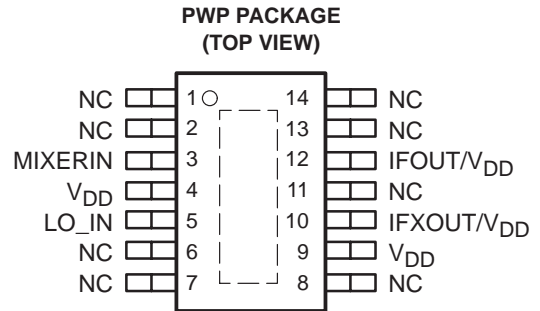


- Downconverter for 1.9-GHz CDMA Applications
- 0.5-Micron GaAs MESFET Technology
- Operates from 2.7-V to 3.3-V Supply
- High Third-Order Intercept Point Mixer
- On-Chip Buffer Amplifier to Minimize Mixer Drive Requirements
- 14-Pin Plastic Surface-Mount TSSOP PowerPAD™ (PWP)



NC – No internal connection

description

The TRF4000 personal communications system (PCS) RF downconverter is a gallium arsenide (GaAs) integrated circuit housed in a 14-pin plastic surface-mount, thin-shrink small outline package (TSSOP). It is suitable for 1.9-GHz code-division multiple-access (CDMA) applications and is composed of a local oscillator (LO) buffer amplifier, an RF preamplifier, a mixer, and a differential IF amplifier.



These devices have no built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the gates.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PowerPAD is a trademark of Texas Instruments Incorporated.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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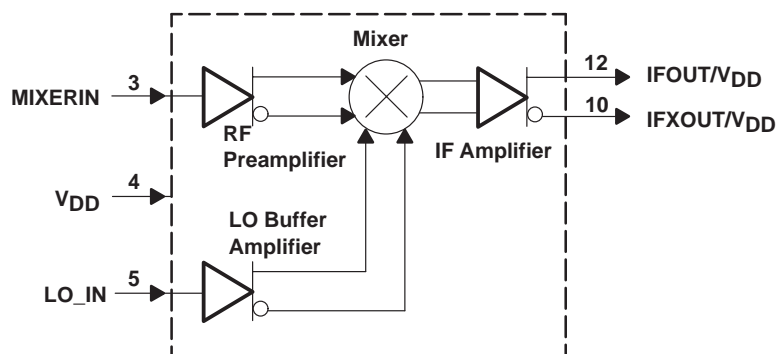
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TRF4000

