

TG2401F

1.9 GHz Band TX Fronted IC

PHS, Digital Cordless Telecommunication

Features

Common Block

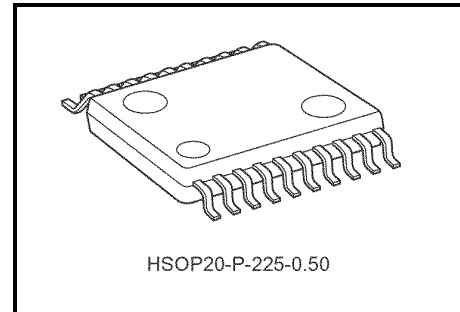
- Positive voltage operation: $V_{DD1} = V_{DD2} = 3.0\text{ V}$,
 $V_{DD3} = V_{DD4} = 3.6\text{ V}$
- Small package: HSOP20 (0.5 mm pin pitch)

Power Amp. Block

- High power Gain: $G_p = 32\text{ dB (min)}$

Antenna Switch Block

- Low insertion Loss: $L_{OSS} = 0.8\text{ dB (typ.)}$
- High isolation: $ISL = 25\text{ dB (typ.)}$



Weight: 0.058 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{DD} (Note 1)	5	V
	V_{GG} (Note 2)	4	V
	V_C (Note 3)	3.5	V
Input power	P_i	1	mW
Power dissipation	P_d (Note 4)	4	W
Operating temperature range	T_{opr} (Note 5)	-40 to 85	°C
Storage temperature range	T_{stg}	-55 to 150	°C

Note 1: $V_{DD} = V_{DD1} = V_{DD2} = V_{DD3} = V_{DD4} = V_{DD}$ (SW)

Note 2: $V_{GG} = V_{GG3} = V_{GG4}$

Note 3: $V_C = V_{C1} = V_{C2}$

Note 4: When mounted on a Teflon board (52 mm × 43 mm × 0.4 mm) that is fixed to an aluminum plate.
(Ta = 25°C)

Note 5: Not intended to guarantee the following electrical characteristics, which were measured at Ta = 25°C.

Caution

This device is electrostatic sensitivity. Please handle with caution.

Electrical Characteristics

【Power Amp, Block】

($V_{DD} = V_{DD2} = 3\text{ V}$, $V_{DD3} = V_{DD4} = 3.6\text{ V}$, $V_{GG} = (\text{Note6})$, $f = 1.893\text{ GHz}$, $T_a = 25^\circ\text{C}$, $Z_g = Z_l = 50\ \Omega$)

【ANT-SW Block】

($V_{DD}(\text{SW}) = 3\text{ V}$, $f = 1.893\text{ GHz}$, $T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Operating frequency	f	—	—	1.893	—	1.920	GHz
Supply current (PA)	I_t	—	$P_O = 20.5\text{dBmW}$, $P_i = \text{adjust}$	—	—	170	mA
Gate current (PA)	I_{GG}	—	$V_{GG} = 2\text{ V}$	—	—	2	mA
Power gain	G_p	—	$P_O = 20.5\text{dBmW}$	32	—	38	dB
Output deviation	ΔP_O	—	$f = 1.893, 1.920\text{ GHz}$, $P_i = \text{fixed}$	—	0.5	1.0	dB
Input VSWR	VSWR _{in}	—	$P_i = -30\text{dBmW}$	—	—	3.0	—
Adjacent channel leakage power ratio	ACP (1)	—	$P_O = 20.5\text{dBmW}$, $P_i = \text{adjust}$, $\Delta f = 600\text{ kHz}$	—	—	-55	dB
	ACP (2)	—	$\Delta f = 900\text{ kHz}$	—	—	-60	dB
Harmonics	2f ₀	—	$P_O = 20.5\text{dBmW}$, $P_i = \text{adjust}$	—	—	-30	dB
	3f ₀	—		—	—	-30	dB
Load mismatch	—	—	$V_{DD3, 4} = 4.2\text{ V}$, $V_{GG} = \text{adjust}$, $P_O = 20.5\text{dBmW}$, $P_i = \text{adjust}$, $Z_g = 50\ \Omega$, VSWR Load = 6:1 all phase	No degradation			—
Stability	—	—	$V_{DD3, 4} = 3.2\sim 4.2\text{ V}$, $V_{C1} = 3\text{ V}$, $V_{GG} = \text{adjust}$, $P_i = -15\text{dBmW}$ to -10dBmW , $Z_g = 50\ \Omega$, VSWR Load = 6:1 all phase	No spurious			—
Supply current (SW)	I_{DD}	TX	$V_{C1} = 3\text{ V}$, $V_{C2} = 0\text{ V}$	—	—	0.04	mA
		RX	$V_{C1} = 0\text{ V}$, $V_{C2} = 3\text{ V}$	—	—	0.04	mA
Control current (SW)	I_{rx}	TX	$V_{C1} = 3\text{ V}$, $V_{C2} = 0\text{ V}$	—	—	0.04	mA
	I_{tx}	RX	$V_{C1} = 0\text{ V}$, $V_{C2} = 3\text{ V}$	—	—	0.04	mA
Insertion Loss	Loss	RX	$V_{C1} = 0\text{ V}$, $V_{C2} = 3\text{ V}$, $P_i(\text{SW}) = 0\text{dBmW}$	—	0.8	1.0	dB
Isolation	ISL	TX	$V_{C1} = 3\text{ V}$, $V_{C2} = 0\text{ V}$, $P_O = 20.5\text{dBmW}$	20	25	—	dB
		RX	$V_{C1} = 0\text{ V}$, $V_{C2} = 3\text{ V}$, $P_i(\text{SW}) = 0\text{dBmW}$	10	15	—	dB

