TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

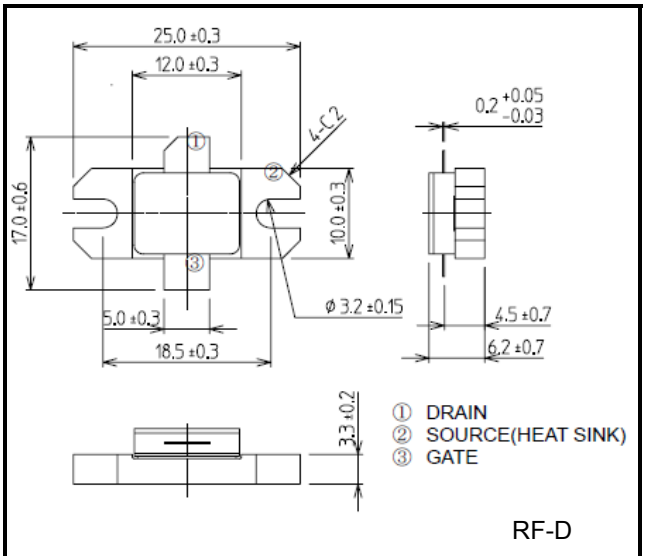
RFM70U12D

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 = 70 W (typ.)
- Gain: G_P = 7.7dB (typ.)
- Drain efficiency: η_D = 50% (typ.)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-12C1A

Weight: 6.5 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage 1 (Note 1)	V_{DSS1}	30	V
Drain-source voltage 2	V_{DSS2}	17	V
Gate-source voltage	V_{GSS}	10	V
Drain current	I_D	15	A
Thermal resistance	Rth_{ch-c}	1.0	°C / W
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	−40 to 150	°C

Note 1: It is the rating under pulse impression, and is not the rating under continuous operation.

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).

Caution

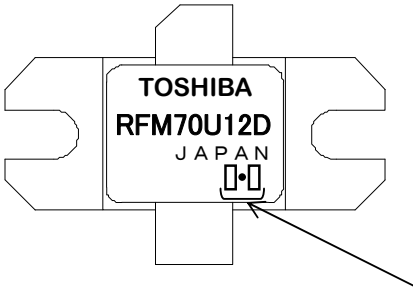
Please take care to avoid generating static electricity when handling this transistor.
Please take care to avoid fall when handling this transistor.

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain cut-off current	I_{DSS}	V_{DS} = 17V, V_{GS} = 0 V	—	—	10	μA
Gate-source leakage current	I_{GSS}	V_{GS} = 10 V	—	—	5	μA
Threshold voltage	V_{th}	V_{DS} = 12.5 V, I_D = 1 mA	0.7	1.2	1.7	V
Output power	P_{O1}	V_{DS} = 12.5V, I_{idle} = 9A (V_{GS} = adjust), f = 520 MHz, P_i = 12 W, Z_G = Z_L = 50 Ω	60	72	—	W
Drain efficiency	η_{D1}		40	50	—	%
Power gain	G_{P1}		7	7.8	—	dB
Output power	P_{O2}	V_{DS} = 12.5V, I_{idle} =2A (V_{GS} = adjust), f = 175 MHz, P_i = 2 W, Z_G = Z_L = 50 Ω	—	90	—	W
Drain efficiency	η_{D2}		—	66	—	%
Power gain	G_{P2}		—	16.5	—	dB
Load mismatch	—	V_{DS} = 15.2 V, P_O = 70 W(P_i = adjust), I_{idle} =9 A (V_{GS} = adjust), f = 520 MHz, VSWR LOAD 20:1 all phase	No degradation			
Load mismatch	—	V_{DS} = 15.2 V, P_O = 70 W(P_i = adjust), I_{idle} = 2A (V_{GS} = adjust), f = 175 MHz, VSWR LOAD 20:1 all phase	No degradation			

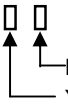
Note 2: These characteristic values are measured using measurement tools specified by Toshiba.

