

TOSHIBA TRANSISTOR
SILICON PNP EPITAXIAL TYPE (PCT PROCESS) SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

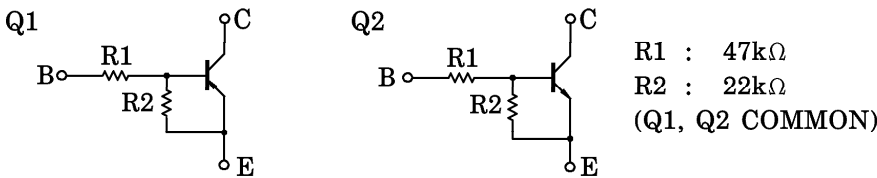
RN4909

SWITCHING, INVERTER CIRCUIT, INTERFACE CIRCUIT
AND DRIVER CIRCUIT APPLICATIONS.

Unit in mm

- 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 RESISTOR 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

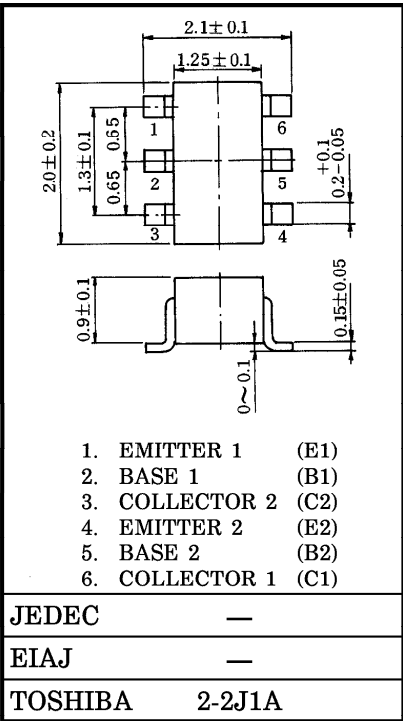
Q2 MAXIMUM RATINGS (Ta = 25°C)

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

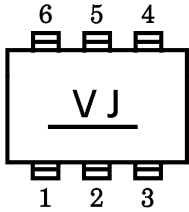
Q1, Q2 COMMON MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector Power Dissipation	P_C^*	200	mW
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	-55~150	°C

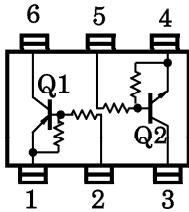
* : Total Rating



MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



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● TOSHIBA is continually working to improve the quality and the 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 observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product 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 products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

Q1 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	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}	$V_{CB} = -10V, I_E = 0, f = 1MHz$	—	3	6	pF

Q2 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	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}	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF

Q1, Q2 COMMON ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	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	

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