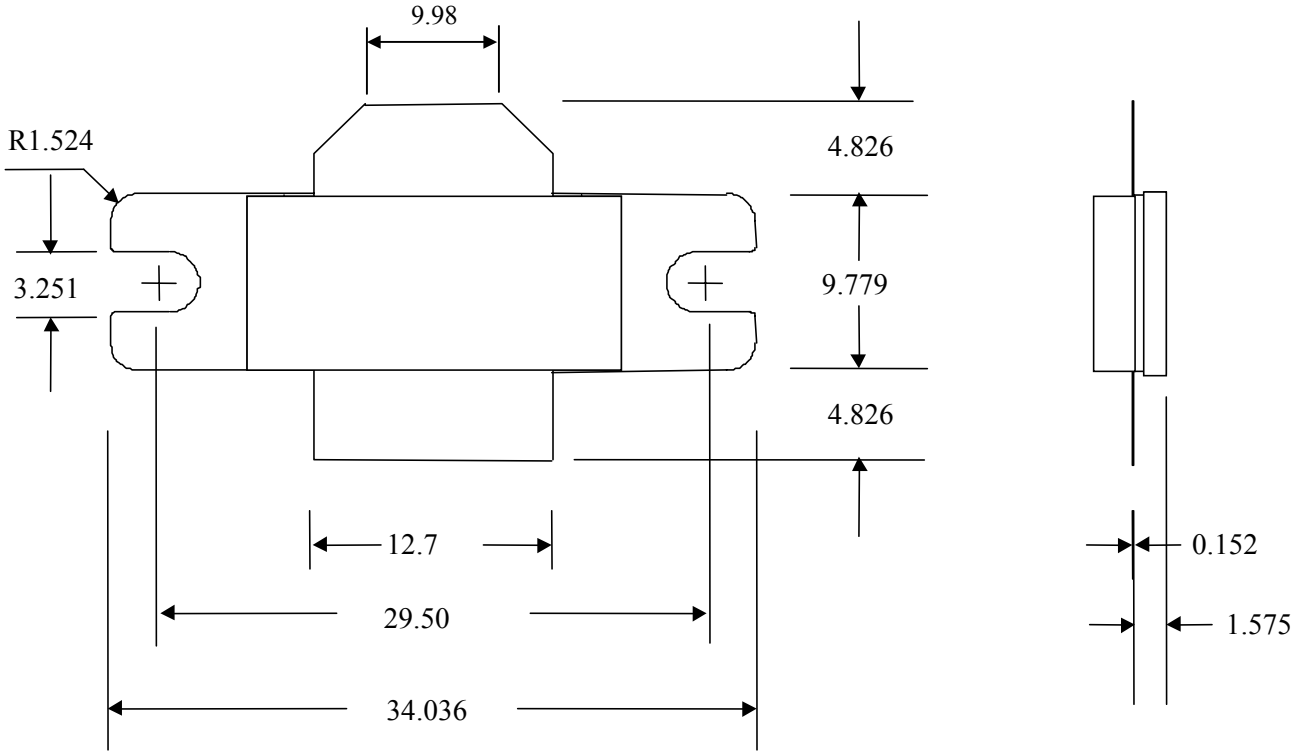
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■ IY Package Outline



Unit : mm

# **FLL21E045IY**

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

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