

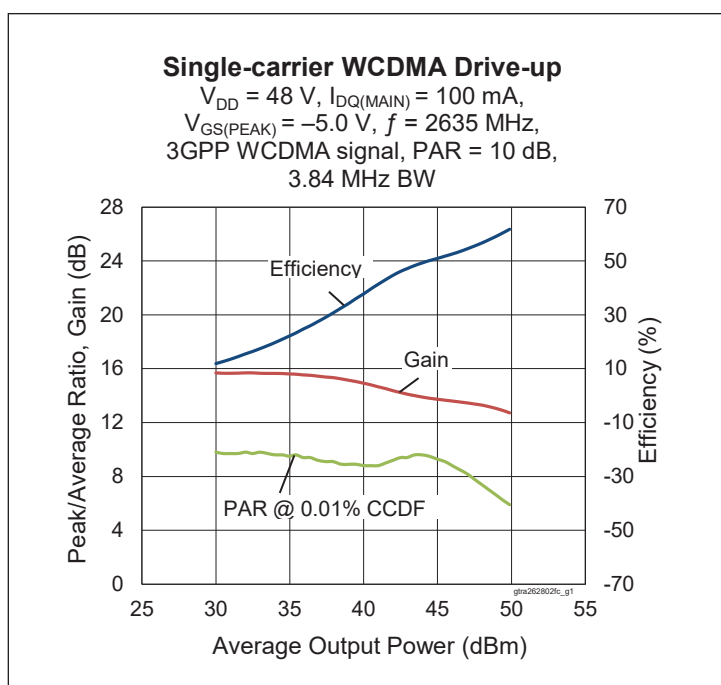
# GTRA262802FC

## Thermally-Enhanced High Power RF GaN on SiC HEMT 250 W, 48 V, 2490 – 2690 MHz

### Description

The GTRA262802FC is a 250-watt ( $P_{3dB}$ ) GaN on SiC high electron mobility transistor (HEMT) for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.

GTRA262802FC  
Package H-37248C-4



### Features

- GaN on SiC HEMT technology
- Input matched
- Typical pulsed CW performance, 2605 MHz, 48 V, combined outputs, 16  $\mu\text{s}$  pulse width, 10% duty cycle
  - Output power at  $P_{3dB} = 250\text{ W}$
  - Efficiency = 62%
  - Gain = 14.4 dB
- Capable of handling 10:1 VSWR @48 V, 38 W (CW) output power
- Human Body Model Class 1A (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

#### Single-carrier WCDMA Specifications (tested in Wolfspeed Doherty production test fixture)

$V_{DD} = 48\text{ V}$ ,  $I_{DQ} = 100\text{ mA}$ ,  $V_{GS(peak)} = V_{GS@I_{DQ}} = 200\text{ mA} - 2.05\text{ V}$ ,  $P_{OUT} = 38\text{ W avg}$ ,  $f = 2635\text{ MHz}$ , 3GPP signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	$G_{ps}$	13.5	14	—	dB
Drain Efficiency	$\eta_D$	49	54	—	%
Adjacent Channel Power Ratio	ACPR	—	-28	-24.5	dBc

All published data at  $T_{CASE} = 25^\circ\text{C}$  unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

## DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-source Breakdown Voltage (main)	$V_{GS} = -8\text{ V}, I_D = 10\text{ mA}$	$V_{(BR)DSS}$	150	—	—	V
	(peak) $V_{GS} = -8\text{ V}, I_D = 10\text{ mA}$	$V_{(BR)DSS}$	150	—	—	V
Drain-source Leakage Current	$V_{GS} = -8\text{ V}, V_{DS} = 10\text{ V}$	$I_{DSS}$	—	—	5	mA
Gate Threshold Voltage (main)	$V_{DS} = 10\text{ V}, I_D = 10.8\text{ mA}$	$V_{GS(th)}$	-3.5	-3	-2.5	V
	(peak) $V_{DS} = 10\text{ V}, I_D = 20\text{ mA}$	$V_{GS(th)}$	-3.5	-3	-2.5	V

