TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

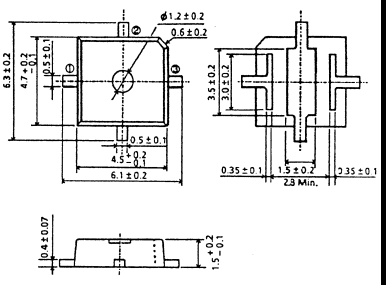
RFM12U7X

VHF- and UHF-band Amplifier Applications

(Note)The TOSHIBA products listed in this document are intended for high frequency Power Amplifier of telecommunications equipment. These TOSHIBA products are neither intended nor warranted for any other use. Do not use these TOSHIBA products listed in this document except for high frequency Power Amplifier of telecommunications equipment.

- Output power: P_O = 12 W (typ.)
- Gain: G_P = 10.8 dB (typ.)
- Drain efficiency: η_D = 60% (typ.)

Unit: mm



1. GATE
2. SOURCE (HEAT SINK)
3. DRAIN

PW-X	
JEDEC	—
JEITA	—
TOSHIBA	2-5N1A

Weight: 0.08 g (typ.)

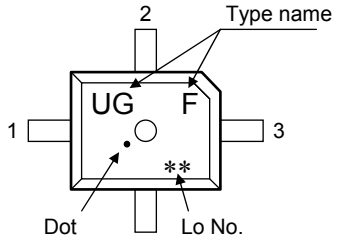
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	20	V
Gate-source voltage	V_{GSS}	10	V
Drain current	I_D	4	A
Power dissipation	P_D*	20	W
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	−45 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

*: Tc = 25°C (When mounted on a 1.6 mm glass epoxy PCB)

Marking



1. Gate
2. Source (heat sink)
3. Drain

Caution

Please take care to avoid generating static electricity when handling this transistor.

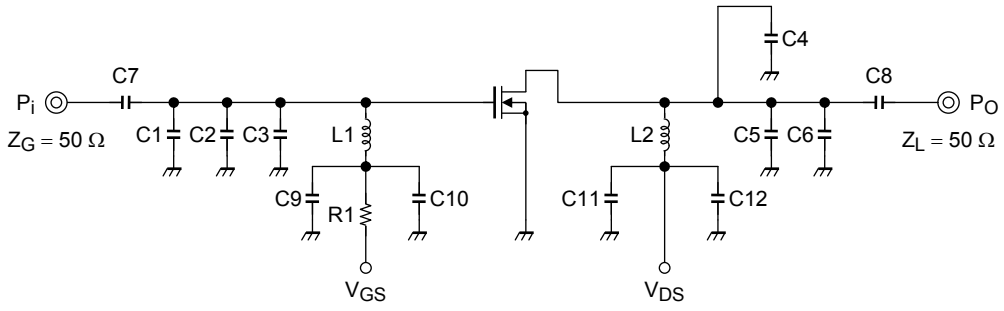
Start of commercial production
2008-11

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain cut-off current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V	—	—	10	μA
Gate-source leakage current	I_{GSS}	V_{GS} = 10 V	—	—	5	μA
Threshold voltage	V_{th}	V_{DS} = 7.2 V, I_D = 0.5 mA	0.5	1.0	1.5	V
Output power	P_O	V_{DS} = 7.2 V, I_{idle} = 750 mA (V_{GS} = adjust), f = 520 MHz, P_i = 1 W, Z_G = Z_L = 50 Ω	11.5	12.0	—	W
Drain efficiency	η_D		55	60	—	%
Power gain	G_P		10.6	10.8	—	dB
Load mismatch	—	V_{DS} = 12.5 V, P_O = 12 W (P_i = adjust), I_{idle} = 750 mA (V_{GS} = adjust), f = 520 MHz, VSWR LOAD 20:1 all phase	No degradation			—

Note 1: These characteristic values are measured using measurement tools specified by Toshiba.

Output Power Test Fixture
(Test Condition: f = 520 MHz, V_{DS} = 7.2 V, I_{idle} = 750 mA, P_i = 1 W)

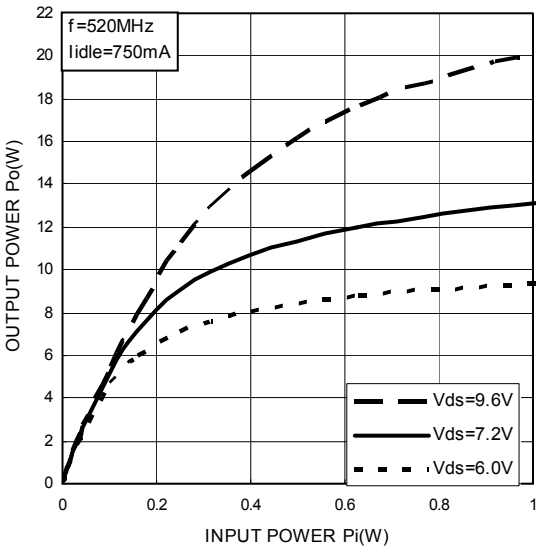


C1: 14 pF
C2: 11 pF
C3: 30 pF
C4: 30 pF
C5: 27 pF
C6: 8 pF
C7: 2200 pF
C8: 2200 pF
C9: 10000 pF
C10: 10 μF
C11: 10000 pF
C12: 10 μF

