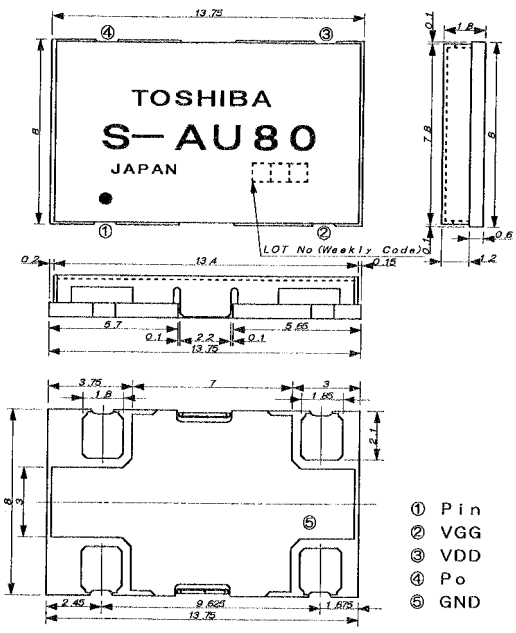
TOSHIBA RF Power Amplifire Module

S - A U 8 0

900 MHz Band Amplifier Applications (GSM)

Unit: mm

- Output Power: P_o = 35.0 dBmW (typ.)
- Power Gain: G_p = 35.0 dB (typ.)
- Total Efficiency: ηT = 43% (typ.)



JEDEC	—
EIAJ	—
TOSHIBA	5-14A

Maximum Ratings (Ta = 25°C)

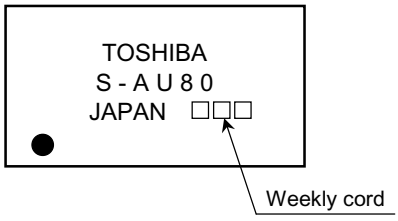
Characteristic	Symbol	Rating	Unit
DC Supply Voltage	V_{DD}	8 (Note1)	V
DC Supply Voltage	V_{GG}	5 (Note2)	V
DC Current	I_{DD}	5	A
Input Power	P_i	6	dBmW
Output Power	P_o	36 (Note3)	dBmW
Operating Case Temperature Range	$T_{c\ (opr)}$	−30~85	°C
Storage Temperature Range	T_{stg}	−40~110	°C

Note1: This value is specified at no operation (V_{GG} = 0 V, P_i = none)

Note2: This value is specified at no operation (V_{DD} = 0 V, P_i = none)

Note3: This value is specified at no 50 Ω load operation

Type Name



961001EAA1

Electrical Characteristics (Ta = 25°C)

