



NEC'S NPN SILICON EPITAXIAL TRANSISTOR

NE68939

FEATURES

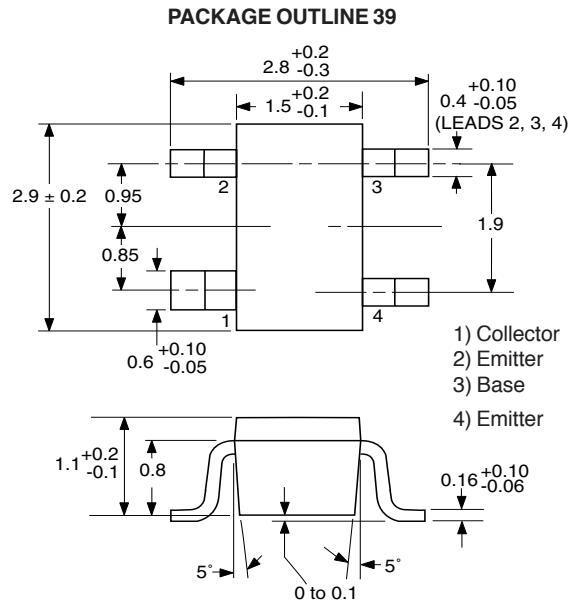
- **OUTPUT POWER AT 1dB COMPRESSION POINT:**
24.5 dBm TYP @F = 1.9 GHz, VCE = 3.6 V, Class AB, Duty 1/8
- **4 PIN MINI MOLD PACKAGE:** NE68939

DESCRIPTION

NEC's NE68939 is a low voltage, NPN Silicon Bipolar Transistor for pulsed power applications. The device is designed to operate from a 3.6 V supply, and deliver over 1/4 watt of power output at frequencies up to 2.0 GHz with a 1:8 duty cycle. These characteristics make it an ideal device for TX driver stage in a 1.9 GHz digital cordless telephone (DECT or PHS). The part is supplied in a SOT-143 (SC-61) 4-pin Mini-mold package and is available on tape and reel.

The NE68939 transistors are manufactured to NEC's stringent quality assurance standards to ensure highest reliability and consistent superior performance.

OUTLINE DIMENSIONS (Units in mm)



ELECTRICAL CHARACTERISTICS (TA = 25 °C)

| PART NUMBER | | NE68939 | | | |
|--------------|---|---------|-----|------|------|
| PACKAGE CODE | | 39 | | | |
| SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
| ICBO | Collector Cutoff Current, VCB = 5 V, IE = 0 | μA | | | 2.5 |
| IEBO | Emitter Cutoff Current, VEB = 1 V, IC = 0 | μA | | | 2.5 |
| hFE | DC Current Gain, VCE = 3.6 V, IC = 100 mA | | 30 | | |
| P-1 | Output Power | dBm | | 24.5 | |
| Gp | Power Gain | dB | 6.5 | 8 | |
| ηC | Collector Efficiency | % | 50 | 62 | |
| TON | Maximum Device On Time | Ms | | | 10.0 |

VCE = 3.6 V, f = 1.9 GHz
ICq = 2 mA (Class AB)
Duty 1/8

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25 °C)

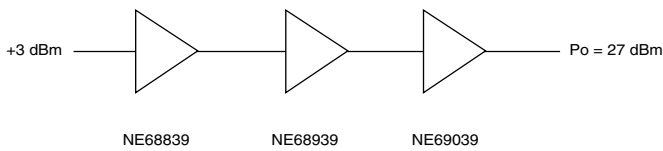
| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|------------------|------------------------------|-------|-------------|
| V _{CB0} | Collector to Base Voltage | V | 9.0 |
| V _{CE0} | Collector to Emitter Voltage | V | 6.0 |
| V _{EB0} | Emitter to Base Voltage | V | 2.0 |
| I _C | Collector Current mA | 150 | |
| P _T | Total Power Dissipation | mW | 200 (CW) |
| T _j | Junction Temperature | °C | 150 |
| T _{STG} | Storage Temperature | °C | -65 to +150 |

Note:

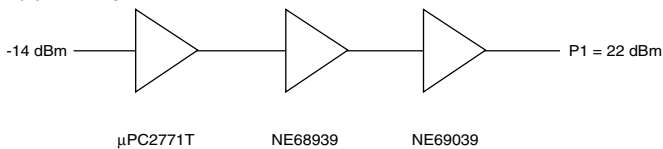
1. Operation in excess of any one of these parameters may result in permanent damage.

