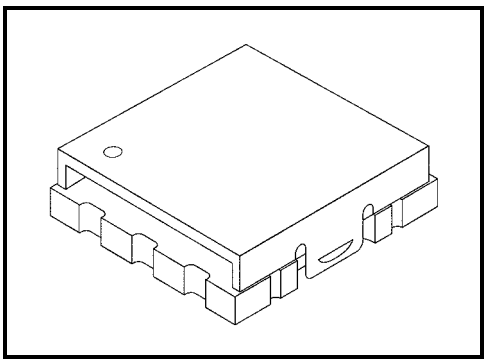
TOSHIBA RF Power Amplifier Module

S-AU84

Power Amplifier Module for Japan cdmaOne

Features

- High output power : Po = 27.5 dBmW (min)
- Low operating current : I_{CC} = 415 mA (typ.)
  @Po = 27.5 dBmW V_{CC} = 3.5 V
  1X modulation
  : I_{CC} = 140 mA (typ.)
  @Po = 17.0 dBmW V_{CC} = 1.3 V
  1X modulation
- Low idle current : I_{CC} (idle) = 52 mA (typ.)
  @V_{CC} = 3.5 V, VDC = 3.6 V,
  Vcon = 2.8 V
- Low leakage current : I_{CC} (leak) = 10 μA (max)
  @V_{CC} = 3.5 V, VDC = 3.6 V, Vcon = 0 V
- Low-voltage operation : Operation at V_{CC} = 1.3 V is possible.
  @Po = 17.0 dBmW
- Compact package : 6.0 mm × 6.0 mm × 1.55 mm (5-6B package)



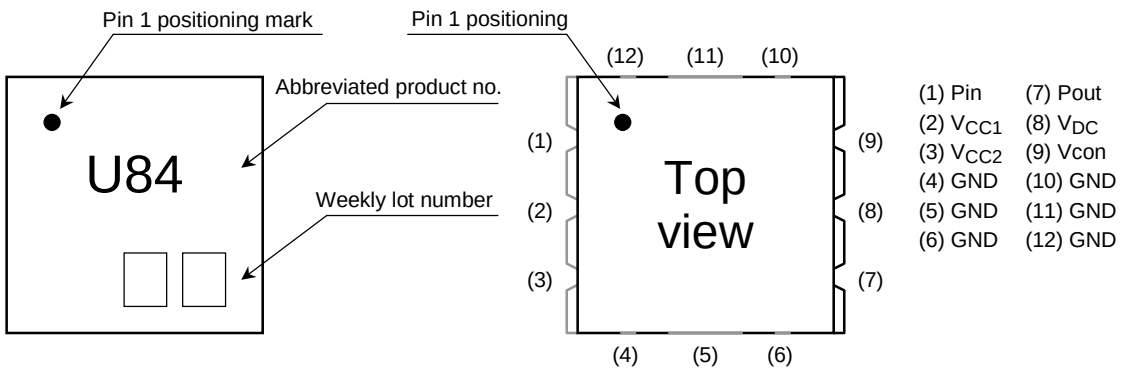
Weight: 0.12 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage 1	V_{CC1}	6	V
Supply voltage 2	V_{CC2}	6	V
Bias circuit voltage	VDC	6	V
Control voltage	Vcon	4	V
Collector current	I_{CC}	1	A
Power dissipation	P_D (Note)	2	W
Operating temperature	T_{op}	−20 to +85	°C
Storage temperature range	T_{stg}	−40 to +125	°C