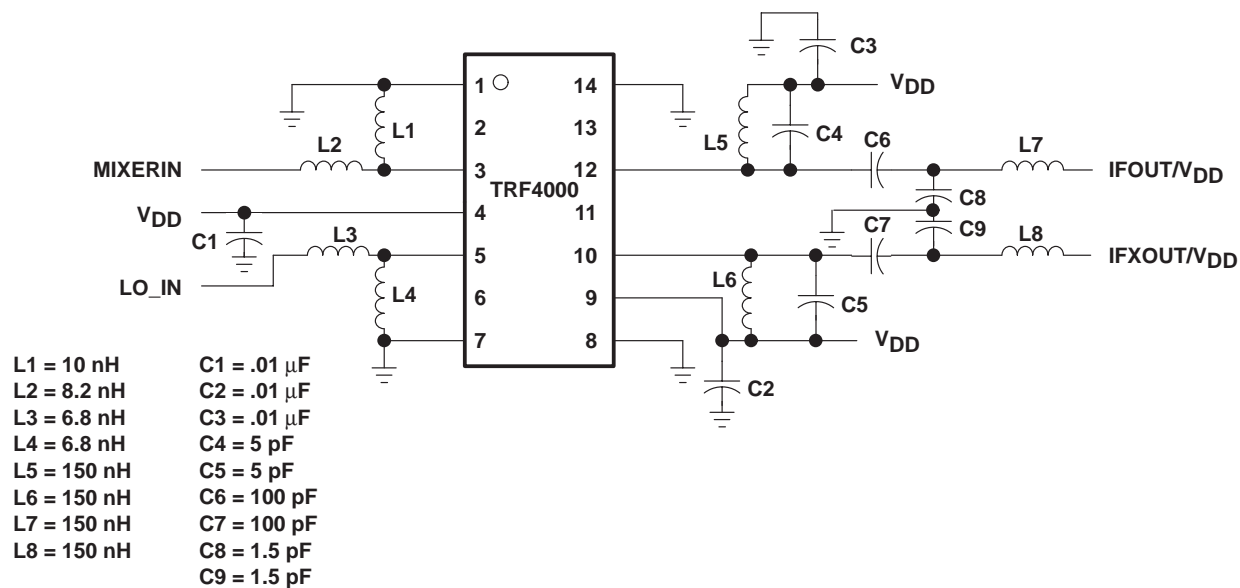
PCS RF DOWNCONVERTER

SLWS050 – MAY 1999

functional block diagram



application circuit



NOTES: A. All ports matched to 50 Ω
 B. Backside must be connected to ground.

Terminal Functions

TERMINAL NAME	NO.	I/O	DESCRIPTION
MIXERIN	3	I	Mixer input
LO_IN	5	I	Local oscillator input
IFOUT/V _{DD}	12	I/O	Intermediate frequency in-phase output (+) and connection to V _{DD}
IFXOUT/V _{DD}	10	I/O	Intermediate frequency quadrature output (–) and connection to V _{DD}
NC	1, 2, 6, 7, 8, 11, 13, 14		No internal connection
V _{DD}	4, 9	I	Supply Voltage

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage range, V _{DD}	2.7 V to 5 V
Input power, MIXERIN	0 dBm
LO_IN	5 dBm
Continuous power dissipation at or below T _A = 25°C	150 mW
Operating free-air temperature range, T _A	–30°C to 80°C

† 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 “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

	MIN	MAX	UNIT
Supply voltage, V _{DD}	2.7	3.3	V
Operating free-air temperature, T _A	–30	80	°C

TRF4000

PCS RF DOWNCONVERTER

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**electrical characteristics over recommended operating free-air temperature range,
V_{DD} = 2.7 V, f_{IF} = 185 MHz**

mixer

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
Input frequency range (MIXERIN)		1930		1990	MHz
Local oscillator frequency range (LO_IN)		2115		2175	MHz
Intermediate frequency (IFOUT, IFXOUT)			185		MHz
Gain		10.5	12	13.5	dB
Noise figure			9.7	10.7	dB
Input VSWR (MIXERIN) (see Note 1)	50 Ω			1.5:1	
Differential output impedance (IFOUT, IFXOUT)	20 mA required to achieve mixer current		330		Ω
Input 1-dB gain compression point (MIXERIN)		–11			dBm
Input third-order intercept point (MIXERIN)	f _{LO} = 2145 MHz, f _{RF} = 1960 MHz	–2.1	0.5		dBm
Input power (LO_IN)		–12.5	–10.5	–8.5	dBm
Input VSWR (LO_IN) (see Note 1)				1.7:1	

† Typical values are at T_A = 25°C.

NOTE 1: VSWR = Voltage standing wave ratio

current consumption over recommended operating free-air temperature range and V_{DD} = 2.7 V

	MIN	TYP†	MAX	UNIT
Total current consumption		30	35	mA

† Typical values are at T_A = 25°C.

