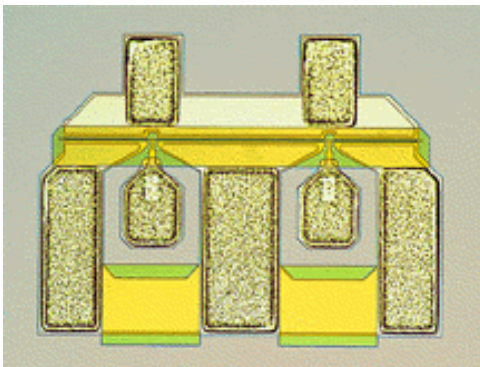


Discrete MESFET

TGF1350-SCC



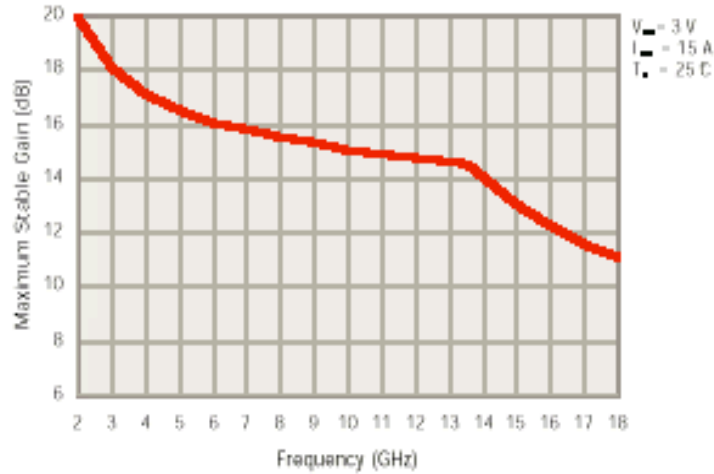
Key Features and Performance

- 0.5 μm x 300 μm FET
- 1.5 dB Noise Figure with 11dB Associated Gain at 10 GHz
- 2.5 dB Noise Figure with 7 dB Associated Gain at 18 GHz
- All-gold Metallization for High Reliability
- Recessed Gate Structure

Description

The TriQuint TGF1350-SCC is a single-gate GaAs field-effect transistor (FET) used for low-noise applications DC to 18 GHz. Bond pad is gold plated for compatibility with thermocompression and thermosonic compatibility wire-bonding processes. The TGF1350-SCC is readily assembled using automated equipment. Die attach should be accomplished with conductive epoxy only. Eutectic attach is not recommended .

**TYPICAL
MAXIMUM
STABLE GAIN**



**ABSOLUTE
MAXIMUM RATINGS**

Drain-to-source voltage, V_{DS}	8 V
Drain-to-source voltage, V_{GS}	0 V to -6 V
Drain-to-source voltage, V_{GD}	0 V to -6 V
Power dissipation, P_D *	0.7 W
Operating channel temperature, T_{CH} **	150 °C
Mounting temperature (30 sec), T_M	320 °C
Storage temperature range, T_{STG}	-65 °C to 150 °C

Ratings over operating channel temperature range, T_{CH}

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "RF Characteristics" is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

* Power dissipation, P_D at (or below) 25 °C base-plate temperature. For operation above 25 °C base-plate temperature, derate linearly at the rate of 1.4 mW/ °C.

** Operating channel temperature directly affects the device MTTF. For maximum life, it is recommended that channel temperature be maintained at the lowest possible level.

TYPICAL S-PARAMETERS

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG (°)	MAG	ANG (°)	MAG	ANG (°)	MAG	ANG (°)
2.0	0.98	-28	3.22	157	0.03	75	0.71	-12
2.5	0.96	-36	3.17	151	0.04	71	0.71	-14
3.0	0.93	-44	3.07	146	0.04	68	0.71	-14
3.5	0.93	-51	2.99	141	0.05	65	0.69	-16
4.0	0.90	-56	2.88	137	0.05	62	0.68	-17
4.5	0.89	-60	2.78	133	0.05	61	0.68	-19
5.0	0.88	-64	2.73	129	0.06	60	0.67	-24
5.5	0.87	-67	2.65	125	0.06	58	0.66	-28
6.0	0.85	-70	2.55	121	0.06	56	0.66	-30
6.5	0.83	-74	2.46	118	0.06	55	0.66	-31
7.0	0.82	-77	2.36	116	0.06	54	0.66	-32
7.5	0.82	-80	2.28	113	0.06	54	0.66	-32
8.0	0.81	-82	2.22	110	0.06	53	0.66	-33
8.5	0.81	-85	2.15	107	0.06	52	0.65	-34
9.0	0.80	-88	2.12	104	0.06	51	0.65	-38
9.5	0.79	-92	2.08	101	0.06	51	0.65	-40
10.0	0.78	-96	2.05	98	0.06	51	0.65	-43
10.5	0.78	-99	2.02	95	0.06	50	0.65	-45
11.0	0.77	-103	2.00	92	0.06	48	0.65	-48
11.5	0.78	-106	1.96	88	0.06	46	0.65	-51
12.0	0.77	-110	1.90	84	0.06	44	0.65	-54
12.5	0.77	-114	1.84	81	0.06	42	0.64	-56
13.0	0.76	-117	1.79	79	0.06	39	0.64	-58
13.5	0.75	-120	1.74	76	0.06	37	0.64	-60
14.0	0.75	-123	1.69	73	0.07	35	0.64	-64
14.5	0.74	-125	1.64	69	0.07	32	0.64	-69
15.0	0.74	-128	1.56	65	0.07	29	0.65	-74
15.5	0.74	-131	1.49	61	0.07	25	0.66	-78
16.0	0.73	-133	1.43	59	0.08	23	0.65	-81
16.5	0.72	-136	1.38	57	0.08	21	0.65	-81
17.0	0.73	-139	1.36	54	0.08	21	0.66	-81
17.5	0.73	-140	1.31	52	0.09	22	0.66	-82
18.0	0.74	-142	1.26	50	0.09	22	0.66	-83

