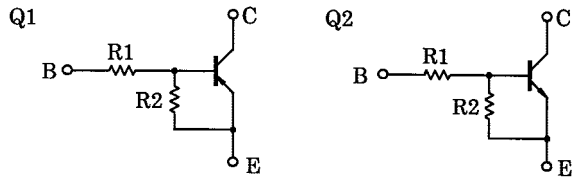
TOSHIBA Transistor
Silicon PNP Epitaxial Type (PCT Process) Silicon NPN Epitaxial Type (PCT Process)

RN4604

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

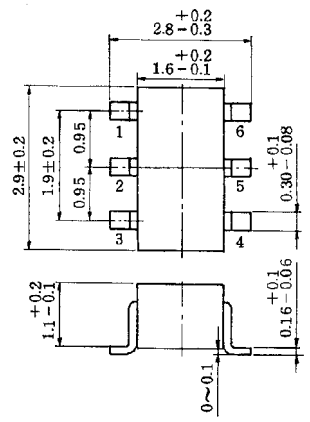
- Including two devices in SM6 (super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process

Equivalent Circuit and Bias Resister Values



R1: 47kΩ
R2: 47kΩ
(Q1, Q2 Common)

Unit in mm



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

Weight: 0.015g

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}	−10	V
Collector current	I_C	−100	mA

Q2 Maximum Ratings (Ta = 25°C)

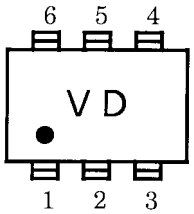
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
Collector current	I_C	100	mA

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

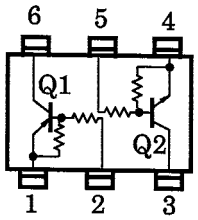
Characteristic	Symbol	Rating	Unit
Collector power dissipation	P_C *	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

* 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} = −10V, I_C = 0	−0.082	—	−0.15	mA
DC current gain	h_{FE}	—	V_{CE} = −5V, I_C = −10mA	80	—	—	—
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	−1.5	—	−5.0	V
Input voltage (OFF)	$V_{I\ (OFF)}$	—	V_{CE} = −5V, I_C = −0.1mA	−1.0	—	−1.5	V
Transition frequency	f_T	—	V_{CE} = −10V, I_C = −5mA	—	200	—	MHz
Collector output capacitance	C_{ob}	—	V_{CB} = −10V, I_E = 0, f = 1MHz	—	3	6	pF

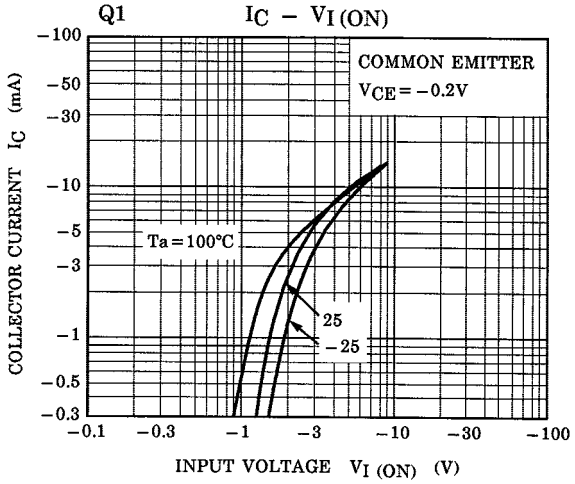
Q2 Electrical Characteristics (Ta = 25°C)

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} = 10V, I_C = 0	0.082	—	0.15	mA
DC current gain	h_{FE}	—	V_{CE} = 5V, I_C = 10mA	80	—	—	—
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	1.5	—	5.0	V
Input voltage (OFF)	$V_{I\ (OFF)}$	—	V_{CE} = 5V, I_C = 0.1mA	1.0	—	1.5	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

