

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# TPCP8601

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

- High DC current gain:  $h_{FE} = 200$  to  $500$  ( $I_C = -0.6$  A)
- Low collector-emitter saturation:  $V_{CE(sat)} = -0.19$  V (max)
- High-speed switching:  $t_f = 35$  ns (typ.)

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

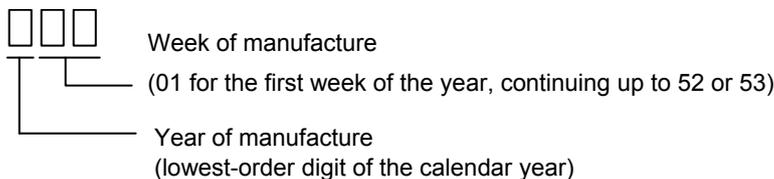
Characteristic		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	-20	V
Collector-emitter voltage		$V_{CEO}$	-20	V
Emitter-base voltage		$V_{EBO}$	-7	V
Collector current	DC (Note 1)	$I_C$	-4.0	A
	Pulse (Note 1)	$I_{CP}$	-7.0	
Base current		$I_B$	-0.5	A
Collector power dissipation ( $t = 10\text{s}$ )	$t = 10\text{s}$	$P_c$ (Note 2)	3.3	W
	DC		1.3	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

Note 1: Ensure that the junction temperature does not exceed  $150^\circ\text{C}$  during use of this device.

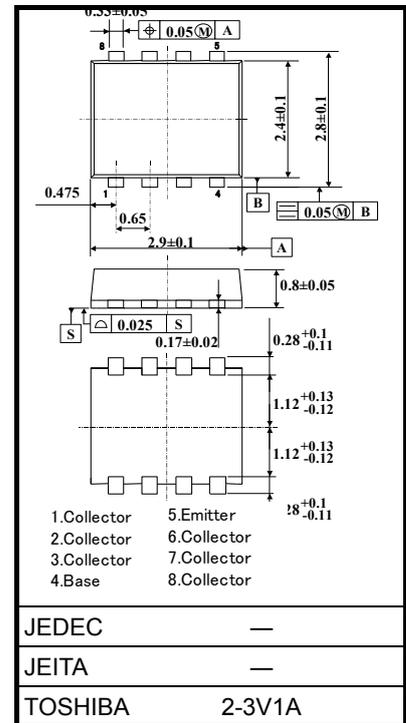
Note 2: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area:  $645\text{ mm}^2$ )

Note 3: ● on the lower left of the marking indicates Pin 1.

\* Weekly code (three digits):

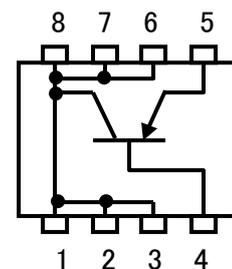


Unit: mm

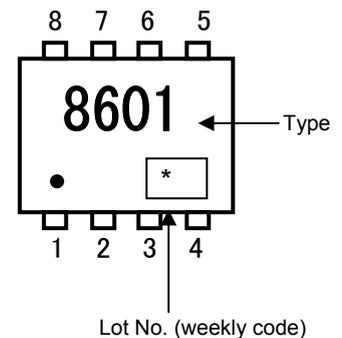


Weight: 0.017 g (typ.)

