

TOSHIBA Transistor Silicon PNP · NPN Epitaxial Type
(PCT Process) (Bias Resistor Built-in Transistor)

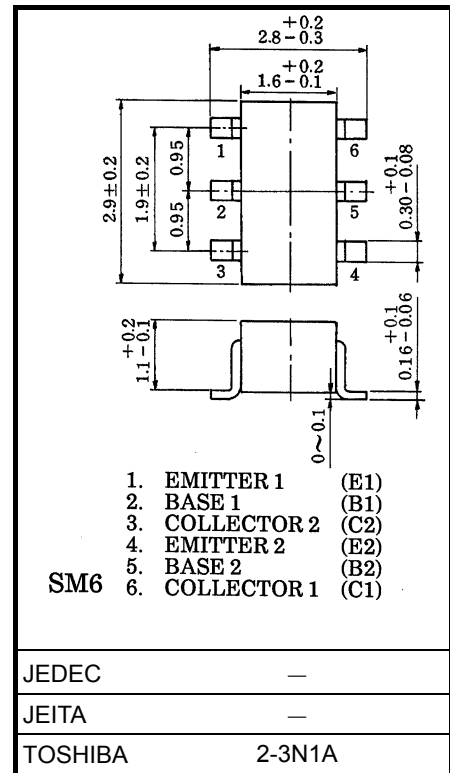
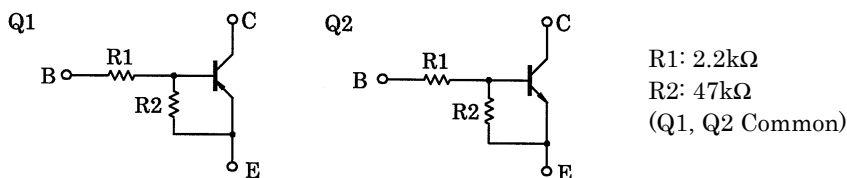
RN4605

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

Unit: mm

- 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 Resistor Values



Weight: 15 mg (typ.)

Q1 Absolute 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}	-5	V
Collector current	I _C	-100	mA

Q2 Absolute 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}	5	V
Collector current	I _C	100	mA

Start of commercial production
1988-11

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

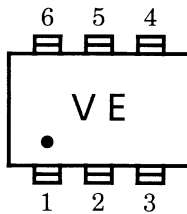
Characteristic	Symbol	Rating	Unit
Collector power dissipation	P_C *	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

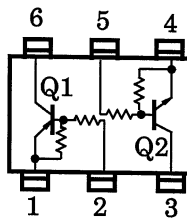
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

* Total rating

Marking



Equivalent Circuit (Top View)



Q1 Electrical Characteristics (Ta = 25°C)

