

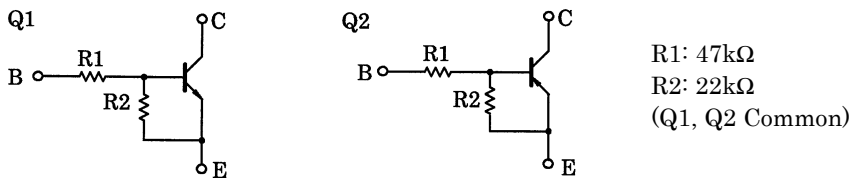
TOSHIBA Transistor  
Silicon NPN Epitaxial Type (PCT Process) Silicon PNP Epitaxial Type (PCT Process)

## RN4989

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

- Including two devices in US6 (ultra 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



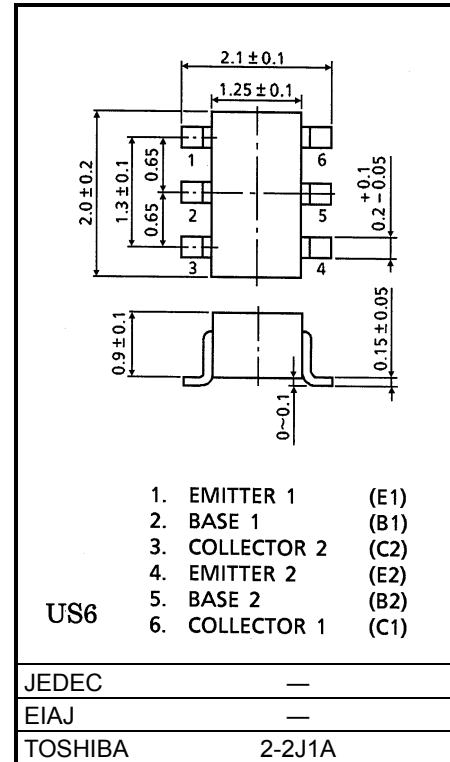
### Q1 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	50	V
Collector-emitter voltage	V <sub>CEO</sub>	50	V
Emitter-base voltage	V <sub>EBO</sub>	15	V
Collector current	I <sub>C</sub>	100	mA

### Q2 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	-50	V
Collector-emitter voltage	V <sub>CEO</sub>	-50	V
Emitter-base voltage	V <sub>EBO</sub>	-15	V
Collector current	I <sub>C</sub>	-100	mA

Unit: mm



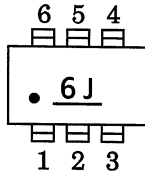
Weight: 6.8mg

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

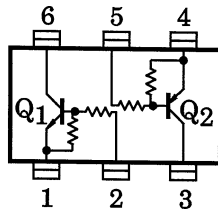
Characteristic	Symbol	Rating	Unit
Collector power dissipation	$P_C$ *	200	mW
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55~150	°C

\* : 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	$f_T$	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector output capacitance	$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1 MHz$	—	3	6	pF

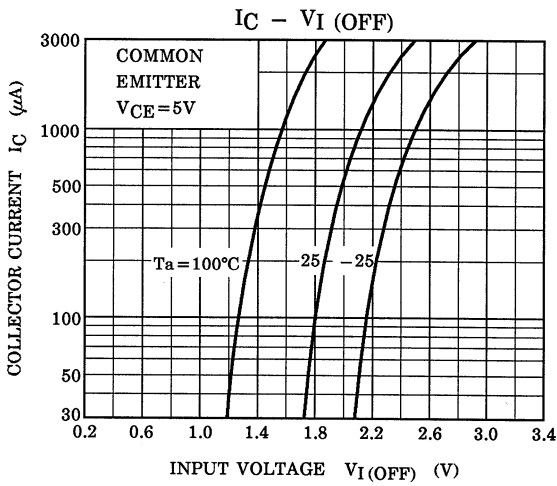
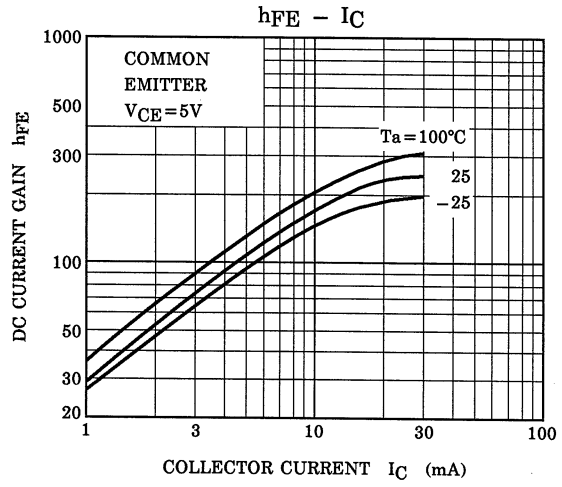
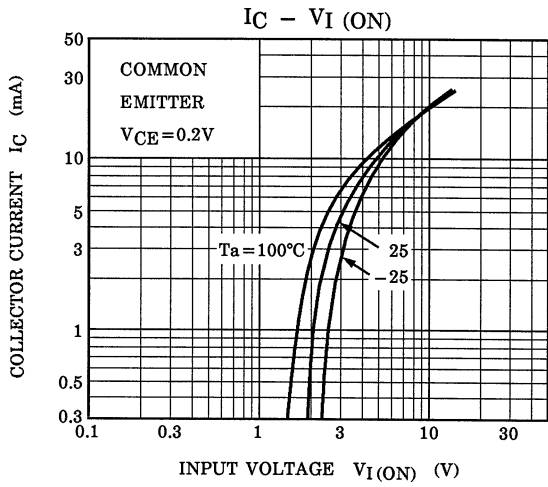
## Q2 Electrical Characteristics (Ta = 25°C)

