# TOSHIBA

*MICROWAVE SEMICONDUCTOR*

TECHNICAL DATA

MICROWAVE POWER GaAs FET

## S8851

**FEATURES:**

- HIGH POWER
  $P_{1dB}$ = 24 dBm at f = 15 GHz
- HIGH GAIN
  $G_{1dB}$ = 8 dB at f = 15 GHz
- SUITABLE FOR Ku-BAND AMPLIFIER
- ION IMPLANTATION

## RF PERFORMANCE SPECIFICATIONS (Ta = 25°C)

| TYPE NUMBER (PACKAGE CODE) | | | | S8851 (2-3K1B) | | |
|---|---|---|---|---|---|---|
| CHARACTERISTIC | SYMBOL | CONDITION | UNIT | MIN. | TYP. | MAX. |
| Output Power at 1dB Compression Point | $P_{1dB}$ | $V_{DS}$=10V, f = 15GHz | dBm | 23.0 | 24.0 | - |
| Power Gain at 1dB Compression Point | $G_{1dB}$ | | dB | 7.0 | 8.0 | - |
| Drain Current | $I_{DS}$ | | A | - | 0.08 | 0.14 |
| Power Added Efficiency | $\eta_{add}$ | | % | - | 26 | - |

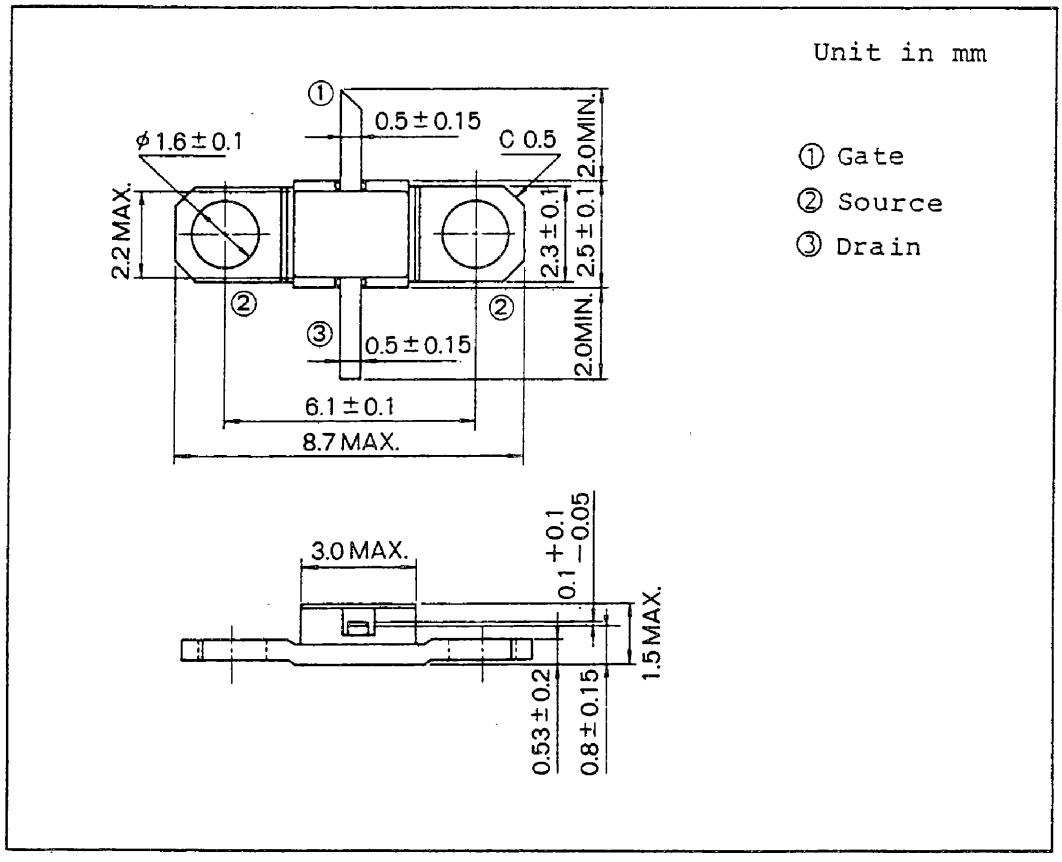
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| TYPE NUMBER (PACKAGE CODE) | | | | S8851 (2-3K1B) | | |
|---|---|---|---|---|---|---|
| CHARACTERISTIC | SYMBOL | CONDITION | UNIT | MIN. | TYP. | MAX. |
| Transconductance | $g_m$ | $V_{DS}$=3V, $I_{DS}$=0.09A | mS | - | 60 | - |
| Pinch-off Voltage | $V_{GSoff}$ | $V_{DS}$=3V, $I_{DS}$=3mA | V | -2.5 | -3.5 | -5 |
| Saturated Drain Current | $I_{DSS}$ | $V_{DS}$=3V, $V_{GS}$=0V | A | - | 0.2 | 0.25 |
| Gate to Source Breakdown Voltage | $V_{GSO}$ | $I_{GS}$=-3μA | V | -5 | - | - |
| Thermal Resistance | $R_{th(c-c)}$ | Channel to case | °C/W | - | 40 | 75 |

## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| TYPE NUMBER (PACKAGE CODE) | | | S8851 (2-3K1B) |
|---|---|---|---|
| CHARACTERISTIC | SYMBOL | UNIT | RATING |
| Drain-Source Voltage | $V_{DS}$ | V | 15 |
| Gate-Source Voltage | $V_{GS}$ | V | -5 |
| Drain Current | $I_D$ | A | 0.25 |
| Total Power Dissipation (Tc=25°C) | $P_T$ | W | 2 |
| Channel Temperature | $T_{ch}$ | °C | 175 |
| Storage Temperature | $T_{stg}$ | °C | -65∿125 |

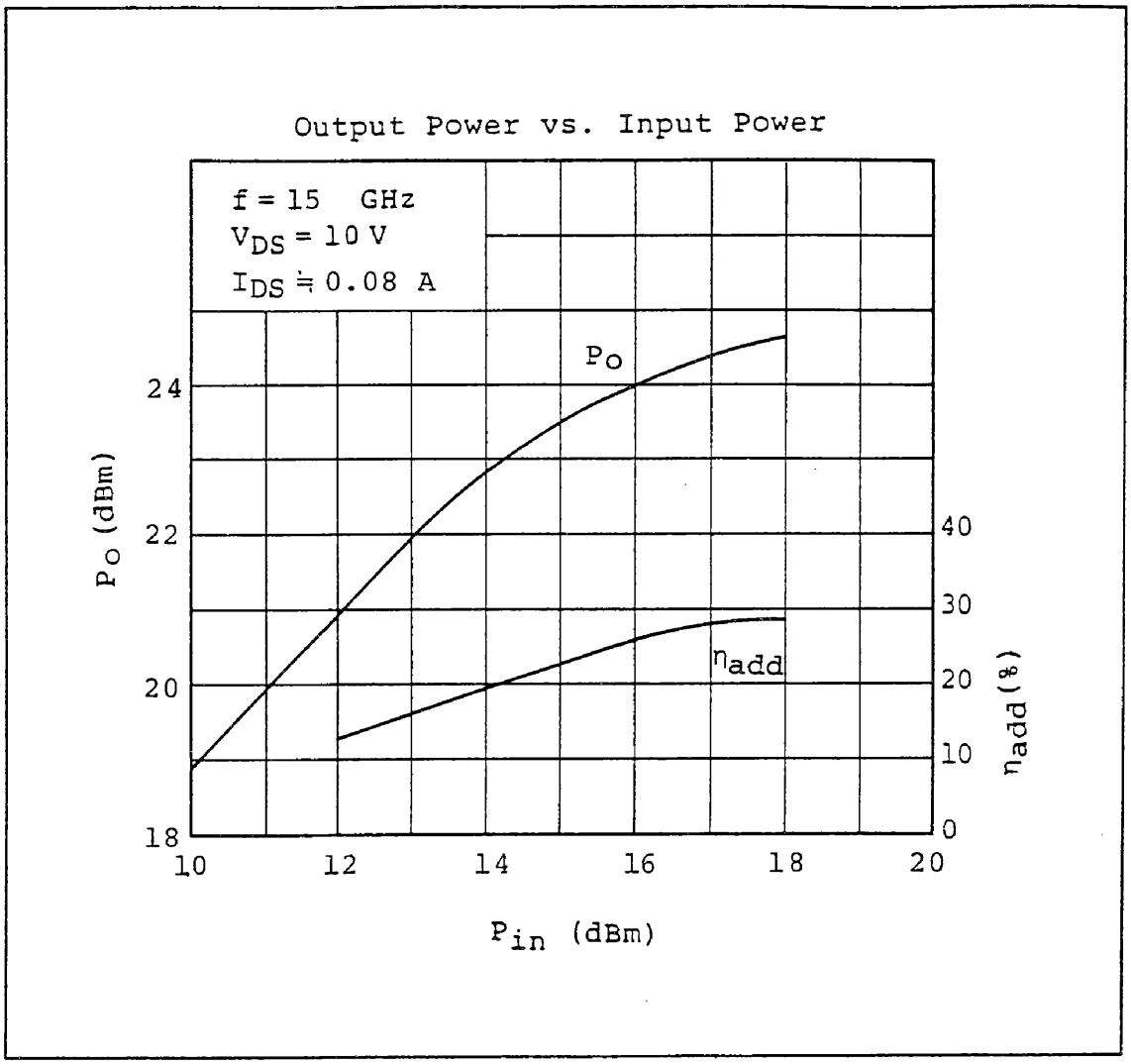
## PACKAGE OUTLINE (2-3K1B)



