TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

2SC4667

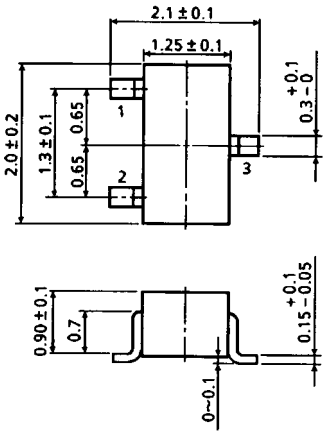
Ultra High Speed Switching Applications
Computer, Counter Applications

- High transition frequency: f_T = 400 MHz (typ.)
- Low saturation voltage: $V_{CE\ (sat)}$ = 0.3 V (max)
- High speed switching time: t_{stg} = 15 ns (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	40	V
Collector-emitter voltage	V_{CEO}	15	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	200	mA
Base current	I_B	40	mA
Collector power dissipation	P_C	100	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Unit: mm



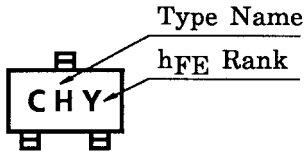
1. BASE
2. EMITTER
3. COLLECTOR

USM

JEDEC	—
JEITA	SC-70
TOSHIBA	2-2E1A

Weight: 0.006 g (typ.)

Marking

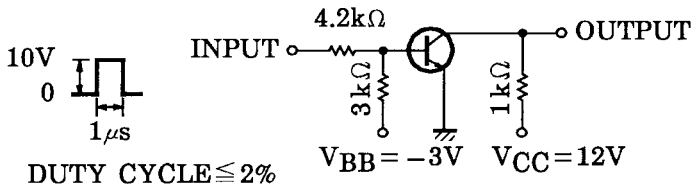


Electrical Characteristics (Ta = 25°C)

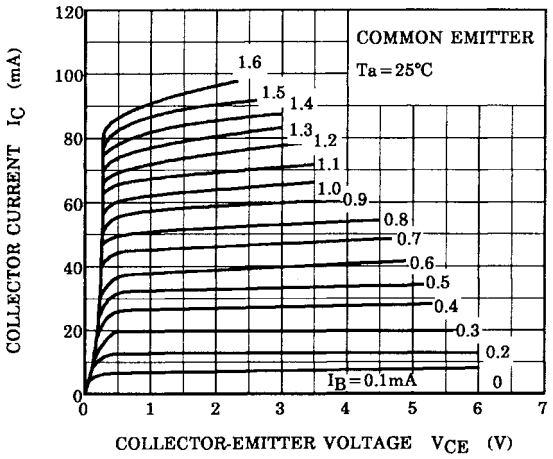
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 40 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	0.1	μA
DC current gain		$h_{FE\ (1)}$ (Note 1)	V_{CE} = 1 V, I_C = 10 mA	40	—	240	
		$h_{FE\ (2)}$	V_{CE} = 1 V, I_C = 100 mA	20	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 20 mA, I_B = 1 mA	—	—	0.3	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 20 mA, I_B = 1 mA	—	—	1.0	V
Transition frequency		f_T	V_{CE} = 10 V, I_C = 10 mA	200	400	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	4	6	pF
Switching time	Turn-on time	t_{on}	(Note 2)	—	70	—	ns
	Storage time	t_{stg}		—	15	—	
	Turn-off time	t_{off}		—	30	—	

