

TOSHIBA Transistor Silicon NPN Epitaxial Type

# 2SC6100

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

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.3$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.14$  V (max)
- High-speed switching:  $t_f = 120$  ns (typ.)

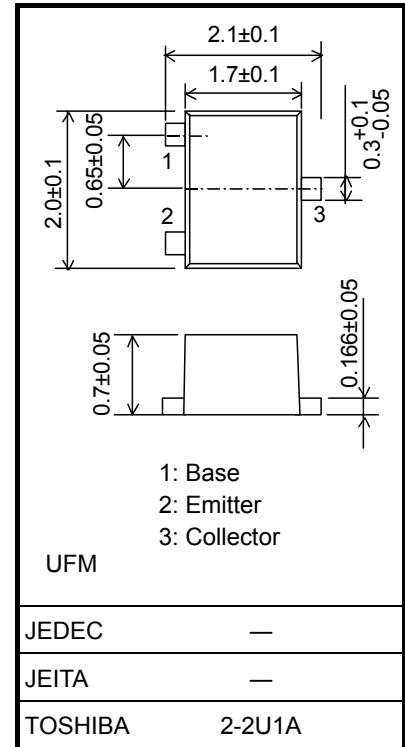
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	100	V
Collector-emitter voltage	$V_{CEX}$	80	V
Collector-emitter voltage	$V_{CEO}$	50	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	DC	$I_C$	A
	Pulse	$I_{CP}$	
Base current	$I_B$	250	mA
Collector power dissipation	$P_C$ (Note 1)	800	mW
	$P_C$ (Note 2)	500	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

- Note1: Mounted on ceramic board.  
 (25.4 mm × 25.4 mm × 0.8 mm, Cu Pad: 645 mm<sup>2</sup>)
- Note2: Mounted on FR4 board.  
 (25.4 mm × 25.4 mm × 1.6 mm, Cu Pad: 645 mm<sup>2</sup>)

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).

Unit: mm

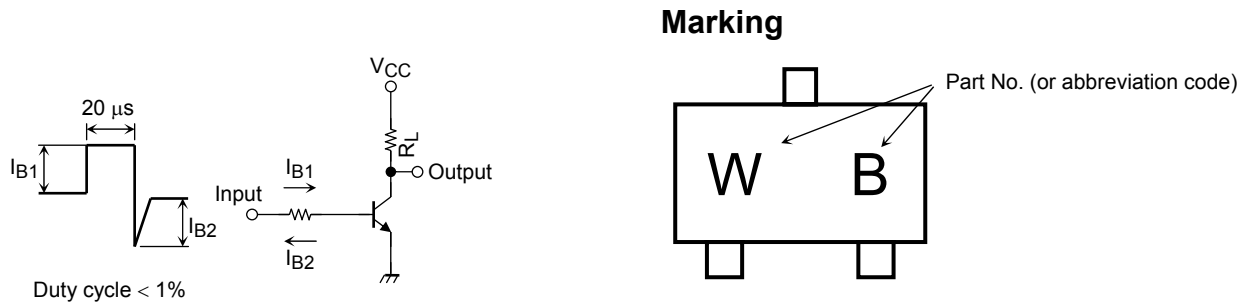


Weight: 6.6 mg (typ.)

