

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

# 2SC2714

HIGH FREQUENCY AMPLIFIER APPLICATIONS

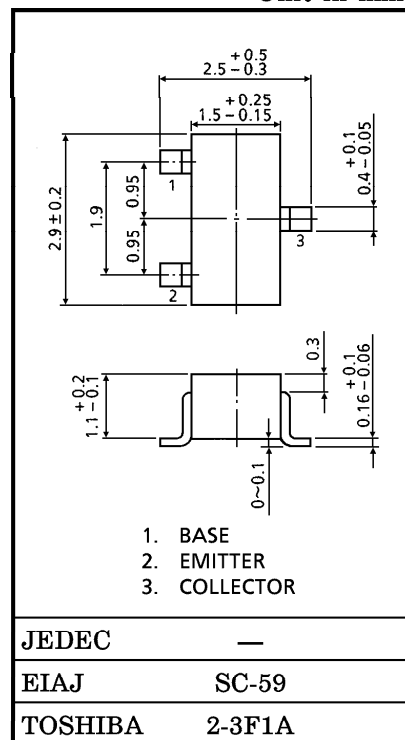
FM, RF, MIX, IF AMPLIFIER APPLICATIONS

- Small Reverse Transfer Capacitance :  $C_{re} = 0.7\text{pF}$  (Typ.)
- Low Noise Figure :  $NF = 2.5\text{dB}$  (Typ.) ( $f = 100\text{MHz}$ )

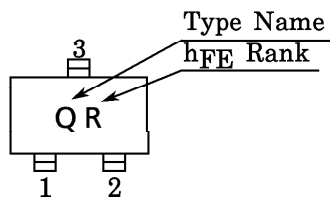
MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CB0}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	30	V
Emitter-Base Voltage	$V_{EB0}$	4	V
Collector Current	$I_C$	20	mA
Base Current	$I_B$	4	mA
Collector Power Dissipation	$P_C$	100	mW
Junction Temperature	$T_j$	125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55~125	$^\circ\text{C}$

Unit in mm



Marking



ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

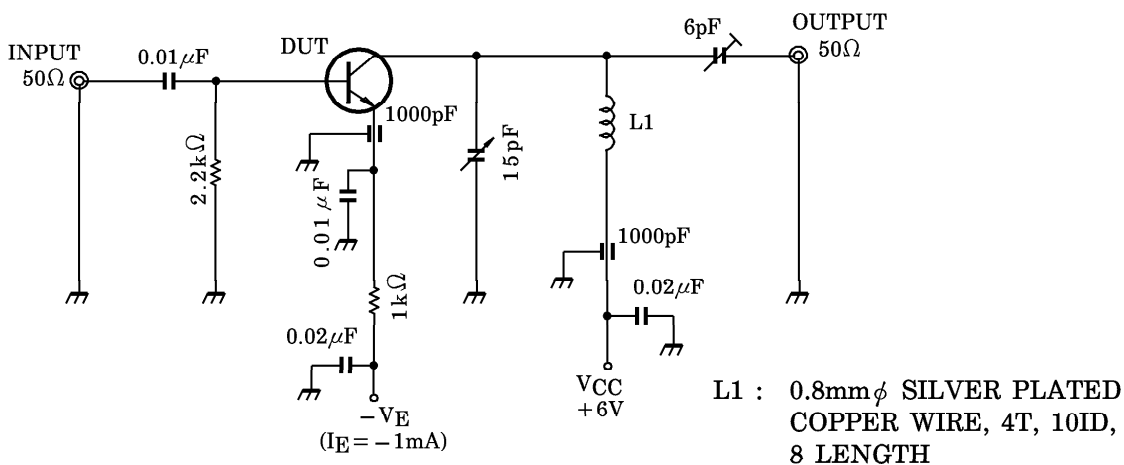
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 18\text{V}, I_E = 0$	—	—	0.5	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 4\text{V}, I_C = 0$	—	—	0.5	$\mu\text{A}$
DC Current Gain	$h_{FE}$ (Note)	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$	40	—	200	
Reverse Transfer Capacitance	$C_{re}$	$V_{CB} = 6\text{V}, f = 1\text{MHz}$	—	0.7	—	pF
Transition Frequency	$f_T$	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$	—	550	—	MHz
Collector-Base Time Constant	$C_c \cdot r_{bb}'$		—	—	30	ps
Noise Figure	NF	$V_{CE} = 6\text{V}, I_E = -1\text{mA}$	—	2.5	5.0	dB
Power Gain	$G_{pe}$	$f = 100\text{MHz}, \text{Fig.}$	17	23	—	dB

(Note)  $h_{FE}$  Classification R : 40~80, O : 70~140, Y : 100~200

961001EAA1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

Fig. NF,  $G_{pe}$  TEST CIRCUIT



y PARAMETER (Typ.)

(1) COMMON EMITTER ( $V_{CE} = 6V$ ,  $I_E = -1mA$ ,  $f = 100MHz$ )

CHARACTERISTIC	SYMBOL	TYP.	UNIT
Input Conductance	$g_{ie}$	2.9	mS
Input Capacitance	$C_{ie}$	10.2	pF
Reverse Transfer Admittance	$ y_{re} $	0.33	mS
Phase Angle of Reverse Transfer Admittance	$\theta_{re}$	-90	°
Forward Transfer Admittance	$ y_{fe} $	40	mS
Phase Angle of Forward Transfer Admittance	$\theta_{fe}$	-20	°
Output Conductance	$g_{oe}$	45	$\mu S$
Output Capacitance	$C_{oe}$	1.1	pF

(2) COMMON BASE ( $V_{CE} = 6V$ ,  $I_E = -1mA$ ,  $f = 100MHz$ )

CHARACTERISTIC	SYMBOL	TYP.	UNIT
Input Conductance	$g_{ib}$	34	mS
Input Capacitance	$C_{ib}$	-10	pF
Reverse Transfer Admittance	$ y_{rb} $	0.27	mS
Phase Angle of Reverse Transfer Admittance	$\theta_{rb}$	-105	°
Forward Transfer Admittance	$ y_{fb} $	34	mS
Phase Angle of Forward Transfer Admittance	$\theta_{fb}$	165	°
Output Conductance	$g_{ob}$	45	$\mu S$
Output Capacitance	$C_{ob}$	1.1	pF

