



NEC'S NPN SILICON EPITAXIAL TRANSISTOR

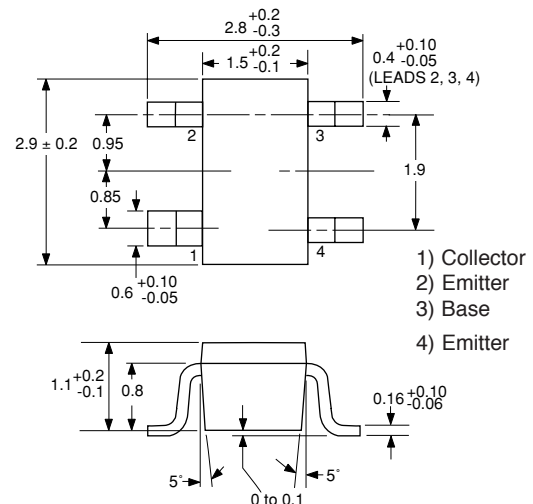
NE69039

FEATURES

- **OUTPUT POWER AT 1dB COMPRESSION POINT:**
27.5 dBm TYP @F = 1.9 GHz, VCE = 3.6 V, Class AB, Duty 1/8
- **4 PIN MINI MOLD PACKAGE:** NE69039

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE 39



DESCRIPTION

NEC's NE69039 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 1/2 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 output 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 NE69039 transistors are manufactured to NEC's stringent quality assurance standards to ensure highest reliability and consistent superior performance.

ELECTRICAL CHARACTERISTICS (TA = 25 °C)

PART NUMBER PACKAGE CODE			NE69039 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		27.5	
GP	Power Gain		5.0	6.0	
ηC	Collector Efficiency		50	72	
TON	Maximum Device On Time	Ms			10.0

Test conditions for P-1, GP, and ηC: VCE = 3.6 V, f = 1.9 GHz, ICq = 1 mA (Class AB), Duty 1/8

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25 °C)

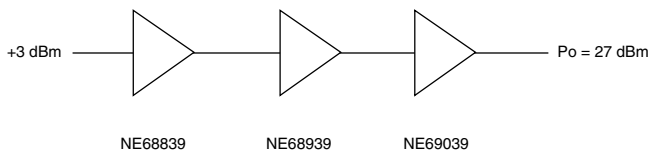
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	9.0
V _{CE0}	Collector to Emitter Voltage	V	6.0
V _{EB0}	Emitter to Base Voltage	V	2.0
I _C	Collector Current	mA	300
P _T	Total Power Dissipation	mW	200 (CW)
T _j	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

Note:

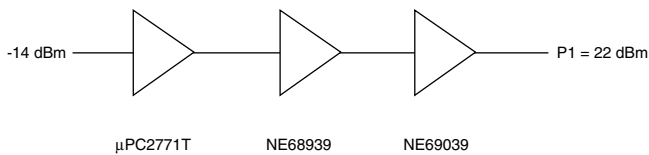
1. Operation in excess of any one of these parameters may result in permanent damage.

APPLICATION

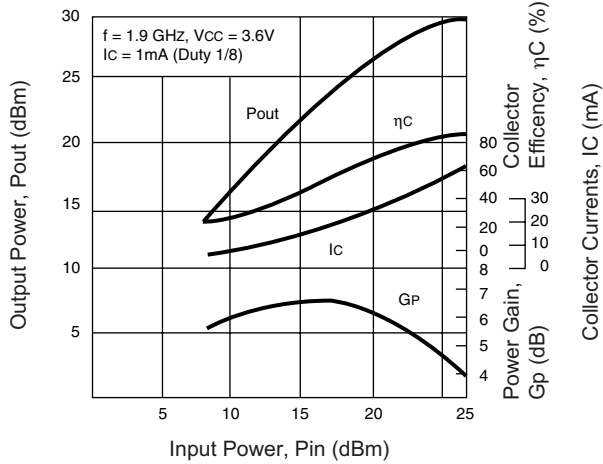
(1) TX Amplifier for DECT



(2) TX Amplifier for PHS



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

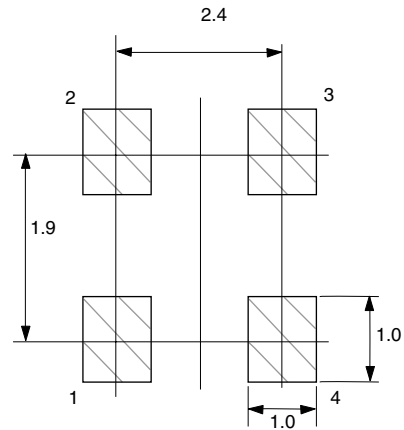


TYPICAL DATA

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

P _{1dB}	27.5	dBm
η _C	72	%
I _C	27	mA
G _L	6.7	db

**OUTLINE 39
RECOMMENDED P.C.B. LAYOUT**



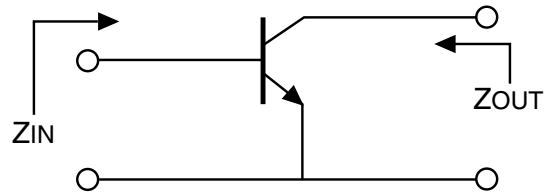
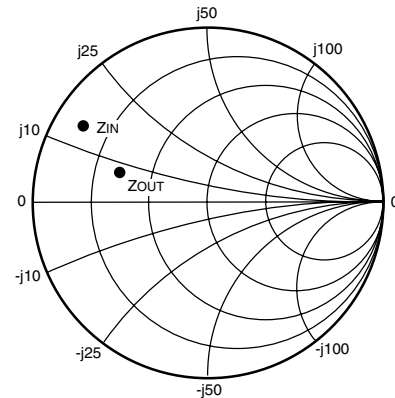
ORDERING INFORMATION

PART NUMBER	QTY
NE69039-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	7.42+j14.2	15.8-j2.64
0.9	4.0+j8.8	4.4-j4.6

EXCLUSIVE NORTH AMERICAN AGENT FOR **NEC** RF, MICROWAVE & OPTOELECTRONIC SEMICONDUCTORS

CEL CALIFORNIA EASTERN LABORATORIES • Headquarters • 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • Telex 34-6393 • FAX (408) 988-0279
24-Hour Fax-On-Demand: 800-390-3232 (U.S. and Canada only) • Internet: <http://WWW.CEL.COM>

DATA SUBJECT TO CHANGE WITHOUT NOTICE

07/06/2000

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

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.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerning the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.