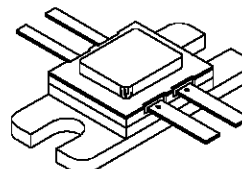


## RF & MICROWAVE TRANSISTORS UHF TV LINEAR APPLICATIONS

- 470-860 MHz
- 26.5 VOLTS
- GOLD METALLIZATION
- $P_{OUT} = 20.0W$  MIN. WITH 9.5 dB GAIN
- INTERNAL INPUT MATCHING
- DIFFUSED EMITTER BALLAST RESISTORS



**.400 x .425 4LFL (M119)**  
hermetically sealed

**ORDER CODE**

SD4010

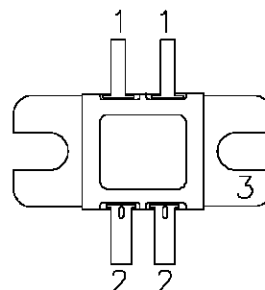
**BRANDING**

SUTV200

### DESCRIPTION

The SD4010 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors. The SD4010 is intended for use in linear applications up to 1GHz, including UHF television transmitters, transposers and cellular base stations.

### PIN CONNECTION



1. Collector

2. Base

3. Emitter

### ABSOLUTE MAXIMUM RATINGS ( $T_{case} = 25^{\circ}C$ )

| Symbol     | Parameter                 | Value        | Unit        |
|------------|---------------------------|--------------|-------------|
| $V_{CBO}$  | Collector-Base Voltage    | 60.0         | V           |
| $V_{CES}$  | Collector-Emitter Voltage | 60.0         | V           |
| $V_{EBO}$  | Emitter-Base Voltage      | 4.0          | V           |
| $I_C$      | Device Current (Maximum)  | 11.0         | A           |
| $P_{DISS}$ | Power Dissipation         | 88.8         | W           |
| $T_J$      | Junction Temperature      | +200         | $^{\circ}C$ |
| $T_{STG}$  | Storage Temperature       | - 65 to +150 | $^{\circ}C$ |

### THERMAL DATA

|               |                                  |     |               |
|---------------|----------------------------------|-----|---------------|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.9 | $^{\circ}C/W$ |
|---------------|----------------------------------|-----|---------------|

## SD4010

### ELECTRICAL SPECIFICATIONS ( $T_{case} = 25^{\circ}C$ )

#### STATIC

| Symbol     | Test Conditions              | Value |      |      | Unit |
|------------|------------------------------|-------|------|------|------|
|            |                              | Min.  | Typ. | Max. |      |
| $BV_{EBO}$ | $I_E = 10mA$ $I_C = 0mA$     | 3.0   | 4.0  | —    | V    |
| $BV_{CES}$ | $I_C = 50mA$ $V_{BE} = 0V$   | 60.0  | 85.0 | —    | V    |
| $BV_{CEO}$ | $I_C = 50mA$ $I_B = 0mA$     | 28.0  | 30.0 | —    | V    |
| $I_{CEO}$  | $V_{CE} = 26.5V$ $I_E = 0mA$ | —     | —    | 5    | mA   |
| $h_{FE}$   | $V_{CE} = 5V$ $I_C = 3A$     | 25    | 50   | 80   | —    |

Tested Per Side

#### DYNAMIC

| Symbol            | Test Conditions                               | Value |      |      | Unit |
|-------------------|---|-------|------|------|------|
|                   |   | Min.  | Typ. | Max. |      |
| $P_{OUT}$         | $f = 860MHz$ $V_{CE} = 26.5V$ $P_{IN} = 2.2W$ | 20.0  | 28.0 | —    | W    |
| $G_P$             | $f = 860MHz$ $V_{CE} = 26.5V$ $P_{OUT} = 20W$ | 9.5   | 10.5 | —    | dB   |
| $IMD_3$           | $P_{SYNC} = 20W$ $V_{CE} = 26.5V$ (note 1)    | —     | -48  | -46  | dBc  |
| $IP_3$            | $V_{CB} = 26.5V$ $P_{OUT} = 20W$ PEP (note 2) | —     | 55   | —    | dBm  |
| $C_{OB}$          | $f = 860MHz$ $V_{CB} = 26.5V$ (note 3)        | —     | 25   | 36   | pF   |
| Load*<br>Mismatch | $f = 860MHz$ $V_{CE} = 26.5V$ $P_{OUT} = 20W$ | 3:1   | 10:1 | —    | VSWR |

$I_{CQ} = I_C = 2.7A$  (1.35A per Side)

\*VSWR tested for a minimum of 3:1 SWR at all phase angles.