## Recommended Operating Conditions

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Voltage		$V_{DD}$	0	—	50	V
Gate Quiescent Voltage	$V_{DS} = 48\text{ V}, I_D = 100\text{ mA}$	$V_{GS(Q)}$	—	-3.0	—	V

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	$V_{DSS}$	125	V
Gate-source Voltage	$V_{GS}$	-10 to +2	V
Operating Voltage	$V_{DD}$	55	V
Gate Current (main)	$I_G$	10.8	mA
	(peak) $I_G$	20	mA
Drain Current (main)	$I_D$	4.0	A
	(peak) $I_D$	7.5	A
Junction Temperature	$T_J$	225	°C
Storage Temperature Range	$T_{STG}$	-65 to +150	°C

Operation above the maximum values listed here may cause permanent damage. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the component. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For reliable continuous operation, the device should be operated within the operating voltage range ( $V_{DD}$ ) specified above.

## Thermal Characteristics

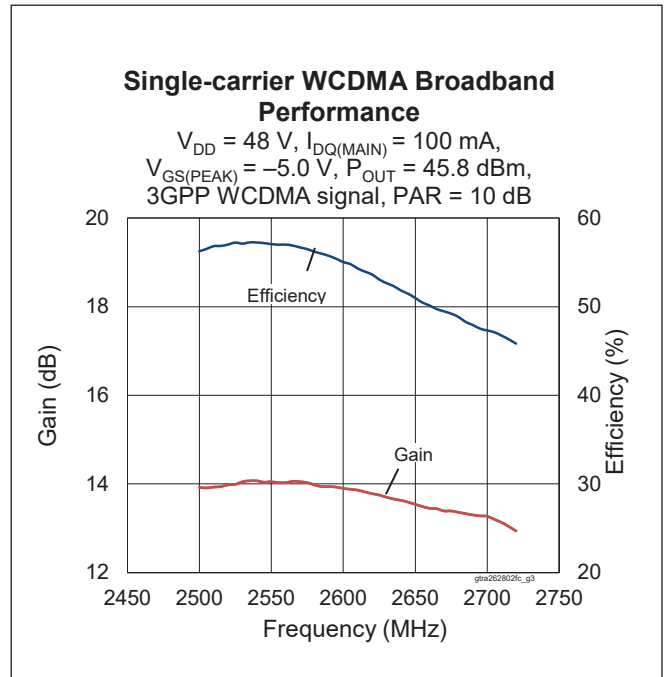
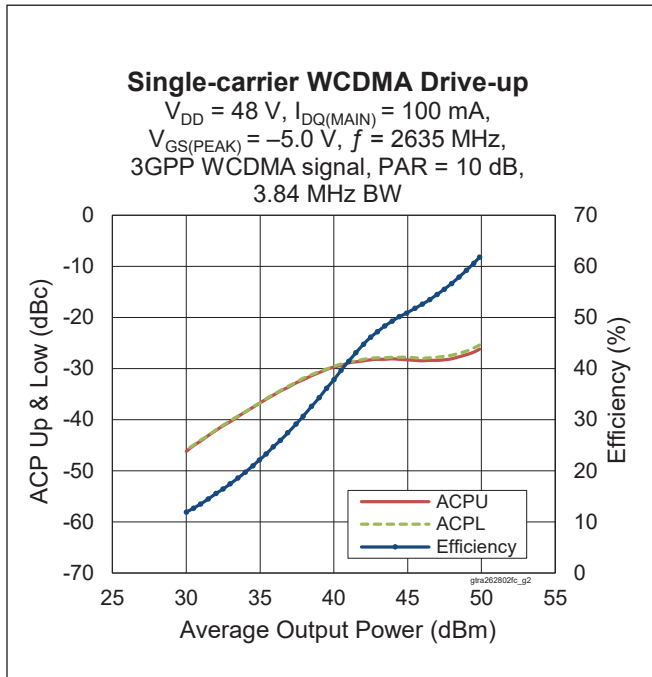
Parameter	Symbol	Value	Unit
Thermal Resistance (main, $T_{CASE} = 70\text{ °C}, 38\text{ W CW}$ )	$R_{\theta JC}$	1.71	°C/W