Note: Ta = 25°C

Marking and Pin Assignment



Electrical Characteristics 1 (1X modulation, f = 887-925 MHz, Tc = 25°C, Zg = Zl = 50 Ω)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector idle current	I_{CC} (idle)	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Pi = no input	—	52	75	mA
Bias circuit current	IDC (idle)		—	0.5	2.0	mA
Control current	Icon (idle)		—	2.5	4.0	mA
Leakage current	I_{CC} (leak)	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 0 V, Pi = no input	—	—	10	μA
	IDC (leak)		—	—	10	μA
Output power 1	Po1	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Pi = adjust	27.5	28.0	—	dBmW
Power gain 1	Gp1	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW	25.0	27.5	—	dB
Collector current 1	I_{CC1}		—	415	440	mA
Bias circuit current 1	IDC1		—	2.5	4.0	mA
Control current 1	Icon1		—	3.5	5.0	mA
Input VSWR 1	VSWRin1		—	2.0	3.5	—
Receiving band noise 1	NRB1		—	−139	−137	dBmW/Hz
2nd harmonics 1	2fo1		—	−35	−30	dBc
3rd harmonics 1	3fo1		—	−45	−40	dBc
Out-of-band noise 1	N-3MHz1	fo = 888 MHz	—	−45	−40	dBmW
Adjacent-channel leakage power ratio 1	ACPR1	Δf = ±900 kHz (Note 2)	—	−49	−46	dBc
Adjacent-channel leakage power ratio 2	ACPR2	Δf = ±1.98 MHz (Note 2)	—	−59	−56	dBc
Adjacent-channel leakage power ratio 3	ACPR3	Δf = ±900 kHz (Note 2), V_{CC1} = V_{CC2} = 3.3 V, VDC = 3.3 V, Vcon = 2.8 V, Po = 26.5 dBmW	—	−50	−46	dBc
Adjacent-channel leakage power ratio 4	ACPR4	Δf = ±1.98 MHz (Note 2)	—	−62	−58	dBc
Stability 1	SPR1	V_{CC1} = V_{CC2} = 1.0 V to 4.2 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW, ZG = 50 Ω, Load VSWR = 5:1 all phase, Ta = −20°C to 85°C	—	—	−55	dBc
Load mismatch 1	—	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 0-27.5 dBmW, Pi = adjust, ZG = 50 Ω, VSWR LOAD 7:1 all phase	No degradation			—
Power gain 2	Gp2	V_{CC1} = V_{CC2} = 1.3 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 17.0 dBmW	22.0	25.5	28.0	dB
Collector current 2	I_{CC2}		—	140	160	mA
Bias circuit current 2	IDC2		—	0.8	2.5	mA
Control current 2	Icon2		—	2.5	4.0	mA
Adjacent-channel leakage power ratio 5	ACPR5	Δf = ±900 kHz (Note 2)	—	−50	−46	dBc
Adjacent-channel leakage power ratio 6	ACPR6	Δf = ±1.98 MHz (Note 2)	—	−64	−58	dBc

Caution: The RF power amplifier is sensitive to electrostatic discharge. When handling this product, ensure that the environment is protected against electrostatic discharge by using an earth strap, a conductive mat and an ionizer.

Electrical Characteristics 2 (IS-95 modulation, f = 887-925 MHz, Tc = 25°C, Zg = Zl = 50 Ω)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output power 2	Po2	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Pi = adjust	27.5	28.0	—	dBmW
Power gain 3	Gp3	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW	25.0	27.5	—	dB
Collector current 3	I_{CC3}		—	435	460	mA
Bias circuit current 3	IDC3		—	2.5	4.0	mA
Control current 3	Icon3		—	3.5	5.0	mA
Input VSWR 2	VSWRin2		—	2.0	3.5	—
Receiving band noise 2	NRB2		—	−138	−136	dBmW/Hz
2nd harmonics 2	2fo2		—	−35	−30	dBc
3rd harmonics 2	3fo2		—	−45	−40	dBc
Out-of-band noise 2	N-3MHz2	fo = 888 MHz	—	−44	−40	dBmW
Adjacent-channel leakage power ratio 7	ACPR7	Δf = ±900 kHz (Note 2)	—	−55	−50	dBc
Adjacent-channel leakage power ratio 8	ACPR8	Δf = ±1.98 MHz (Note 2)	—	−58	−55	dBc
Adjacent-channel leakage power ratio 9	ACPR9	Δf = ±900 kHz (Note 2); V_{CC1} = V_{CC2} = 3.3 V, VDC = 3.3 V, Vcon = 2.8 V, Po = 26.5 dBmW	—	−50	−46	dBc
Adjacent-channel leakage power ratio 10	ACPR10	Δf = ±1.98 MHz (Note 2); V_{CC1} = V_{CC2} = 3.3 V, VDC = 3.3 V, Vcon = 2.8 V, Po = 26.5 dBmW	—	−60	−56	dBc
Stability 2	SPR2	V_{CC1} = V_{CC2} = 1.0 V to 4.2 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW, ZG = 50 Ω, Load VSWR = 5:1 all phase, Ta = −20°C to 85°C	—	—	−55	dBc
Load mismatch 2	—	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 0-27.5 dBmW, Pi = adjust, ZG = 50 Ω, VSWR LOAD 7:1 all phase	No degradation			—
Power gain 4	Gp4	V_{CC1} = V_{CC2} = 1.3 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 17.0 dBmW	22.0	25.0	28.0	dB
Collector current 4	I_{CC4}		—	145	165	mA
Bias circuit current 4	IDC4		—	0.8	2.5	mA
Control current 4	Icon4		—	2.5	4.0	mA
Adjacent-channel leakage power ratio 11	ACPR11	Δf = ±900 kHz (Note 2)	—	−50	−46	dBc
Adjacent-channel leakage power ratio 12	ACPR12	Δf = ±1.98 MHz (Note 2)	—	−64	−58	dBc

Note1: I_{CC} = Current of a V_{CC1} terminal + current of a V_{CC2} terminal

Note2: ACPR

a) Pc (1.23 MHz) is average power measured for 1.23 MHz bandwidth with carrier frequency.

b) P (30 kHz) is average power measured for 30 kHz bandwidth with 900 kHz/1.98 MHz offset.

c) ACPR1 (or ACPR2) = P (30 kHz) − P_c (1.23 MHz) dB

Note3: These electrical characteristics are measured using Toshiba standard test board in Toshiba standard measurement system.

