

## Low Noise and Medium Power GaAs FETs

### FEATURES

- Via holes for source grounding
- Low Noise Figure:  $NF = 0.5$  dB Typical at 12 GHz
- High Associated Gain:  $G_a = 13$  dB Typical at 12 GHz
- High Dynamic Range: 1 dB Compression Power  $P_{-1} = 21.5$  dBm at 6 V, 40 mA and 12 GHz
- Breakdown Voltage:  $BV_{DGO} \geq 9$  V
- $L_g = 0.25$   $\mu\text{m}$ ,  $W_g = 300$   $\mu\text{m}$
- All-Gold Metallization for High Reliability
- Tight  $V_p$  ranges control
- High RF input power handling capability
- 100 % DC Tested

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC1201V is the same as TC1201 except via holes in the source reducing the grounding inductance. The device is processed with via-holes for high gain applications. It can be used in circuits up to 30 GHz and suitable for low noise and medium power amplifier application including a wide range of commercial and military application. All devices are 100% DC tested to assure consistent quality. All bond pads are gold plated for either thermo-compression or thermo-sonic wire bonding.

### ELECTRICAL SPECIFICATIONS ( $T_A = 25$ °C)

Symbol	Conditions	MIN	TYP	MAX	UNIT
NF	Noise Figure at $V_{DS} = 4$ V, $I_{DS} = 25$ mA, $f = 12$ GHz		0.5	0.7	dB
$G_a$	Associated Gain at $V_{DS} = 4$ V, $I_{DS} = 25$ mA, $f = 12$ GHz	11	13		dB
$P_{1dB}$	Output Power at 1dB Gain Compression Point, $f = 12$ GHz $V_{DS} = 6$ V, $I_{DS} = 40$ mA	20.5	21.5		dBm
$G_L$	Linear Power Gain, $f = 12$ GHz $V_{DS} = 6$ V, $I_{DS} = 40$ mA	11	12		dB
$I_{DSS}$	Saturated Drain-Source Current at $V_{DS} = 2$ V, $V_{GS} = 0$ V		90		mA
$g_m$	Transconductance at $V_{DS} = 2$ V, $V_{GS} = 0$ V		100		mS
$V_p$	Pinch-off Voltage at $V_{DS} = 2$ V, $I_D = 0.6$ mA		-1.0*		Volts
$BV_{DGO}$	Drain-Gate Breakdown Voltage at $I_{DGO} = 0.15$ mA	9	12		Volts
$R_{th}$	Thermal Resistance		96		°C/W

**Note:** \* For the tight control of the pinch-off voltage . TC1201V's are divided into 3 groups:

(1)TC1201VP0710 :  $V_p = -0.7$ V to  $-1.0$ V (2)TC1201VP0811 :  $V_p = -0.8$ V to  $-1.1$ V

(3)TC1201VP0912 :  $V_p = -0.9$ V to  $-1.2$ V

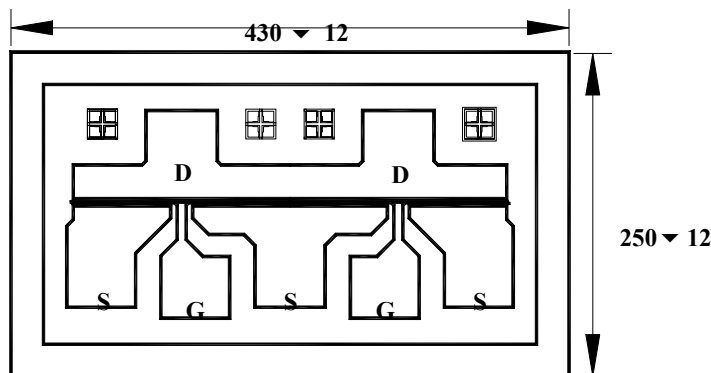
In addition, the customers may specify their requirements.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25 °C) TYPICAL NOISE PARAMETERS (T<sub>A</sub>=25 °C)**

 V<sub>DS</sub> = 4 V, I<sub>DS</sub> = 25 mA

Symbol	Parameter	Rating
V <sub>DS</sub>	Drain-Source Voltage	7.0 V
V <sub>GS</sub>	Gate-Source Voltage	-3.0 V
I <sub>DS</sub>	Drain Current	I <sub>DSS</sub>
I <sub>GS</sub>	Gate Current	300 μA
P <sub>in</sub>	RF Input Power, CW	21 dBm
P <sub>T</sub>	Continuous Dissipation	400 mW
T <sub>CH</sub>	Channel Temperature	175 °C
T <sub>STG</sub>	Storage Temperature	- 65 °C to +175 °C

Frequency (GHz)	NF <sub>out</sub> (dB)	G <sub>A</sub> (dB)	Γ <sub>out</sub>		Rn/50
			MAG	ANG	
2	0.36	20.2	0.96	14	0.59
4	0.38	18.5	0.83	31	0.50
6	0.40	16.7	0.67	51	0.39
8	0.43	15.2	0.51	76	0.28
10	0.50	13.8	0.37	108	0.17
12	0.56	12.7	0.28	147	0.13
14	0.66	12.1	0.25	-166	0.11
16	0.83	12.0	0.31	-108	0.15
18	1.03	12.2	0.49	-41	0.34

**CHIP DIMENSIONS**

**Units: Micrometers**
**Chip Thickness: 55**
**Gate Pad: 55 x 50**
**Drain Pad: 55 x 50**
**Source Pad: 55 x 65**
**CHIP HANDLING**

**DIE ATTACHMENT :** Conductive epoxy or eutectic die attach is recommended. For eutectic die attach can be accomplished with Au-Sn (80%Au-20%Sn) perform in State Temperature : 290°C ±5°C ; Handling Tool :

Tweezers ; Time : less than 1min .

**WIRE BONDING :** The recommended wire bond method is thermo-compression bonding with 0.7 or 1.0 mil (0.018 or 0.025mm) gold wire. State Temperature : 220°C to 250°C ; Bond Tip Temperature : 150°C ; Bond Force : 20 to 30 gms depending on size of wire and Bond Tip Temperature.

**HANDLING PRECAUTIONS :** The user must operate in a clean, dry environment. Care should be exercised during handling avoid damage to the devices. Electrostatic Discharge(ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. The static discharge must less than 300V.