Low Noise and Medium Power GaAs FETs

FEATURES

- Via hole for source grouding
- Low Noise Figure: NF = 0.8dB Typical at 12 GHz
- High Associated Gain: Ga = 12 dB Typical at 12 GHz
- High Dynamic Range: 1 dB Compression Power P_{-1} = 24.5 dBm at 12 GHz
- Breakdown Voltage: $BV_{DGO} \geq 9$ V
- Lg = 0.25 µm, Wg = 600 µm
- All-Gold Metallization for High Reliability
- Tight Vp ranges control
- High RF input power handling capability
- 100 % DC Tested

PHOTO ENLARGEMENT

DESCRIPTION

The TC1301V is the same as TC1301 expect via holes in the source pads for 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)

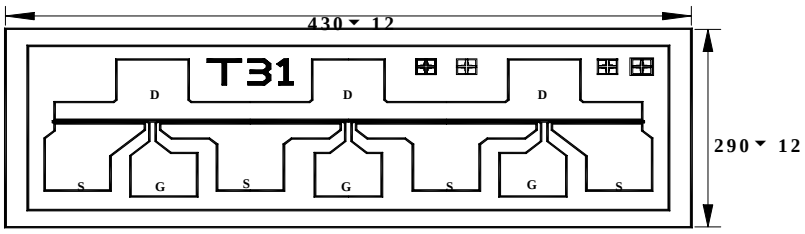
Symbol	Conditions	MIN	TYP	MAX	UNIT
NF	Noise Figure at V_{DS} = 4 V, I_{DS} = 50 Ma, f = 12GHz		0.8	1.0	dB
G_a	Associated Gain at V_{DS} = 4 V, I_{DS} = 50 mA, f = 12GHz	10	12		dB
P_{1dB}	Output Power at 1dB Gain Compression Point, f = 12GHz,V_{DS} = 6 V, I_{DS} = 80 mA	23.5	24.5		dBm
G_L	Linear Power Gain, f = 12GHz,V_{DS} = 6 V, I_{DS} = 80 mA	9	10		dB
I_{DSS}	Saturated Drain-Source Current at V_{DS} = 2 V, V_{GS} = 0 V		180		mA
g_m	Transconductance at V_{DS} = 2 V, V_{GS} = 0 V		200		mS
V_P	Pinch-off Voltage at V_{DS} = 2 V, I_D = 1.2 mA		-1.0*		Volts
BV_{DGO}	Drain-Gate Breakdown Voltage at I_{DGO} =0.3mA	9	12		Volts
R_{th}	Thermal Resistance		48		°C/W

Note: * For the tight control of the pinch-off voltage . TC1301V's are divided into 3 groups:
(1) **TC1301VP0710** : Vp = -0.7V to -1.0V (2) **TC1301VP0811** : Vp = -0.8V to -1.1V
(3) **TC1301VP0912** : Vp = -0.9V to -1.2V
In addition, the customers may specify their requirements.

ABSOLUTE MAXIMUM RATINGS (T_A=25 °C)

Symbol	Parameter	Rating
V_{DS}	Drain-Source Voltage	7.0 V
V_{GS}	Gate-Source Voltage	-3.0 V
I_{DS}	Drain Current	I_{DSS}
I_{GS}	Gate Current	600 μA
P_{in}	RF Input Power, CW	24 dBm
P_T	Continuous Dissipation	800 mW
T_{CH}	Channel Temperature	175 °C
T_{STG}	Storage Temperature	- 65 °C to +175 °C

CHIP DIMENSIONS



Units: Micrometers
Chip Thickness: 50

Gate Pad: 75 x 70
Drain Pad: 80 x 70
Source Pad: 75 x 80

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℃ ±5℃ ; 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℃ to 250℃ ; Bond Tip Temperature : 150℃ ; 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.