APPLICATION INFORMATION

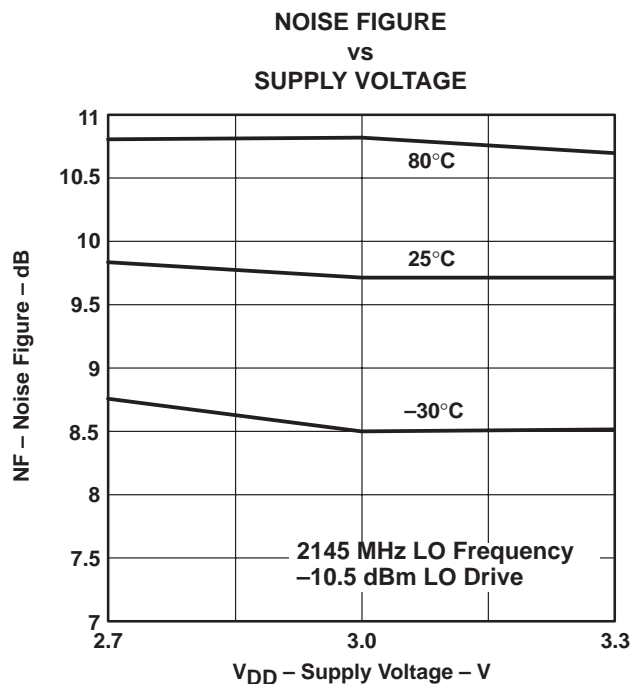


Figure 1

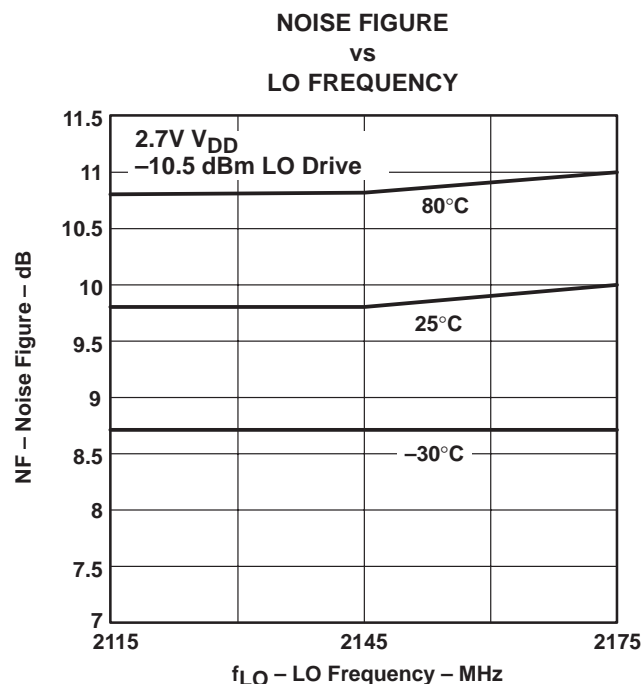


Figure 2

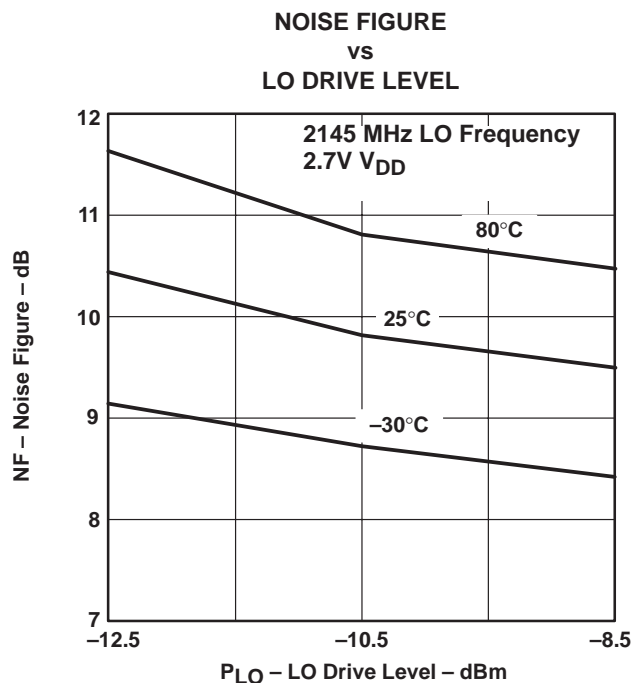


Figure 3

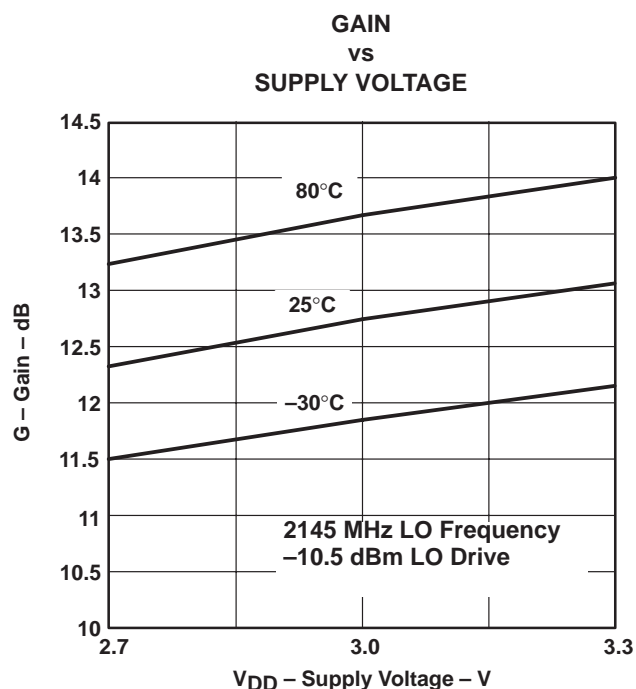


Figure 4

APPLICATION INFORMATION

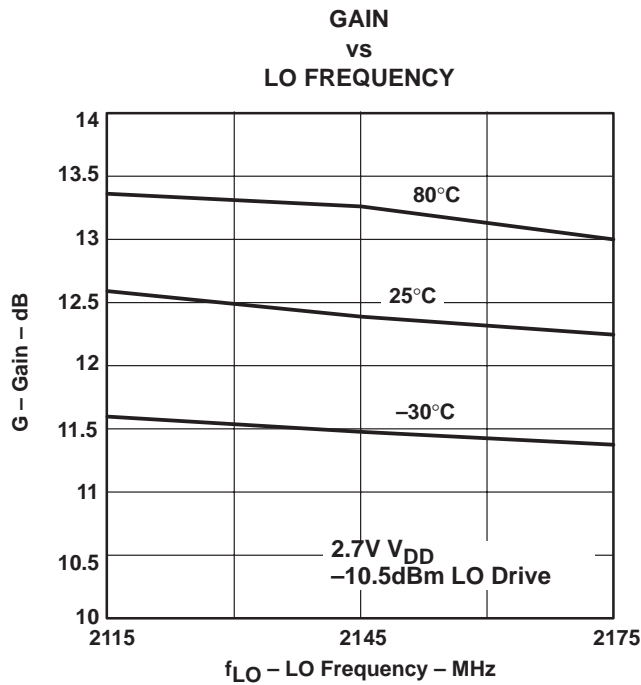


Figure 5

