

T1P2701012-SP

10 W, 12V, 500 MHz—3GHz, Powerband™ pHEMT RF Power Transistor

Introduction

The T1P2701012-SP is a POWERBAND™ discrete pHEMT, depletion mode, RF Power transistor designed to operate from 500MHz to 3GHz in wide-band circuits. The device has an instantaneous band-width P1dB output power of 10watts across the entire band when operated in the TriQuint wide-band test fixture. The T1P2701012-SP can also be used in narrow band applications and is rated at 15Watts P1dB at 3GHz.

Figure 1. Available Packages



Features

- Exceptional Instantaneous band-width performance from 500MHz – 3GHz
- Increased efficiency results in significant advantages
 - Smaller and lighter systems
 - Reduced system component costs
 - Reduced energy consumption
- Typical Performance ratings
 - Wide-Band 500MHz-3GHz (as tested in TriQuint Wideband Fixture)
 - 10dB gain
 - 50% Efficiency
 - 10Watt P1dB
 - Narrow Band up to 3GHz
 - 12dB gain
 - 60% efficiency
 - 15Watt P1dB

Table 1. Maximum Ratings

Sym	Parameter	Value	Notes
V ⁺	Positive Supply Voltage	12.5 V	2/
V ⁻	Negative Supply Voltage Range	-5V to 0V	
I ⁺	Positive Supply Current	5.6A	2/
I _G	Gate Supply Current	70 mA	
P _D	Power Dissipation	See note 3	2/ 3/
T _{CH}	Operating Channel Temperature	150° C	4/

1/ These ratings represent the maximum operable values for this device.

2/ Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.

3/ For a median life time of 1E+6 hrs, Power dissipation is limited to: P_D(max) = (150 °C – T_{BASE} °C) / 8.3 (°C/W)

4/ Junction operating temperature will directly affect the device median time to failure(T_M). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

Table 2. Thermal Information

Parameter	Test Conditions	TCH (°C)	θ _{JC} (°C/W)	T _M (HRS)
θ _{JC} Thermal Resistance (channel to backside of carrier)	V _d = 10 V I _{dq} = 900 mA P _{diss} = 9 W	145	8.3	1.6E+6

Preliminary Data Sheet
Subject to Change

T1P2701012-SP

10 W, 12V, 500 MHz—3GHz, Powerband™ pHEMT RF Power Transistor

Electrical Characteristics

Recommended operating conditions apply unless otherwise specified: $T_A = 25\text{ }^\circ\text{C}$.

Table 3. dc Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Saturated Drain Current	I_{dss}	—	3000	—	mA
Transconductance	G_m	—	4000	—	mS
Pinch-off Voltage	V_p	-1.35	-1	-0.65	V
Breakdown Voltage Gate-Source	V_{BGS}	-30	—	-8	V
Breakdown Voltage Gate-Drain	V_{BGD}	-30	—	-15	V

