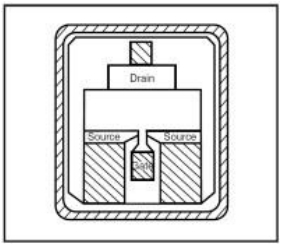
FLK017XP

GaAs FET Chips

FEATURES

- High Output Power: P_{1dB} = 20.5dBm(Typ.)
- High Gain: G_{1dB} = 8.0dB(Typ.)
- High Power Added Efficiency: PAE = 26%(Typ.)
- Proven Reliability



DESCRIPTION

The FLK017XP 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's 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	1.15	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 1.34 and -0.05 mA respectively with gate resistance of 3000ohm.
3. The operating channel temperature (Tch) should not exceed 145deg.C.

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

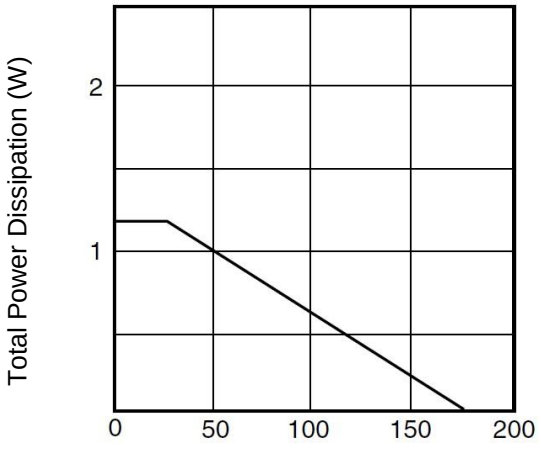
Item	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	V_{DS} = 5V, V_{GS} = 0V	-	60	90	mA
Transconductance	gm	V_{DS} = 5V, I_{DS} = 40mA	-	30	-	mS
Pinch-off Voltage	Vp	V_{DS} = 5V, I_{DS} = 3mA	-1.0	-2.0	-3.5	V
Gate Source Breakdown Voltage	V_{GSO}	I_{GS} = -3uA	-5	-	-	V
Output Power at 1dB G.C.P.	P_{1dB}	V_{DS} = 10V	19.5	20.5	-	dBm
Power Gain at 1dB G.C.P.	G_{1dB}	$I_{DS} \approx 0.6 I_{DSS}$	7.0	8.0	-	dB
Power-added Efficiency	PAE	f = 14.5GHz	-	26	-	%
Noise Figure	NF	V_{DS} = 3V	-	2.5	-	dB
Associated Gain	Gas	$I_{DS} \approx$ 20mA f = 12GHz	-	7	-	dB
Maximum Availble Gain	G_a(max)	V_{DS} = 10V $I_{DS} \approx$ 36mA f = 12GHz	-	11	-	dB
Thermal Resistance	R_{th}	Channel to Case	-	65	130	deg.C/W

Note: RF parameter sample size 10pcs. criteria (accept/reject)=(2/3) G.C.P.: Gain Compression Point

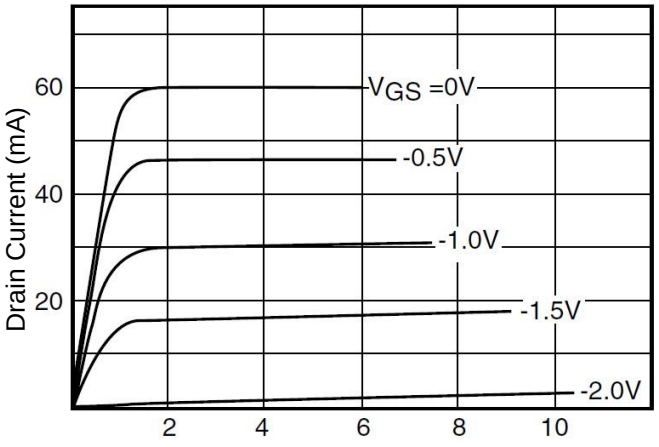
The chip must be enclosed in a hermetically sealed environment for optimum performance and reliability.

RoHS Compliance	Yes

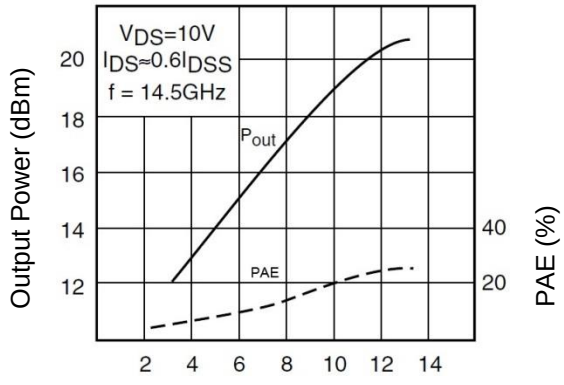
POWER DERATING CURVE



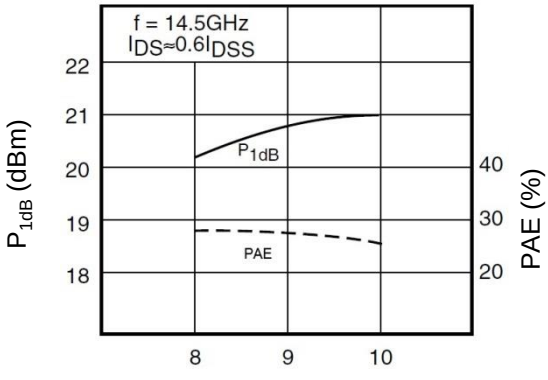
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



