

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC5176

High-Current Switching Applications  
DC-DC Converter Applications

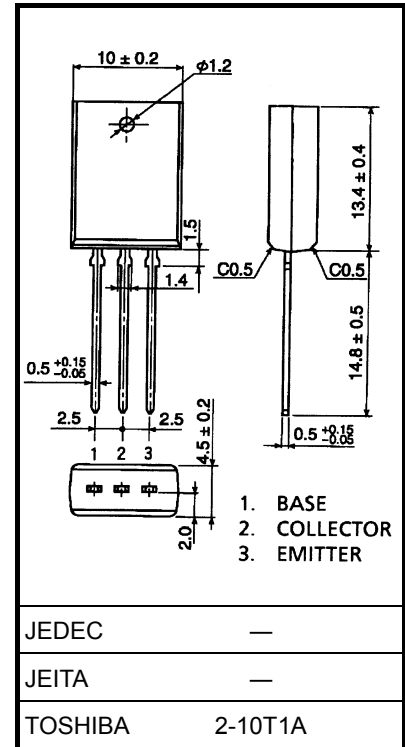
- Low collector saturation voltage:  $V_{CE(sat)} = 0.4 \text{ V (max)}$  ( $I_C = 3 \text{ A}$ )
- High-speed switching:  $t_{stg} = 1.0 \text{ } \mu\text{s (typ.)}$

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	100	V
Collector-emitter voltage		$V_{CEO}$	80	V
Emitter-base voltage		$V_{EBO}$	7	V
Collector current	DC	$I_C$	5	A
	Pulse	$I_{CP}$	8	
Base current		$I_B$	1	A
Collector power dissipation		$P_C$	1.8	W
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