MARKING



Alphanumeric characters: Date of manufacture

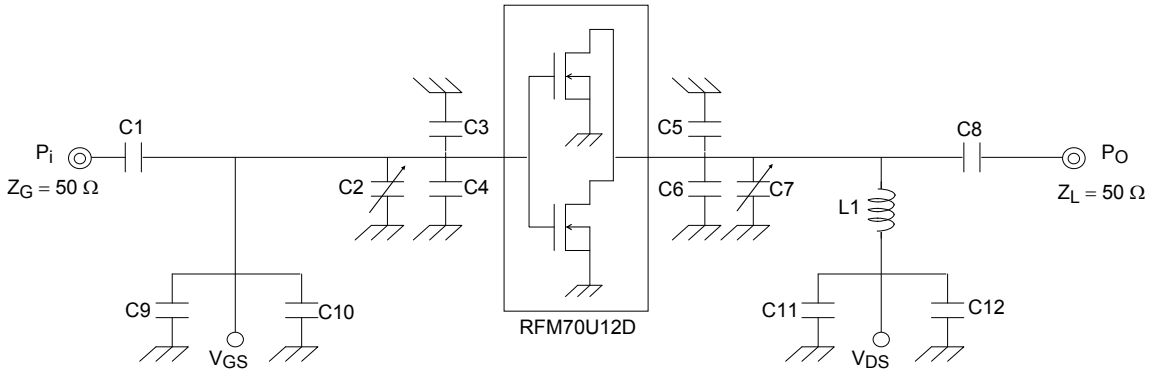
Explanation of Lot No.



Month of manufacture: January to December are denoted by letters A to L respectively.

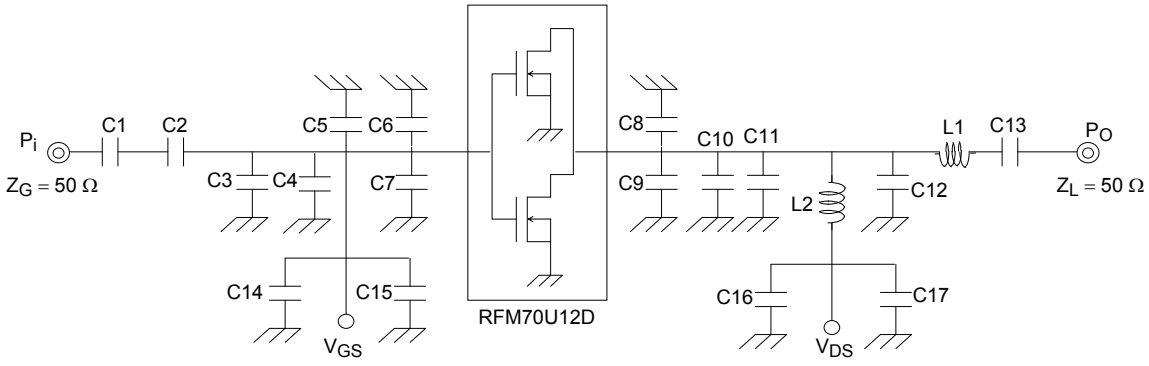
Year of manufacture: Last decimal digit of the year of manufacture

Output Power Test Fixture
(Test Condition: f = 520 MHz, V_{DS} = 12.5 V, Iidle=9A, P_i = 12 W)