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	$I_{EBO}$	—	$V_{EB} = -15V, I_C = 0$	-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

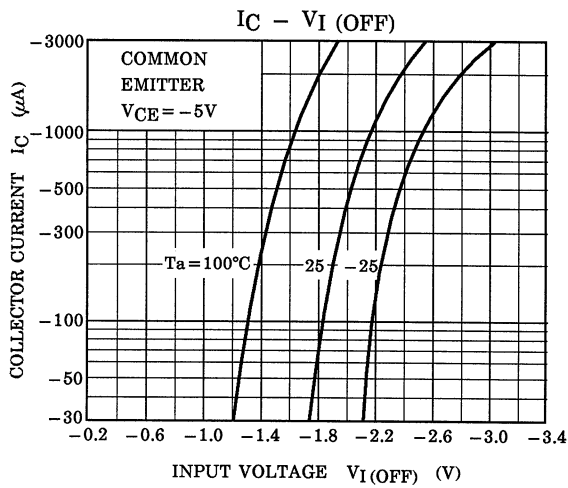
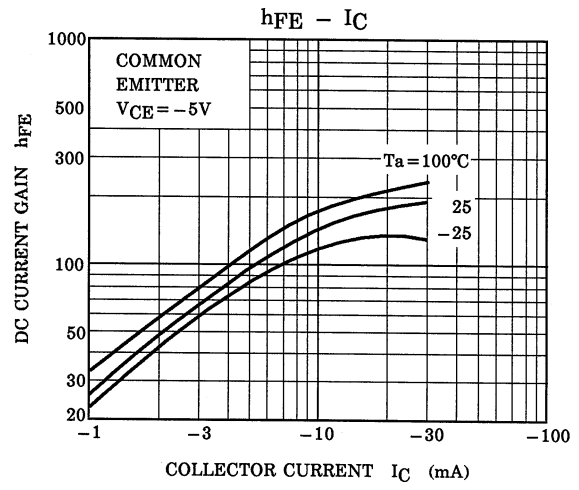
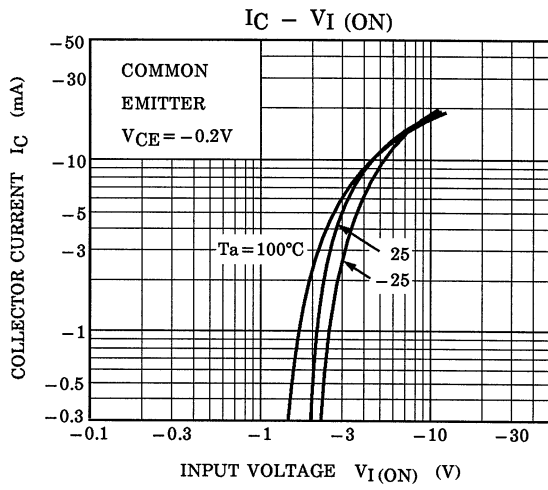
## Q1, Q2 Common Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input resistor	R1	—	—	32.9	47	61.1	kΩ
Resistor ratio	R1/R2	—	—	1.92	2.14	2.35	—

Q1



**Q2**



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