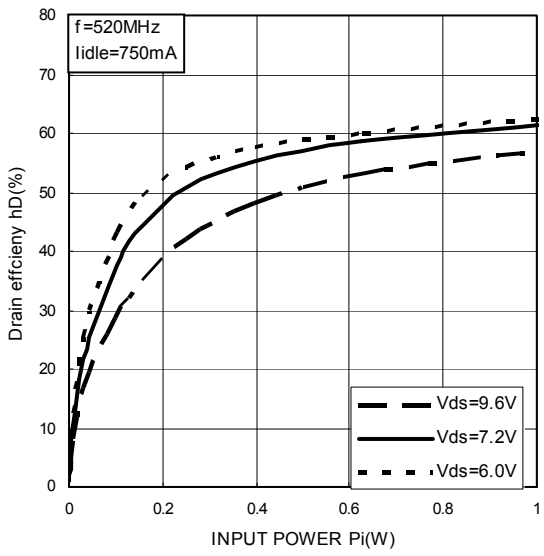
L1: ϕ0.6 mm enamel wire, 5.8ID, 4T
L2: ϕ0.6 mm enamel wire, 5.8ID, 8T

R1: 1.5 kΩ

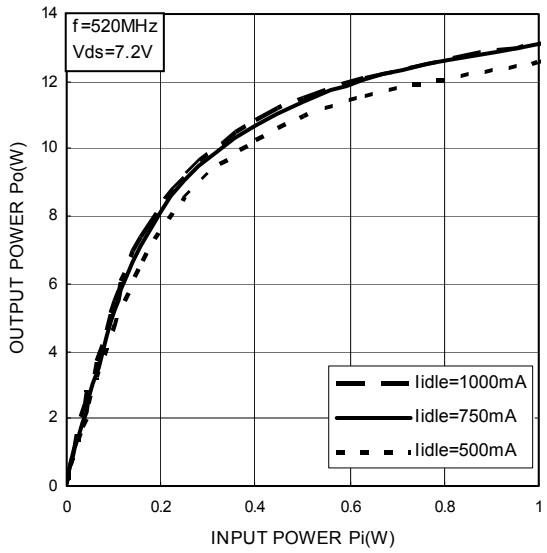
Po -Pi



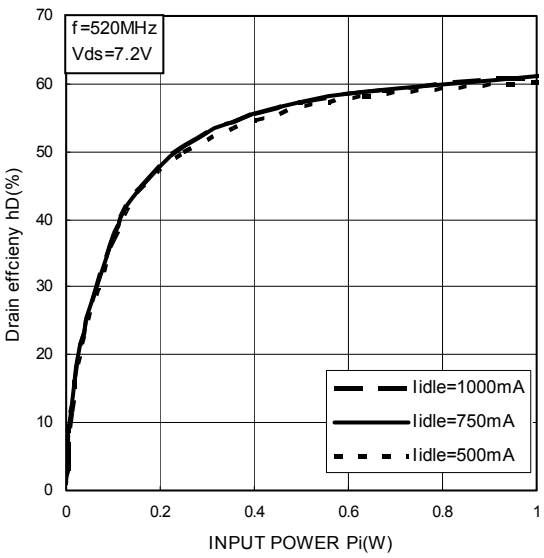
nD -Pi



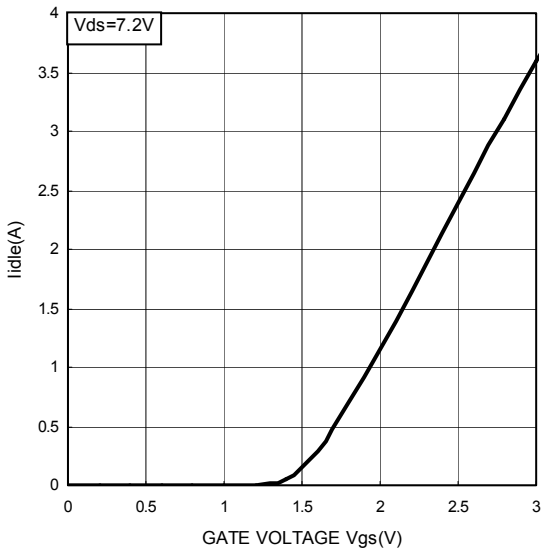
Po -Pi



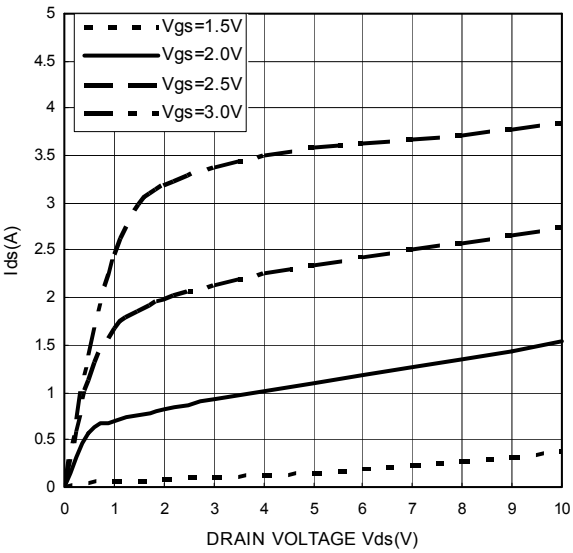
