

TOSHIBA Transistor Silicon NPN Epitaxial Type

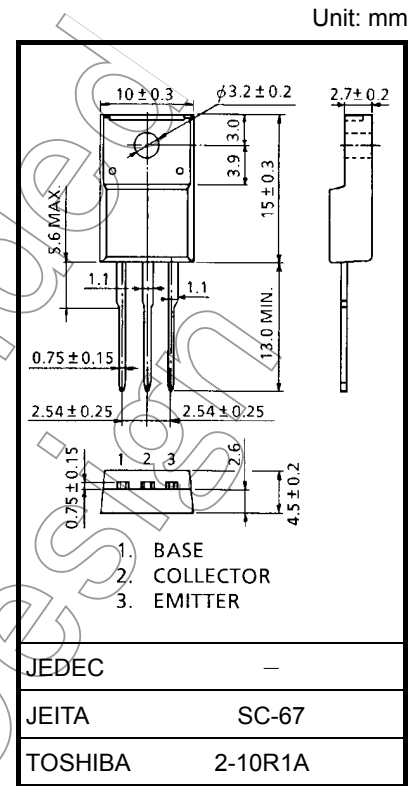
TTC009

- 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.)

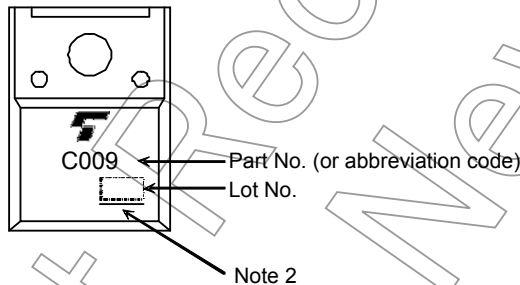
Note1: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

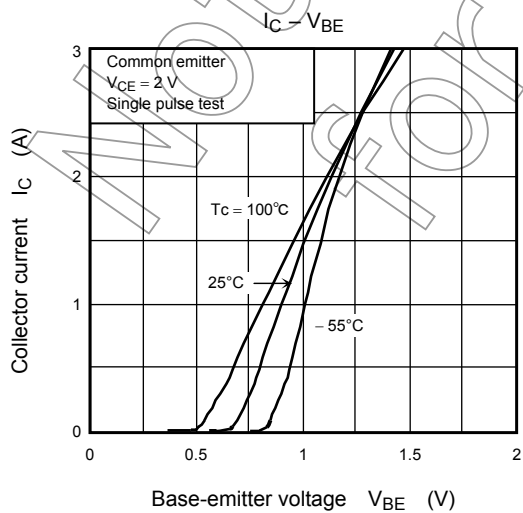
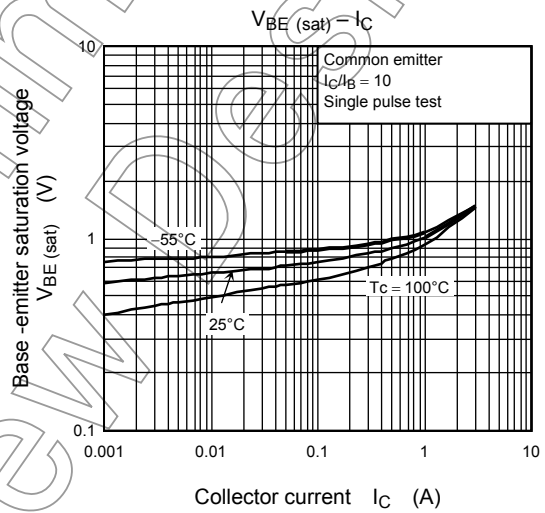
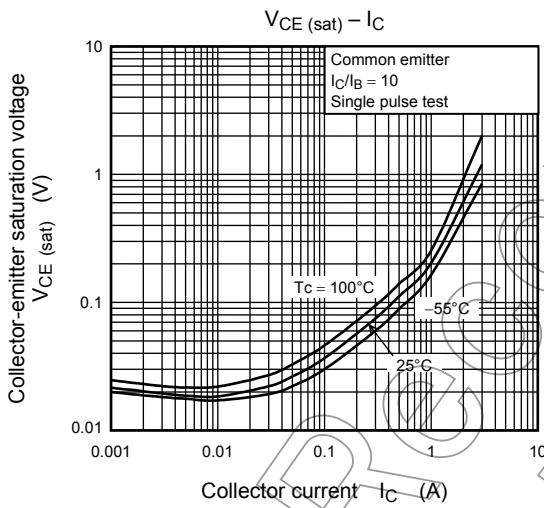
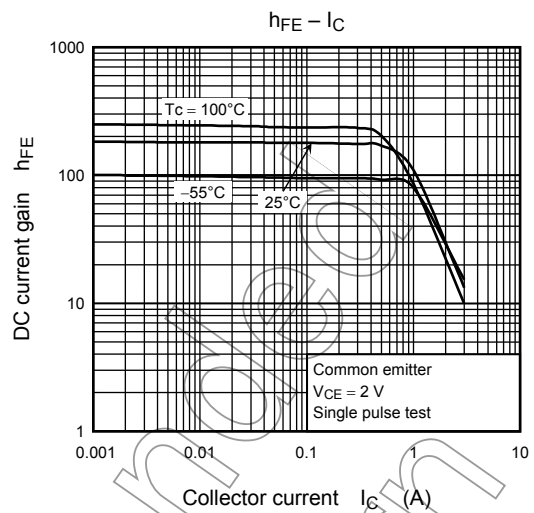
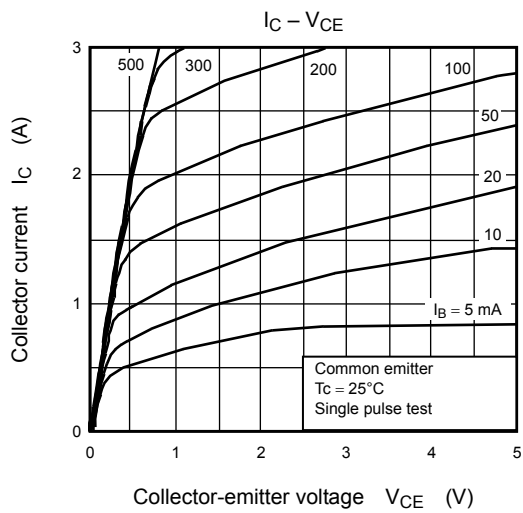