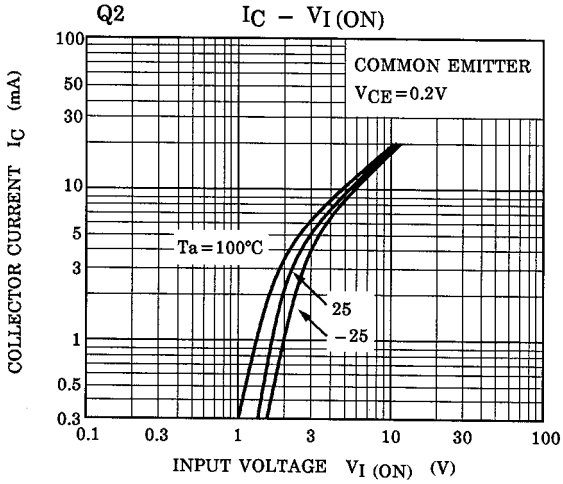
Q1, Q2 Common Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input resistor	R1	—	—	32.9	47	61.1	kΩ
Resistor ratio	R1/R2	—	—	0.9	1.0	1.1	—

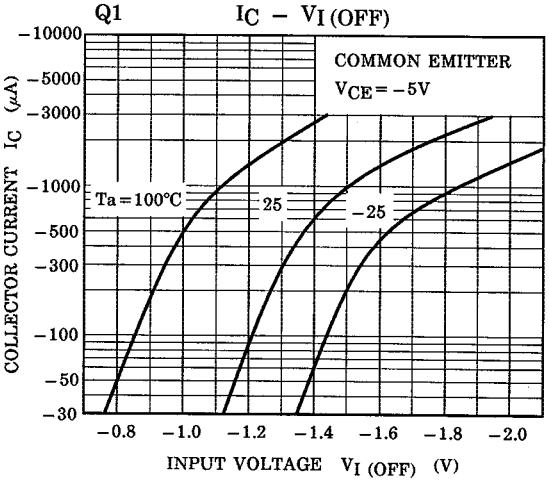
Q1 $I_C - V_{I\,(ON)}$



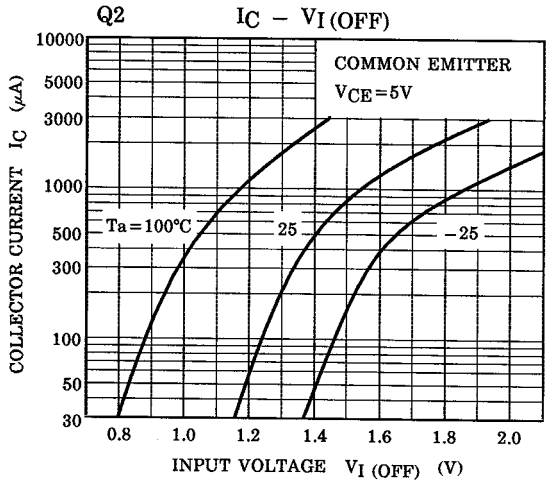
Q2 $I_C - V_{I\,(ON)}$



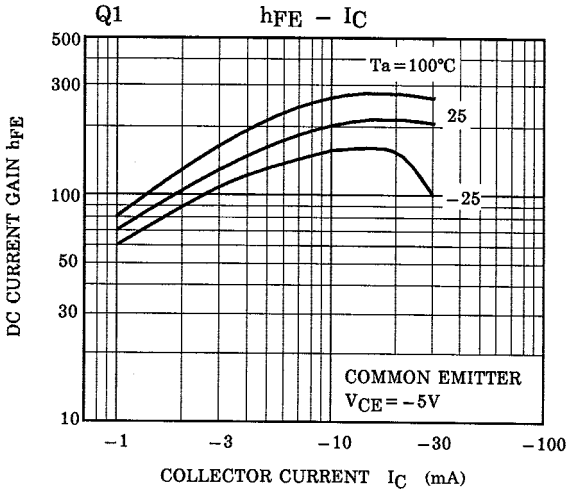
Q1 $I_C - V_{I\,(OFF)}$



Q2 $I_C - V_{I\,(OFF)}$



Q1 $h_{FE} - I_C$



Q2 $h_{FE} - I_C$