Table 4. RF Characteristics

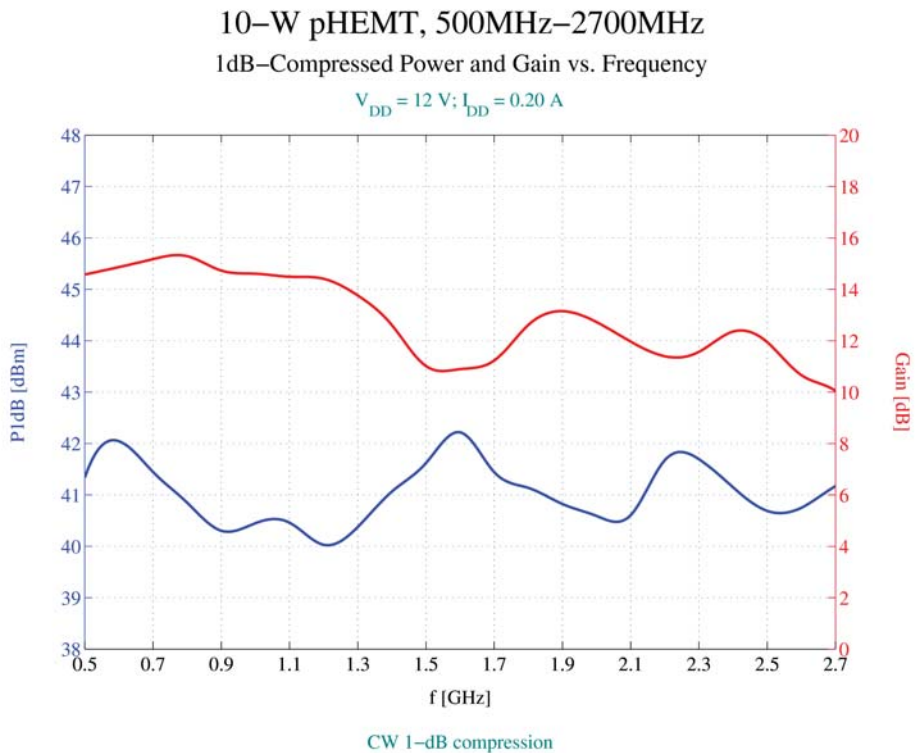
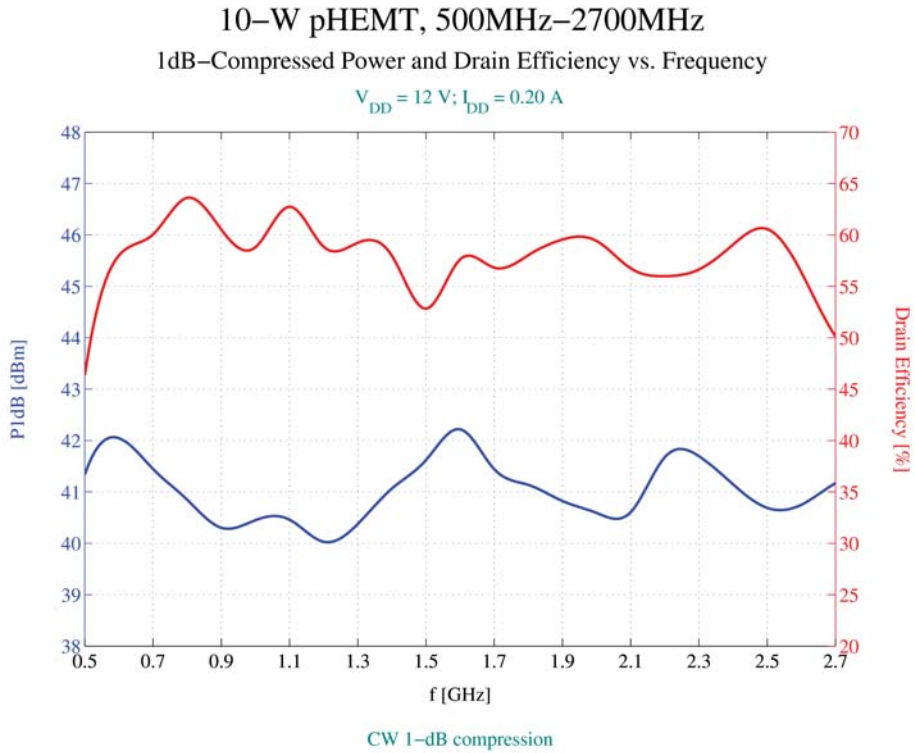
Parameter	Symbol	Min	Typ	Max	Unit
Functional Tests, Instantaneous Band-Width (Tested in TriQuint's Wide-Band Test Fixture)					
Gain @ P1dB, 500MHz-3GHz ($V_{DS} = 12\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DD} = 200\text{ mA}$)	G	—	10	—	dB
P1dB, 500MHz-3GHz ($V_{DS} = 12\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DD} = 200\text{ mA}$)	P1dB	—	10	—	W
Power Added Efficiency, 500MHz-3GHz ($V_{DS} = 12\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DD} = 200\text{ mA}$)	—	—	45	—	%
Functional Tests, Narrow Band RF Performance (1GHz)					
Gain ($V_{DS} = 12\text{ V}$, $P_{OUT} = 15\text{ W}$, $I_{DQ} = 200\text{ mA}$)	G	—	17	—	dB
Output Power ($V_{DS} = 12\text{ V}$, 1 dB compression, $I_{DQ} = 200\text{ mA}$)	P1dB	—	15	—	W
Drain Efficiency ($V_{DS} = 12\text{ V}$, $P_{OUT} = \text{P1dB}$, $I_{DQ} = 200\text{ mA}$)	—	—	59	—	%
Ruggedness ($V_{DS} = 12\text{ V}$, $P_{OUT} = 15\text{ W}$, $I_{DQ} = 200\text{ mA}$, $f = 500\text{ MHz}$, $V_{SWR} = 3:1$, all angles)	—	No degradation in output power.			