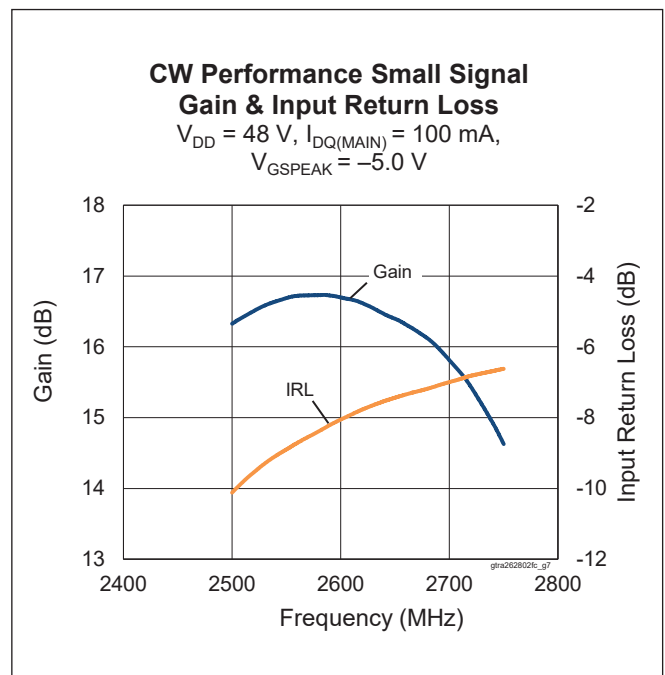
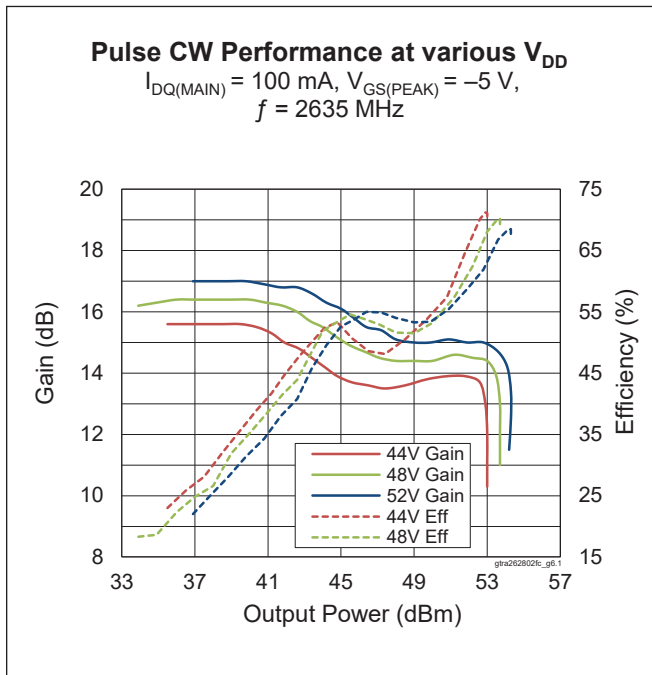