**Figure 1.**  
**Circuit Configuration**  
**(Top View)**



**Figure 2. Marking (Note 3)**

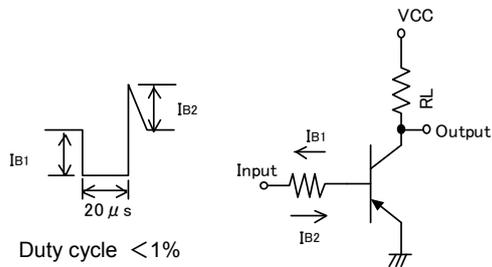


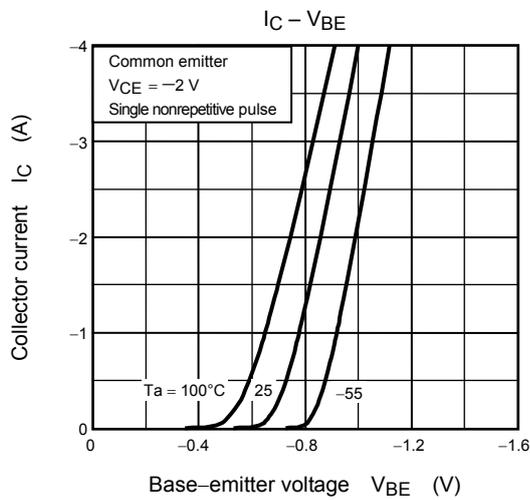
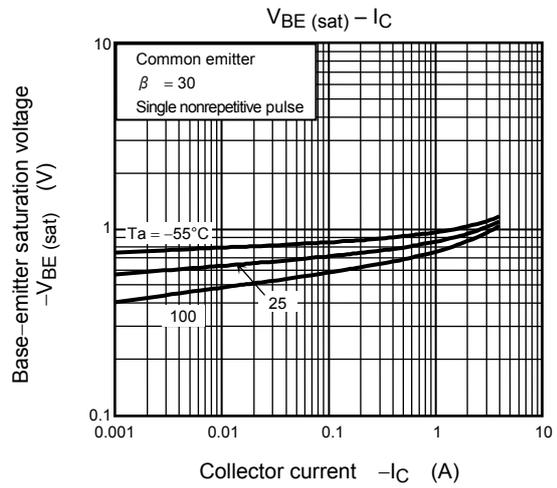
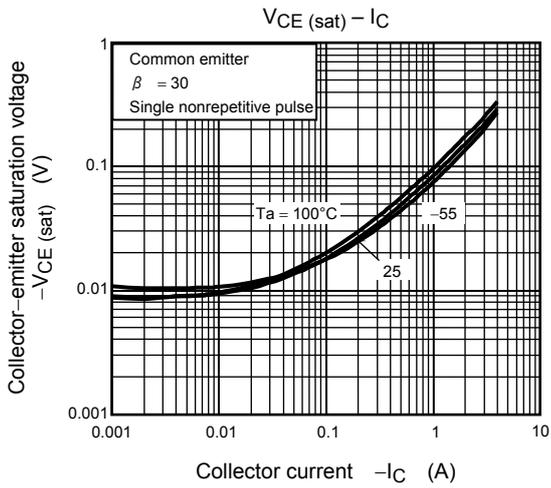
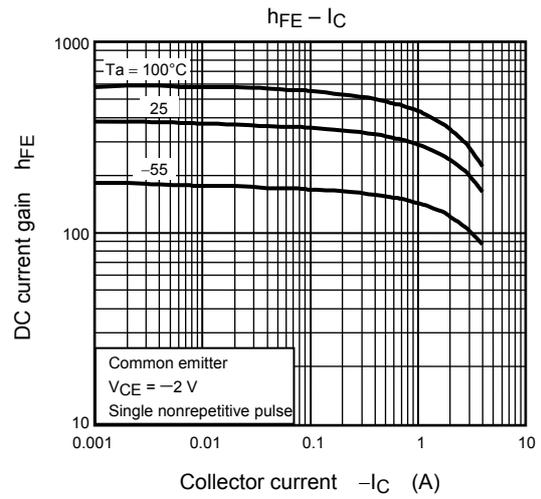
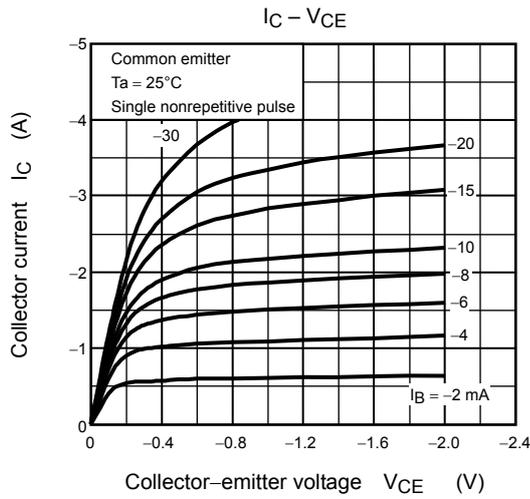
Start of commercial production  
 2004-06