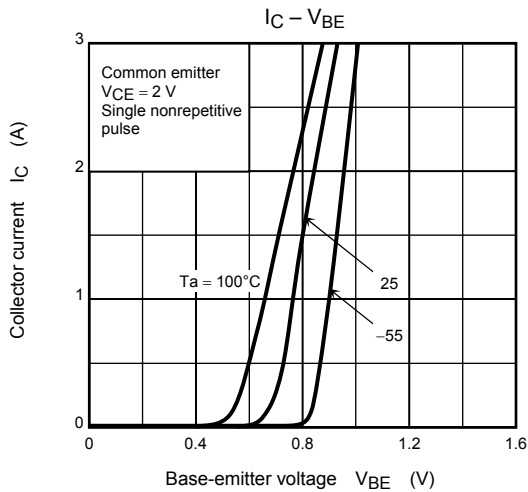
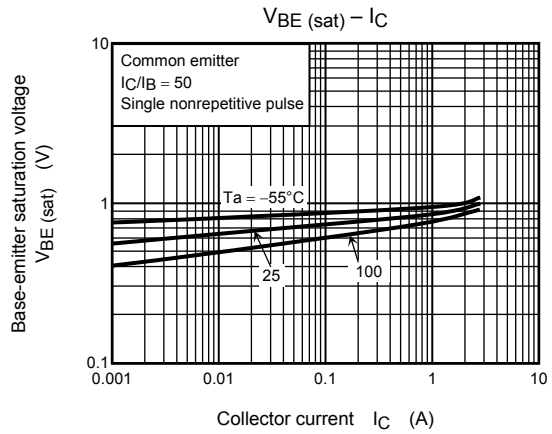
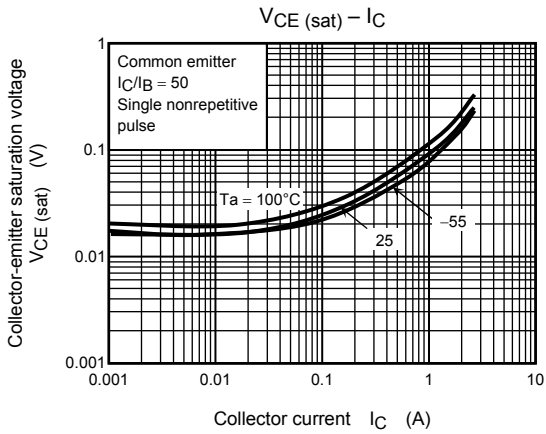
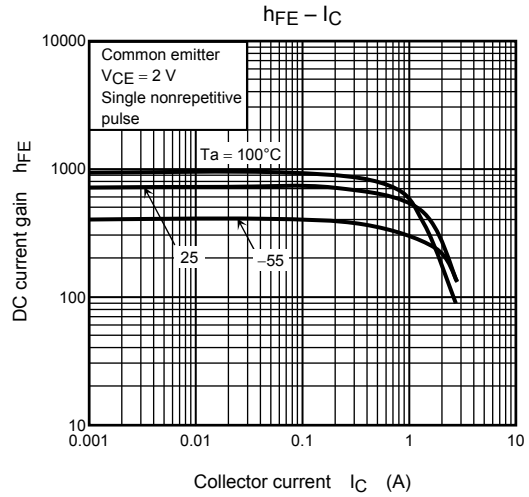
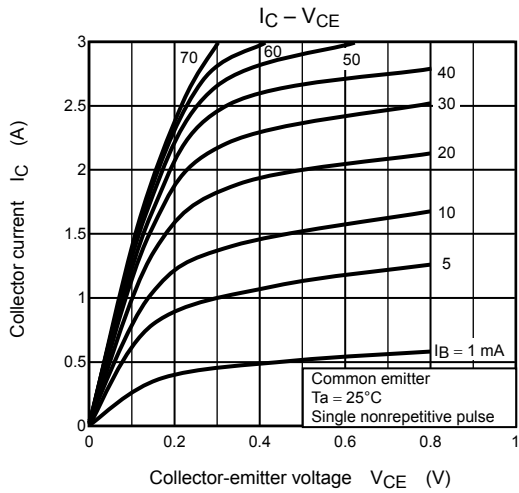
Start of commercial production  
 2007-08