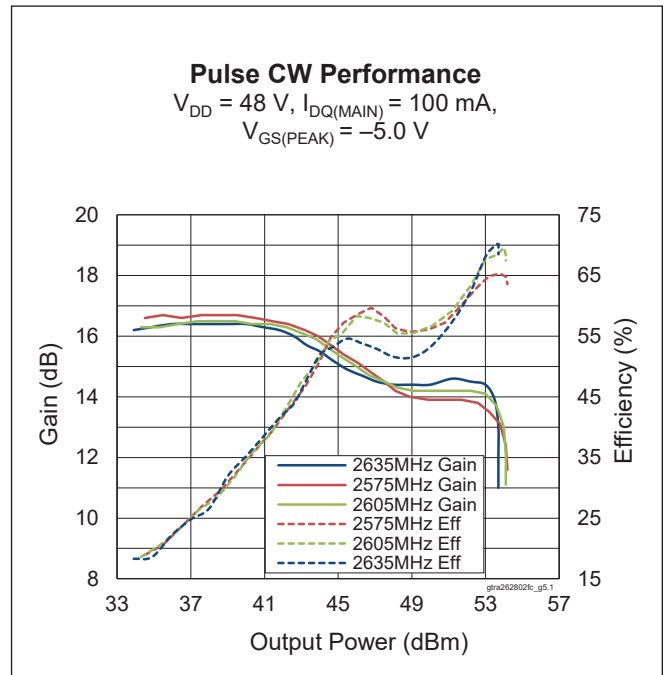
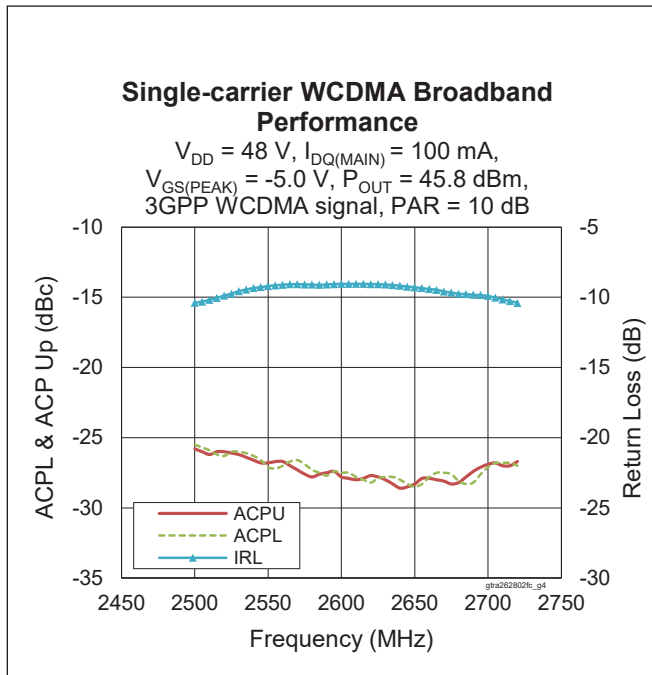
**Ordering Information**