Note 1: $h_{FE\ (1)}$ classification R: 40~80, O: 70~140, Y: 120~240

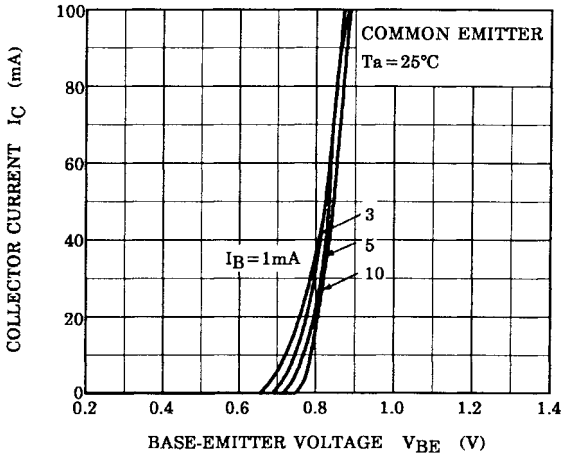
Note 2: Switching time test circuit



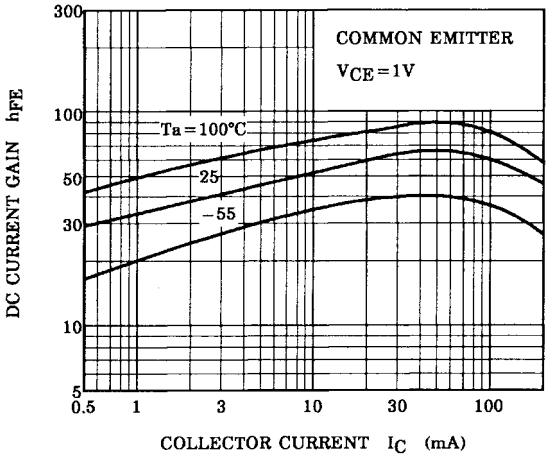
$I_C - V_{CE}$



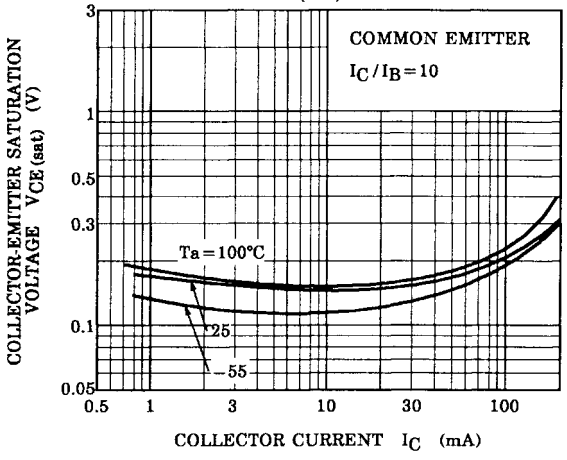
$I_C - V_{BE}$

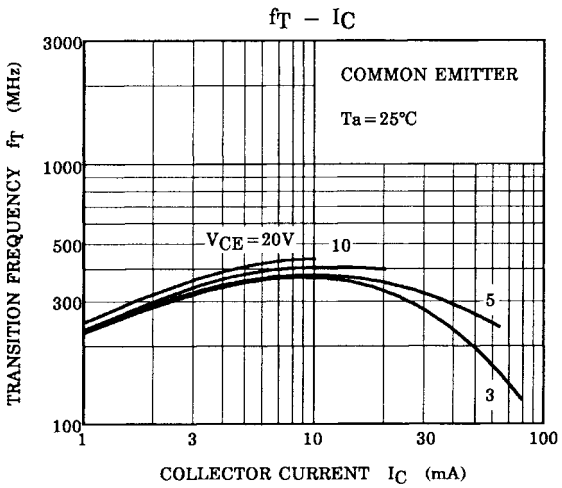


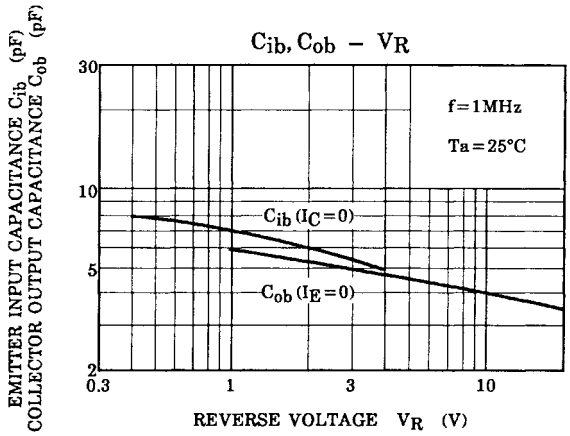
$h_{FE} - I_C$

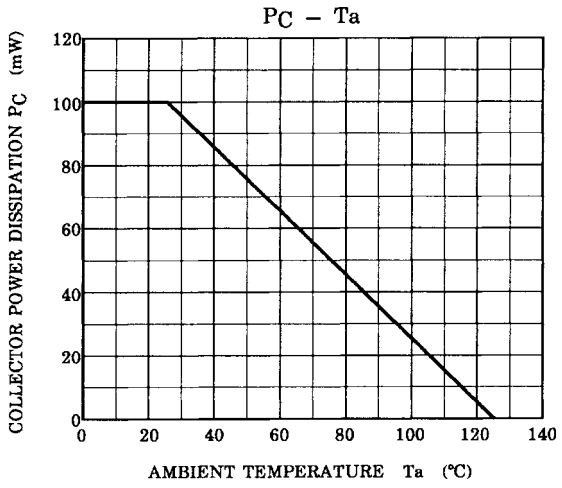


$V_{CE\,(sat)} - I_C$




f_T – I_C
COMMON EMITTER
Ta = 25°C
V_{CE} = 20V
10
5
3
TRANSITION FREQUENCY f_T (MHz)
3000
1000
500
300
100
1
3
10
30
100
COLLECTOR CURRENT I_C (mA)


C_{ib}, C_{ob} – V_R
f = 1MHz
Ta = 25°C
C_{ib} (I_C = 0)
C_{ob} (I_E = 0)
EMITTER INPUT CAPACITANCE C_{ib} (pF)
COLLECTOR OUTPUT CAPACITANCE C_{ob} (pF)
30
10
5
2
0.3
1
3
10
REVERSE VOLTAGE V_R (V)


P_C – Ta
COLLECTOR POWER DISSIPATION P_C (mW)
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
AMBIENT TEMPERATURE Ta (°C)

RESTRICTIONS ON PRODUCT USE

000707EAA

- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- 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.