T1G4005528-FS

55W, 28V, DC – 3.5GHz, GaN RF Power Transistor

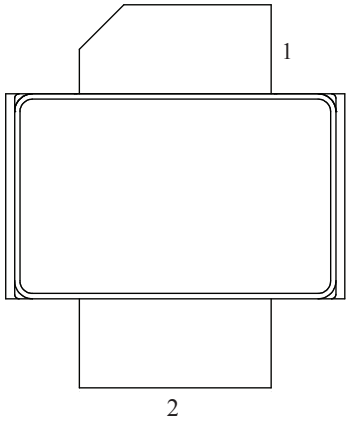
Applications

- Military radar
- Civilian radar
- Professional and military radio communications
- Test instrumentation
- Avionics
- Wideband or narrowband amplifiers

Product Features

- Frequency: DC to 3.5 GHz
- Linear Gain: >15 dB at 3.5 GHz
- Operating Voltage: 28 V
- Output Power (P_{3dB}): 55 W at 3.5 GHz
- Lead-free and RoHS compliant

Functional Block Diagram



General Description

The TriQuint T1G4005528-FS is a 55 W (P_{3dB}) discrete GaN on SiC HEMT which operates from DC to 3.5 GHz. The device is constructed with TriQuint's proven 0.25 µm production process, which features advanced field plate techniques to optimize power and efficiency at high drain bias operating conditions. This optimization can potentially lower system costs in terms of fewer amplifier line-ups and lower thermal management costs.

Pin Configurations

Pin #	Symbol
1	RF Output
2	RF Input
Flange	Source

Ordering Information

Material No.	Part No.	Description	ECCN
1078974	T1G4005528-FS	Packaged part: Flangeless	EAR99
1079752	T1G4005528-FS-EVB1	3.0-3.5 GHz Eval Brd	EAR99

Specifications

Absolute Maximum Ratings

Sym	Parameter	Value
V^+	Positive Supply Value[1]	28 V
V^-	Negative Supply Voltage Range	- 10 V to 0 V
I	Positive Supply Current[1]	4.5 A
$\|I_G\|$	Gate Supply Current	100 mA
P_D	Power Dissipation[1]	61 W
T_{CH}	Operating Channel Temperature[1]	213 °C
BV_{osx}	Breakdown Voltage	85 V

Notes:
[1] Absolute maximum ratings at 3 GHz.
[2] Absolute maximum ratings are set based on industry recommended standard mean time to failure (MTTF) greater than 1M hours while operating at a maximum case temperature of 85C . Operating at lower maximum case temperatures allows maximum operating voltage to be increased up to a maximum of 40V. Application specific limits for operating voltage, positive supply current, and power dissipation can be determined with engineering guidance from Triquint.

Electrical Specifications

Recommended operating conditions apply unless otherwise specified: T_A=25 °C

DC Characteristics

Characteristics	Symbol	Min	Typ	Max	Unit	Conditions
Break-Down Voltage Drain Source	BV_{DSX}	85	120		V	V_{GS} = -8 V, I_D = 10 mA
Gate Quiescent Voltage	$V_{GS\ (Q)}$		-3.5		V	V_{DS} = 28 V; I_{DQ} = 0.8 A
Gate Threshold Voltage	$V_{GS\ (th)}$		-4.5		V	V_{DS} = 10 V; I_D = 40 mA
Saturated Drain Current	I_{DSX}		16		A	V_{DS} = 5 V; V_{GS} = 0 V

RF Characteristics

Characteristics	Symbol	Min	Typ	Max	Unit
Load Pull Performance at 3.0 GHz (V_{DS} = 28 V, I_{DQ} = 200 mA; Pulse: 100µs, 20%)					
Linear Gain	G_{LIN}		17.3		dB
Output Power at 1 dB Gain Compression	P_{1dB}		51.3		W
Drain Efficiency at 1 dB Gain Compression	DE_{1dB}		59.0		%
Power-Added Efficiency at 1 dB Gain Compression	PAE_{1dB}		57.6		%
Gain at 1dB Compression	G_{1dB}		16.3		dB
Load Pull Performance at 3.5 GHz (V_{DS} = 28 V, I_{DQ} = 200 mA; Pulse: 100µs, 20%)					
Linear Gain	G_{LIN}		17.6		dB
Output Power at 1 dB Gain Compression	P_{1dB}		55.0		W
Drain Efficiency at 1 dB Gain Compression	DE_{1dB}		62.1		%
Power-Added Efficiency at 1 dB Gain Compression	PAE_{1dB}		60.7		%
Gain at 1dB Compression	G_{1dB}		16.6		dB
Performance at 3.3 GHz in the 3.0 to 3.5 GHz Eval. Board (V_{DS} = 28 V, I_{DQ} = 200 mA; Pulse: 100 µs, 20%)					
Linear Gain	G_{LIN}	14.0	15.1		dB
Output Power	P_{3dB}	55.0	65.6		W
Drain Efficiency at 3 dB Gain Compression	DE_{3dB}	50.0	52.5		%
Power-Added Efficiency at 3 dB Gain Compression	PAE_{3dB}	45.0	49.3		%
Gain at 3dB Compression	G_{3dB}	11.0	12.1		dB
Narrow Band Performance at 3.5 GHz (V_{DS} = 28 V, I_{DQ} = 200 mA, CW at P1dB, applied for 3.5 secs)					
Impedance Mismatch Ruggedness[3]	VSWR	10:1			

Note: [3]VSWR testing performed with increasing real impedance value only from reference Z to 10 times reference Z.