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

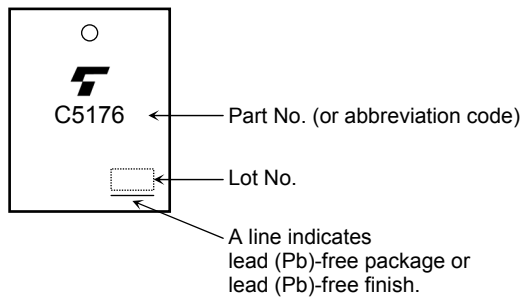


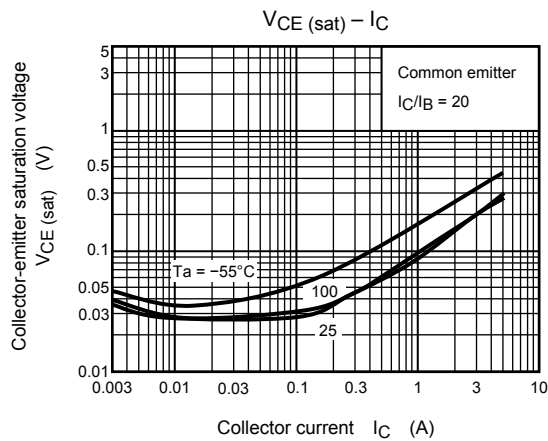
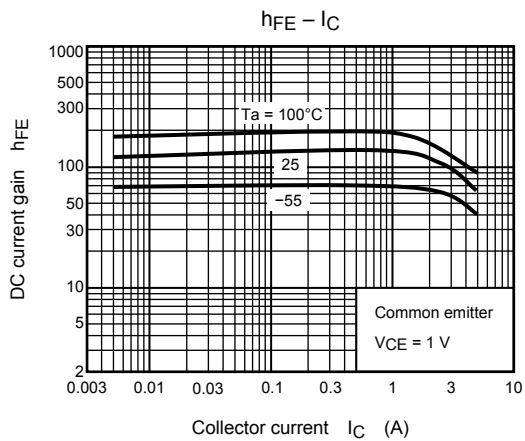
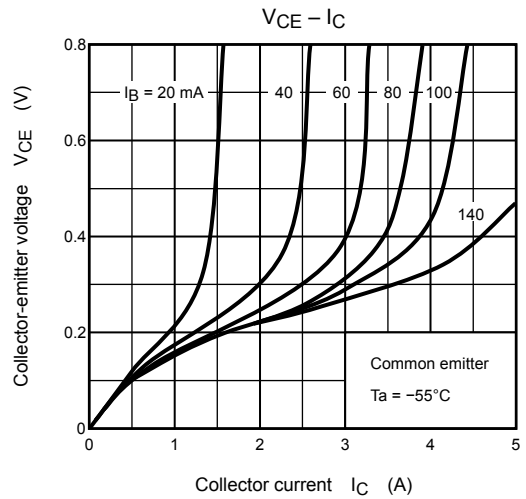
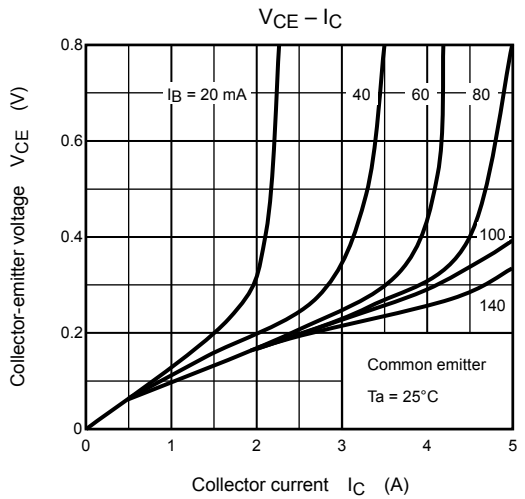
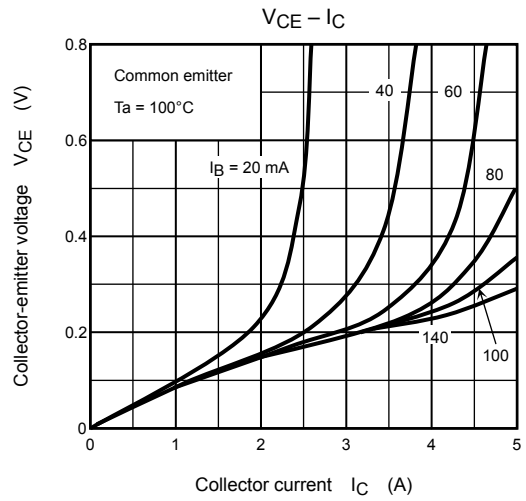
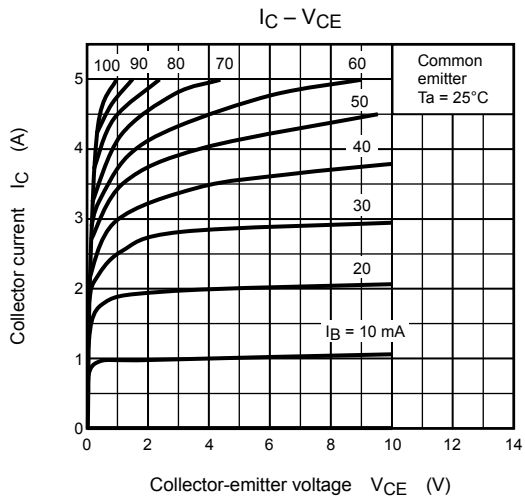
Weight: 1.5 g (typ.)