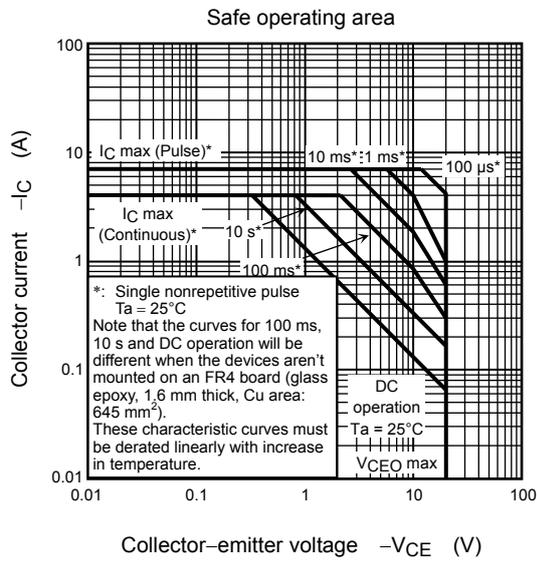
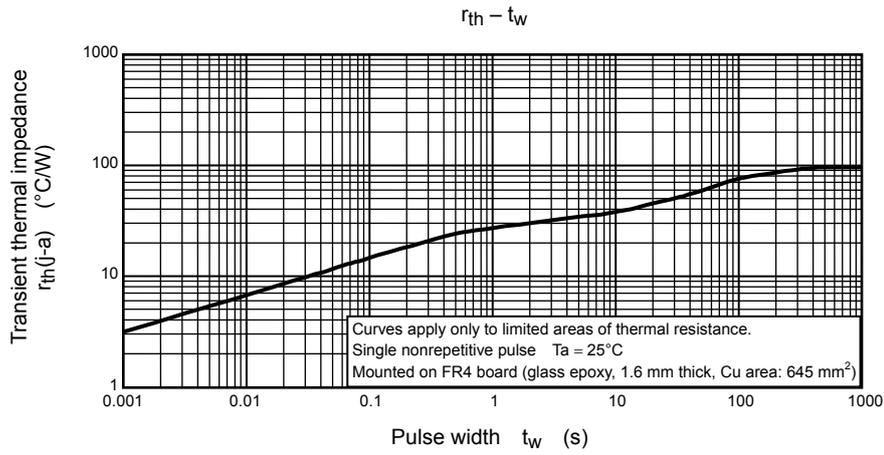
**Electrical Characteristics (Ta = 25°C)**

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = -20\text{ V}, I_E = 0$	—	—	-100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = -7\text{ V}, I_C = 0$	—	—	-100	nA
Collector-base breakdown voltage		$V_{(BR) CBO}$	$I_C = -1\text{ mA}, I_B = 0$	-20	—	—	V
Collector-emitter breakdown voltage		$V_{(BR) CEO}$	$I_C = -10\text{ mA}, I_B = 0$	-20	—	—	V
DC current gain	$h_{FE} (1)$		$V_{CE} = -2\text{ V}, I_C = -0.6\text{ A}$	200	—	500	
	$h_{FE} (2)$		$V_{CE} = -2\text{ V}, I_C = -2.0\text{ A}$	100	—	—	
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = -2\text{ A}, I_B = -67\text{ mA}$	—	—	-0.19	V
Base-emitter saturation voltage		$V_{BE (sat)}$	$I_C = -2\text{ A}, I_B = -67\text{ mA}$	—	—	-1.1	V
Switching time	Rise time	$t_r$	See Figure 3 circuit diagram $V_{CC} \approx 12\text{ V}, R_L = 6\ \Omega$ $I_{B1} = -I_{B2} = -67\text{ mA}$	—	72	—	ns
	Storage time	$t_{stg}$		—	170	—	
	Fall time	$t_f$		—	35	—	

**Figure 3. Switching Time Test Circuit & Timing Chart**







# 2SC5755

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

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.2$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.12$  V (max)
- High-speed switching:  $t_f = 25$  ns (typ.)

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

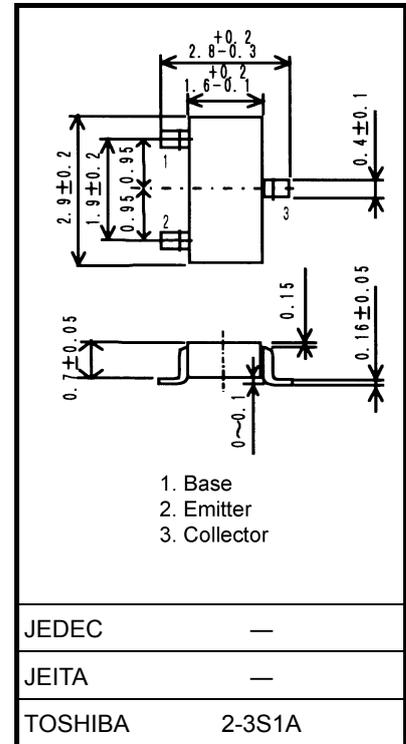
Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	20	V
Collector-emitter voltage		$V_{CEO}$	10	V
Emitter-base voltage		$V_{EBO}$	7	V
Collector current	DC	$I_C$	2	A
	Pulse	$I_{CP}$	3.5	
Base current		$I_B$	200	mA
Collector power dissipation	DC	$P_C$ (Note 1)	500	mW
	$t = 10$ s		750	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

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).