$$T_A = 25^{\circ}\text{C}, V_{DS} = 3 \text{ V}, I_{DS} = 15\text{mA}$$

Reference planes for S-parameter data are located at center of gate and drain bond pads. Three 0.7 mil diameter wires, approximately 13 mils long, are bonded from the center of each of the source pads to ground. The S-parameters are also available on floppy disk and the world wide web.

RF CHARACTERISTICS

PARAMETER	TEST CONDITIONS	TYP	UNIT
NF _{MIN} Minimum noise figure	10 GHz	1.5	dB
	18 GHz	2.5	
G _A Associated gain	10 GHz	11	
	18 GHz	7	

V_{DS} = 3 V, I_{DS} = 15mA, T_A = 25°C

DC CHARACTERISTICS

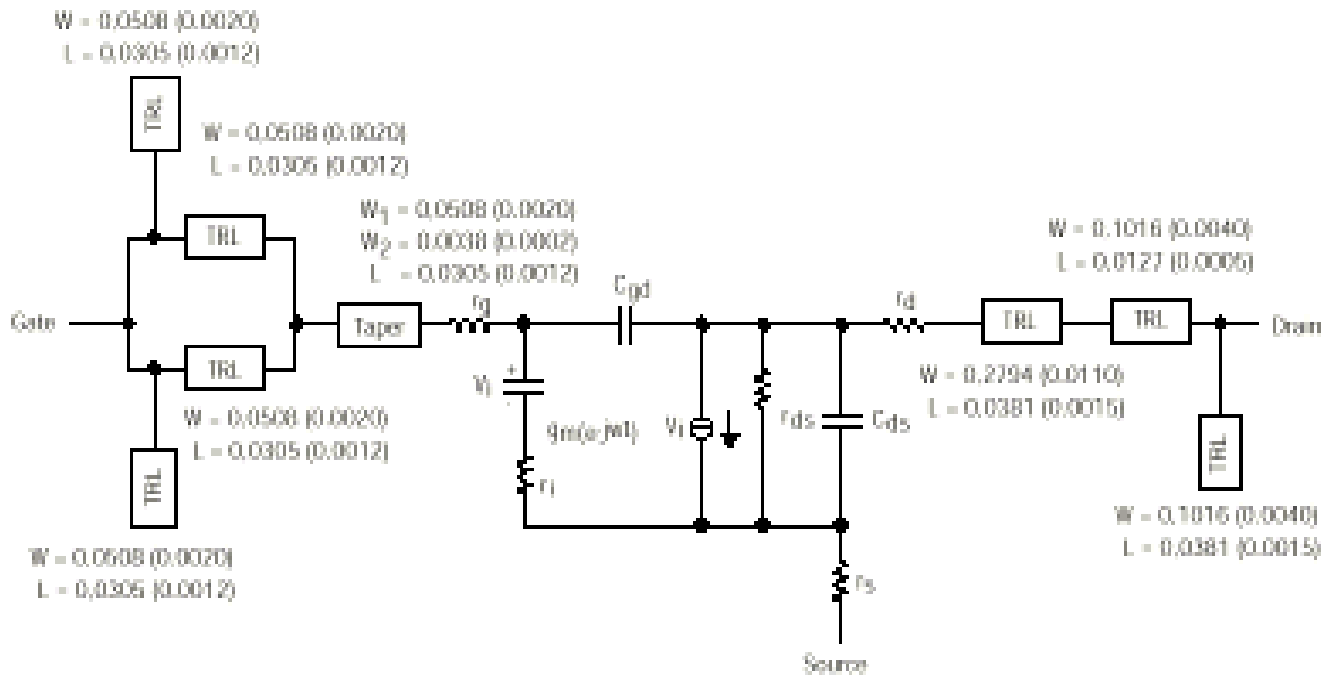
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{(BR)GDO} Gate-drain breakdown voltage	I _{GS} = 1.0mA per mm	- 6			V
V _{(BR)GSO} Gate-source breakdown voltage	I _{GD} = 1.0mA per mm	- 6			V
V _{GS(OFF)} Gate-source cutoff (pinch-off) voltage	V _{DS} = V _{DSS} * I _D = 0.5mA per mm	- 0.5	- 1.2	- 3	V
I _{DSS} Zero-gate-voltage drain current at saturation	V _{DS} = 0.5 V to 3.5V** V _{GS} = 0	30	50	100	mA
G _M DC transconductance	V _{DS} = 0.5 V to V _{DSS} * V _{GS} = - 0.25V	40	50	78	mA

