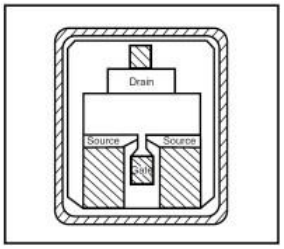
FLK027XP, FLK027XV

GaAs FET Chips

FEATURES

- High Output Power: P_{1dB} = 24.0dBm(Typ.)
- High Gain: G_{1dB} = 7.0dB(Typ.)
- High Power Added Efficiency: PAE = 32%(Typ.)
- Proven Reliability



DESCRIPTION

The FLK027XP, and FLK027XV chip is a power GaAs FET that is designed for general purpose applications in the Ku-Band frequency range as it provides superior power, gain, and efficiency. Sumitomo Electric stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATING (Ambient Temperature Ta=25deg.C)

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V_{DS}		15	V
Gate-Source Voltage	V_{GS}		-5	V
Total Power Dissipation	P_{tot}	Tc = 25deg.C	1.88	W
Storage Temperature	T_{stg}		-65 to +175	deg.C
Channel Temperature	T_{ch}		175	deg.C

Sumitomo Electric recommends the following conditions for the reliable operation of GaAs FETs:

1. The drain-source operating voltage (V_{DS}) should not exceed 10 volts.
2. The forward and reverse gate currents should not exceed 2.2 and -0.1 mA respectively with gate resistance of 2000ohm.
3. The operating channel temperature (T_{ch}) should not exceed 145deg.C.

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25deg.C)

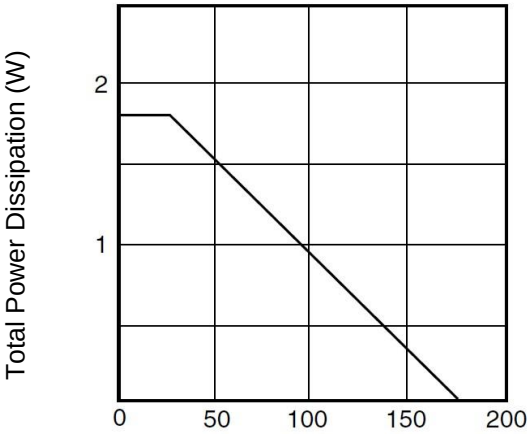
Item	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	V_{DS} = 5V, V_{GS} = 0V	-	100	150	mA
Transconductance	gm	V_{DS} = 5V, I_{DS} = 65mA	-	50	-	mS
Pinch-off Voltage	Vp	V_{DS} = 5V, I_{DS} = 5mA	-1.0	-2.0	-3.5	V
Gate Source Breakdown Voltage	V_{GSO}	I_{GS} = -5uA	-5	-	-	V
Output Power at 1dB Gain Compression Point	P_{1dB}	V_{DS} = 10V $I_{DS} \approx 0.6 I_{DSS}$ f = 14.5GHz	23	24	-	dBm
Power Gain at 1dB Gain Compression Point	G_{1dB}		6	7	-	dB
Power-added Efficiency	PAE		-	32	-	%
Thermal Resistance	R_{th}	Channel to Case	-	40	80	deg.C/W

Note: RF parameter sample size 10pcs. criteria (accept/reject)=(2/3)

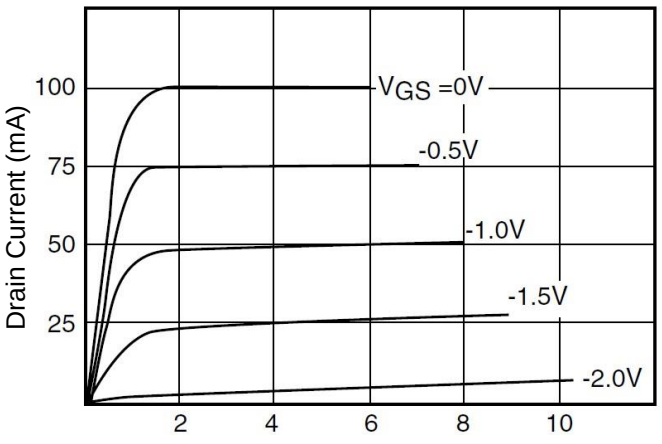
The chip must be enclosed in a hermetically sealed environment for optimum performance and reliability.

