1 W Flange Ceramic Packaged PHEMT GaAs Power FETs

FEATURES

- 1 W Typical Output Power at 6 GHz
- 12 dB Typical Linear Power Gain at 6 GHz
- High Linearity: IP3 = 40 dBm Typical at 6 GHz
- High Power Added Efficiency:
  Nominal PAE of 43 % at 6 GHz
- Suitable for High Reliability Application
- Breakdown Voltage: $BV_{DGO} \geq 15$ V
- Lg = 0.35 μm, Wg = 2.4 mm
- Tight Vp ranges control
- High RF input power handling capability
- 100 % DC Tested
- Flange Ceramic Package

PHOTO ENLARGEMENT

DESCRIPTION

The TC2591 is packaged with the TC1501 Pseudomorphic High Electron Mobility Transistor (PHEMT) chip. The flange ceramic package provides the best thermal conductivity for the GaAs FET. All devices are 100% DC and RF tested to assure consistent quality. Typical applications include high dynamic range power amplifiers for commercial and military high performance power applications.

ELECTRICAL SPECIFICATIONS (T_A=25 °C)

Symbol	CONDITIONS	MIN	TYP	MAX	UNIT
P_{1dB}	Output Power at 1dB Gain Compression Point , f = 6GHz V_{DS} = 8 V, I_{DS} = 240 mA	29.5	30		dBm
G_L	Linear Power Gain, f = 6GHz V_{DS} = 8 V, I_{DS} = 240 mA	11	12		dB
IP3	Intercept Point of the 3rd-order Intermodulation, f = 6GHz V_{DS} = 8 V, I_{DS} = 240 mA, *P_{SCL} = 17 dBm		40		dBm
PAE	Power Added Efficiency at 1dB Compression Power, f = 6GHz		43		%
I_{DSS}	Saturated Drain-Source Current at V_{DS} = 2 V, V_{GS} = 0 V		600		mA
g_m	Transconductance at V_{DS} = 2 V, V_{GS} = 0 V		400		mS
V_P	Pinch-off Voltage at V_{DS} = 2 V, I_D = 4.8 mA		-1.7**		Volts
BV_{DGO}	Drain-Gate Breakdown Voltage at I_{DGO} =1.2 mA	15	18		Volts
R_{th}	Thermal Resistance		18		°C/W

Note: * P_{SCL}: Output Power of Single Carrier Level.

** For the tight control of the pinch-off voltage range, we divide TC2591 into 3 model numbers to fit customer design requirement
(1)TC2591P1519 : Vp = -1.5V to -1.9V (2)TC2591P1620 : Vp = -1.6V to -2.0V (3)TC2591P1721 : Vp = -1.7V to -2.1V
If required, customer can specify the requirement in purchasing document. For special Vp requirement, please contact factory for details.

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ABSOLUTE MAXIMUM RATINGS (T_A=25 °C)

Symbol	Parameter	Rating
V_{DS}	Drain-Source Voltage	12 V
V_{GS}	Gate-Source Voltage	-5 V
I_{DS}	Drain Current	I_{DSS}
P_{in}	RF Input Power, CW	28 dBm
P_T	Continuous Dissipation	3.8 W
T_{CH}	Channel Temperature	175 °C
T_{STG}	Storage Temperature	- 65 °C to +175 °C

RECOMMANDED OPERATING CONDITION

Symbol	Parameter	Rating
V_{DS}	Drain to Source Voltage	8 V
I_D	Drain Current	240 mA

HANDLING PRECAUTIONS:

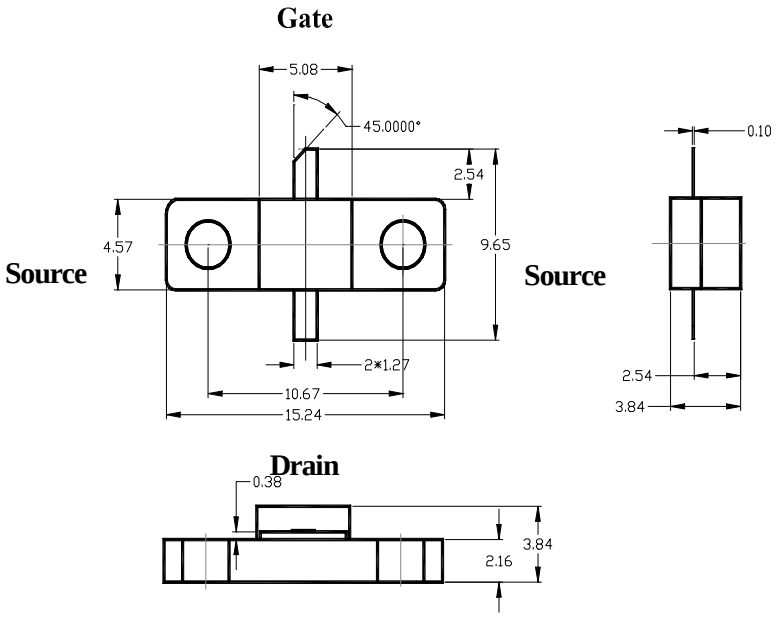
The user must operate in a clean, dry environment. Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. The static discharge must be less than 300V.

