

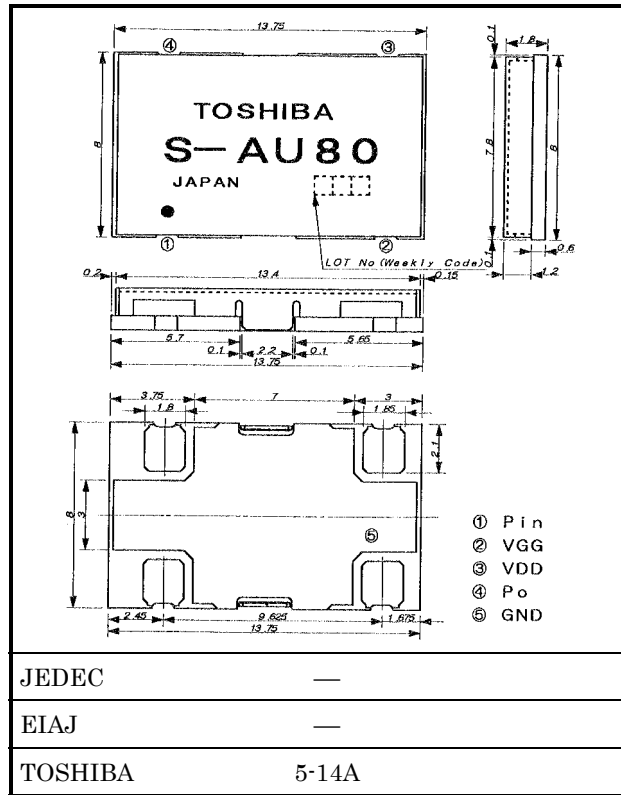
TOSHIBA RF Power Amplifier Module

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: $\eta_T = 43\%$ (typ.)



Maximum Ratings (Ta = 25°C)

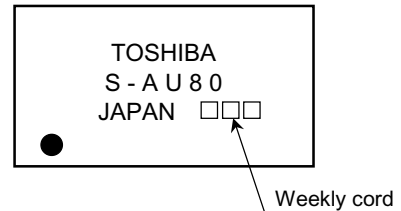
Characteristic	Symbol	Rating	Unit
DC Supply Voltage	V _{DD}	8 (Note1)	V
DC Supply Voltage	V _{GG}	5 (Note2)	V
DC Current	I _{DD}	5	A
Input Power	P _i	6	dBmW
Output Power	P _o	36 (Note3)	dBmW
Operating Case Temperature Range	T _{c (opr)}	-30~85	°C
Storage Temperature Range	T _{stg}	-40~110	°C

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

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Electrical Characteristics (Ta = 25°C)