Unit: mm

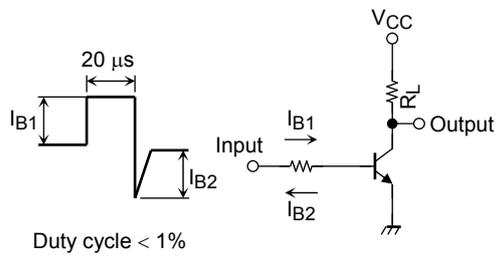


Weight: 0.01 g (typ.)

Start of commercial production  
 2000-11

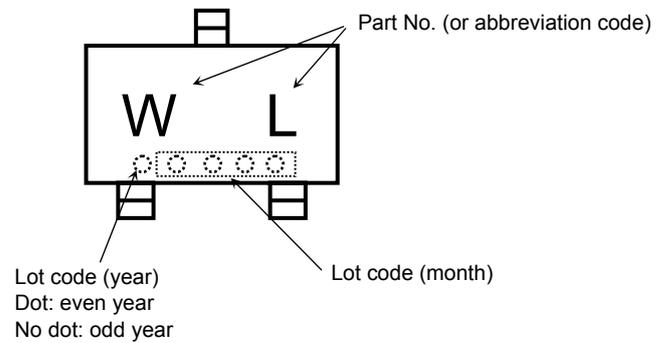
**Electrical Characteristics (Ta = 25°C)**

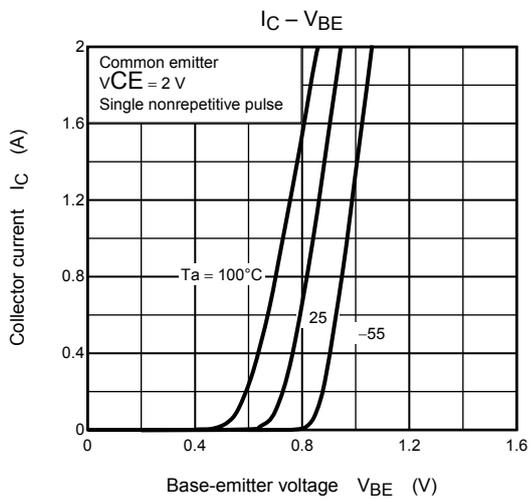
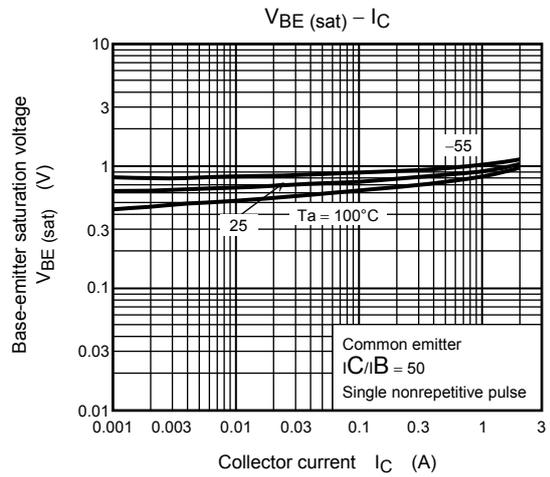
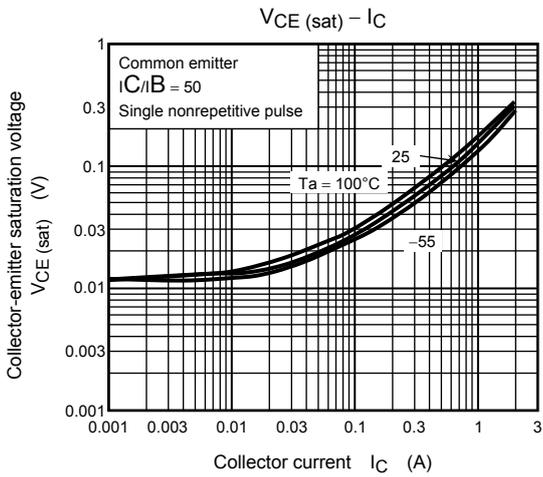
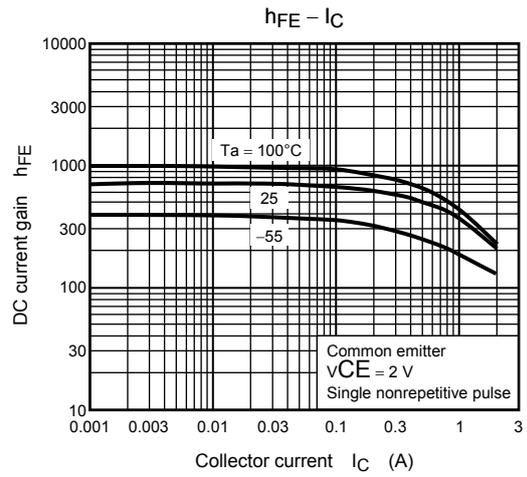
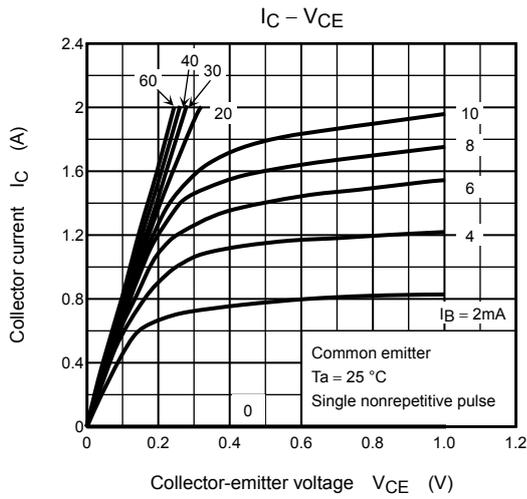
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 20\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	10	—	—	V
DC current gain		$h_{FE}(1)$	$V_{CE} = 2\text{ V}, I_C = 0.2\text{ A}$	400	—	1000	
		$h_{FE}(2)$	$V_{CE} = 2\text{ V}, I_C = 0.6\text{ A}$	200	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 0.6\text{ A}, I_B = 12\text{ mA}$	—	—	0.12	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 0.6\text{ A}, I_B = 12\text{ mA}$	—	—	1.10	V
Switching time	Rise time	$t_r$	See Figure 1.	—	60	—	ns
	Storage time	$t_{stg}$	$V_{CC} \approx 6\text{ V}, R_L = 10\ \Omega$	—	215	—	
	Fall time	$t_f$	$I_{B1} = -I_{B2} = 12\text{ mA}$	—	25	—	