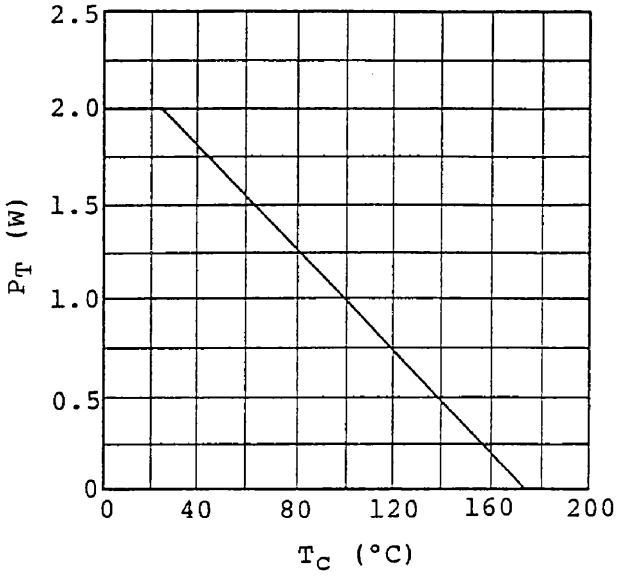

HANDLING PRECAUTIONS FOR PACKAGED TYPE

Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C.

## OUTPUT POWER CHARACTERISTICS

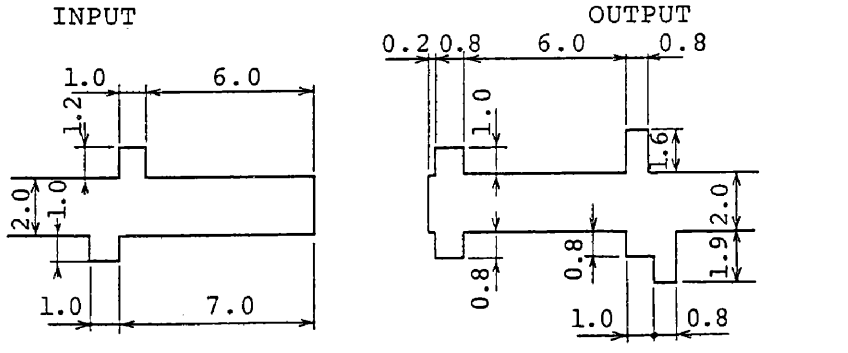


## POWER DISSIPATION VS. CASE TEMPERATURE




## DRAWING OF MATCHING NETWORK FOR S8851

(f=15 GHz)



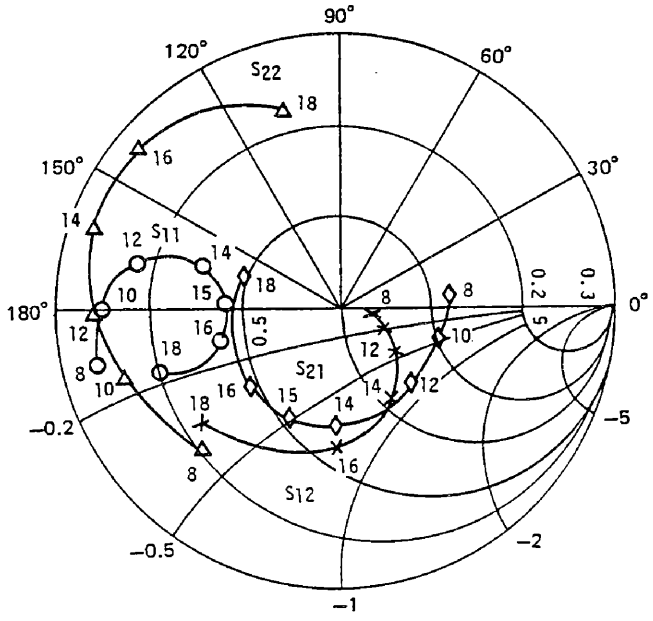

$\varepsilon_r$= 2.6 (Teflon Glass)

t= 0.7 mm

## S8851 S-PARAMETERS
## (MAGN. and ANGLES)

$V_{DS}$ = 10 V, $I_{DS}$ = 100 mA

f = 8-18 GHz




| FREQUENCY (GHz) | $S_{11}$ | | $S_{12}$ | | $S_{21}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| 8 | 0.88 | -167 | 0.037 | -5 | 1.17 | 7 | 0.70 | -136 |
| 9 | 0.86 | -179 | 0.043 | -12 | 1.11 | -4 | 0.75 | -152 |
| 10 | 0.84 | 180 | 0.050 | -20 | 1.10 | -18 | 0.80 | -163 |
| 11 | 0.81 | 173 | 0.061 | -28 | 1.05 | -30 | 0.83 | -172 |
| 12 | 0.75 | 166 | 0.075 | -36 | 1.08 | -45 | 0.87 | -178 |
| 13 | 0.65 | 162 | 0.091 | -47 | 1.18 | -67 | 0.90 | 172 |
| 14 | 0.51 | 162 | 0.109 | -60 | 1.22 | -92 | 0.92 | 161 |
| 15 | 0.40 | 178 | 0.126 | -75 | 1.27 | -116 | 0.92 | 152 |
| 16 | 0.44 | -166 | 0.146 | -92 | 1.24 | -140 | 0.91 | 140 |
| 17 | 0.54 | -157 | 0.164 | -116 | 1.15 | -170 | 0.87 | 125 |
| 18 | 0.68 | -162 | 0.188 | -142 | 1.07 | 161 | 0.72 | 106 |