Type and Version	Order Code	Package Description	Shipping
GTRA262802FC V2 R0	GTRA262802FC-V2-R0	H-37248C-4	Tape & Reel, 50 pcs
GTRA262802FC V2 R2	GTRA262802FC-V2-R2	H-37248C-4	Tape & Reel, 250 pc

**Typical Performance** (data taken in a production test fixture)



Typical Performance (cont.)



## Load Pull Performance

**Main Side Load Pull Performance** – Pulsed CW signal: 16  $\mu$ s, 10% duty cycle, 48 V,  $I_{DQ}$  = 100 mA, Class AB

		P <sub>3dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>L</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta_D$ [%]	Z <sub>L</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta_D$ [%]
2550	24.62-j26.07	6.32-j4.58	16.28	51.00	125.89	64.9	4.21-j0.93	18.05	49.13	81.75	77.8
2620	27.89-j15.25	7.12-j4.87	16.15	50.91	123.31	66.4	4.75-j1.63	17.64	49.67	92.60	77.2
2690	37.33-j8.37	7.07-j5.42	15.71	50.81	120.50	64.8	4.46-j1.56	17.52	49.04	80.09	76.5

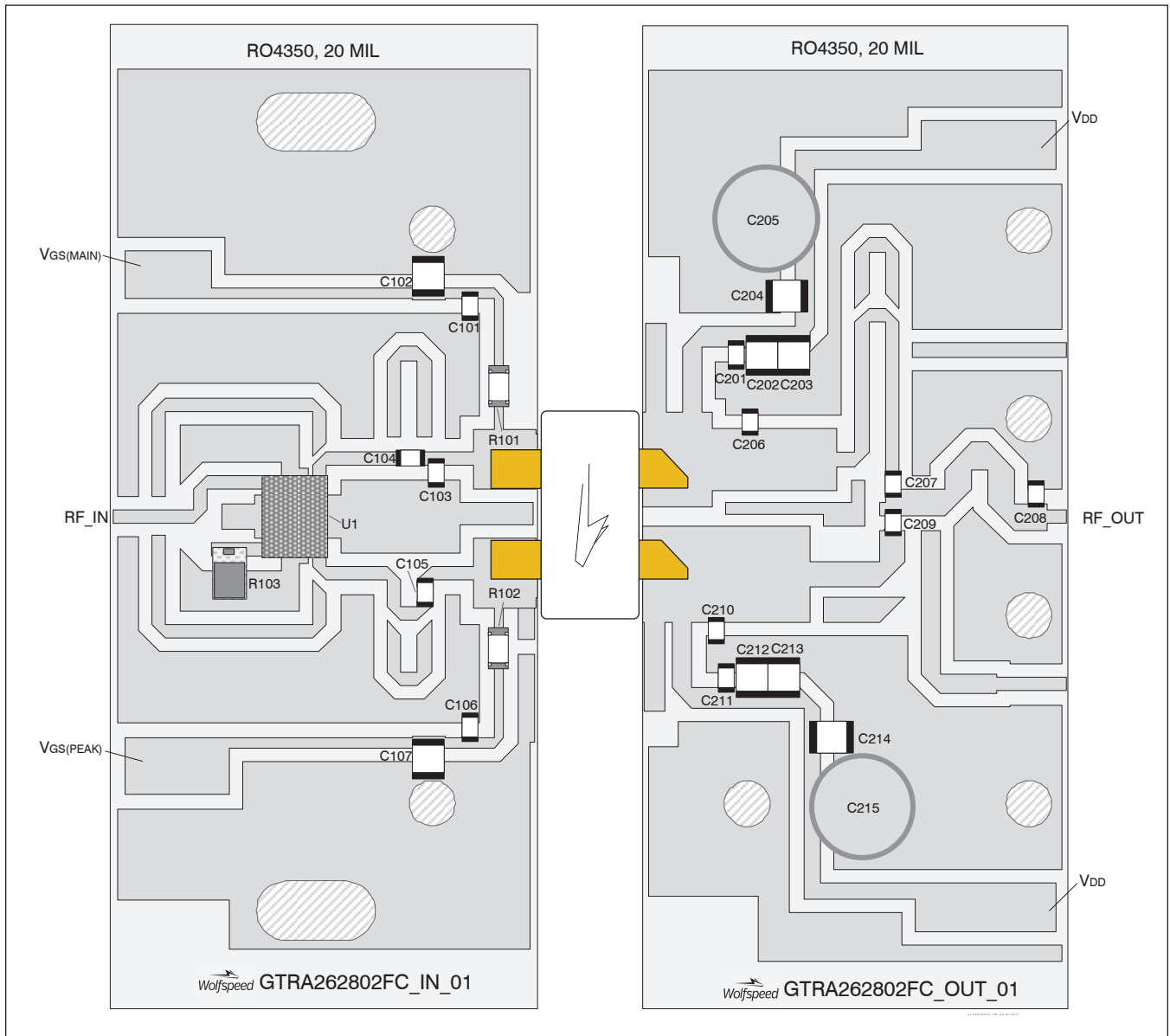
**Peak Side Load Pull Performance** – Pulsed CW signal: 16  $\mu$ s, 10% duty cycle, 48 V,  $I_{DQ}$  = 200 mA, Class AB

