

# 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:  $P_O = 28.4\text{dBmW}$  (typ)
- Gain:  $G_P = 15.4\text{dB}$  (typ)
- Drain efficiency:  $\eta_D = 64\%$  (typ)

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

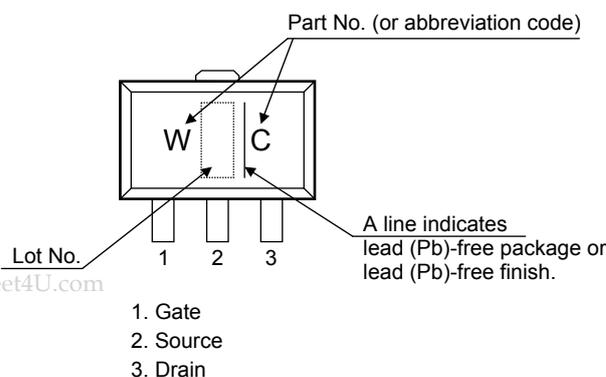
Characteristics	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	7.5	V
Gain-source voltage	$V_{GSS}$ (Note 1)	3.5	V
Drain current	$I_D$	0.5	A
Power dissipation	$P_D$ (Note 2)	3	W
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-45~150	$^\circ\text{C}$

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).

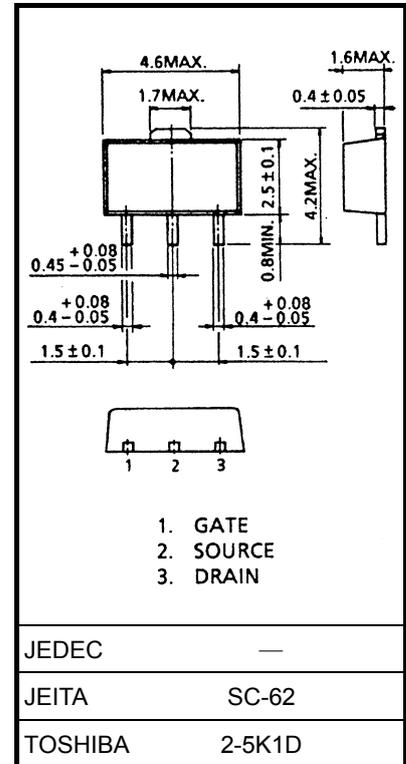
Note 1: Operating Ranges: 0~3.5V

Note 2:  $T_c = 25^\circ\text{C}$  (When mounted on a 1.6 mm glass epoxy PCB)

### Marking



Unit: mm



Weight: 0.05 g (typ.)

**Caution:** This device is sensitive to electrostatic discharge.

Please make enough tool and equipment earthed when you handle.

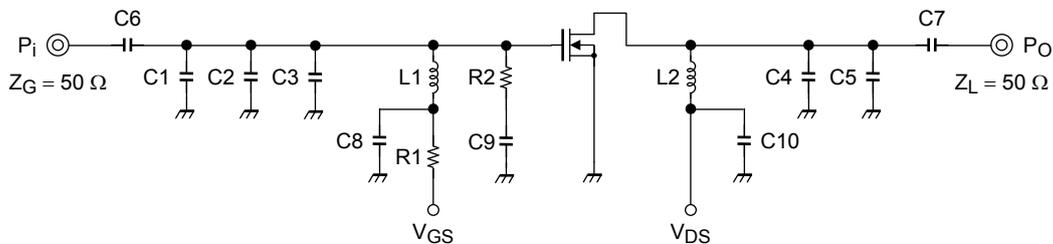
## Electrical Characteristics (Ta = 25°C)

