TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

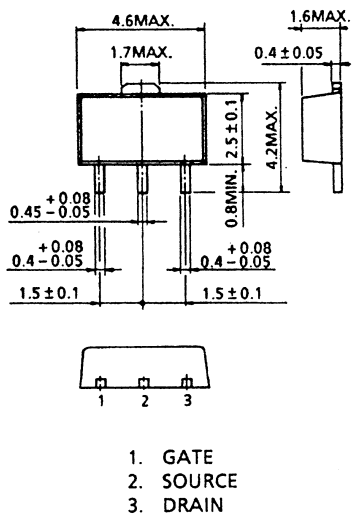
2SK3656

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 =28.4dBmW (typ)
- Gain: G_P = 15.4dB (typ)
- Drain efficiency: η_D = 64% (typ)

Unit: mm



JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1D

Weight: 0.05 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

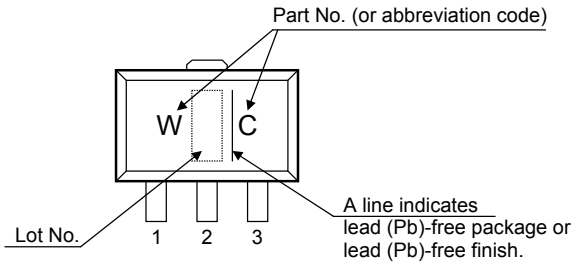
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	7.5	V
Gain-source voltage	V_{GSS}(Note 1)	3.5	V
Drain current	I_D	0.5	A
Power dissipation	P_D (Note 2)	3	W
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	−45~150	°C

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).

Note 1: Operating Ranges: 0~3.5V

Note 2: Tc = 25°C (When mounted on a 1.6 mm glass epoxy PCB)

Marking



1. Gate
2. Source
3. Drain

Caution: This device is sensitive to electrostatic discharge.

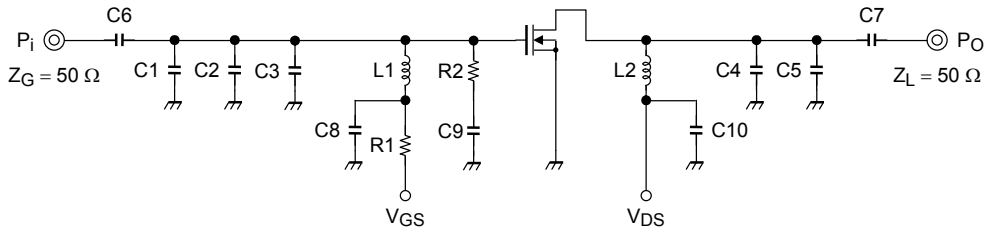
Please make enough tool and equipment earthed when you handle.

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output power	P_O	V_{DS} = 3.6 V, I_{idle} = 50 mA (V_{GS} = adjust), f = 470 MHz, P_i = 13dBmW,	27.5	28.4	—	dBmW
Drain efficiency	η_D		50	64	—	%
Power gain	G_P		—	15.4	—	dB
Threshold voltage	V_{th}	V_{DS} = 3.6 V, I_D = 0.5 mA	0.2	—	1.2	V
Drain cut-off current	I_{DSS}	V_{DS} = 7.5 V, V_{GS} = 0 V	—	—	10	μA
Gate-source leakage current	I_{GSS}	V_{GS} = 3.5 V, V_{DS} = 0 V	—	—	5	μA
Load Mismatch (Note 3)	—	V_{DS} = 3.6 V, f = 470 MHz, P_i = 13dBmW, P_o = 27dBmW (V_{GS} = adjust), VSWR LOAD 10:1 all phase	No Degradation			—

Note 3: These characteristic values are measured using measurement tools specified by Toshiba.

Output Power Test Fixture
(Test Condition: f = 470 MHz, V_{DS} = 3.6 V, I_{idle} = 50 mA, P_i = 13 dBmW)

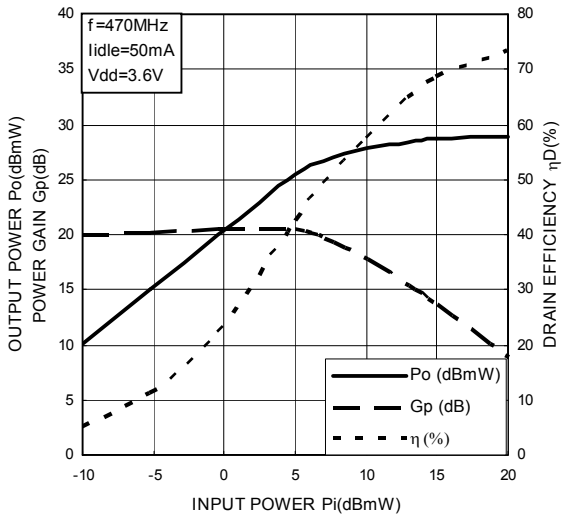


C1: 7 pF
C2: 10 pF
C3: 5 pF
C4: 13 pF
C5: 8 pF
C6: 2200 pF
C7: 2200 pF
C8: 10000 pF
C9: 2200 pF
C10: 10000 pF