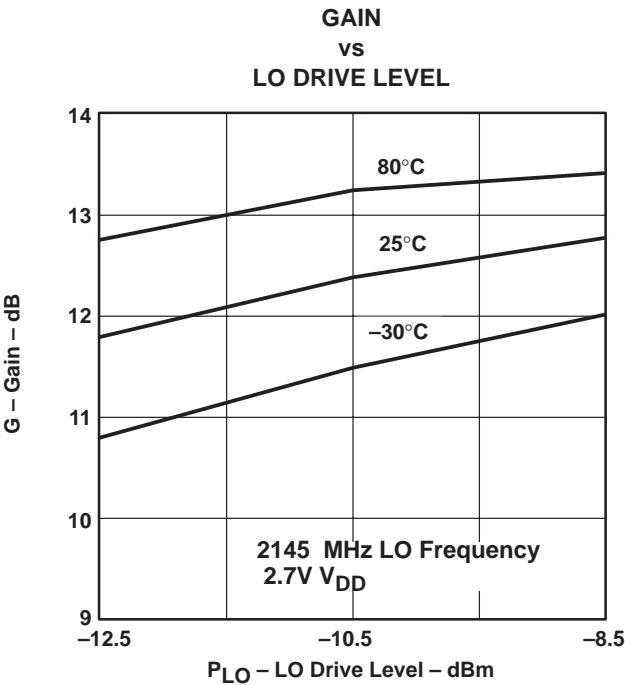


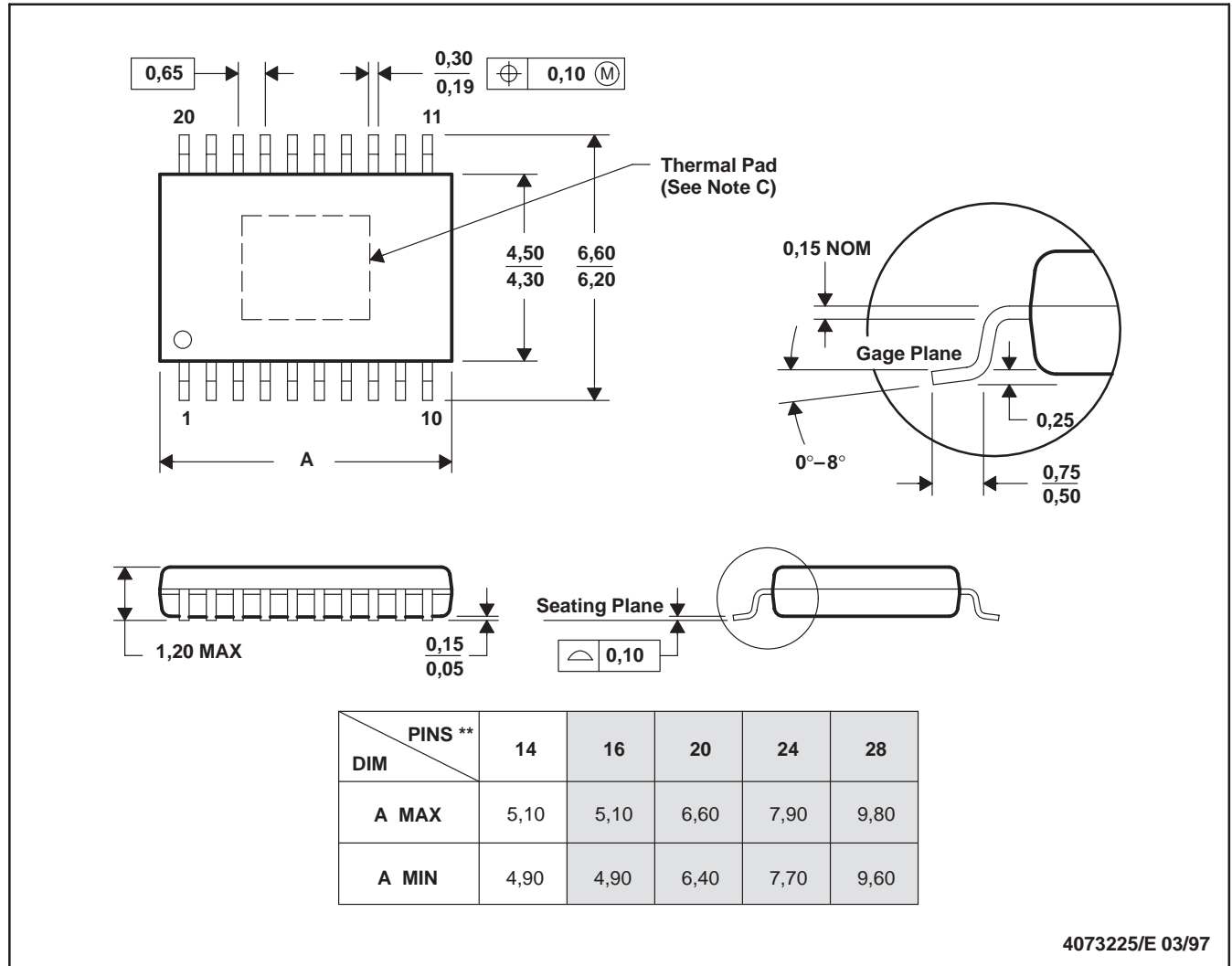
Figure 6

MECHANICAL DATA

PWP (R-PDSO-G**)

PowerPAD™ PLASTIC SMALL-OUTLINE PACKAGE

20-PIN SHOWN



- NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. The package thermal performance may be enhanced by bonding the thermal pad to an external thermal plane. This solderable pad is electrically and thermally connected to the backside of the die and possibly selected leads. The maximum pad size on the printed circuit board should be equal to the package body size – 2,0mm.

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