

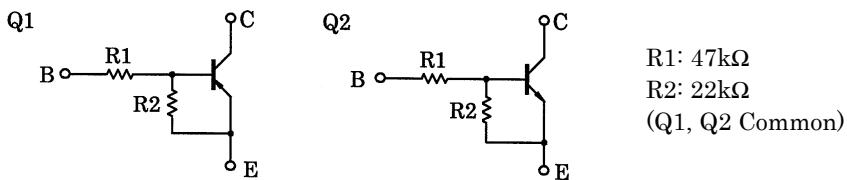
TOSHIBA Transistor
Silicon PNP Epitaxial Type (PCT Process) Silicon NPN Epitaxial Type (PCT Process)

RN4609

Switching, Inverter Circuit, Interface Circuit And Driver Circuit Applications

- Including two devices in SM6 (super mini type with 6 leads)
 - With built-in bias resistors
 - Simplify circuit design
 - Reduce a quantity of parts and manufacturing process

Equivalent Circuit and Bias Resister Values



Q1 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-50	V
Collector-emitter voltage	V_{CEO}	-50	V
Emitter-base voltage	V_{EBO}	-15	V
Collector current	I_C	-100	mA

Unit in mm

2.9±0.2

1.9±0.2

0.95

0.95

1

2

3

2.8 - 0.3

+0.2

1.6 - 0.1

6

5

4

+0.1

0.30 - 0.08

0.16 - 0.06

+0.1

1. Emitter 1 (E1)
2. Base 1 (B1)
3. Collector 2 (C2)
4. Emitter 2 (E2)
5. Base 2 (B2)
6. Collector 1 (C1)

SM6

JEDEC	—
EIAJ	—
TOSHIBA	2-3N1A

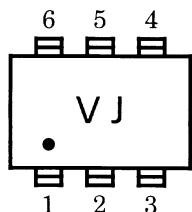
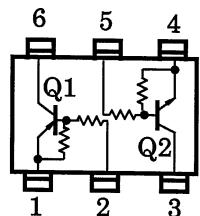
Q2 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	15	V
Collector current	I_C	100	mA

Q1, Q2 Common Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P _C *	300	mW
Junction temperature	T _j	150	°C
Storage temperature range	T _{stg}	-55~150	°C

* Total rating

Marking**Equivalent Circuit (Top View)**

Q1 Electrical Characteristics (Ta = 25°C)