Electrical Characteristics 3
(1X modulation, f = 887-925 MHz, Tc = –20~85°C, Zg = Zl = 50 Ω)

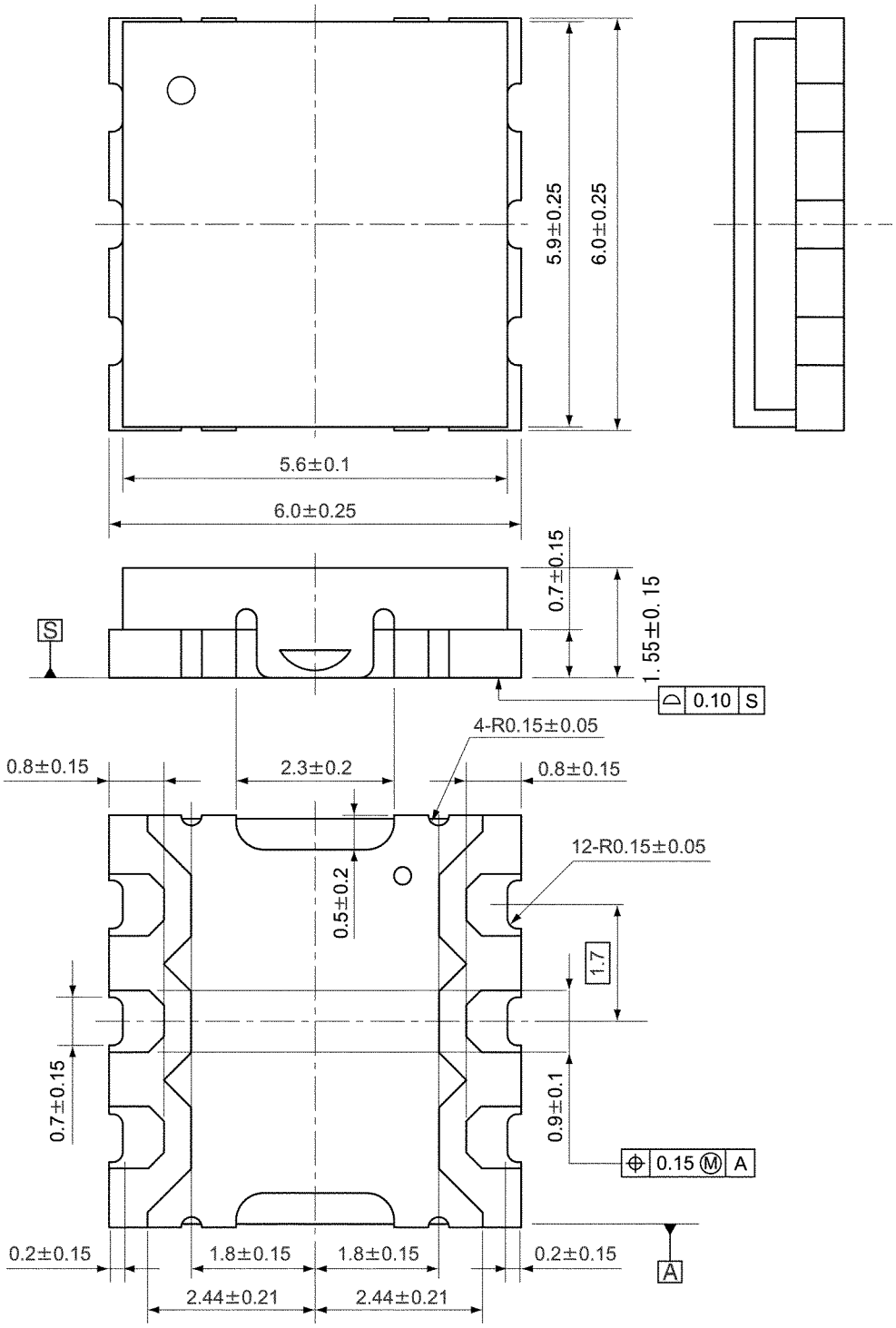
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Power gain 5	Gp5	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW	23.5	—	—	dB
Adjacent-channel power ratio 13	ACPR13	Δf = ±900 kHz (Note 2)	—	—	–45	dBc
Adjacent-channel power ratio 14	ACPR14	Δf = ±1.98 MHz (Note 2)	—	—	–54	dBc

Electrical Characteristics 4
(IS-95 modulation, f = 887-925 MHz, Tc = –20~85°C, Zg = Zl = 50 Ω)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Power gain 6	Gp6	V_{CC1} = V_{CC2} = 3.5 V, VDC = 3.6 V, Vcon = 2.8 V, Po = 27.5 dBmW	23.5	—	—	dB
Adjacent-channel power ratio 15	ACPR15	Δf = ±900 kHz (Note 2)	—	—	–48	dBc
Adjacent-channel power ratio 16	ACPR16	Δf = ±1.98 MHz (Note 2)	—	—	–54	dBc

Package Dimensions

Unit: mm



Weight: 0.12 g (typ.)

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