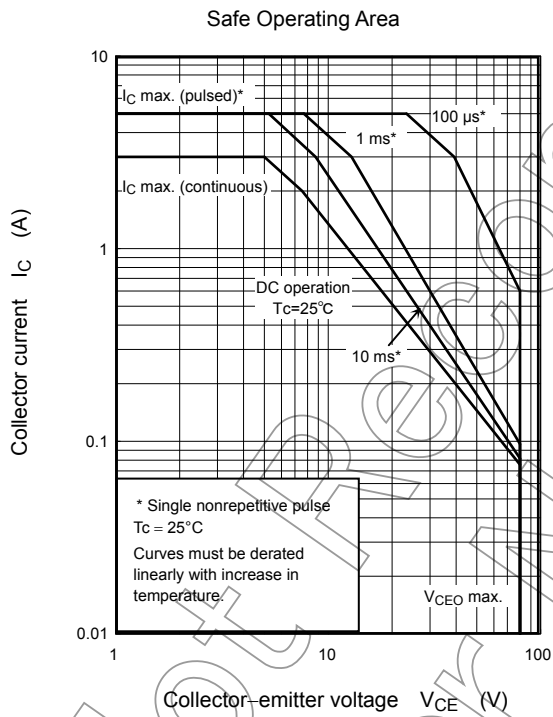
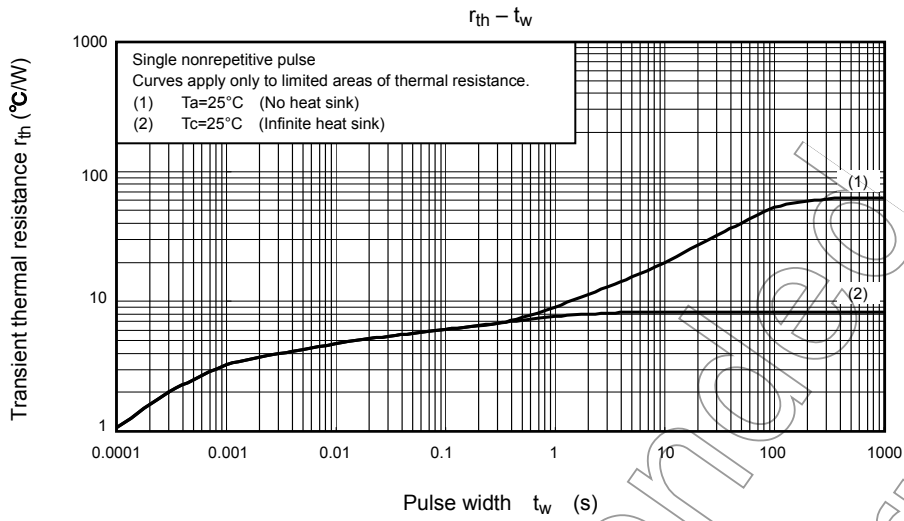
Note 2: A line under a Lot No. identifies the indication of product Labels.

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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