APPLICATION

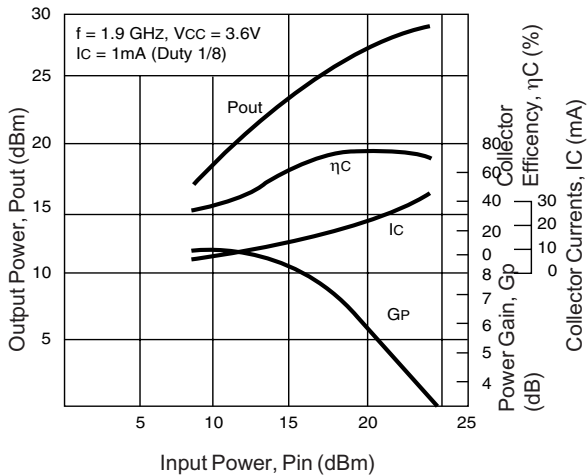
(1) TX Amplifier for DECT



(2) TX Amplifier for PHS



OUTPUT POWER, COLLECTOR EFFICIENCY, COLLECTOR CURRENT AND POWER GAIN VS. INPUT POWER

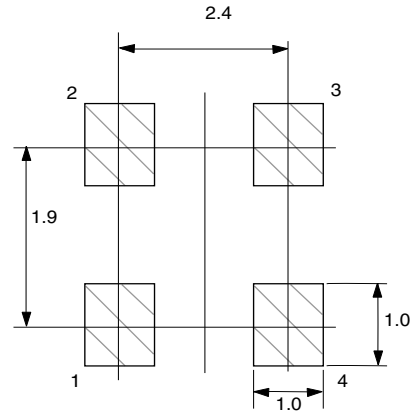


TYPICAL DATA

f = 1.9 GHz, V_{CC} = 3.6 V, I_{CQ} = 1 mA, DUTY = 1/8

| | | |
|------------------|------|-----|
| P _{1dB} | 24.5 | dbm |
| η _C | 62 | % |
| I _C | 15 | mA |
| GL | 9.0 | db |

OUTLINE 39 RECOMMENDED P.C.B. LAYOUT



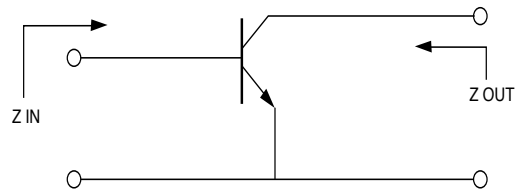
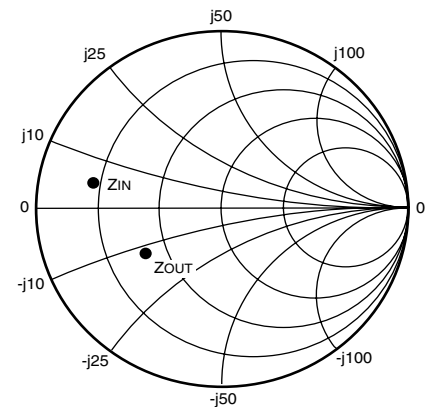
ORDERING INFORMATION

| PART NUMBER | QTY |
|--------------|---------|
| NE68939-T1-A | 3K/REEL |

Note:

1. Lead material: Cu
Lead plating: PbSn

Z_{IN} (Ω), Z_{OUT} (Ω) DATA



IMPEDANCE LOOKING INTO DEVICE

V_{CC} = 3.6 V, I_{CQ} = 1 mA, CLASS AB

| FREQUENCY (GHz) | Z _{IN} (Ω) | Z _{OUT} (Ω) |
|-----------------|---------------------|----------------------|
| 1.9 | 7.85+j5.62 | 21.9-j11.6 |
| 0.9 | 3.1+j11.6 | 5.3-j5.7 |

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DATA SUBJECT TO CHANGE WITHOUT NOTICE

07/05/2000

Subject: Compliance with EU Directives

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CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

| Restricted Substance per RoHS | Concentration Limit per RoHS (values are not yet fixed) | Concentration contained in CEL devices | |
|-------------------------------|---|--|-----|
| | | -A | -AZ |
| Lead (Pb) | < 1000 PPM | Not Detected | (*) |
| Mercury | < 1000 PPM | Not Detected | |
| Cadmium | < 100 PPM | Not Detected | |
| Hexavalent Chromium | < 1000 PPM | Not Detected | |
| PBB | < 1000 PPM | Not Detected | |
| PBDE | < 1000 PPM | Not Detected | |

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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