

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

2SK3656

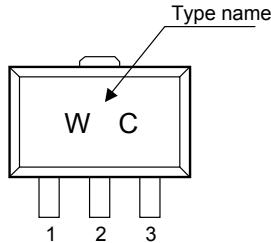
VHF- and UHF-band Amplifier Applications

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

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

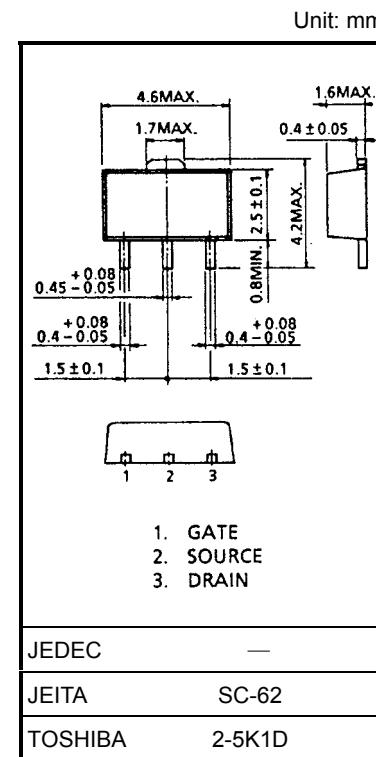
Note 1: Recommended Operation Condition: 0~3.5V

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

1. Gate
2. Source
3. Drain

Caution

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



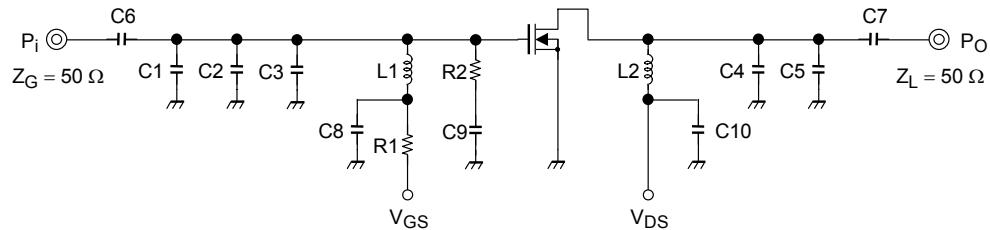
Electrical Characteristics (Ta = 25°C)

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} = adjust), $f = 470 \text{ MHz}$, $P_i = 13 \text{ dBmW}$,	27.5	28.4	—	dBmW
Drain efficiency	η_D		50	64	—	%
Power gain	G _P		—	15.4	—	dB
Threshold voltage	V _{th}	$V_{DS} = 3.6 \text{ V}$, $I_D = 0.5 \text{ mA}$	0.2	—	1.2	V
Drain cut-off current	I _{DSS}	$V_{DS} = 7.5 \text{ V}$, $V_{GS} = 0 \text{ V}$	—	—	10	μA
Gate-source leakage current	I _{GSS}	$V_{GS} = 3.5 \text{ V}$, $V_{DS} = 0 \text{ V}$	—	—	5	μA
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} = adjust), VSWR LOAD 10:1 all phase	No Degradation			—

