

TOSHIBA Transistor Silicon NPN Epitaxial Type

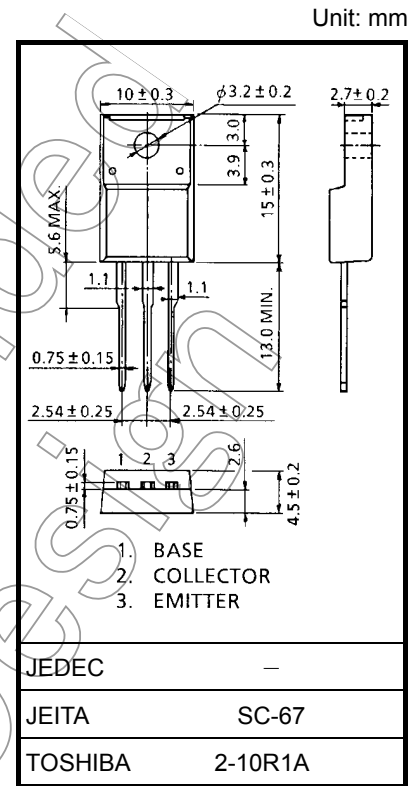
# TTC009

- Power Amplifier Applications
- Power Switching Applications

- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.5\text{ V (max)}$  ( $I_C = 1\text{ A}$ )
- High-speed switching:  $t_{stg} = 0.4\ \mu\text{s (typ.)}$

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	160	V
Collector-emitter voltage		$V_{CEX}$	160	V
		$V_{CEO}$	80	V
Emitter-base voltage		$V_{EBO}$	7	V
Collector current	DC	$I_C$	3	A
	Pulse	$I_{CP}$	5	A
Base current		$I_B$	1	A
Collector power dissipation	$T_c=25^\circ\text{C}$	$P_C$	15	W
	$T_a=25^\circ\text{C}$		2	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$



Weight: 1.7g(typ.)

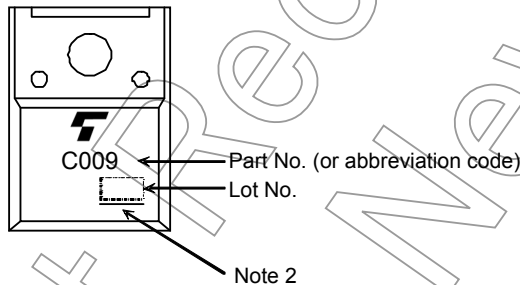
Note1: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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.).

Not for

## Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Conditions	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 160\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	80	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = 2\text{ V}, I_C = 1\text{ mA}$	80	—	—	—	
	$h_{FE(2)}$	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$	100	—	200		
	$h_{FE(3)}$	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	60	—	—		
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$	$I_C = 0.5\text{ A}, I_B = 50\text{ mA}$	—	—	0.3	V	
	$V_{CE(sat)(2)}$	$I_C = 1\text{ A}, I_B = 100\text{ mA}$	—	—	0.5	V	
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 100\text{ mA}$	—	—	1.5	V
Transition frequency		$f_T$	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$	—	150	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	14	—	pF
Switching time	Rise time	$t_r$		—	0.05	—	μs
	Storage time	$t_{stg}$		—	0.4	—	
	Fall time	$t_f$		$I_{B1} = I_{B2} = 100\text{ mA}$ Duty cycle ≤ 1%	—	0.15	