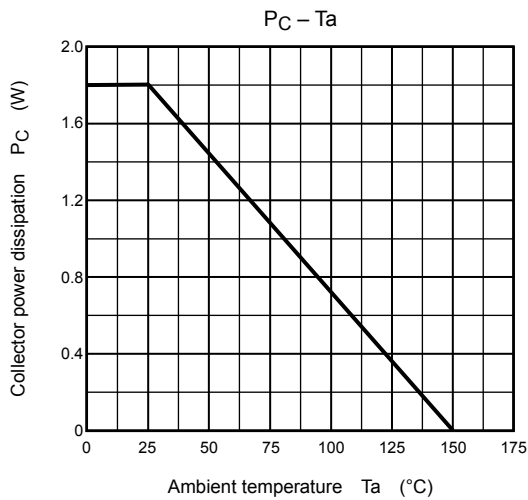
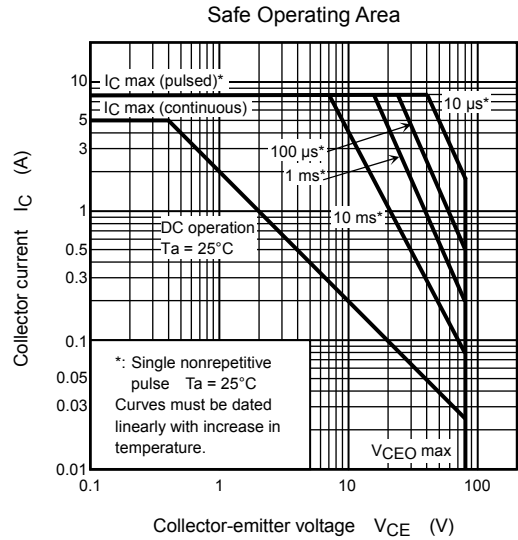
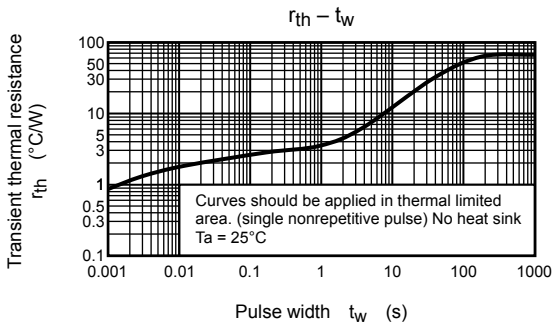
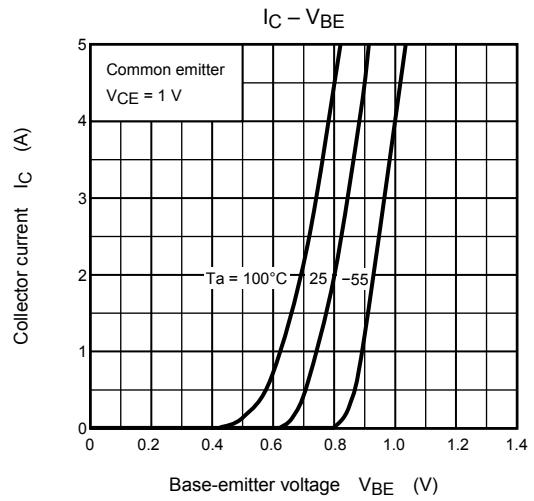
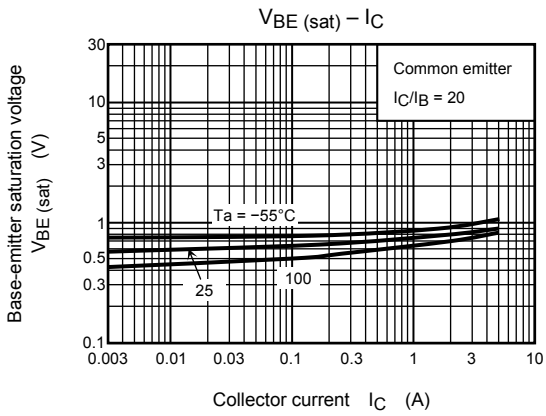
## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	1	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	80	—	—	V
DC current gain		$h_{FE(1)}$	$V_{CE} = 1\text{ V}, I_C = 1\text{ A}$	70	—	240	
		$h_{FE(2)}$	$V_{CE} = 1\text{ V}, I_C = 3\text{ A}$	40	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 3\text{ A}, I_B = 0.15\text{ A}$	—	0.2	0.4	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 3\text{ A}, I_B = 0.15\text{ A}$	—	0.9	1.2	V
Transition frequency		$f_T$	$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	—	120	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	80	—	pF
Switching time	Turn-on time	$t_{on}$	<p><math>I_{B1} = -I_{B2} = 0.15\text{ A}, \text{duty cycle} \leq 1\%</math></p>	—	0.2	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	1.0	—	
	Fall time	$t_f$		—	0.1	—	

## Marking







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