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

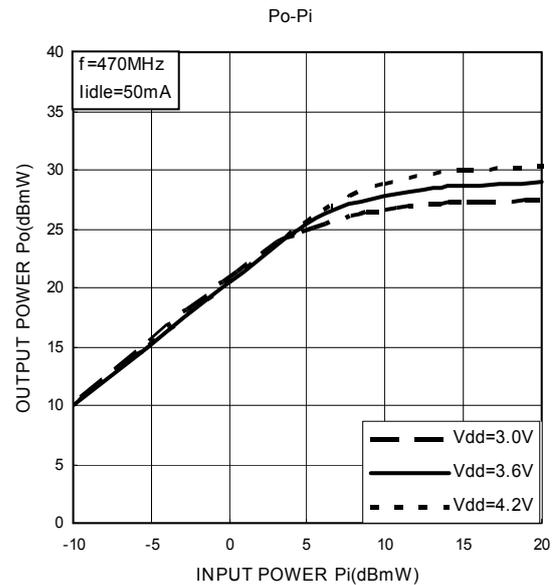
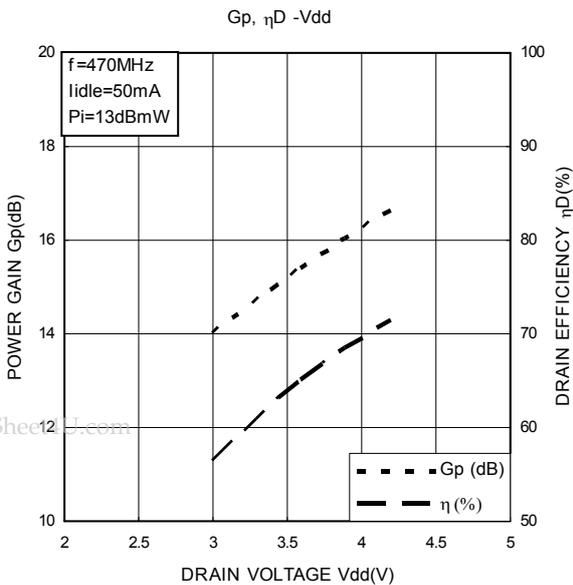
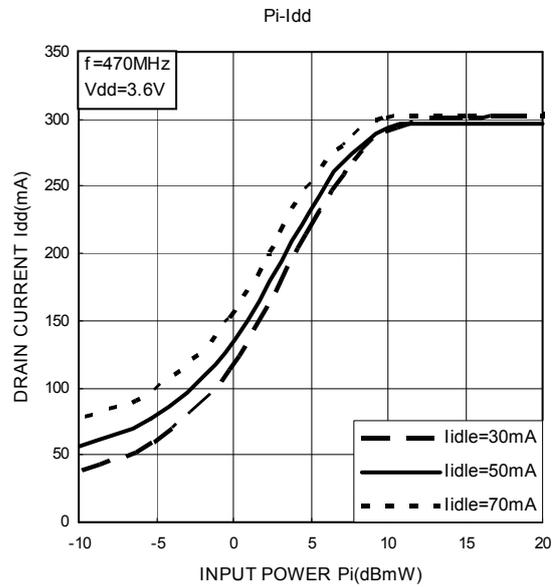
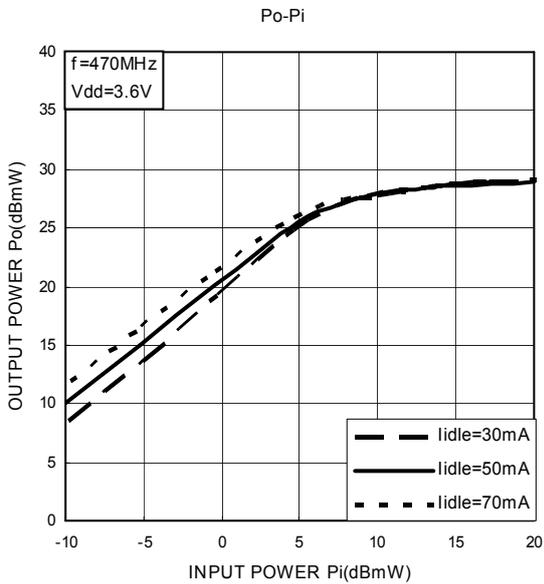
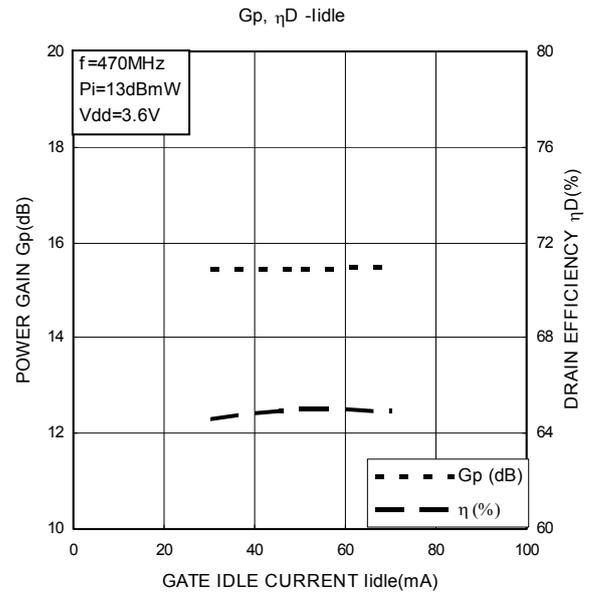
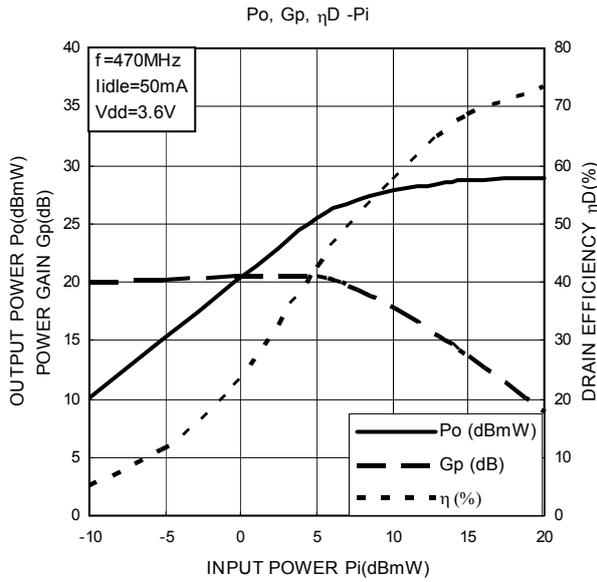
Note 3: These characteristic values are measured using measurement tools specified by Toshiba.