## Marking

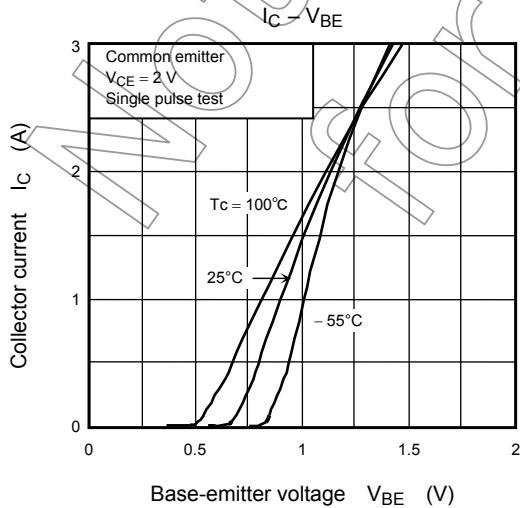
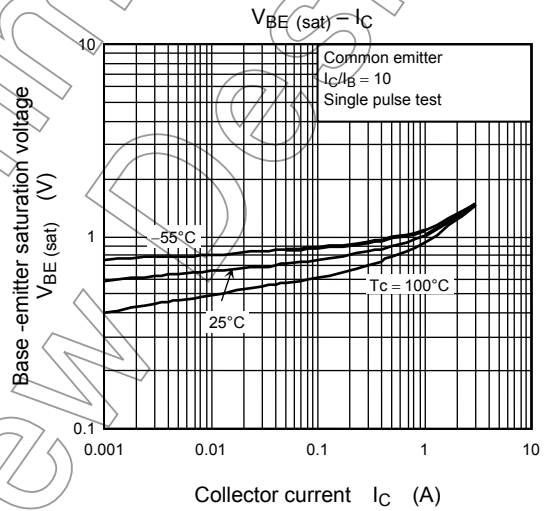
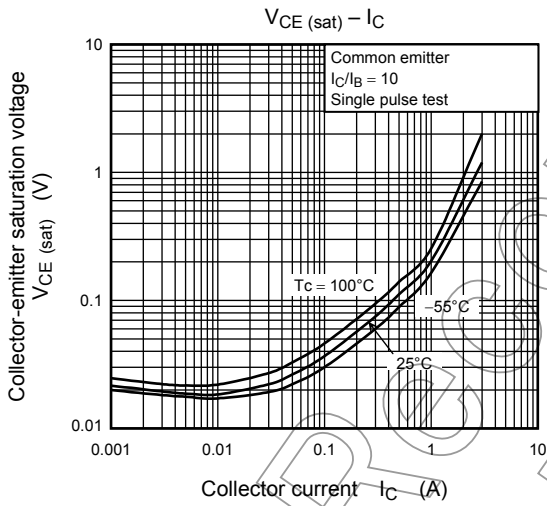
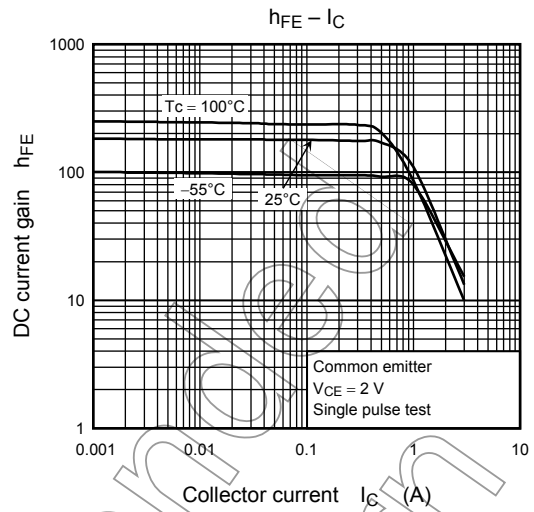
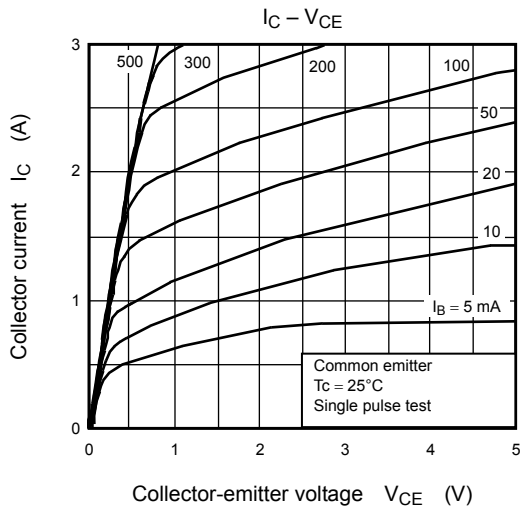


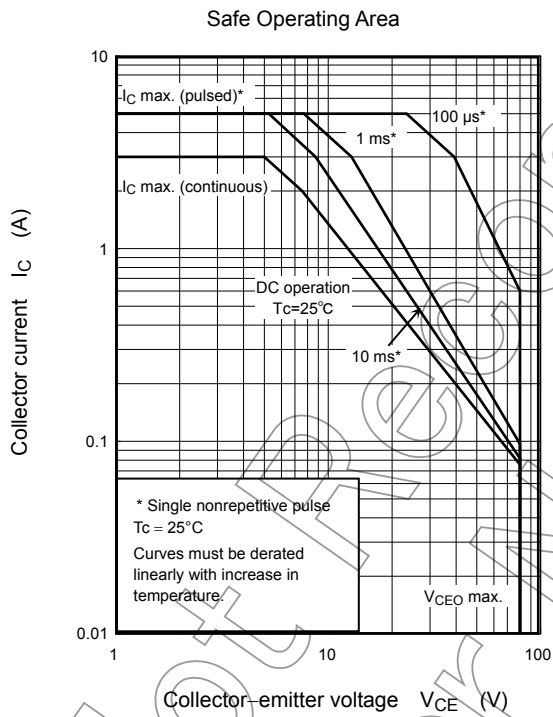
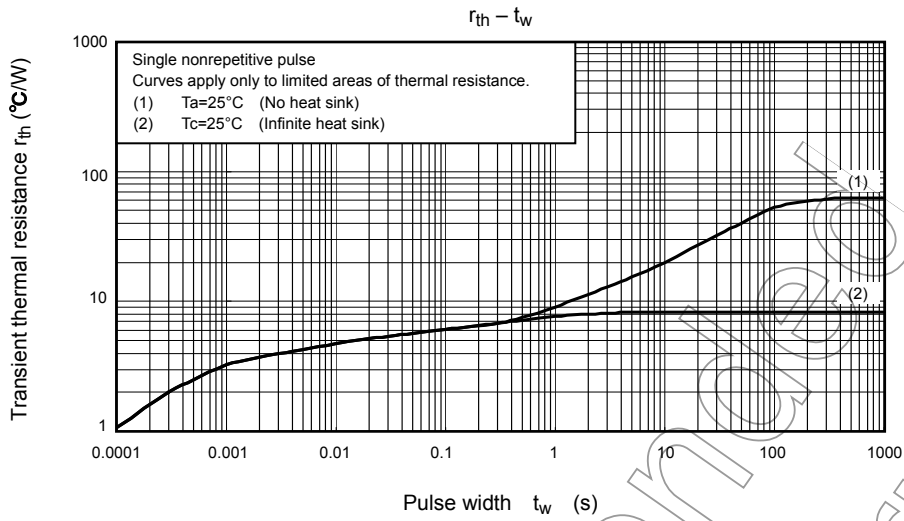
Note 2: A line under a Lot No. identifies the indication of product Labels.

Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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