RoHS Compliance	Yes

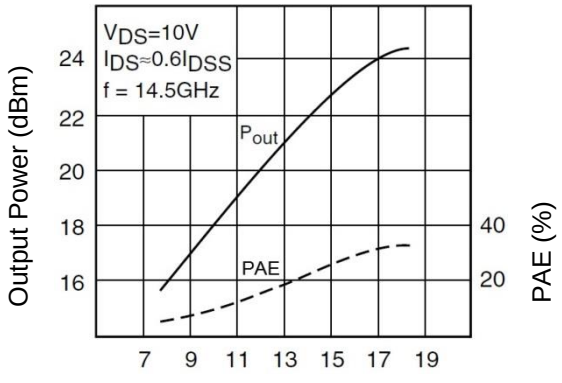
POWER DERATING CURVE



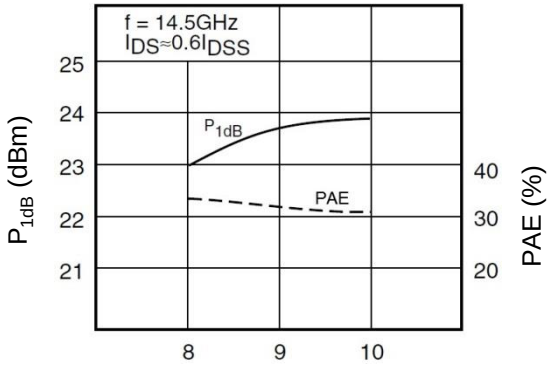
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



OUTPUT POWER vs. INPUT POWER



P_{1dB} & PAE vs. V_{DS}



S-PARAMETERS

V_{DS} = 10V, I_{DS} = 60mA

FLK027XP

Freq	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-3.3	4.479	177.6	0.003	88.1	0.735	-1.1
500	0.996	-16.4	4.436	168.1	0.013	80.7	0.732	-5.4
1000	0.984	-32.4	4.309	156.4	0.025	71.7	0.721	-10.6
1500	0.967	-47.6	4.121	145.3	0.035	63.2	0.705	-15.4
2000	0.947	-61.7	3.894	135.0	0.044	55.5	0.687	-19.8
2500	0.926	-74.7	3.651	125.3	0.052	48.5	0.668	-23.7
3000	0.907	-86.5	3.407	116.4	0.058	42.2	0.649	-27.3
3500	0.890	-97.2	3.174	108.2	0.063	36.6	0.633	-30.6
4000	0.874	-107.0	2.956	100.5	0.067	31.6	0.618	-33.7
4500	0.861	-115.8	2.756	93.4	0.070	27.0	0.605	-36.6
5000	0.850	-123.9	2.573	86.7	0.072	22.9	0.594	-39.4
5500	0.841	-131.3	2.409	80.4	0.074	19.2	0.585	-42.1
6000	0.834	-138.0	2.259	74.4	0.076	15.8	0.578	-44.8
6500	0.828	-144.3	2.125	68.6	0.077	12.6	0.571	-47.5
7000	0.823	-150.1	2.003	63.1	0.078	9.6	0.566	-50.2
7500	0.820	-155.5	1.892	57.8	0.079	6.9	0.562	-52.9
8000	0.817	-160.6	1.792	52.6	0.080	4.3	0.559	-55.7
8500	0.815	-165.4	1.700	47.6	0.080	1.8	0.556	-58.4
9000	0.813	-169.8	1.616	42.8	0.080	-0.5	0.555	-61.2
9500	0.812	-174.1	1.538	38.0	0.080	-2.8	0.553	-64.1
10000	0.812	-178.1	1.467	33.4	0.081	-4.9	0.553	-66.9
10500	0.812	178.1	1.401	28.8	0.081	-6.9	0.553	-69.9
11000	0.812	174.4	1.340	24.3	0.080	-8.9	0.553	-72.8
11500	0.813	171.0	1.283	19.9	0.080	-10.9	0.554	-75.8
12000	0.814	167.6	1.230	15.6	0.080	-12.7	0.555	-78.8
12500	0.815	164.4	1.181	11.3	0.080	-14.5	0.557	-81.9
13000	0.816	161.3	1.134	7.1	0.080	-16.3	0.559	-85.0
13500	0.818	158.4	1.090	3.0	0.079	-18.0	0.562	-88.1
14000	0.819	155.5	1.048	-1.1	0.079	-19.7	0.565	-91.3
14500	0.821	152.8	1.009	-5.2	0.078	-21.3	0.568	-94.4
15000	0.823	150.1	0.971	-9.2	0.078	-23.0	0.571	-97.6
15500	0.825	147.6	0.936	-13.1	0.078	-24.5	0.575	-100.8
16000	0.827	145.1	0.902	-17.1	0.077	-26.1	0.580	-104.1
16500	0.829	142.7	0.869	-21.0	0.076	-27.6	0.584	-107.3
17000	0.831	140.4	0.838	-24.8	0.076	-29.1	0.589	-110.6
17500	0.834	138.1	0.808	-28.6	0.075	-30.6	0.594	-113.9
18000	0.836	135.9	0.780	-32.4	0.075	-32.0	0.600	-117.1
18500	0.838	133.8	0.752	-36.2	0.074	-33.5	0.606	-120.4
19000	0.841	131.7	0.725	-39.9	0.073	-34.9	0.612	-123.7
19500	0.843	129.7	0.700	-43.6	0.073	-36.2	0.618	-127.0
20000	0.846	127.8	0.675	-47.2	0.072	-37.6	0.625	-130.2