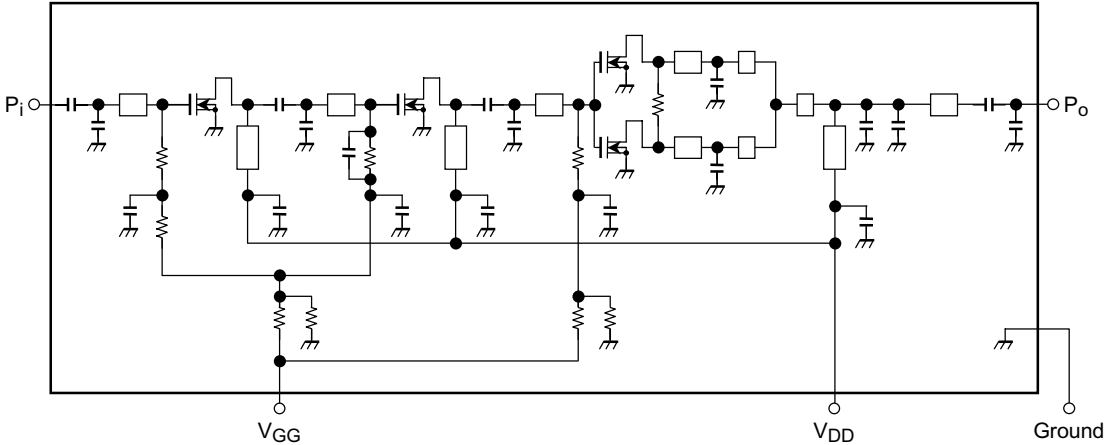
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Frequency range	f_{range}	—	880	—	915	MHz	
Leakage current	I_{leak}	$V_{\text{DD}} = 6.0, V_{\text{GG}} = 0 \text{ V}$	—	500	—	μA	
Output power	P_{o}	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.6 \text{ V}, V_{\text{GG}} \leq 2.5 \text{ V}$	34.5	35.0	—	dBmW	
Power gain	G_{p}	$Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	34.5	35.0	—	dB	
Total efficiency (Note4)	Eff	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.6 \text{ V}, V_{\text{GG}} \leq 2.5 \text{ V}$ $P_{\text{o}} = 34.5 \text{ dBmW}, Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	37	43	—	%	
Input VSWR	VSWR		—	—	3.0	—	
Control current	I_{cont}	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.6 \text{ V}, V_{\text{GG}} \leq 2.5 \text{ V}$	—	0.5	1.0	mA	
2nd harmonics	2 nd HRM	$P_{\text{o}} = 34.5 \text{ dBmW}, Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	—	-45	-35	dB	
3rd harmonics	3 rd HRM		—	-50	-40	dB	
Low voltage power	$P_{\text{o-L}}$	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.2 \text{ V}, V_{\text{GG}} \leq 2.5 \text{ V}$ $Z_{\text{G}} = Z_{\text{L}} = 50 \Omega, T_{\text{c}} = 85^{\circ}\text{C}$	33.5	34.0	—	dBmW	
Isolation	$P_{\text{o-iso}}$	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.6 \text{ V}, V_{\text{GG}} = 0.3 \text{ V}$ $Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	—	-40	-37	dBmW	
AM-AM conversion	AM _{con}	$P_{\text{i}1} = 0 \text{ dBmW}, P_{\text{i}2} = -40 \text{ dBmW}$ $P_{\text{in}2} = P_{\text{i}1} + 200 \text{ kHz}, V_{\text{DD}} = 3.6 \text{ V}$ $P_{\text{o}} = 7 \sim 34.5 \text{ dBmW} (V_{\text{GG}} = \text{adjust})$ $Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	$f_0 - 200 \text{ kHz}$	—	-30	—	dB
			$f_0 + 200 \text{ kHz}$	—	-30	—	dB
Switching time (Note5)	$t_{\text{r}}/t_{\text{f}}$	$V_{\text{DD}} = 3.6 \text{ V}$ $P_{\text{o}} = 0 \sim 34.5 \text{ dBmW} (V_{\text{GG}} = \text{adjust})$ $P_{\text{i}} = 0 \text{ dBmW}, Z_{\text{G}} = Z_{\text{L}} = 50 \Omega$	—	1.0	—	μs	
Noise Power	NRB	$f_0 = 915 \text{ MHz}, P_{\text{in}} = 0 \text{ dBmW}$ $P_{\text{o}} = 34.5 \text{ dBmW}, \text{RBW} = 100 \text{ kHz}$ $V_{\text{DD}} = 3.6 \text{ V}, V_{\text{GG}} = \text{adjust}$	$f_0 + 20 \text{ MHz}$	—	-82	—	dBmW
			$f_0 + 10 \text{ MHz}$	—	-78	—	dBmW
Load Mismatch	—	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.2 \sim 4.3 \text{ V}$ $P_{\text{o}} \leq 34.5 \text{ dBmW} (V_{\text{GG}} = \text{adjust}), Z_{\text{G}} = 50 \Omega$ VSWR LOAD 6:1 ALL PHASE	No degradation			—	
Stability	—	$P_{\text{i}} = 0 \text{ dBmW}, V_{\text{DD}} = 3.2 \sim 4.3 \text{ V}$ $V_{\text{GG}} = 0 \sim 2.5 \text{ V}, Z_{\text{G}} = 50 \Omega$ $P_{\text{o}} \leq 34.5 \text{ dBmW} (@Z_{\text{L}} = 50 \Omega)$ 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:
 $1/(S21)^2 = 1/(0.9809)^2 = 1.04$

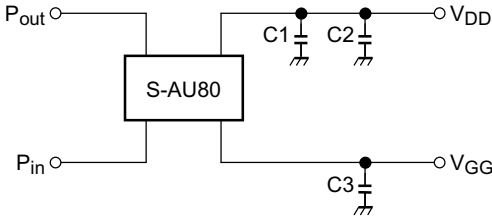
Note5: GSM pulse is applied to V_{GG} (1/8 duty 575 μs)