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

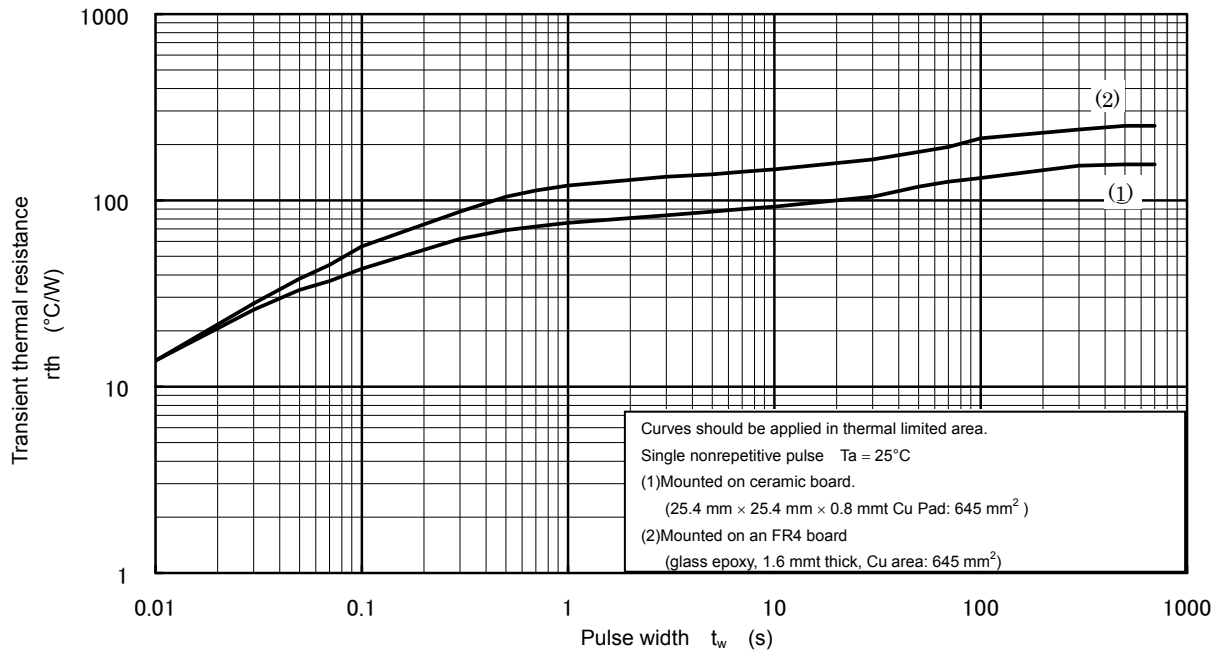
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	50	—	—	V
DC current gain	$h_{FE}(1)$	$V_{CE} = 2\text{ V}, I_C = 0.3\text{ A}$	400	—	1000	—
	$h_{FE}(2)$	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	200	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	0.14	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	1.10	V
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	13	—	pF
Switching time	Rise time	$t_r$	See Figure 1.		—	ns
	Storage time	$t_{stg}$	$V_{CC} \approx 30\text{ V}, R_L = 30\ \Omega$		—	
	Fall time	$t_f$	$I_{B1} = -I_{B2} = 33.3\text{ mA}$		—	



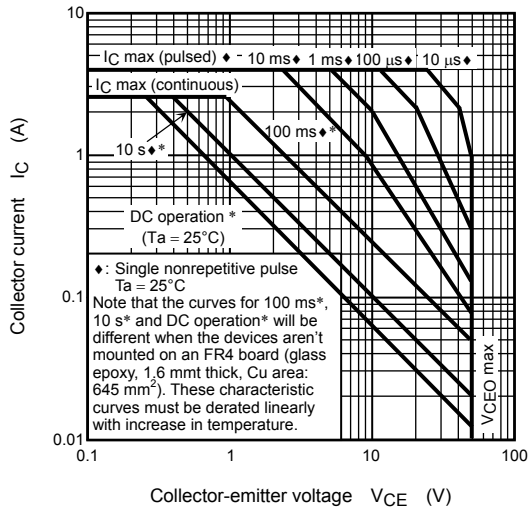
**Figure 1 Switching Time Test Circuit & Timing Chart**



Transient Thermal Resistance  $r_{th-t_w}$



Safe Operating Area



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