

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

## 2SC2669

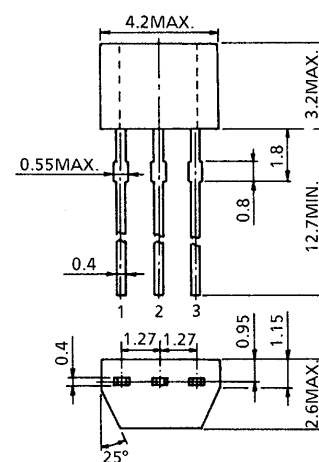
HIGH FREQUENCY AMPLIFIER APPLICATIONS

Unit in mm

- High Power Gain :  $G_{pe} = 30\text{dB}$  (Typ.) ( $f = 10.7\text{ MHz}$ )
- Recommended for FM IF, OSC Stage and AM CONV, IF Stage.

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CB0}$	35	V
Collector-Emitter Voltage	$V_{CEO}$	30	V
Emitter-Base Voltage	$V_{EBO}$	4	V
Collector Current	$I_C$	50	mA
Base Current	$I_B$	10	mA
Collector Power Dissipation	$P_C$	200	mW
Junction Temperature	$T_j$	125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	$-55\sim 125$	$^\circ\text{C}$



1. EMITTER
2. COLLECTOR
3. BASE

JEDEC —

EIAJ —

TOSHIBA 2-4E1A

Weight : 0.13 g

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 35\text{ V}, I_E = 0$	—	—	0.1	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 4\text{ V}, I_C = 0$	—	—	1.0	$\mu\text{A}$
DC Current Gain	$h_{FE}$ (Note)	$V_{CE} = 12\text{ V}, I_C = 2\text{ mA}$	40	—	240	—
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	—	0.4	V
Base-Emitter Voltage	$V_{BE}$	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$	—	—	1.0	V
Transition Frequency	$f_T$	$V_{CE} = 10\text{ V}, I_C = 1\text{ mA}$	100	—	—	MHz
Collector Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	2.0	3.2	pF
Collector-Base Time Constant	$C_c \cdot r_{bb'}$	$V_{CE} = 10\text{ V}, I_E = -1\text{ mA}, f = 30\text{ MHz}$	—	—	50	ps
Power Gain	$G_{pe}$	$V_{CC} = 6\text{ V}, I_E = -1\text{ mA}, f = 10.7\text{ MHz}$ (Fig.)	27	30	33	dB

(Note) :  $h_{FE}$  Classification R : 40~80, O : 70~140, Y : 120~240

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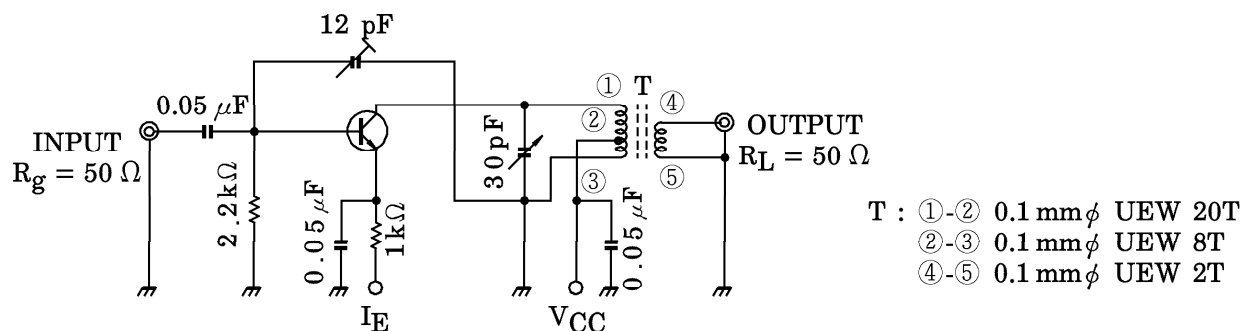