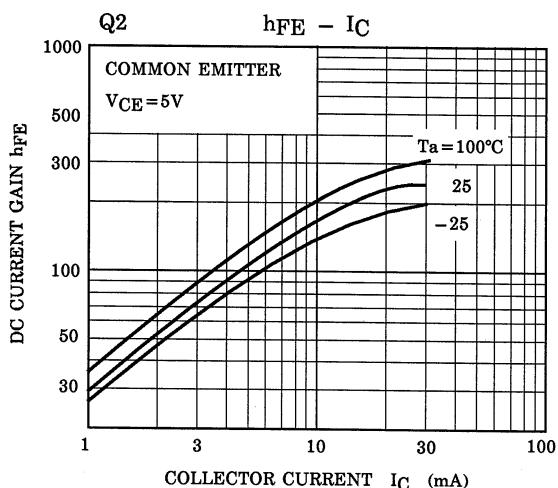
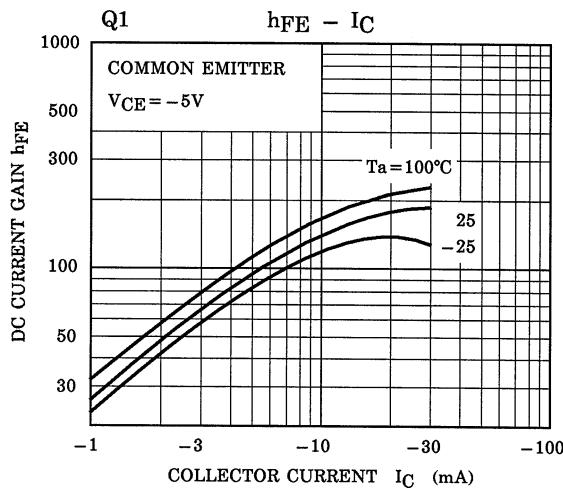
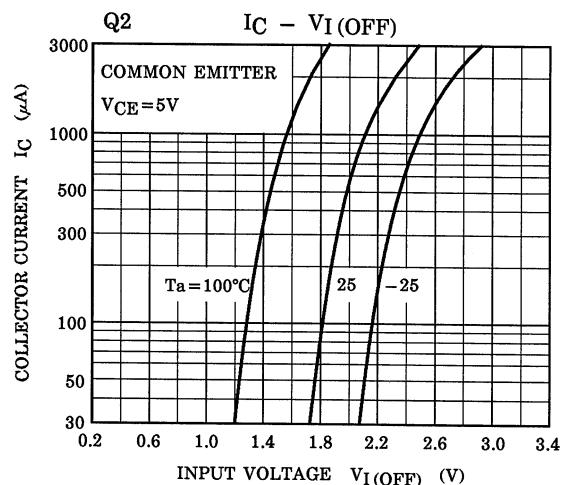
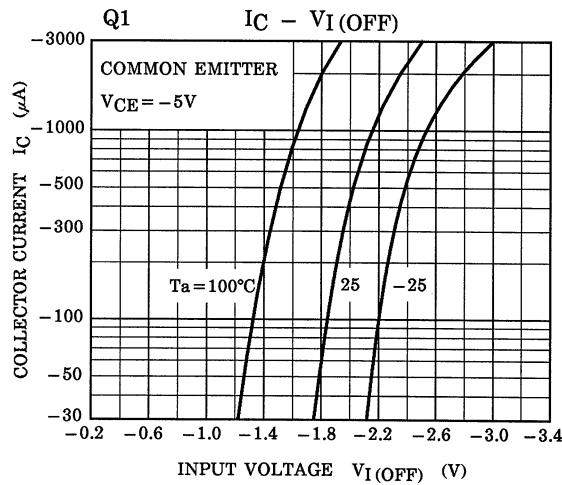
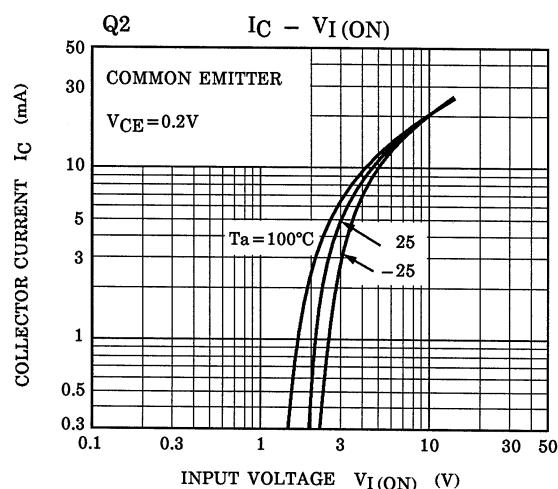
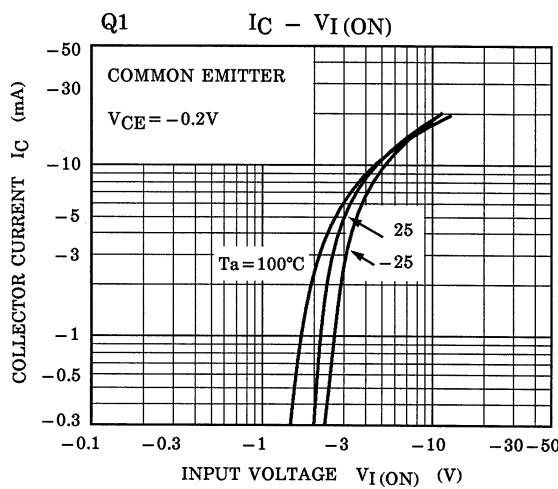
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I _{CBO}	—	V _{CB} = -50V, I _E = 0	—	—	-100	nA
	I _{CEO}	—	V _{CE} = -50V, I _B = 0	—	—	-500	
Emitter cut-off current	I _{EBO}	—	V _{EB} = -15V, I _C = 0	-0.167	—	-0.311	mA
DC current gain	h _{FE}	—	V _{CE} = -5V, I _C = -10mA	70	—	—	—
Collector-emitter saturation voltage	V _{CE} (sat)	—	I _C = -5mA, I _B = -0.25mA	—	-0.1	-0.3	V
Input voltage (ON)	V _I (ON)	—	V _{CE} = -0.2V, I _C = -5mA	-2.2	—	-5.8	V
Input voltage (OFF)	V _I (OFF)	—	V _{CE} = -5V, I _C = -0.1mA	-1.5	—	-2.6	V
Transition frequency	f _T	—	V _{CE} = -10V, I _C = -5mA	—	200	—	MHz
Collector output capacitance	C _{ob}	—	V _{CB} = -10V, I _E = 0	—	3	6	pF

Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I _{CBO}	—	V _{CB} = 50V, I _E = 0	—	—	100	nA
	I _{CEO}	—	V _{CE} = 50V, I _B = 0	—	—	500	
Emitter cut-off current	I _{EBO}	—	V _{EB} = 15V, I _C = 0	0.167	—	0.311	mA
DC current gain	h _{FE}	—	V _{CE} = 5V, I _C = 10mA	70	—	—	—
Collector-emitter saturation voltage	V _{CE} (sat)	—	I _C = 5mA, I _B = 0.25mA	—	0.1	0.3	V
Input voltage (ON)	V _I (ON)	—	V _{CE} = 0.2V, I _C = 5mA	2.2	—	5.8	V
Input voltage (OFF)	V _I (OFF)	—	V _{CE} = 5V, I _C = 0.1mA	1.5	—	2.6	V
Transition frequency	f _T	—	V _{CE} = 10V, I _C = 5mA	—	250	—	MHz
Collector output capacitance	C _{ob}	—	V _{CB} = 10V, I _E = 0, f = 1 MHz	—	3	6	pF

Q1, Q2 Common Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input resistor	R ₁	—	—	32.9	47	61.1	kΩ
Resistor ratio	R ₁ /R ₂	—	—	1.92	2.14	2.35	—



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