		P <sub>3dB</sub>									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>L</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta_D$ [%]	Z <sub>L</sub> [ $\Omega$ ]	Gain [dB]	P <sub>3dB</sub> [dBm]	P <sub>3dB</sub> [W]	$\eta_D$ [%]
2550	7.71-j18.49	4.94-j4.23	15.03	53.81	240.38	64.0	2.92-j1.60	16.74	52.20	165.84	73.7
2620	11.70-j15.12	4.83-j4.21	15.31	53.31	214.29	61.0	2.98-j1.60	16.84	51.97	157.29	71.7
2690	14.78-j11.61	4.83-j4.33	15.18	53.45	221.31	60.8	3.13-j1.73	16.72	52.14	163.64	71.6

See next page for Reference Circuit



Reference Circuit, 2575 – 2635 MHz



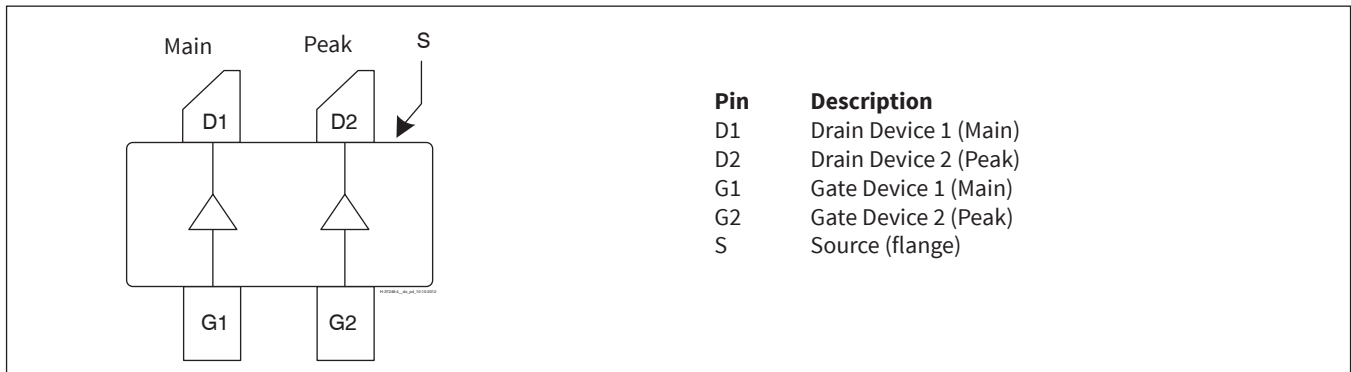
Reference circuit assembly diagram (not to scale)

**Reference Circuit** (cont.)**Reference Circuit Assembly**

DUT	GTRA262802FC V2
Test Fixture Part No.	LTA/GTRA262802FC V2
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ , $f = 2575 - 2635$ MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at <a href="http://www.wolfspeed.com/RF">http://www.wolfspeed.com/RF</a>	

**Components Information**

Component	Description	Manufacturer	P/N
<b>Input</b>			
C101, C104, C105, C106	Capacitor, 10 pF	ATC	ATC600F100JT250XT
C102, C107	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C103	Capacitor, 0.5 pF	ATC	ATC600F0R5BT250XT
R101, R102	Resistor, 20 ohms	Panasonic Electronic Components	ERJ-8GEYJ200V
R103	Resistor, 50 ohms	Richardson	C8A50Z4A
U1	Hybrid coupler	Anaren	X3C26P1-03S
<b>Output</b>			
C201, C207, C209, C211	Capacitor, 10 pF	ATC	ATC600F100JT250XT
C202, C203, C204, C212, C213, C214	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C205, C215	Capacitor, 470 $\mu$ F	Cornell Dubilier Electronics (CDE)	SEK471M050ST
C206	Capacitor, 0.8 pF	ATC	ATC600F0R8BT250XT
C208	Capacitor, 0.2 pF	ATC	ATC600F0R2BT250XT
C210	Capacitor, 0.5 pF	ATC	ATC600F0R5BT250XT

**Pinout Diagram** (top view)

Lead connections for GTRA262802FC V2

Package Outline Specifications