Fig.1  $G_{pe}$  TEST CIRCUIT

### Y PARAMETERS (Typ.)

(1) (COMMON EMITTER  $f = 455 \text{ kHz}$ ,  $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	2SC2669-R	2SC2669-O	2SC2669-Y	UNIT
Collector-Emitter Voltage	$V_{CE}$	6	6	6	V
Emitter Current	$I_E$	−1	−1	−1	mA
Input Conductance	$g_{ie}$	0.58	0.41	0.26	mS
Input Capacitance	$C_{ie}$	53	46	38	pF
Output Conductance	$g_{oe}$	1.9	2.7	4.8	$\mu$ S
Output Capacitance	$C_{oe}$	2.6	2.8	3.6	pF
Forward Transfer Admittance	$ y_{fe} $	38	38	38	mS
Phase Angle of Forward Transfer Admittance	$\theta_{fe}$	−0.79	−0.83	−0.92	°
Reverse Transfer Admittance	$ y_{re} $	5.7	5.7	6.2	$\mu$ S
Phase Angle of Reverse Transfer Admittance	$\theta_{re}$	−90	−90	−90	°

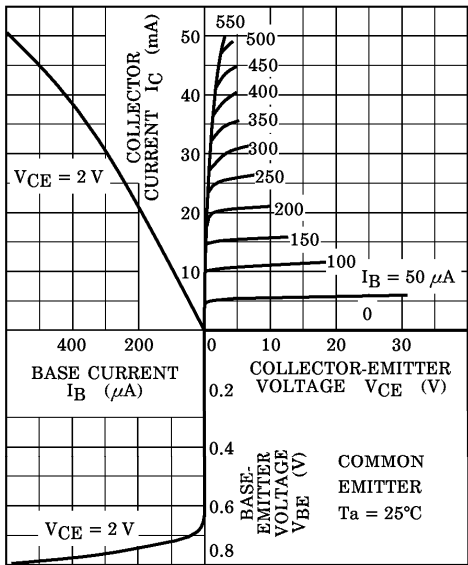
(2) (COMMON EMITTER  $f = 10.7 \text{ MHz}$ ,  $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	2SC2669-R	2SC2669-O	2SC2669-Y	UNIT
Collector-Emitter Voltage	$V_{CE}$	6	6	6	V
Emitter Current	$I_E$	−1	−1	−1	mA
Input Conductance	$g_{ie}$	1.04	0.85	0.65	mS
Input Capacitance	$C_{ie}$	49	43	36	pF
Output Conductance	$g_{oe}$	10	15	28	$\mu$ S
Output Capacitance	$C_{oe}$	2.7	2.9	3.6	pF
Forward Transfer Admittance	$ y_{fe} $	37	37	37	mS
Phase Angle of Forward Transfer Admittance	$\theta_{fe}$	−9.6	−10.4	−11.5	°
Reverse Transfer Admittance	$ y_{re} $	120	120	140	$\mu$ S
Phase Angle of Reverse Transfer Admittance	$\theta_{re}$	−90	−90	−90	°

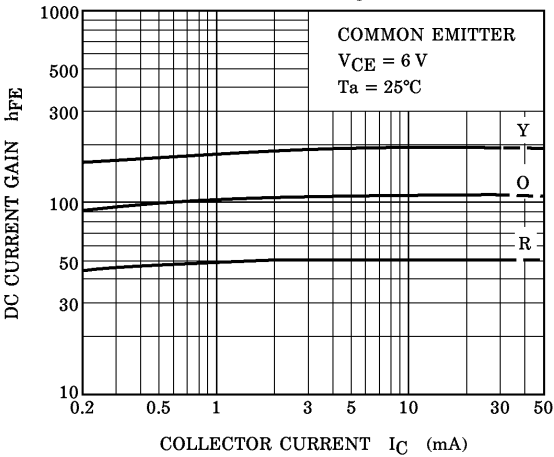
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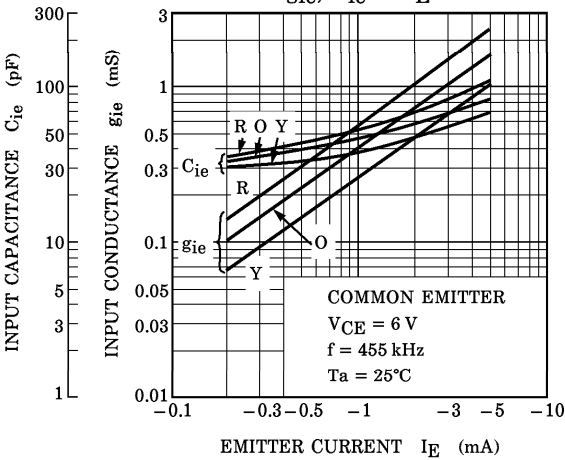
STATIC CHARACTERISTICS



$h_{FE} - I_C$



$g_{ie}, C_{ie} - I_E$



$g_{ie}, C_{ie} - V_{CE}$