nD -Pi

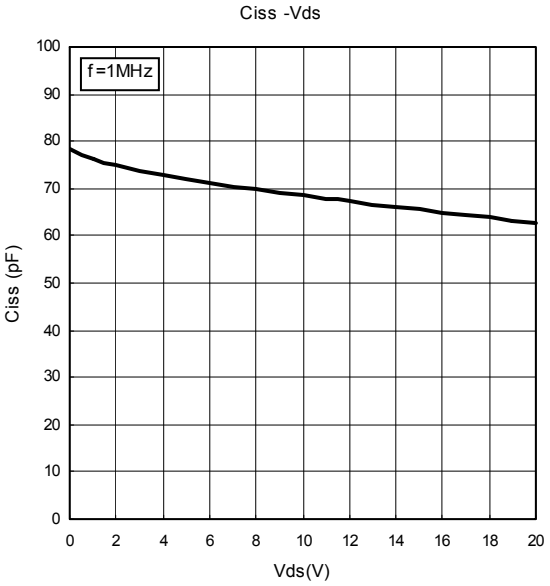


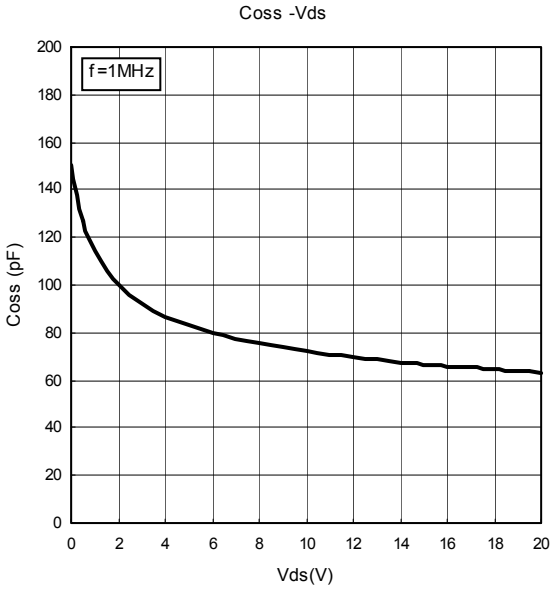
Vgs - Iidle

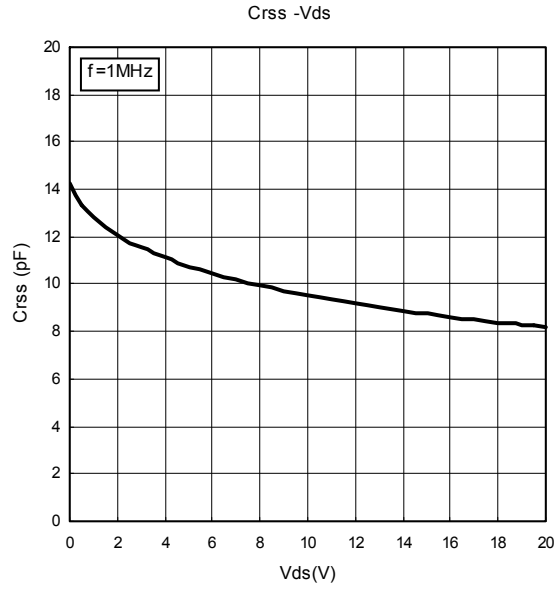


Vds - Ids









Note 2: These are only typical curves and devices are not necessarily guaranteed at these curves.

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