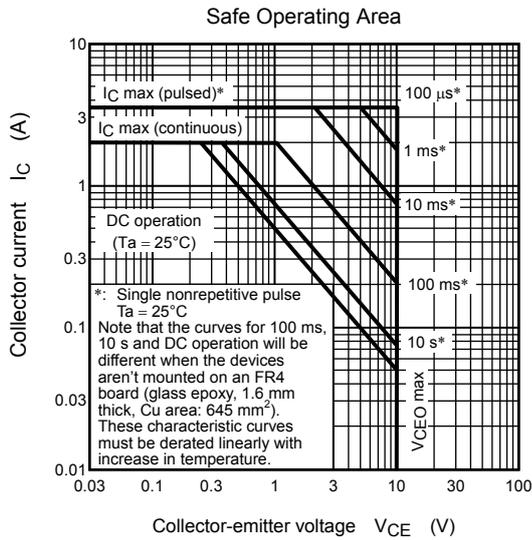
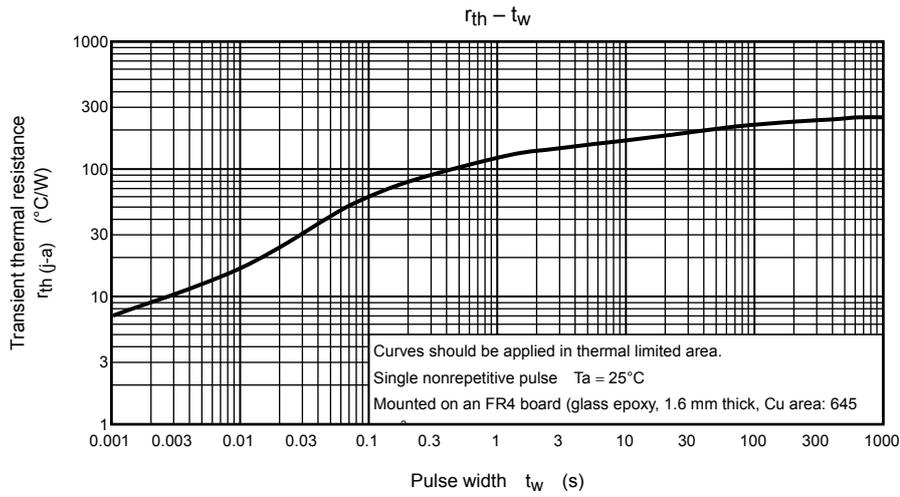


**Figure 1 Switching Time Test Circuit & Timing Chart**

**Marking**







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