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

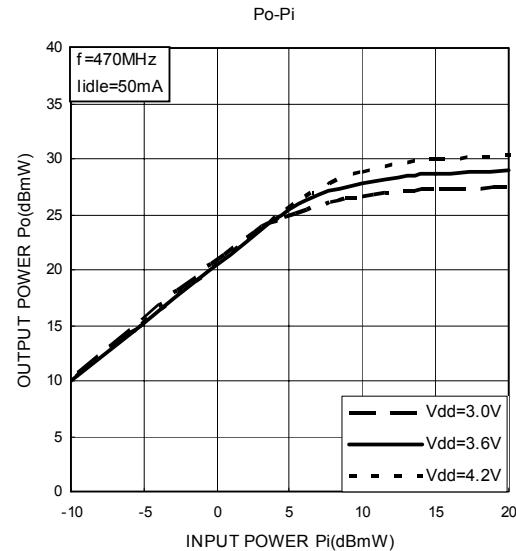
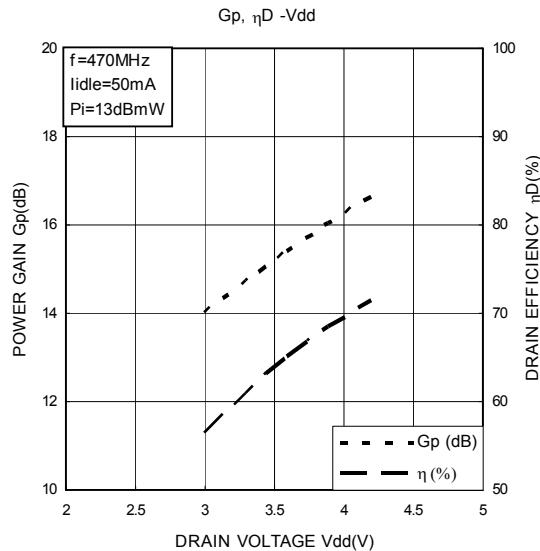
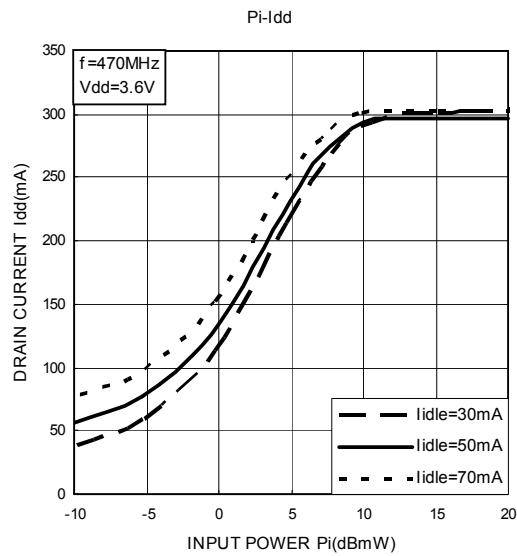
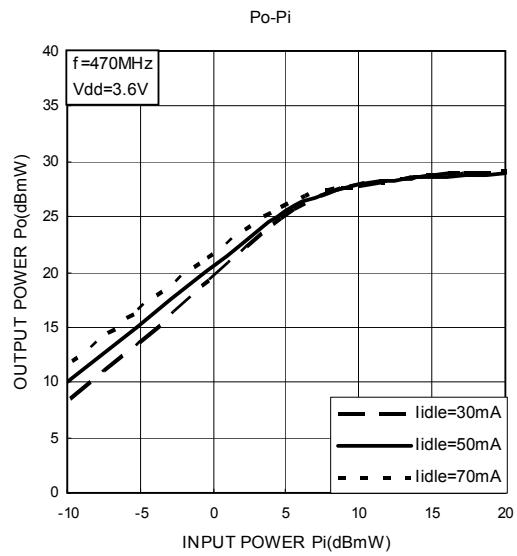
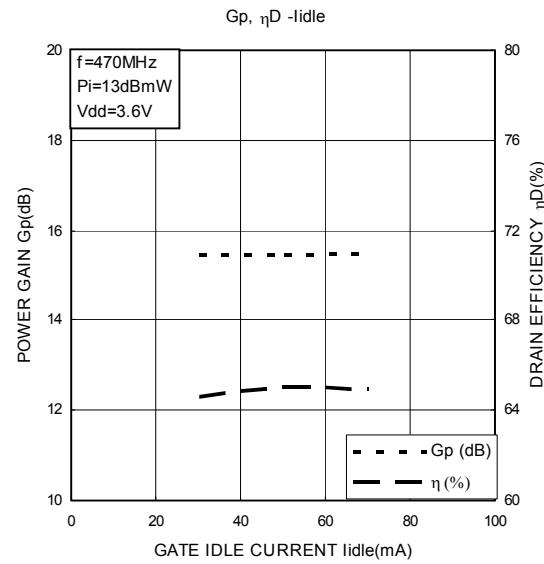
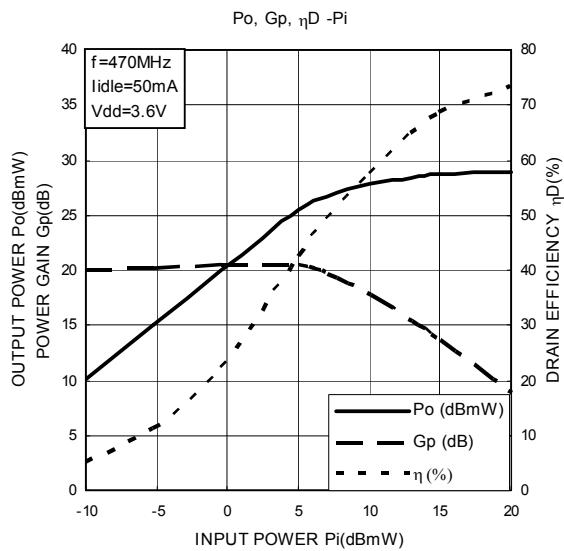
Output Power Test Fixture

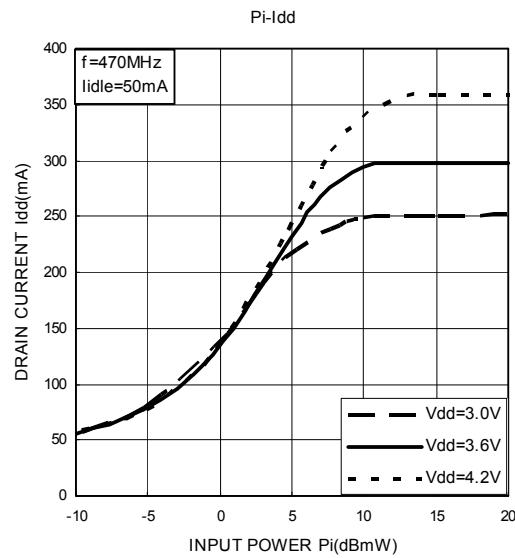
(Test Condition: $f = 470 \text{ MHz}$, $V_{DS} = 3.6 \text{ V}$, $I_{idle} = 50 \text{ mA}$, $P_i = 13 \text{ dBmW}$)



C1: 7 pF
 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: $\phi 0.6 \text{ mm}$ enamel wire, 5.5ID, 5T
 L2: $\phi 0.6 \text{ mm}$ enamel wire, 5.5ID, 7T
 R1: 6.8 k Ω
 R2: 56 Ω





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

RESTRICTIONS ON PRODUCT USE

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.