TYPICAL SCATTERING PARAMETERS (T_A=25 °C)

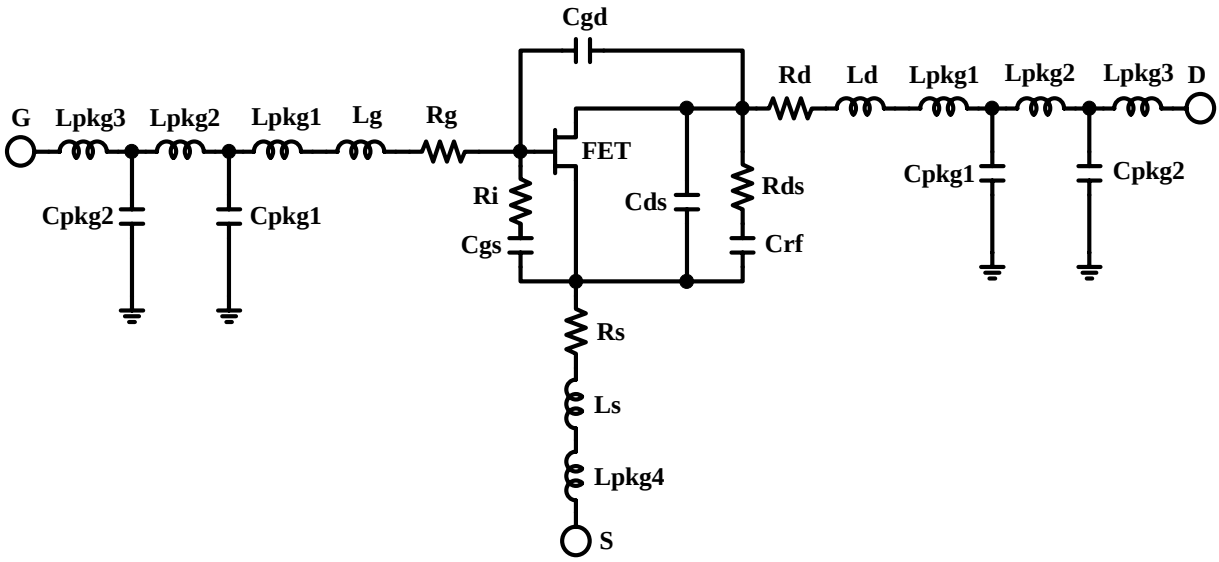
V_{DS} = 8 V, I_{DS} = 240 mA

FREQUENCY	S11		S21		S12		S22	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.9111	-167.09	3.8048	68.95	0.0337	-10.27	0.4441	170.74
3	0.8964	166.15	2.8222	42.16	0.0378	-31.72	0.4297	157.73
4	0.8794	141.85	2.3866	16.06	0.0429	-52.55	0.3963	143.48
5	0.8578	114.38	2.1913	-12.25	0.0497	-75.68	0.3453	124.99
6	0.8360	79.47	2.0878	-44.97	0.0575	-103.32	0.2799	96.28
7	0.8306	34.88	1.9288	-83.30	0.0627	-136.68	0.2361	45.65
8	0.8581	-14.11	1.5922	-125.20	0.0600	-173.75	0.3061	-16.20
9	0.9001	-56.65	1.1456	-165.31	0.0493	150.84	0.4635	-58.84

OUTLINE DIMENSIONS (Unit: mm)



NONLINEAR MODEL



TOM2 MODEL PARAMETERS

VTO	-2 V	**CGD**	0.22 pF
ALPHA	4.54	**CGS**	4.04 pF
BETA	0.399	**CDS**	0.62 pF
GAMMA	0.0084	**VBR**	15 V
DELTA	0.003	**TNOM**	27 °C
Q	1.055	**LS**	0.009 nH
NG	0	**LG**	0.0475 nH
ND	0.01	**LD**	0.032 nH
TAU	3.9 ps	**Rds**	10.29 Ohm
RG	0.65 Ohm	**Ri**	0.0375 Ohm
RD	0.675 Ohm	**Crf**	1E-7 PF
RS	0.475 Ohm	**Lpkg1**	0.1 nH
IS	1E-14 mA	**Lpkg2**	0.16 nH
N	1	**Lpkg3**	0.07 nH
VBI	0.68 V	**Lpkg4**	0.032 nH
VDELTA	0.2 V	**Cpkg1**	0.42 PF
VMAX	0.5 V	**Cpkg2**	0.26 PF

MODEL RANGE

Frequency: 0.5 to 10 GHz

Bias: V_{DS} = 1V to 8V, I_D = 100mA to 600mA

I_{DS} = 600mA at V_{GS} = 0V, V_{DS} = 2V

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