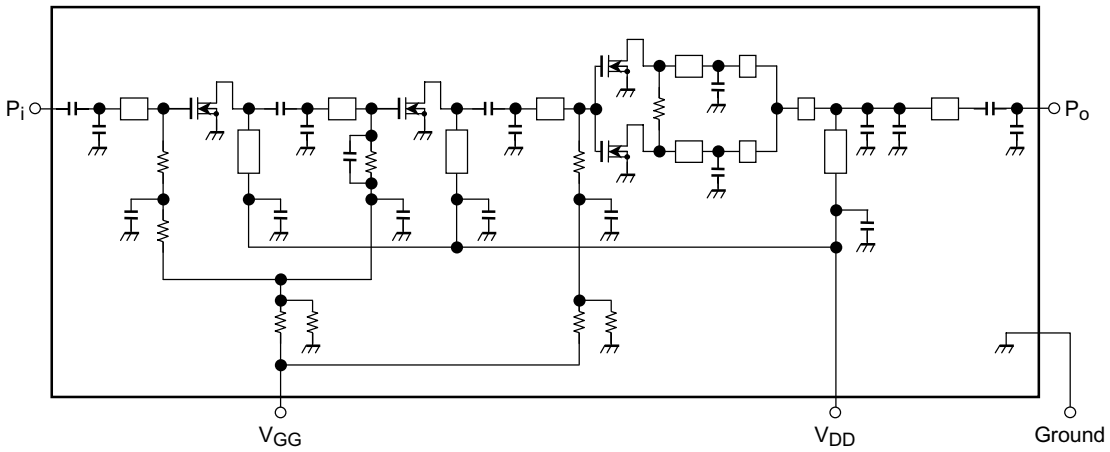
Characteristic	Symbol	Test Condition		Min	Typ.	Max	Unit
Frequency range	f_{range}	—		880	—	915	MHz
Leakage current	I_{leak}	V_{DD} = 6.0, V_{GG} = 0 V		—	500	—	μA
Output power	P_o	P_i = 0 dBmW, V_{DD} = 3.6 V, $V_{GG} \leqq$ 2.5 V $Z_G = Z_L$ = 50 Ω		34.5	35.0	—	dBmW
Power gain	G_p			34.5	35.0	—	dB
Total efficiency (Note4)	Eff	P_i = 0 dBmW, V_{DD} = 3.6 V, $V_{GG} \leqq$ 2.5 V P_o = 34.5 dBmW, $Z_G = Z_L$ = 50 Ω		37	43	—	%
Input VSWR	VSWR	P_i = 0 dBmW, V_{DD} = 3.6 V, $V_{GG} \leqq$ 2.5 V P_o = 34.5 dBmW, $Z_G = Z_L$ = 50 Ω		—	—	3.0	—
Control current	I_{cont}			—	0.5	1.0	mA
2nd harmonics	2^{nd} HRM			—	–45	–35	dB
3rd harmonics	3^{rd} HRM			—	–50	–40	dB
Low voltage power	P_o-L	P_i = 0 dBmW, V_{DD} = 3.2 V, $V_{GG} \leqq$ 2.5 V $Z_G = Z_L$ = 50 Ω, T_c = 85°C		33.5	34.0	—	dBmW
Isolation	P_o-iso	P_i = 0 dBmW, V_{DD} = 3.6 V, V_{GG} = 0.3 V $Z_G = Z_L$ = 50 Ω		—	–40	–37	dBmW
AM-AM conversion	AM_{con}	P_{i1} = 0 dBmW, P_{i2} = –40 dBmW $P_{in2} = P_{i1}$ + 200 kHz, V_{DD} = 3.6 V P_o = 7~34.5 dBmW (V_{GG} = adjust) $Z_G = Z_L$ = 50 Ω	f0 – 200 kHz	—	–30	—	dB
			f0 + 200 kHz	—	–30	—	dB
Switching time (Note5)	t_r/t_f	V_{DD} = 3.6 V P_o = 0~34.5 dBmW (V_{GG} = adjust) P_i = 0 dBmW, $Z_G = Z_L$ = 50 Ω		—	1.0	—	μs
Noise Power	NRB	f0 = 915 MHz, P_{in} = 0 dBmW P_o = 34.5 dBmW, RBW = 100 kHz V_{DD} = 3.6 V, V_{GG} = adjust	f0 + 20 MHz	—	–82	—	dBmW
			f0 + 10 MHz	—	–78	—	dBmW
Load Mismatch	—	P_i = 0 dBmW, V_{DD} = 3.2~4.3 V $P_o \leqq$ 34.5 dBmW (V_{GG} = adjust), Z_G = 50 Ω VSWR LOAD 6:1 ALL PHASE		No degradation			—
Stability	—	P_i = 0 dBmW, V_{DD} = 3.2~4.3 V V_{GG} = 0~2.5 V, Z_G = 50 Ω $P_o \leqq$ 34.5 dBmW (@Z_L = 50 Ω) VSWR LOAD 6:1 ALL PHASE		All spurious output than 60 dB below desired signal			—

Note4: Output power P_o is defined at the root point of the module output pin P_o.
The coefficient of output power loss in the P.C.B. output is showed as follows:
1/(S21)^2 = 1/(0.9809)^2 = 1.04

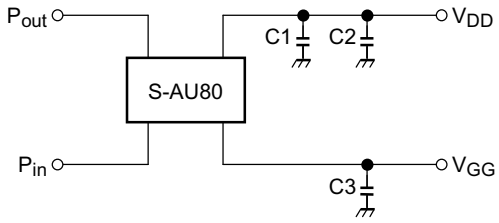
Note5: GSM pulse is applied to V_{GG} (1/8 duty 575 μs)

*: This transistor is the electrostatic sensitive device. Please handle with caution.