Note 1: Three Tone IMD Testing (CCIR)

$f_1 = 860.0MHz/ -8dB$  ref. to  $P_{SYNC}$  - Visual

$f_2 = 863.5MHz/ -16dB$  ref. to  $P_{SYNC}$  - Color Subcarrier

$f_3 = 864.5MHz/ -7dB$  ref. to  $P_{SYNC}$  - Aural

Note 2:  $IP_3$  Calculated Based on Two-Tone  
IMD Testing:

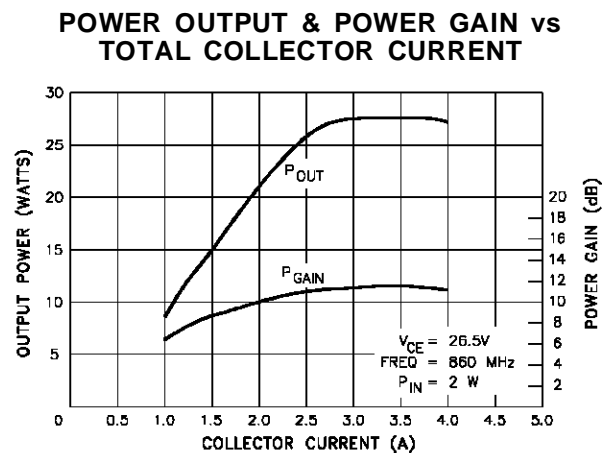
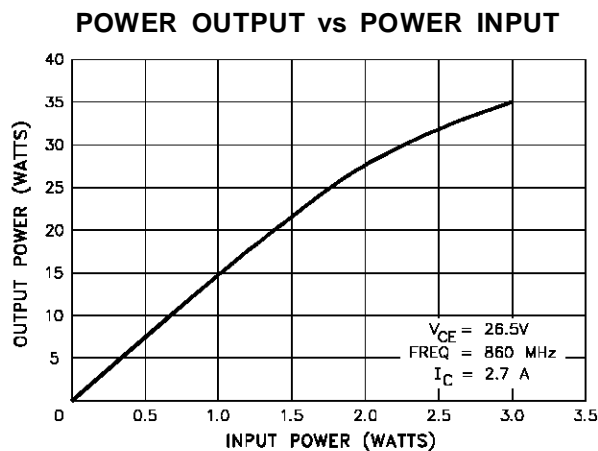
$f_1 = 900.0 MHz/ -6dB$  ref. to  $P_{OUT}$