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

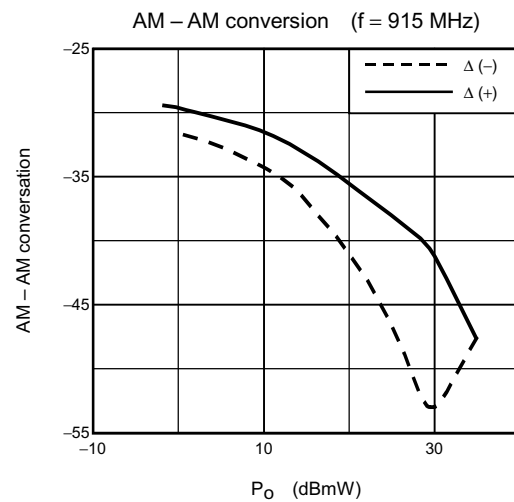
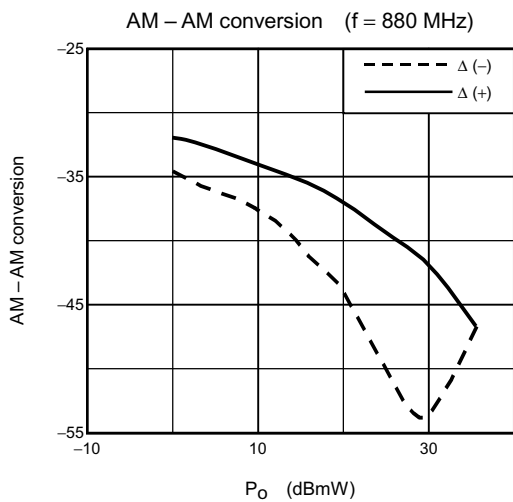
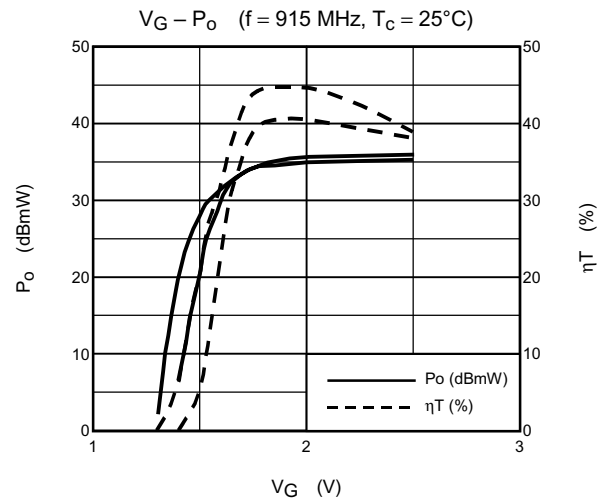
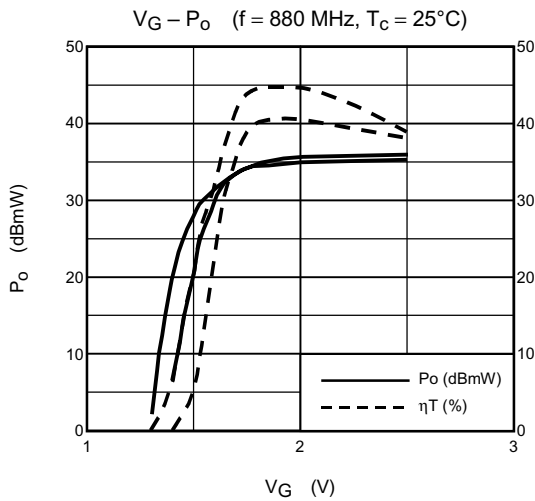
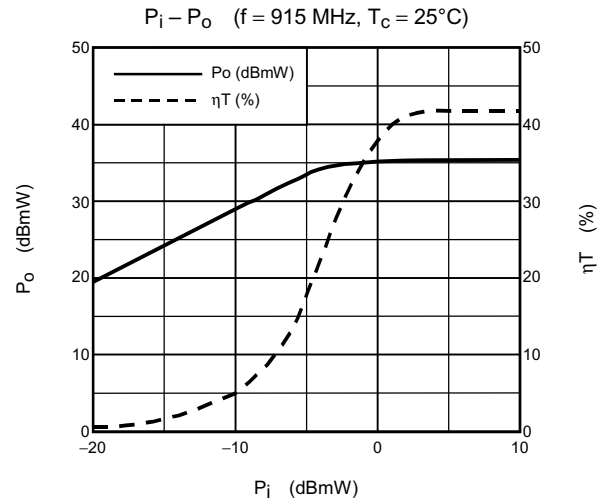
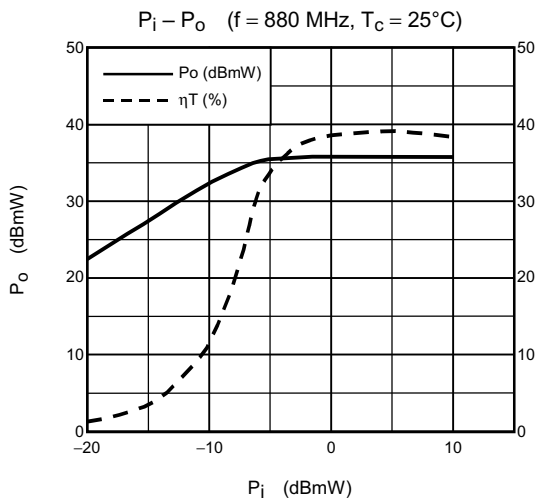
Schematic



Test Circuit



- C1: 10000 pF
- C2: 10 μF
- C3: 100 pF



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