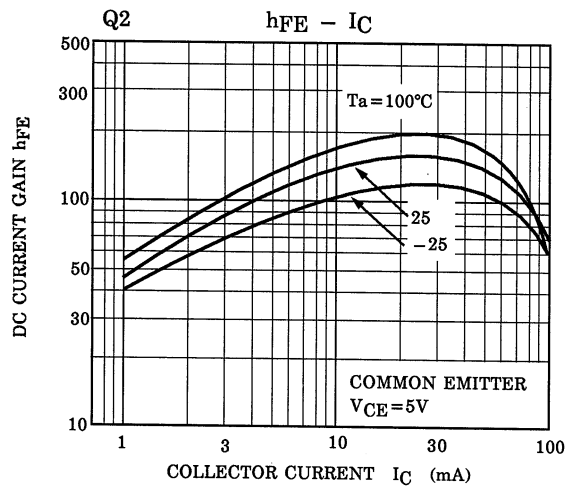
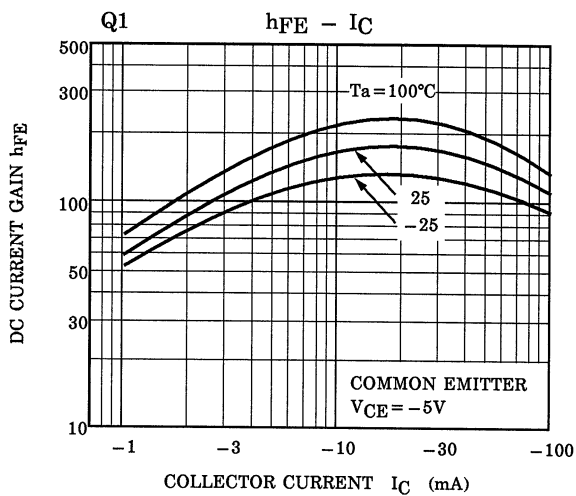
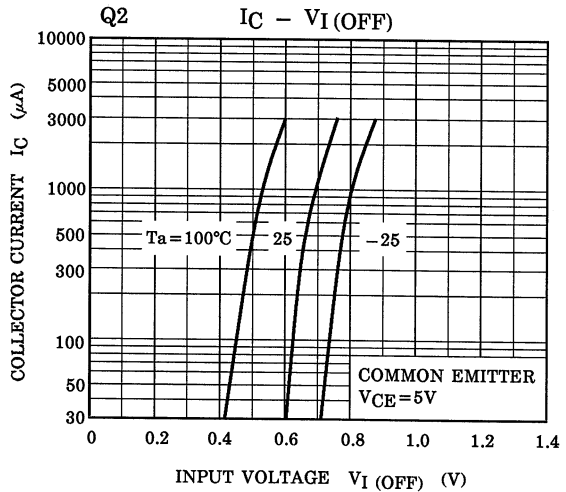
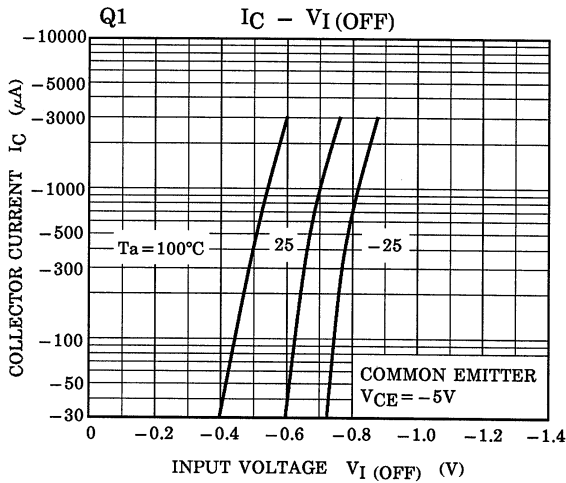
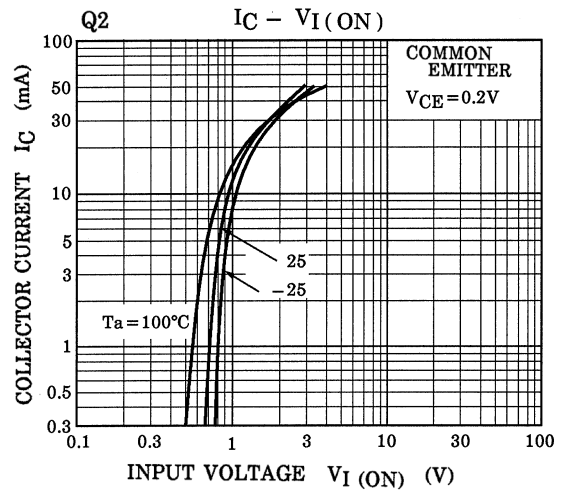
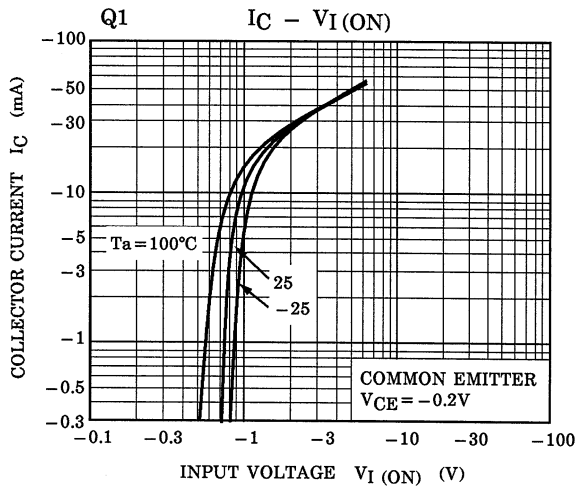
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I _{CBO}	—	V _{CB} = -50V, I _E = 0	—	—	-100	nA
	I _{CEO}	—	V _{CE} = -50V, I _B = 0	—	—	-500	
Emitter cut-off current	I _{EBO}	—	V _{EB} = -5V, I _C = 0	-0.078	—	-0.145	mA
DC current gain	h _{FE}	—	V _{CE} = -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	-0.6	—	-1.1	V
Input voltage (OFF)	V _{I (OFF)}	—	V _{CE} = -5V, I _C = -0.1mA	-0.5	—	-0.8	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 = 1 MHz	—	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} = 5V, I _C = 0	0.078	—	0.145	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	0.6	—	1.1	V
Input voltage (OFF)	V _{I (OFF)}	—	V _{CE} = 5V, I _C = 0.1mA	0.5	—	0.8	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	—	—	1.54	2.2	2.86	kΩ
Resistor ratio	R1/R2	—	—	0.0421	0.0468	0.0515	—



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