T_A = 25°C

*V_{DSS} = V_{DS} @ I_{DSS}

**V_{DS} for I_{DSS} is the drain voltage between 0.5V and 3.5V at which drain current is highest.

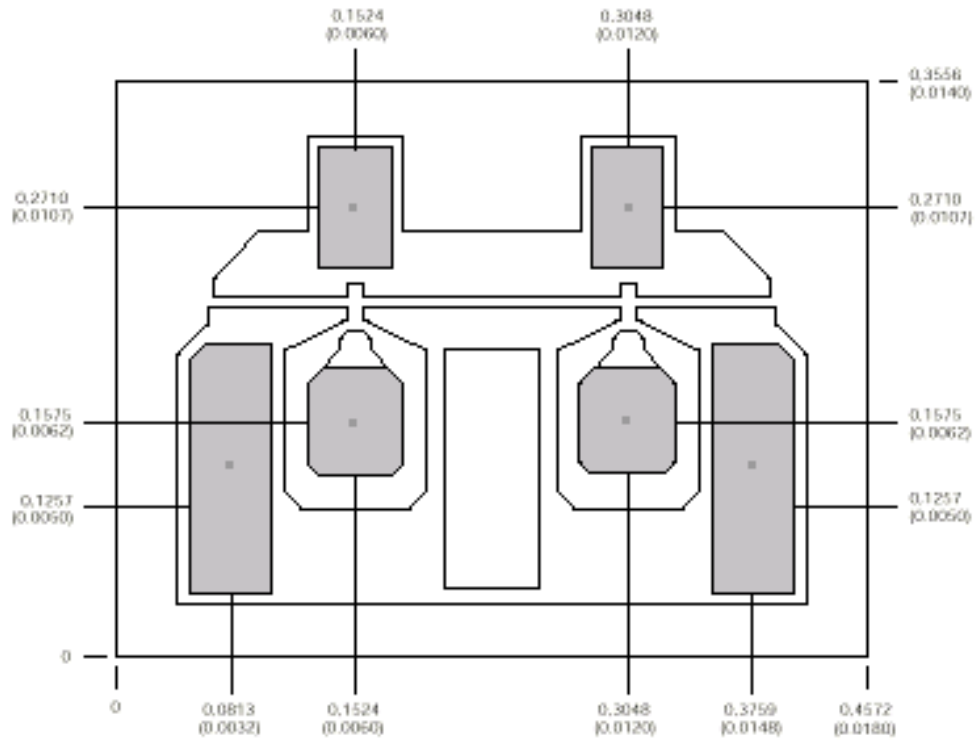
EQUIVALENT SCHEMATIC



TYPICAL MODEL PARAMETERS

PARAMETER	VALUE	STANDARD DEVIATION	UNIT
r_s Source resistance	5.62	0.6	Ω
r_d Drain resistance	4.48	0.4	Ω
r_g Gate resistance	4.68	0.5	Ω
g_m Transconductance	52.32	6	mS
r_{ds} Drain-to-source resistance	224	40	Ω
r_i Input resistance	1.30	1	Ω
C_{gs} Gate-to-source capacitance	0.351	0.027	pF
C_{gd} Gate-to-drain capacitance	0.0159	0.0037	pF
C_{ds} Drain-to-source capacitance	0.0877	0.0095	pF
τ Time constant	2.33	0.1	ps

MECHANICAL DRAWING



Units: millimeters (inches)
Thickness: 0.1016 (0.004)
Chip size \pm 0.0508 (0.002)

Bond pad #1 (source)	0.0508 x 0.1397 (0.0020 x 0.0055)
Bond pad #2 (gate)	0.0508 x 0.0610 (0.0020 x 0.0024)
Bond pad #3 (drain)	0.0508 x 0.0762 (0.0020 x 0.0030)
Bond pad #4 (drain)	0.0508 x 0.0762 (0.0020 x 0.0030)
Bond pad #5 (gate)	0.0508 x 0.0610 (0.0020 x 0.0024)
Bond pad #6 (source)	0.0508 x 0.1397 (0.0020 x 0.0055)

GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.