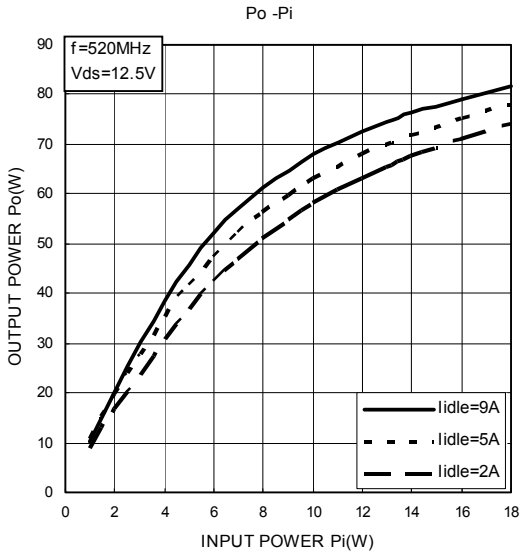


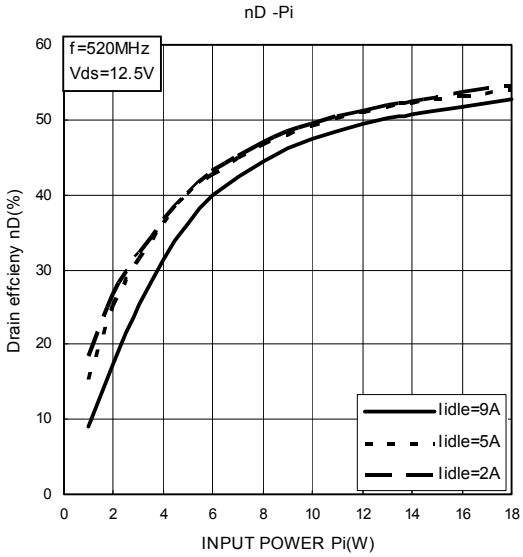
C1: 56 pF
C2: 0～20 pF
C3: 24pF
C4: 24 pF
C5: 22 pF
C6: 22 pF
C7: 0～20 pF
C8: 56 pF
C9: 47 μF
C10: 10000 pF
C11: 47 μF
C12: 10000 pF
L1: ϕ1.0 mm enamel wire, 5.5ID, 10T

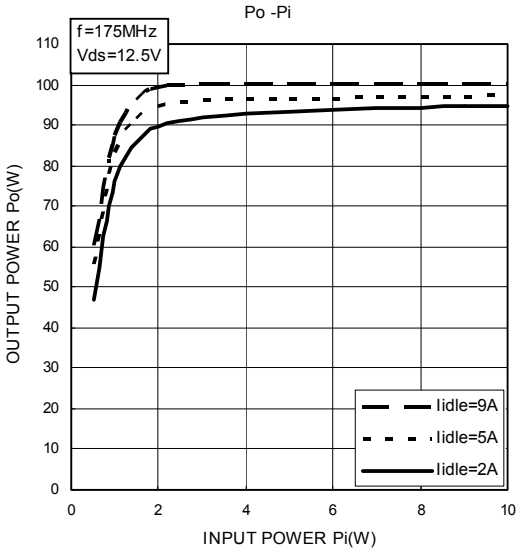
Output Power Test Fixture
(Test Condition: f = 175 MHz, V_{DS} = 12.5 V, Iidle=2A, P_i = 2 W)

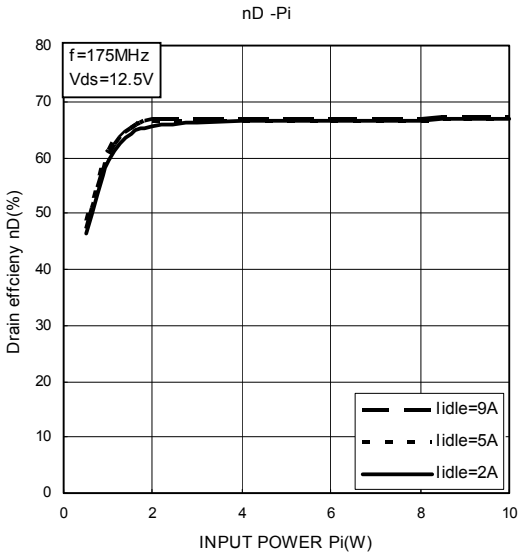


C1: 51 pF
C2: 62 pF
C3: 62 pF
C4: 13 pF
C5: 30 pF
C6: 47 pF
C7: 30 pF
C8: 62 pF
C9: 62 pF
C1 0: 62 pF
C14: 10000 pF
C15: 47 μF
C16: 10000 pF
C17: 47 μF
L1: ϕ0.8 mm enamel wire, 2.0ID, 3T
L2: ϕ1.0 mm enamel wire, 5.5ID, 10T









Note 3: These are only typical curves and devices are not necessarily guaranteed at these curves.

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