TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC5712

High-Speed Switching Applications DC-DC Converter Applications DC-AC Converter Applications

- High DC current gain:  $h_{FE} = 400$  to 1000 (I<sub>C</sub> = 0.3 A)
- Low collector-emitter saturation voltage:  $V_{CE}$  (sat) = 0.14 V (max)
- High-speed switching: t<sub>f</sub> = 120 ns (typ.)

## Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Collector-base voltage		V <sub>CBO</sub>	100	V	
Collector-emitter voltage		V <sub>CEX</sub>	80	V	
		V <sub>CEO</sub>	50		
Emitter-base voltage		V <sub>EBO</sub>	7	V	
Collector current	DC	Ι <sub>C</sub>	3.0	A	
	Pulse	I <sub>CP</sub>	5.0		
Base current		Ι <sub>Β</sub>	300	mA	
Collector power dissipation	DC	P <sub>C</sub>	1.0	W	
	t = 10 s	(Note)	2.5	٧V	
Junction temperature		Тј	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

Unit: mm



Weight: 0.05 g (typ.)

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit	
Collector cut-off current		I <sub>CBO</sub>	$V_{CB} = 100 \text{ V}, \text{ I}_{E} = 0$	_	_	100	nA	
Emitter cut-off current		I <sub>EBO</sub>	$V_{EB} = 7 V, I_C = 0$	_	_	100	nA	
Collector-emitter breakdown voltage		V (BR) CEO	$I_{C} = 10 \text{ mA}, I_{B} = 0$	50	_		V	
DC current gain		h <sub>FE</sub> (1)	$V_{CE} = 2 V, I_C = 0.3 A$	400	_	1000		
		h <sub>FE</sub> (2)	$V_{CE} = 2 V, I_C = 1 A$	200	_			
Collector-emitter saturation voltage		V <sub>CE (sat)</sub>	$I_{C} = 1 \text{ A}, I_{B} = 20 \text{ mA}$			0.14	V	
Base-emitter saturation voltage		V <sub>BE (sat)</sub>	$I_{C} = 1 \text{ A}, I_{B} = 20 \text{ mA}$	_	_	1.10	V	
Collector output capacitance		C <sub>ob</sub>	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$		13		pF	
Switching time	Rise time	t <sub>r</sub>	See Figure 1 circuit diagram.		40		ns	
	Storage time	t <sub>stg</sub>	$V_{CC}\simeq 30~V,~R_L=30~\Omega$		500			
	Fall time	t <sub>f</sub>	$I_{B1} = -I_{B2} = 33.3 \text{ mA}$		120			

Industrial Applications

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

Marking





Figure 1 Switching Time Test Circuit & Timing Chart

## TOSHIBA













Safe Operating Area 10 ⊐IC max (pulsed) ♦ 10 ms♦ 1 ms♦ 100 μs♦ 10 µs∢ IC max (continuous) 10 s 🔹 € 100 ms + <u>ں</u> DC operation Collector current ♦: Single nonrepetitive pulse Ta = 25°C Note that the curves for 100 ms<sup>®</sup>, 10 s<sup>\*</sup> and DC operation<sup>®</sup> will be different when the devices aren't mounted on an FR4 board (glass epoxy, 1,6 mm thick, Cu area: 645 mm<sup>2</sup>). These characteristic curves must be derated linearly with increase in temperature. 0.1 /CEO max 0.01 with increase in temperature. 10 100 Collector-emitter voltage  $V_{CE}$  (V)

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