NOTE:* The data includes bonding wires.
n: number of wires Gate n=1 (0.2mm length, 25um Dia Au wire)
Drain n=1 (0.2mm length, 25um Dia Au wire)
Source n=4 (0.3mm length, 25um Dia Au wire)

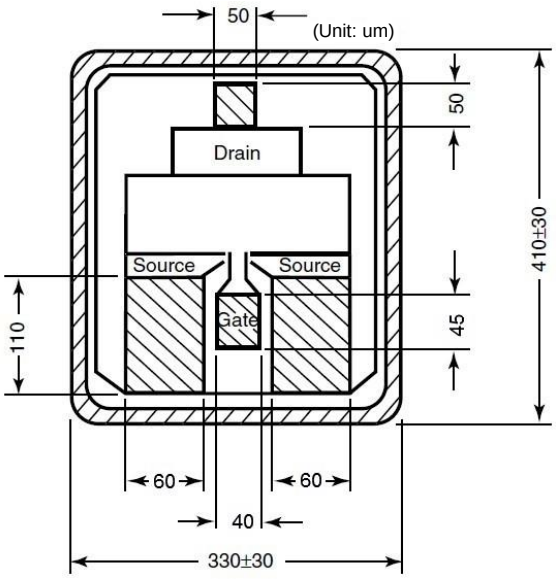
FLK027XV

Freq	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-3.3	4.479	177.6	0.003	88.1	0.735	-1.1
500	0.996	-16.4	4.436	168.1	0.013	80.7	0.732	-5.4
1000	0.984	-32.4	4.310	156.5	0.025	71.6	0.721	-10.6
1500	0.968	-47.6	4.122	145.4	0.035	63.1	0.705	-15.4
2000	0.948	-61.7	3.896	135.0	0.044	55.4	0.687	-19.8
2500	0.928	-74.7	3.653	125.4	0.052	48.3	0.668	-23.8
3000	0.909	-86.5	3.410	116.5	0.058	42.0	0.649	-27.4
3500	0.892	-97.2	3.177	108.3	0.063	36.3	0.633	-30.7
4000	0.877	-107.0	2.959	100.6	0.067	31.2	0.618	-33.8
4500	0.864	-115.8	2.759	93.5	0.070	26.6	0.605	-36.7
5000	0.854	-123.9	2.576	86.8	0.073	22.5	0.594	-39.5
5500	0.845	-131.2	2.411	80.4	0.075	18.7	0.585	-42.2
6000	0.837	-138.0	2.262	74.4	0.077	15.2	0.577	-44.9
6500	0.831	-144.3	2.127	68.7	0.078	11.9	0.571	-47.6
7000	0.827	-150.1	2.005	63.1	0.079	8.9	0.566	-50.3
7500	0.823	-155.5	1.894	57.8	0.080	6.0	0.562	-53.0
8000	0.820	-160.5	1.793	52.7	0.081	3.3	0.558	-55.8
8500	0.818	-165.3	1.701	47.7	0.081	0.8	0.556	-58.5
9000	0.816	-169.7	1.617	42.8	0.082	-1.6	0.554	-61.3
9500	0.815	-174.0	1.539	38.0	0.082	-4.0	0.553	-64.1
10000	0.814	-178.0	1.468	33.4	0.082	-6.2	0.552	-67.0
10500	0.814	178.2	1.402	28.8	0.082	-8.4	0.552	-69.9
11000	0.814	174.6	1.341	24.3	0.083	-10.5	0.553	-72.8
11500	0.814	171.1	1.284	19.9	0.083	-12.5	0.553	-75.8
12000	0.815	167.8	1.231	15.6	0.083	-14.5	0.555	-78.8
12500	0.816	164.6	1.181	11.3	0.082	-16.4	0.556	-81.8
13000	0.817	161.5	1.135	7.1	0.082	-18.3	0.558	-84.9
13500	0.818	158.6	1.091	3.0	0.082	-20.2	0.561	-88.0
14000	0.820	155.8	1.049	-1.1	0.082	-22.0	0.564	-91.1
14500	0.821	153.0	1.010	-5.2	0.082	-23.8	0.567	-94.3
15000	0.823	150.4	0.973	-9.2	0.081	-25.6	0.570	-97.4
15500	0.825	147.8	0.937	-13.2	0.081	-27.4	0.574	-100.6
16000	0.827	145.4	0.904	-17.1	0.081	-29.1	0.578	-103.8
16500	0.829	143.0	0.872	-21.0	0.080	-30.8	0.583	-107.0
17000	0.831	140.7	0.841	-24.9	0.080	-32.5	0.588	-110.3
