TOSHIBA Transistor Silicon NPN Epitaxial Type

# 2SC5713

High-Speed Switching Applications DC-DC Converter Applications Strobe Applications

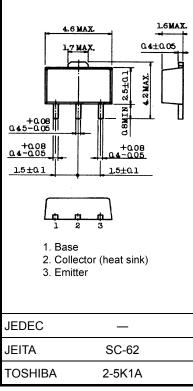
- High DC current gain:  $h_{FE} = 400$  to 1000 (IC = 0.5 A)
- Low collector-emitter saturation voltage:  $V_{CE (sat)} = 0.15 \text{ V (max)}$
- High-speed switching: tf = 50 ns (typ.)

### Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Collector-base voltage		V <sub>CBO</sub>	20	V	
Collector-emitter voltage		V <sub>CEX</sub>	15	V	
Collector-emitter voltage		V <sub>CEO</sub>	10	V	
Emitter-base voltage		V <sub>EBO</sub>	7	V	
Collector current	DC	Ic	4	Α	
	Pulse	I <sub>CP</sub>	7		
Base current		ΙΒ	400	mA	
Collector power dissipation	DC	PC	1.0	W	
	t = 10 s	(Note 1)	2.5		
Junction temperature		Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

**Industrial Applications** 

Unit: mm



Weight: 0.05 g (typ.)

- Note 1: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)
- Note 2: 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).

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	$V_{CB} = 20 \text{ V}, I_{E} = 0$	_	_	100	nA
Emitter cut-off current		I <sub>EBO</sub>	$V_{EB} = 7 \text{ V, } I_{C} = 0$	_	_	100	nA
Collector-emitter breakdown voltage		V (BR) CEO	$I_C = 10 \text{ mA}, I_B = 0$	10	_	_	V
DC current gain		h <sub>FE</sub> (1)	$V_{CE} = 2 \text{ V}, I_{C} = 0.5 \text{ A}$	400	_	1000	
		h <sub>FE</sub> (2)	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 1.6 A	200	_	_	
Collector-emitter saturation voltage		V <sub>CE</sub> (sat)	I <sub>C</sub> = 1.6 A, I <sub>B</sub> = 32 mA	_	_	0.15	V
Base-emitter saturation voltage		V <sub>BE</sub> (sat)	I <sub>C</sub> = 1.6 A, I <sub>B</sub> = 32 mA	_	_	1.10	V
Collector output capacitance		C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	_	28	_	pF
Switching time	Rise time	t <sub>r</sub>	See Figure 1 circuit diagram.	_	110	_	ns
	Storage time	t <sub>stg</sub>	$V_{CC} \simeq 6 \text{ V}, R_L = 3.75 \Omega$	_	150	_	
	Fall time	t <sub>f</sub>	$I_{B1} = -I_{B2} = 53 \text{ mA}$	_	50	_	

## Marking

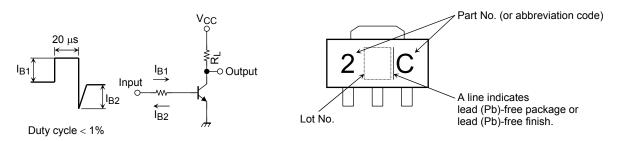
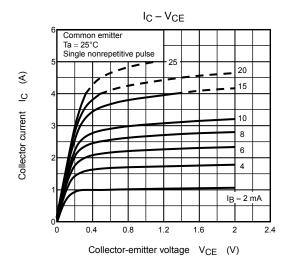
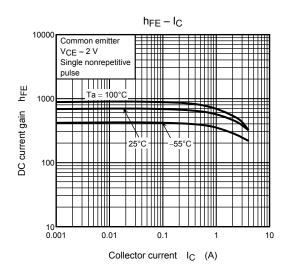
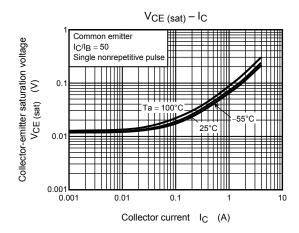
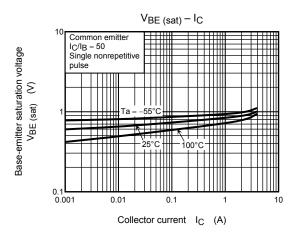


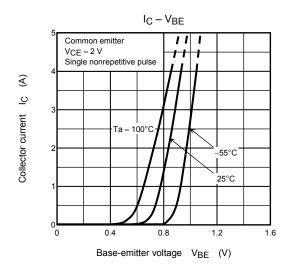
Figure 1 Switching Time Test Circuit & Timing Chart



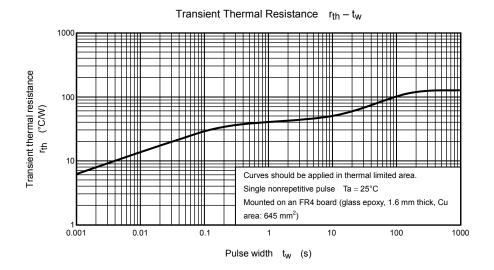


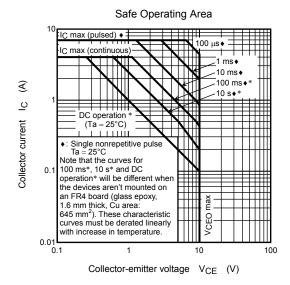






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