- (1) The P_O in this technical data includes insertion Loss for ANT-SW.
- (2) Stability's load condition is that SHORT STAB join to ANT (Pin No.11) and all phase.
- (3) All test for ELECTRICAL CHARACTERISTICS bases on measure with following "RF TES BOARD".
- (4) Control current is separated by TX and RX mode. TX control current is I_{rx} , RX control current is I_{tx} .
- (5) Operation mode

	RX Mode	TX Mode
V_{C1}	$0 \pm 0.2\text{ V}$	$3 + 0.4\text{ V}$ $3 - 0.2\text{ V}$
V_{C2}	$3 + 0.4\text{ V}$ $3 - 0.2\text{ V}$	$0 \pm 0.2\text{ V}$

$V_{DD}(\text{SW}) = 3 \pm 0.05\text{ V}$

- (6) Input signal is modulated to $\pi/4\text{QPSK}$ ($\alpha = 0.5$). Bit rate is 384 kbps.
- (7) 1/2 duty operation.

Note 6: Classify V_{GG} Rank

Rank	V _{GG} Condition
000	0 V
010	1 V
020	2 V
030	2.8 V

Rank Indication

Example) 0 1 0

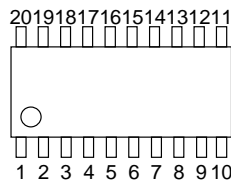
V_{GG} input voltage rank: 1.0 V

Classify customer: standard products 0

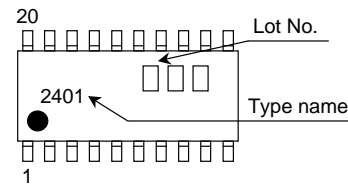
Satisfy ELECTRICAL CHARACTERISTICS by V_g Condition on each rank.

The rank division is performed for every reel and can't order to choose any rank.

Pin Assignment (top view)

