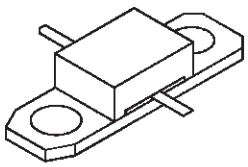
SGS-THOMSON MICROELECTRONICS

# SD1894

## RF & MICROWAVE TRANSISTORS SATELLITE COMMUNICATIONS APPLICATIONS

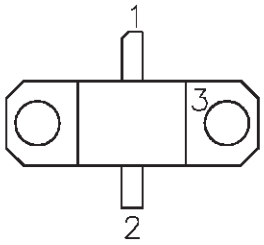
- CLASS C
- 1.6 GHz
- COMMON BASE
- REFRACTORY/GOLD METALLIZATION
- EFFICIENCY = 50% MIN.
- $P_{OUT}$ = 4.5 W MIN. WITH 10 dB GAIN



**.250 x .320 2LFL (M170)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1894 | SD1894 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1894 is a common base silicon NPN bipolar device optimized for 1.6 GHz SATCOM applications.

The SD1894 offers superior gain and collector efficiency, making it an ideal choice for Class C power amplifiers used in portable as well as fixed SATCOM terminals.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 375 | mA |
| $P_{DISS}$ | Power Dissipation | 12.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 14.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

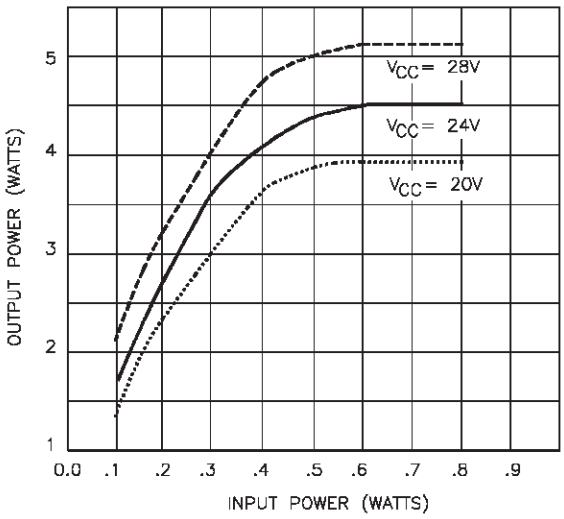
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1 mA | $I_E$ = 0 mA | 45 | — | — | V |
| $BV_{CES}$ | $I_C$ = 1 mA | $V_{BE}$ = 0 V | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1 mA | $I_C$ = 0 mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28 V | $I_E$ = 0 mA | — | — | .25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5 V | $I_C$ = .2 A | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{IN}$ | f = 1650 MHz | $V_{CC}$ = 28 V | $P_{OUT}$ = 4.5 W | — | .35 | .45 | W |
| $\eta_C$ | f = 1650 MHz | $V_{CC}$ = 28 V | $P_{OUT}$ = 4.5 W | 50 | 55 | — | % |
| $P_G$ | f = 1650 MHz | $V_{CC}$ = 28 V | $P_{OUT}$ = 4.5 W | 10.0 | 11.1 | — | dB |
| Load Mismatch | $V_{CC}$ = 28 V | $P_{OUT}$ = 4.5 W | VSWR = 20:1 | No Degradation in Output Power | | | |