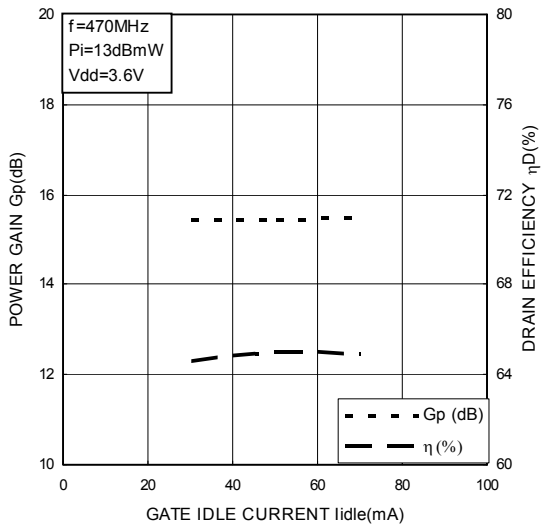
L1: ϕ0.6 mm enamel wire, 5.5ID, 5T
L2: ϕ0.6 mm enamel wire, 5.5ID, 7T

R1: 6.8 kΩ
R2: 56 Ω

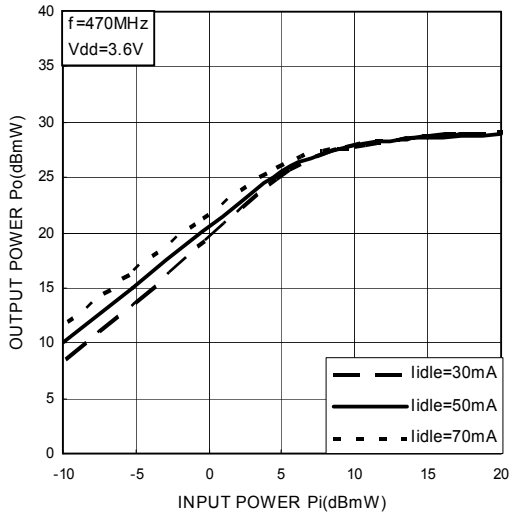
Po, Gp, ηD -Pi



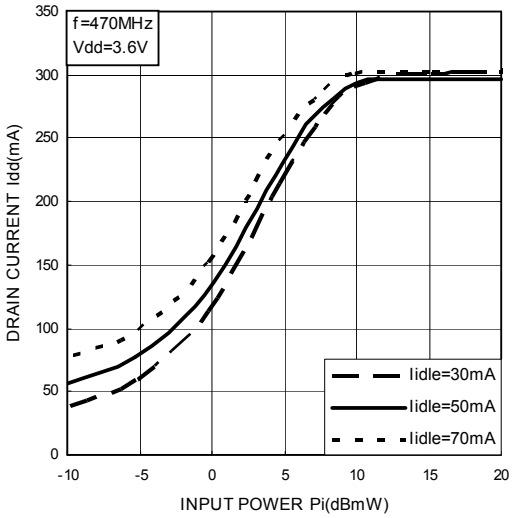
Gp, ηD -Iidle



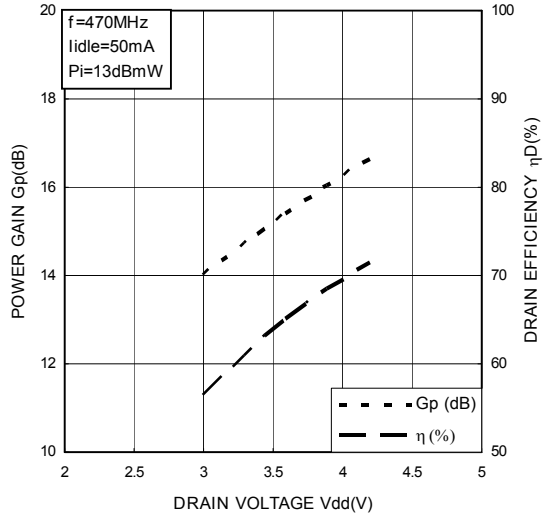
Po-Pi



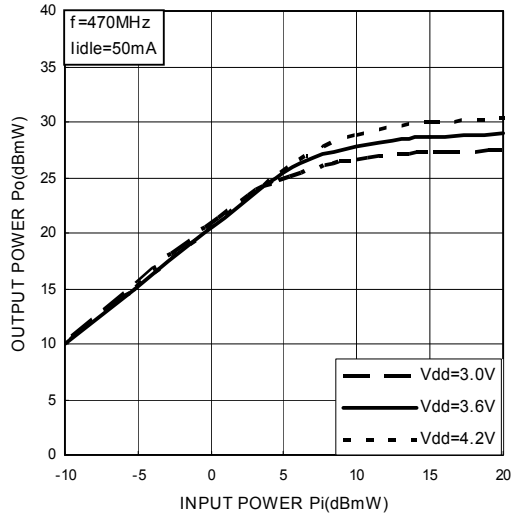
Pi-Idd

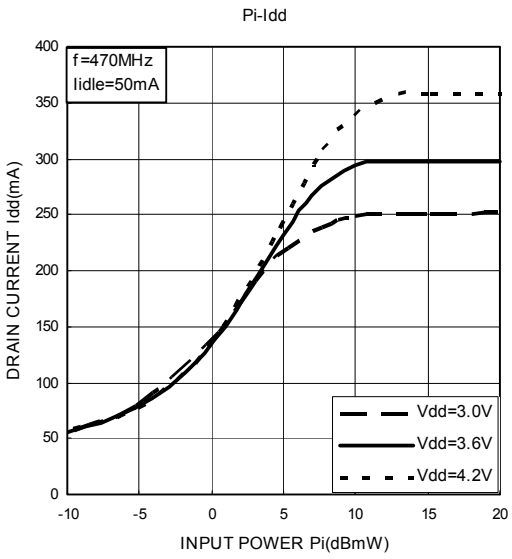


Gp, ηD -Vdd



Po-Pi





Note 4: These are only typical curves and devices are not necessarily guaranteed at these curves.

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20070701-EN GENERAL

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