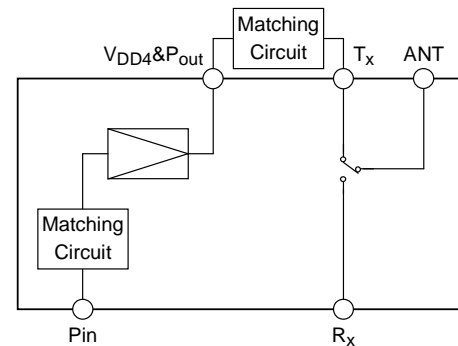


Marking

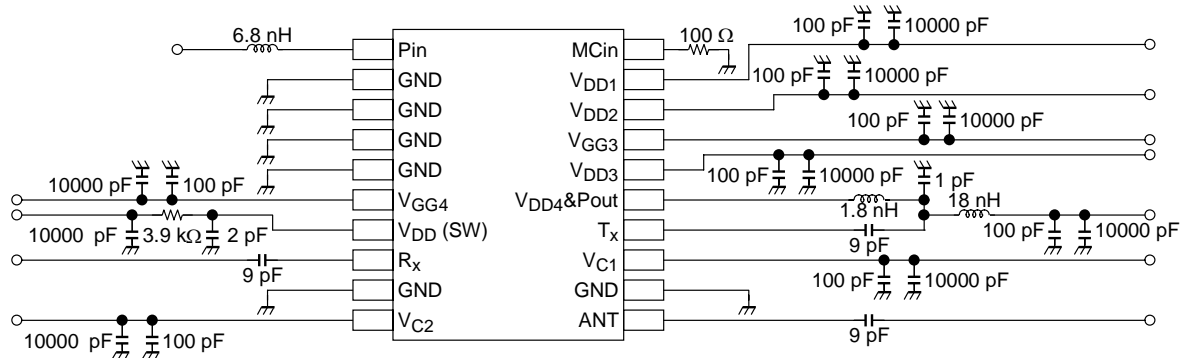


Pin No.	Assign	Pin No.	Assign
1	Pin	11	ANT
2	GND	12	GND
3	GND	13	V _{C1}
4	GND	14	T _x
5	GND	15	V _{DD4} &P _{out}
6	V _{GG4}	16	V _{DD3}
7	V _{DD} (SW)	17	V _{GG3}
8	R _x	18	V _{DD2}
9	GND	19	V _{DD1}
10	V _{C2}	20	MCin

Equivalent Circuit



Test Circuit



Caution

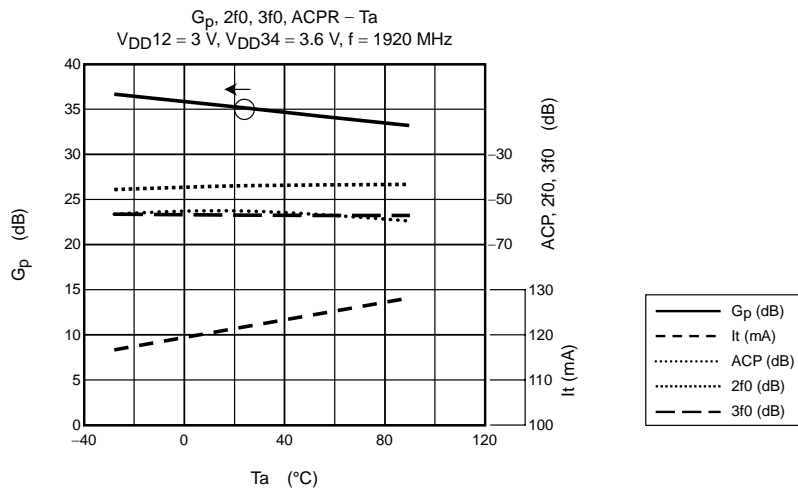
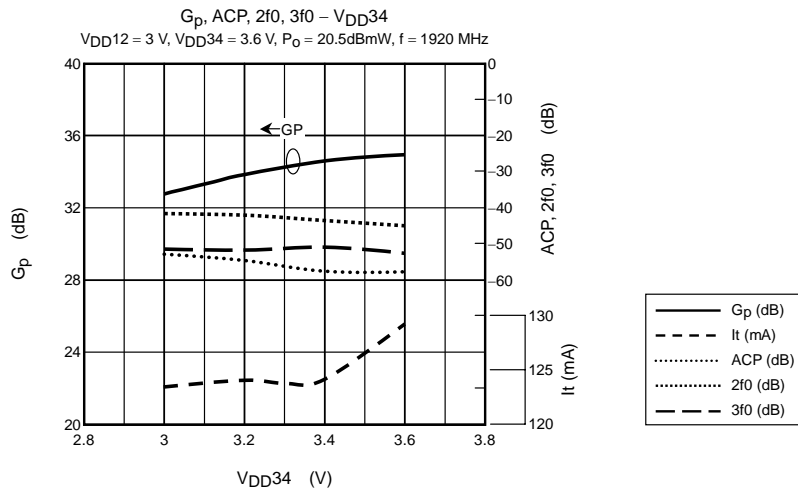
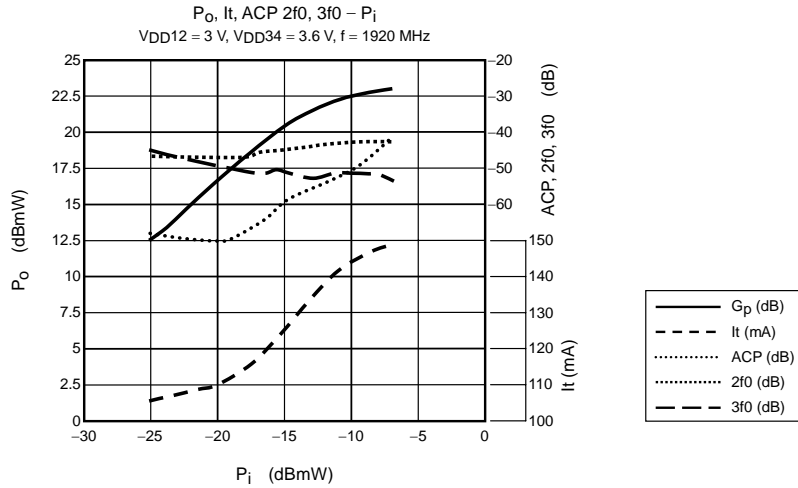
The circuits and measurements contained in this document are given only in the context of as examples of applications for these products.