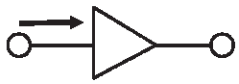
**INPUT POWER vs OUTPUT POWER**



## IMPEDANCE DATA

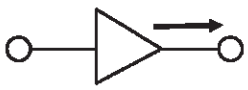
**TYPICAL INPUT IMPEDANCE**

$Z_{IN}$



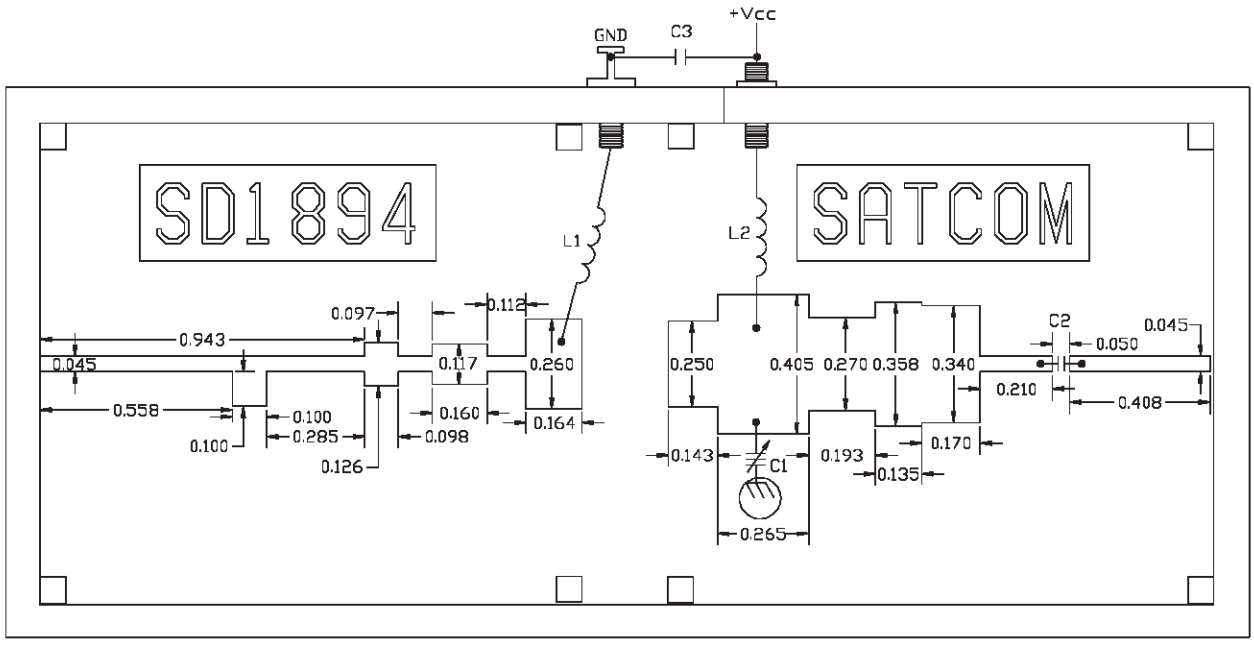
**TYPICAL COLLECTOR LOAD IMPEDANCE**

$Z_{CL}$



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1600 MHz | 31.6 + j 21.4 | 5.2 + j 14.7 |
| 1620 MHz | 38.0 + j 15.0 | 5.6 + j 14.55 |
| 1635 MHz | 38.8 + j 11.3 | 5.85 + j 14.45 |
| 1650 MHz | 36.0 + j 9.1 | 6.1 + j 14.3 |
| 1665 MHz | 34.3 + j 8.77 | 6.37 + j 14.2 |

## TEST CIRCUIT



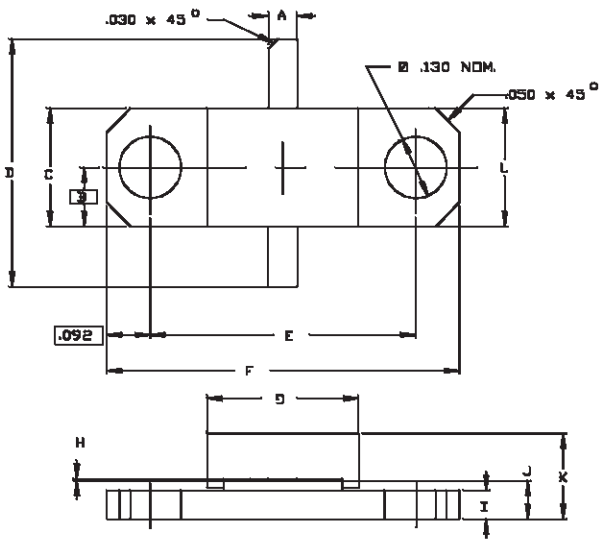

C1 : .6 - 4.5 pf Johanson
C2 : 39pf ATC Chip Capacitor
C3 : .1µf Ceramic

L1 : 10 Turns, AWG #28, .080"I.D.
L2 : 4 Turns, AWG #28, .)80" I.D.

Board Material: Er = 10.2, Thickness .050"

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0170
UDCS No. 1010996 rev B




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .055/1,40 | .065/1,65 |
| B | .124/3,15 | |
| C | .243/6,17 | .253/6,43 |
| D | .635/16,13 | .665/16,89 |
| E | .555/14,10 | .565/14,35 |
| F | .739/18,77 | .749/19,02 |
| G | .315/8,00 | .325/8,26 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .075/1,91 | .095/2,41 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .190/4,83 |
| L | .245/6,22 | .255/6,48 |
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