$f_2 = 900.1 MHz/ -6dB$  ref. to  $P_{OUT}$

$IMD_3$  (Typ) < -36dBc

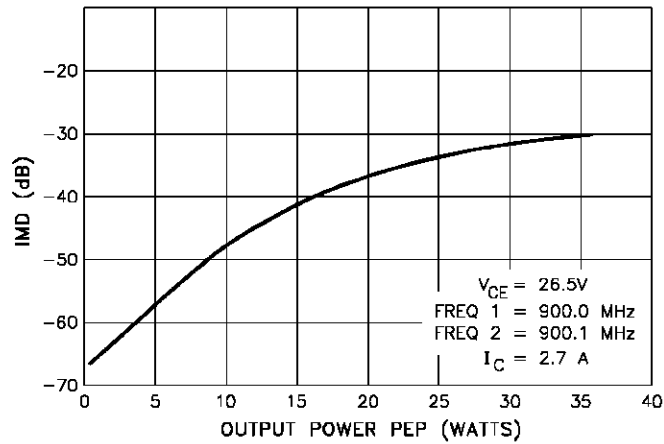
Note 3: Tested Per Side

#### TYPICAL PERFORMANCE

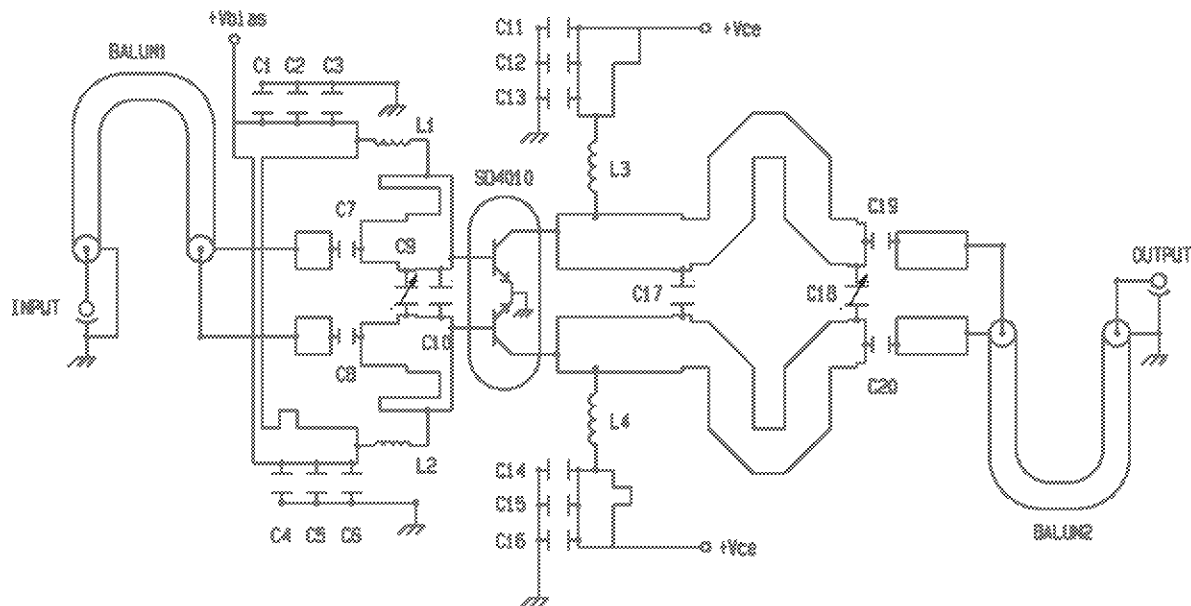


## TYPICAL PERFORMANCE (cont'd)

INTERMODULATION DISTORTION vs POWER OUTPUT



## TEST CIRCUIT SCHEMATIC



Balun 1, 2 :  $50\Omega$  Coaxial Cable,  $\lambda/4$  @ 860 MHz

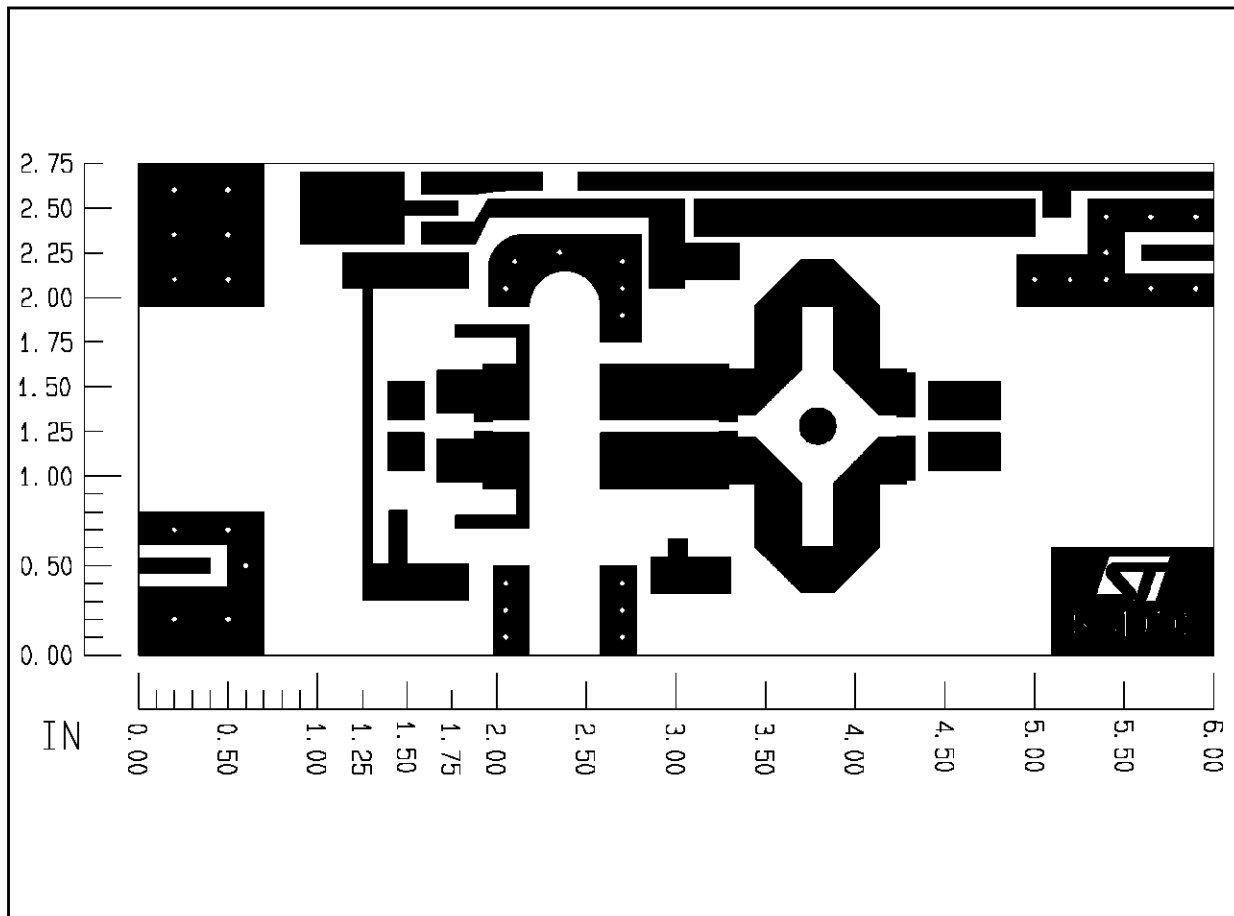
C1, C4,  
 C11, C16 :  $100\mu F$ , 50V Electrolytic  
 C2, C5,  
 C12, C15 :  $10\mu F$ , 35V Tantalum  
 C3, C6, C7 C8,  
 C19, C20 : 75 pF Ceramic Chip, ATC B  
 C9, C18 : 0.4 - 2.5 pF Variable, JOHANSON Giga-trim  
 C10 : 2pF Ceramic Chip, ATC B  
 C17 : 5pF Ceramic Chip, ATC B