17500	0.833	138.4	0.811	-28.7	0.079	-34.2	0.593	-113.5
18000	0.835	136.2	0.783	-32.5	0.079	-35.8	0.598	-116.7
18500	0.837	134.1	0.756	-36.2	0.078	-37.5	0.604	-120.0
19000	0.839	132.1	0.729	-39.9	0.078	-39.1	0.610	-123.2
19500	0.842	130.1	0.704	-43.6	0.077	-40.7	0.616	-126.4
20000	0.844	128.1	0.680	-47.3	0.077	-42.3	0.623	-129.6

NOTE:* The data includes bonding wires.
n: number of wires Gate n=1 (0.2mm length, 25um Dia Au wire)
Drain n=1 (0.2mm length, 25um Dia Au wire)

CHIP OUTLINE

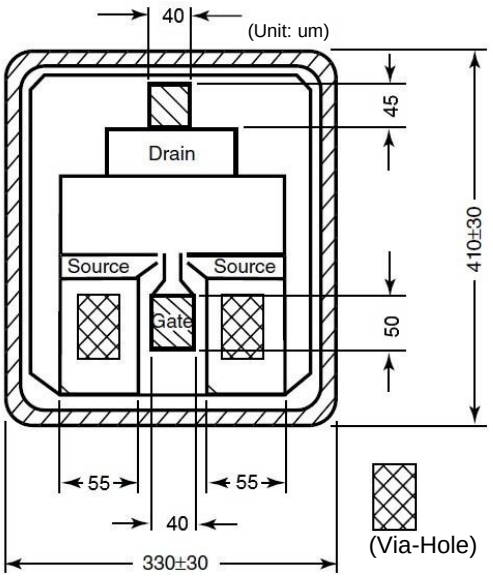
FLK027XP



Source electrodes are electrically insulated from the bottom of the chip (PHS)

Die Thickness: 60±20um

FLK027XV



Source electrodes are connected to the PHS by Via-Hole

Die Thickness: 60±20um

■ BARE DIE INDEMNIFICATION

All devices are DC probed and visually inspected at SEI, and non-compliant devices are removed. The RF electrical characteristics of the bare dice are warranted by the sampling inspection procedures. The standard sampling inspection procedure shall include the number of the sampling dice, position of the sampling dice in the wafer and RF electrical characteristics of the sampling dice measured in the test fixture. Customer shall understand that all the bare dice will not be 100% RF tested by SEI. It is the customer responsibility to verify performance of the devices.

Customer shall comply with the storage and handling requirements for condition and period of storage of the bare dice agreed by customer and SEI. Warranty will not apply when customer disregards the storage and handling requirements.

Warranty will not apply to the electrical characteristics and product quality to the bare dice after assembly by customer.

SEI will indemnify customer for warranty failures, provided however that the indemnification to customer shall be limited to supply of bare dice for substitution.

CAUTION

Sumitomo Electric Device Innovations, Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

・Do not put these products into the mouth.

・Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.

・Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.