Preliminary Data Sheet
Subject to Change

T1P2701012-SP

10 W, 12V, 500 MHz—3GHz, Powerband™ pHEMT RF Power Transistor

Typical Instantaneous Wideband Performance Data, 500MHz-2.7GHz (tested in TriQuint Wideband Fixture)



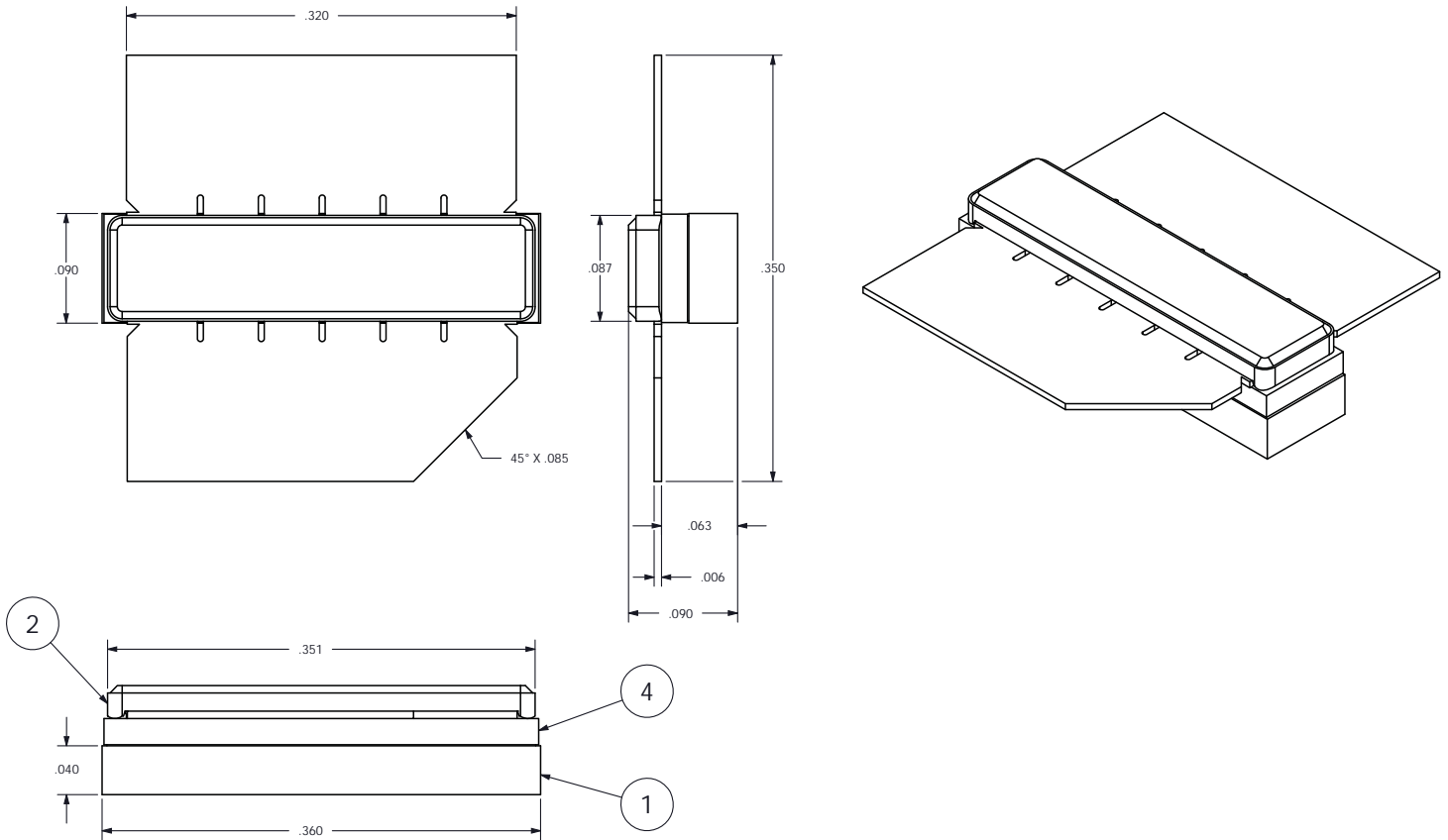
Sheet
nge

T1P2701012-SP

10 W, 12V, 500 MHz—3GHz, Powerband™ pHEMT RF Power Transistor

Package Dimensions

Note: All dimensions in inches. Scale 8:1



Preliminary Data Sheet
Subject to Change