L1, L2 : 7 Turns, 0.12" I.D., #22 AWG (1:1)  
 L3, L4 : 5 Turns, 0.12" I.D., #22 AWG (1:1)

See Photomaster for Microstrip Lines

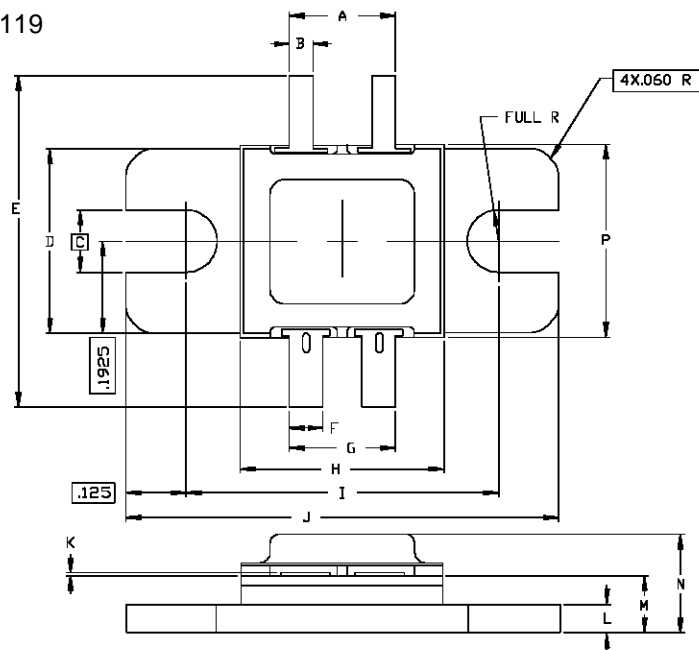
Board  
 Material: ROGERS Ultra-Lam Er = 2.55, Height = 0.030",  
 2 oz. Cu.

PHOTOMASTER OF TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref. Dwg. No.: 12-0119



| SGS-THOMSON MICROELECTRONICS |                      |                      | CONT'D |                      |                      |
|------------------------------|----------------------|----------------------|--------|----------------------|----------------------|
|                              | MINIMUM<br>Inches/mm | MAXIMUM<br>Inches/mm |        | MINIMUM<br>Inches/mm | MAXIMUM<br>Inches/mm |
| A                            | .210/5,33            | .230/5,84            | K      | .002/0,05            | .006/0,15            |
| B                            | .045/1,14            | .055/1,40            | L      | .058/1,47            | .065/1,65            |
| C                            | .130/3,30            |                      | M      | .115/2,92            | .130/3,30            |
| D                            | .380/9,65            | .390/9,91            | N      | ----                 | .230/5,84            |
| E                            | .770/19,56           | .830/21,08           | P      | .395/10,03           | .408/10,36           |
| F                            | .070/1,78            | .080/2,03            |        |                      |                      |
| G                            | .215/5,46            | .235/5,97            |        |                      |                      |
| H                            | .420/10,67           | .433/11,00           |        |                      |                      |
| I                            | .645/16,38           | .655/16,64           |        |                      |                      |
| J                            | .895/22,73           | .905/22,99           |        |                      |                      |

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