T1G6001528-Q3

DC – 6 GHz 18 W GaN RF Power Transistor

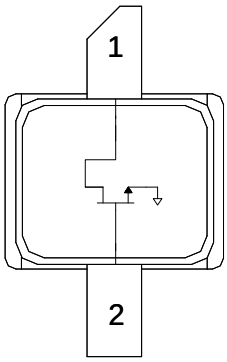
Applications

- General Purpose RF Power
- Jammers
- Military and Civilian Radar
- Professional and Military radio systems
- Wideband amplifiers
- Test instrumentation
- Avionics

Product Features

- Frequency: DC to 6 GHz
- Output Power (P3dB): 18 W at 6 GHz
- Linear Gain: >10 dB at 6 GHz
- Operating Voltage: 28 V
- Low thermal resistance package

Functional Block Diagram



General Description

The TriQuint T1G6001528-Q3 is a 18 W (P3dB) discrete GaN on SiC HEMT which operates from DC to 6 GHz and typically provides >10 dB gain at 6 GHz. The device is constructed with TriQuint's proven 0.25 µm process, which features advanced field plate techniques to optimize power and efficiency at high drain bias operating conditions. This optimization can potentially lower system costs in terms of fewer amplifier line-ups and lower thermal management costs.

Lead-free and RoHS compliant

Evaluation Boards are available upon request.

Pin Configuration

Pin #	Symbol
1	Vd/RF OUT
2	Vg/RF IN
Flange	Source

Ordering Information

Part No.	ECCN	Description
T1G6001528-Q3	EAR99	Packaged Transistor
T1G6001528-Q3 EVB1	EAR99	5-6 GHz Eval Board

Specifications

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage,Vd	+40 V
Gate Voltage,Vg	-50 to 0 V
Drain to Gate Voltage, Vd – Vg	80 V
Drain Current, Id	1.5 A
Gate Current, Ig	-25 to 25 mA
Power Dissipation, Pdiss	26 W
RF Input Power, CW, T = 25ºC	37 dBm
Channel Temperature, Tch	250 °C
Mounting Temperature (30 Seconds)	260 °C
Storage Temperature	-40 to 150 °C

Absolute maximum ratings at 3 GHz.
Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Conditions

Parameter	Min	Typical	Max	Units
Vd		28	30	V
Idq		50		mA
Id_drive (Under RF Drive)		1400		mA
Vg		-3.7		V
Channel Temperature, Tch			200	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

Test conditions unless otherwise noted: 25 ºC, Vd = 28 V, Idq = 50 mA, Vg = -3.7 V Typical.

RF Characteristics	Symbol	Min	Typ	Max	Units
Load Pull Performance at 3 GHz (V_{DS}=28V, I_{DQ}= 50mA, CW)					
Linear Gain	G_{LIN}		15.0		dB
Output Power at 3 dB Gain Compression	P_{3dB}		20.0		W
Drain Efficiency at 3 dB Gain Compression	DE_{3dB}		60		%
Power-Added Efficiency at 3 dB Gain Compression	PAE_{3dB}		56		%
Gain at 3 dB Compression	G_{3dB}		12.5		dB
Load Pull Performance at 6 GHz (V_{DS}=28V, I_{DQ}= 50mA, CW)					
Linear Gain	G_{LIN}		11.5		dB
Output Power at 3 dB Gain Compression	P_{3dB}		19.0		W
Drain Efficiency at 3 dB Gain Compression	DE_{3dB}		60		%
Power-Added Efficiency at 3 dB Gain Compression	PAE_{3dB}		52		%
Gain at 3 dB Compression	G_{3dB}		8.5		dB
Performance at 5.4 GHz in the 5-6 GHz Fixture (V_{DS}=28V, I_{DQ}= 50mA, Pulse:100µs 20%)					
Linear Gain	G_{LIN}	9.0	9.5		dB
Output Power at 3 dB Gain Compression	P_{3dB}	17.8	21.0		W
Drain Efficiency at 3 dB Gain Compression	DE_{3dB}	50	58		%
Power-Added Efficiency at 3 dB Gain Compression	PAE_{3dB}	40	45		%
Gain at 3 dB Compression	G_{3dB}	6.0	6.5		dB
Narrowband Performance at 3.5 GHz (V_{DS}=28V, I_{DQ}= 50mA, CW at P1dB, applied for 3.5 secs)					
Impedance Mismatch Ruggedness	VSWR			10:1	

Note: VSWR testing performed with increasing real impedance value only from reference Z to 10 times reference Z.