Moreover, these example application circuits are not intended for mass production, since the high-frequency characteristics (the AC characteristics) of these devices will be affected by the external components which the customer uses, by the design of the circuit and by various other conditions.

It is the responsibility of the customer to design external circuits which correctly implement the intended application, and to check the characteristics of the design.

TOSHIBA assume no responsibility for the integrity of customer circuit designs or applications.

Curve Data

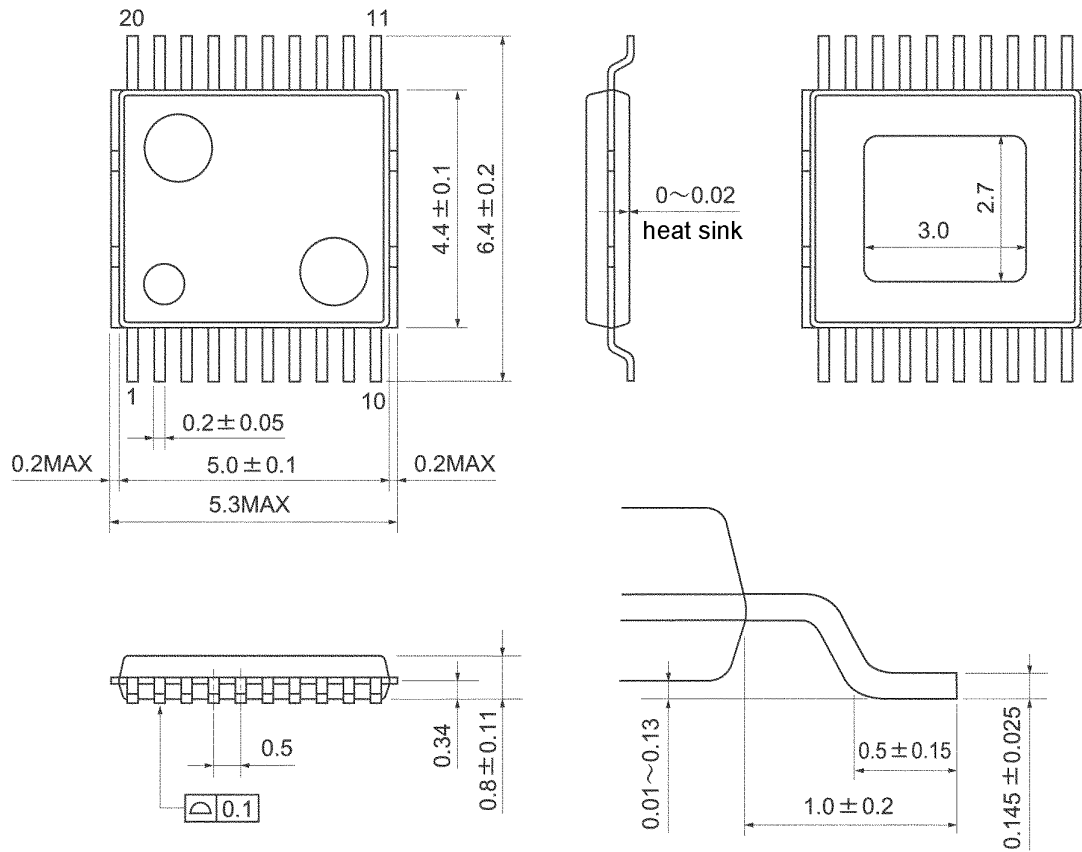


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Package Dimensions

HSOP20-P-225-0.50

Unit: mm



Weight: 0.058 g (typ.)

RESTRICTIONS ON PRODUCT USE

020704EAC

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