TOSHIBA Transistor Silicon NPN Epitaxial Type

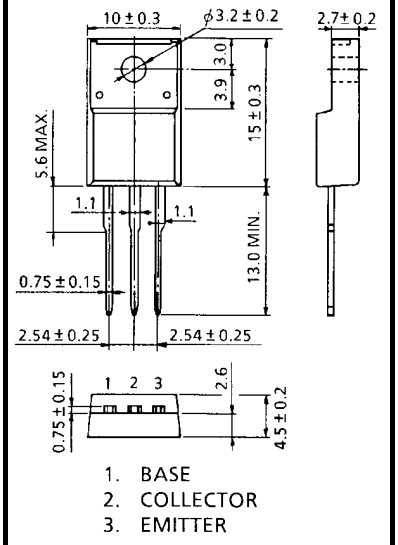
TTC009

○ Power Amplifier Applications

○ Power Switching Applications

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

Unit: mm



JEDEC	―
JEITA	SC-67
TOSHIBA	2-10R1A

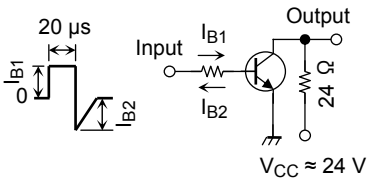
Weight:1.7g(typ.)

Absolute Maximum Ratings (Ta = 25°C)

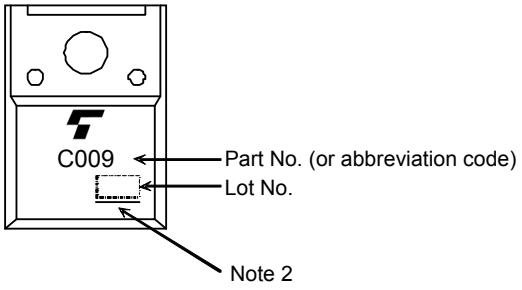
Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	160	V
Collector-emitter voltage		V_{CEX}	160	V
		V_{CEO}	80	V
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC	I_C	3	A
	Pulse	I_{CP}	5	A
Base current		I_B	1	A
Collector power dissipation	Tc=25°C	P_C	15	W
	Ta=25°C		2	
Junction temperature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

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).

Electrical Characteristics (Ta = 25°C)

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

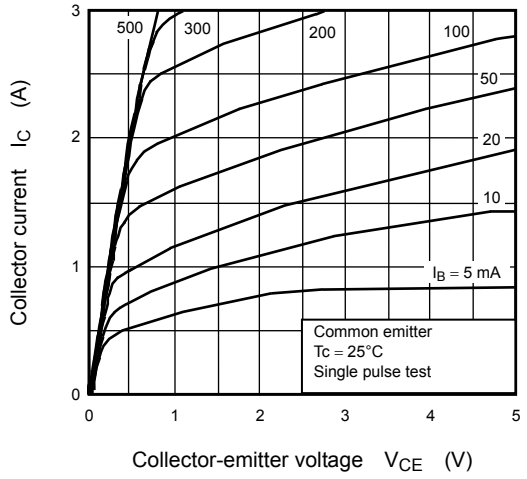
Marking



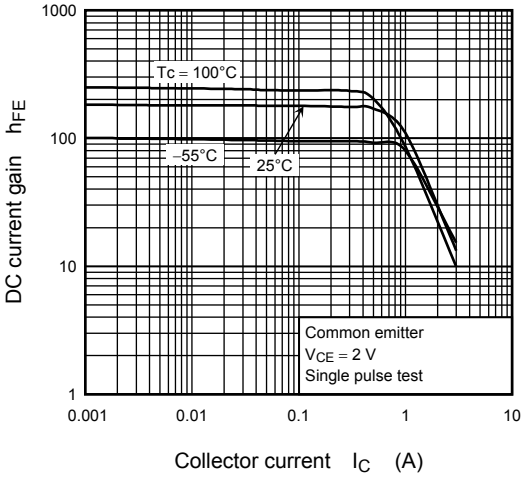
Note 2: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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.