### Output Power Test Fixture

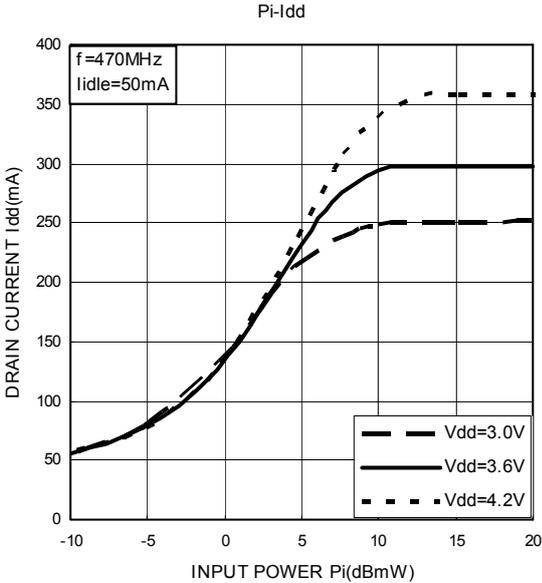
(Test Condition:  $f = 470\text{ MHz}$ ,  $V_{DS} = 3.6\text{ V}$ ,  $I_{idle} = 50\text{ mA}$ ,  $P_i = 13\text{ dBmW}$ )



- |               |   |                    |
|---------------|---|--------------------|
| C1: 7 pF      | L1: $\phi 0.6\text{ mm}$ enamel wire, 5.5ID, 5T | R1: 6.8 k $\Omega$ |
| C2: 10 pF     | L2: $\phi 0.6\text{ mm}$ enamel wire, 5.5ID, 7T | R2: 56 $\Omega$    |
| C3: 5 pF      |   |                    |
| C4: 13 pF     |   |                    |
| C5: 8 pF      |   |                    |
| C6: 2200 pF   |   |                    |
| C7: 2200 pF   |   |                    |
| C8: 10000 pF  |   |                    |
| C9: 2200 pF   |   |                    |
| C10: 10000 pF |   |                    |



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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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