OUTPUT POWER vs. INPUT POWER



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



Typical on chip measurements

S-PARAMETERS

V_{DS} = 10V, I_{DS} = 40mA

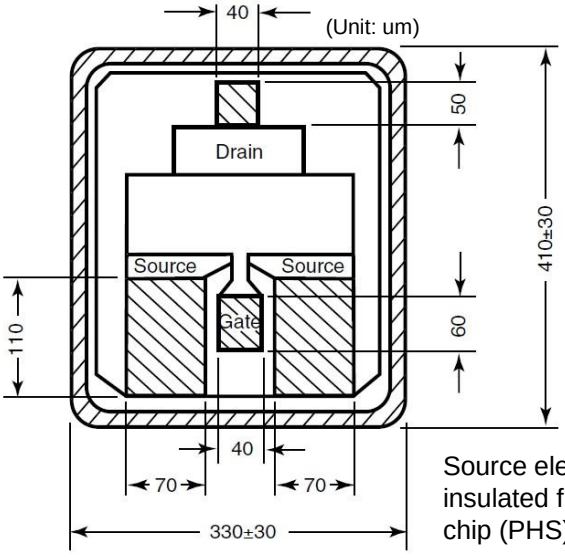
Freq	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-1.9	2.832	178.4	0.001	88.9	0.846	-0.6
500	0.998	-9.5	2.824	171.9	0.007	84.7	0.845	-2.9
1000	0.992	-18.9	2.799	163.9	0.014	79.5	0.842	-5.7
1500	0.982	-28.2	2.758	156.0	0.021	74.3	0.838	-8.5
2000	0.969	-37.4	2.703	148.3	0.028	69.4	0.832	-11.2
2500	0.953	-46.3	2.638	140.7	0.034	64.6	0.825	-13.8
3000	0.936	-55.0	2.564	133.4	0.039	60.0	0.817	-16.4
3500	0.918	-63.5	2.485	126.2	0.044	55.6	0.809	-18.8
4000	0.899	-71.6	2.401	119.4	0.049	51.5	0.800	-21.2
4500	0.881	-79.5	2.316	112.7	0.053	47.6	0.792	-23.5
5000	0.863	-87.1	2.231	106.3	0.056	44.0	0.784	-25.8
5500	0.846	-94.4	2.147	100.1	0.059	40.6	0.776	-28.0
6000	0.830	-101.5	2.064	94.1	0.062	37.3	0.769	-30.1
6500	0.816	-108.3	1.985	88.3	0.064	34.3	0.762	-32.2
7000	0.802	-114.8	1.908	82.7	0.066	31.5	0.755	-34.3
7500	0.791	-121.1	1.834	77.2	0.067	28.9	0.749	-36.4
8000	0.780	-127.1	1.764	72.0	0.069	26.4	0.744	-38.4
8500	0.771	-133.0	1.697	66.8	0.070	24.1	0.739	-40.5
9000	0.764	-138.6	1.634	61.8	0.071	21.9	0.735	-42.5
9500	0.757	-143.9	1.574	57.0	0.072	19.8	0.731	-44.6
10000	0.752	-149.1	1.516	52.2	0.072	17.9	0.727	-46.7
10500	0.747	-154.1	1.462	47.6	0.073	16.1	0.724	-48.8
11000	0.744	-158.9	1.410	43.0	0.073	14.4	0.721	-51.0
11500	0.741	-163.5	1.361	38.6	0.073	12.8	0.718	-53.2
12000	0.739	-168.0	1.314	34.2	0.073	11.3	0.716	-55.4
12500	0.738	-172.3	1.269	29.9	0.073	9.9	0.713	-57.6
13000	0.738	-176.4	1.227	25.7	0.073	8.6	0.711	-59.8
13500	0.738	179.6	1.186	21.6	0.073	7.3	0.710	-62.1
14000	0.739	175.8	1.147	17.5	0.073	6.2	0.708	-64.5
14500	0.740	172.1	1.110	13.5	0.073	5.1	0.707	-66.8
15000	0.742	168.5	1.074	9.5	0.072	4.1	0.706	-69.2
15500	0.744	165.1	1.039	5.6	0.072	3.1	0.705	-71.7
16000	0.746	161.8	1.006	1.7	0.072	2.3	0.704	-74.2
16500	0.749	158.5	0.974	-2.1	0.071	1.5	0.704	-76.7
17000	0.752	155.5	0.943	-5.9	0.071	0.7	0.703	-79.2
17500	0.755	152.5	0.913	-9.6	0.071	0.0	0.703	-81.8
18000	0.758	149.6	0.885	-13.3	0.070	-0.6	0.703	-84.5
18500	0.761	146.8	0.856	-16.9	0.070	-1.2	0.703	-87.1
19000	0.765	144.1	0.829	-20.5	0.070	-1.7	0.703	-89.8
19500	0.768	141.4	0.803	-24.1	0.070	-2.2	0.704	-92.6
20000	0.772	138.9	0.777	-27.7	0.069	-2.7	0.704	-95.3

NOTE:* The data includes bonding wires.

n: number of wires

Gate	n=1 (0.2mm length, 25µm Dia Au wire)
Drain	n=1 (0.2mm length, 25µm Dia Au wire)
Source	n=4 (0.3mm length, 25µm Dia Au wire)

CHIP OUTLINE



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

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.