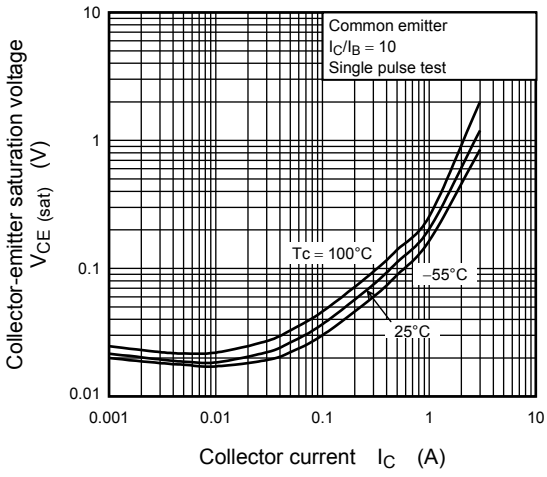
$I_C - V_{CE}$



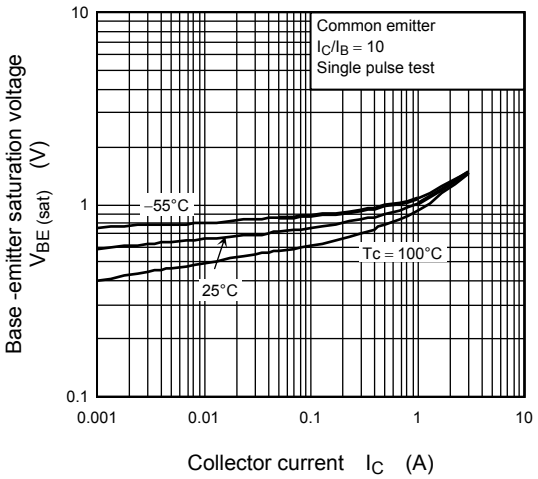
$h_{FE} - I_C$



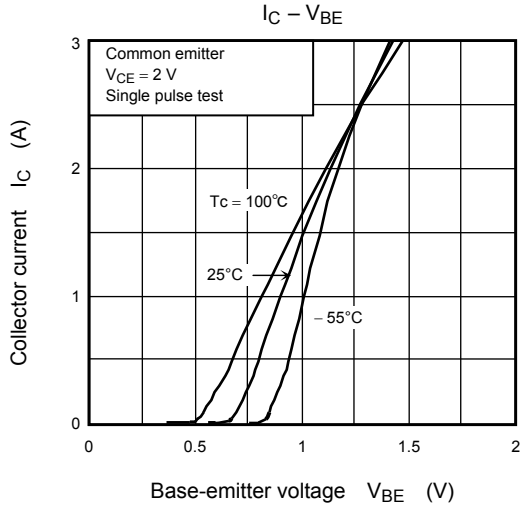
$V_{CE\ (sat)} - I_C$



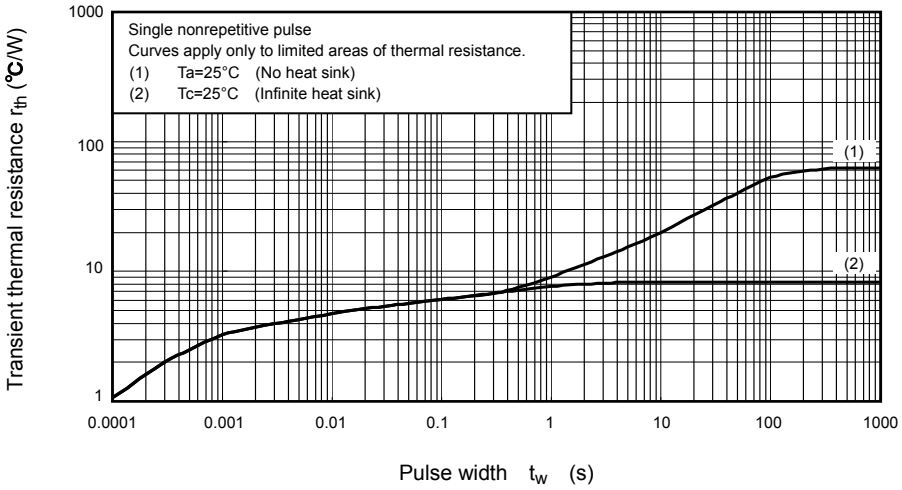
$V_{BE\ (sat)} - I_C$



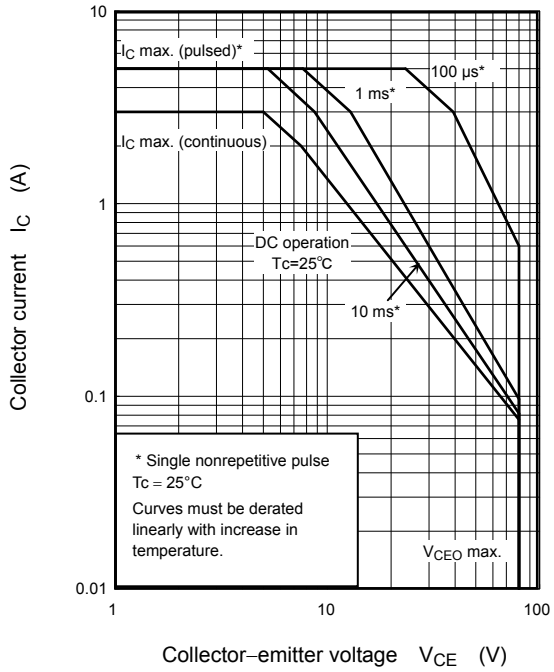
$I_C - V_{BE}$



$r_{th} - t_w$



Safe Operating Area



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