Schematic

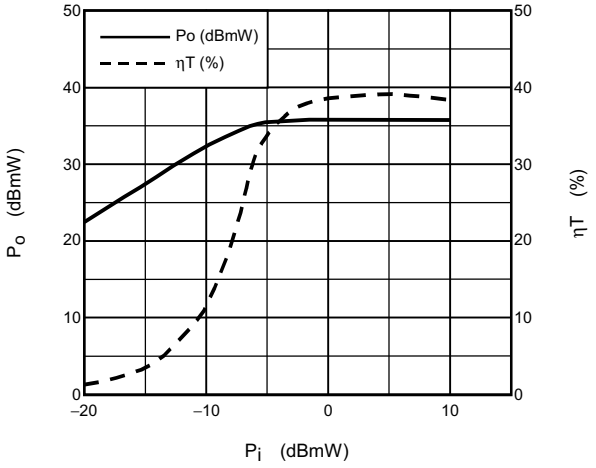


Test Circuit

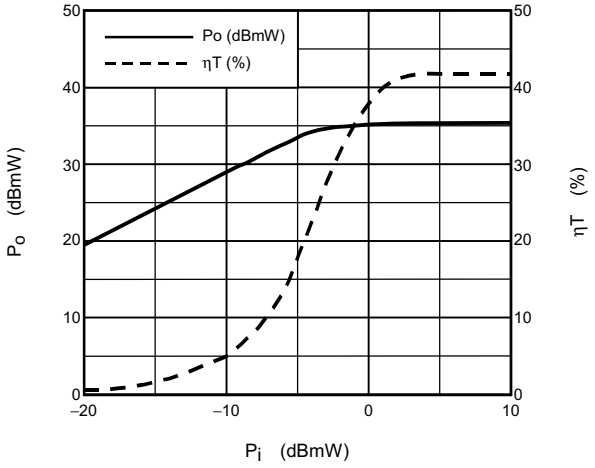


C1: 10000 pF
C2: 10 µF
C3: 100 pF

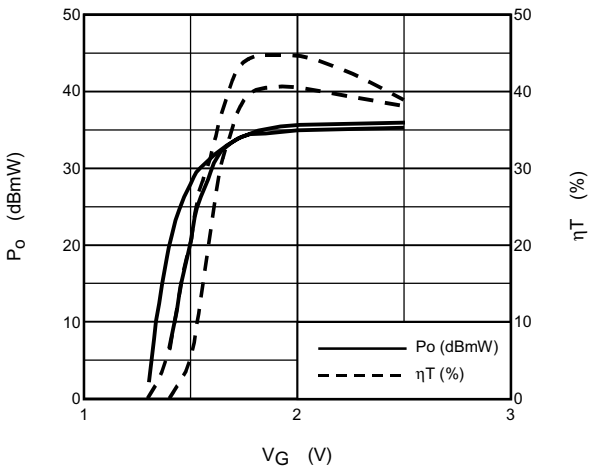
$P_i - P_o$ (f = 880 MHz, T_c = 25°C)



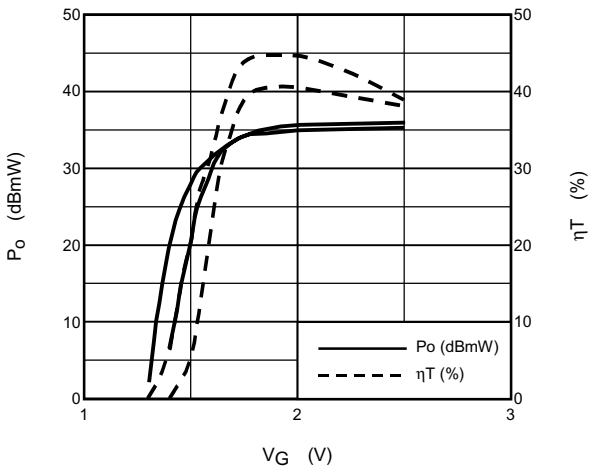
$P_i - P_o$ (f = 915 MHz, T_c = 25°C)



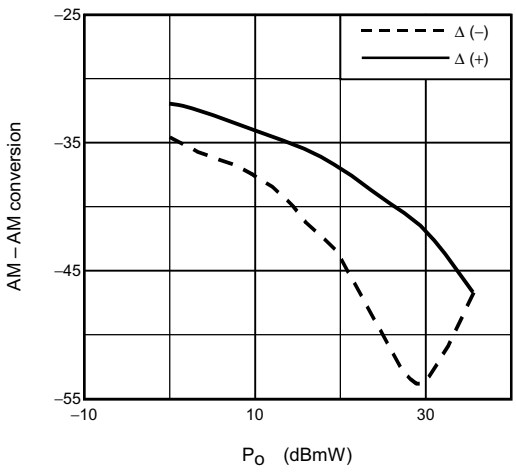
$V_G - P_o$ (f = 880 MHz, T_c = 25°C)



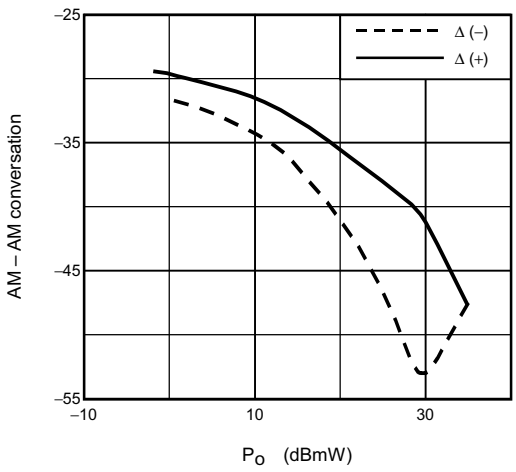
$V_G - P_o$ (f = 915 MHz, T_c = 25°C)



AM – AM conversion (f = 880 MHz)



AM – AM conversion (f = 915 MHz)



*: These are only typical curves and devices are not necessarily guaranteed at these curves.