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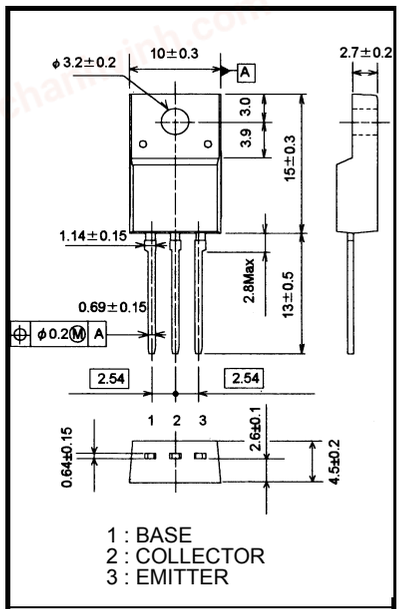
TOSHIBA Multi-chip Device Silicon PNP Epitaxial Transistor Type

2SA2190

Power Amplifier Applications
Driver Stage Amplifier Applications

- High transition frequency: f_T = 200 MHz (typ.)

Unit: mm



JEDEC	—
JEITA	SC-67
TOSHIBA	2-10U1A

Weight: 1.7 g (typ.)

Absolute Maximum Ratings (Tc = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	− 180	V
Collector-emitter voltage		V_{CEO}	− 180	V
Emitter-base voltage		V_{EBO}	− 5	V
Collector current		I_C	− 2.0	A
Base current		I_B	− 1.0	A
Collector power dissipation	Ta = 25°C	P_C	2.0	W
	Tc = 25°C		20	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	− 55~150	°C

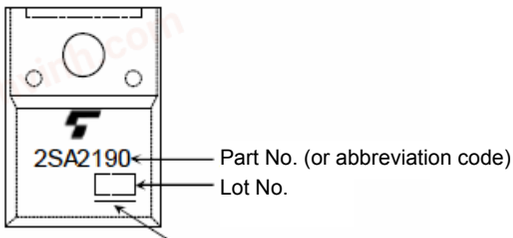
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Electrical Characteristics (Tc = 25°C)

Characteristic	Symbol	Test Conditions	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = − 180 V, I_E = 0	—	—	− 5.0	μA
Emitter cut-off current	I_{EBO}	V_{EB} = − 5 V, I_C = 0	—	—	− 5.0	μA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C = − 10 mA, I_B = 0	− 180	—	—	V
DC current gain	h_{FE} (1)	V_{CE} = − 5 V, I_C = − 0.1 A	100	—	320	
	h_{FE} (2)	V_{CE} = − 5 V, I_C = − 1 A	50	—	—	
Collector-emitter saturation voltage	$V_{CE (sat)}$	I_C = − 1 A, I_B = − 0.1 A	—	− 0.24	−1.0	V
Base-emitter voltage	V_{BE}	V_{CE} = − 5 V, I_C = − 1 A	—	—	− 1.5	V
Transition frequency	f_T	V_{CE} = − 5 V, I_C = − 0.3 A	—	200	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = − 10 V, I_E = 0, f = 1MHz	—	26	—	pF

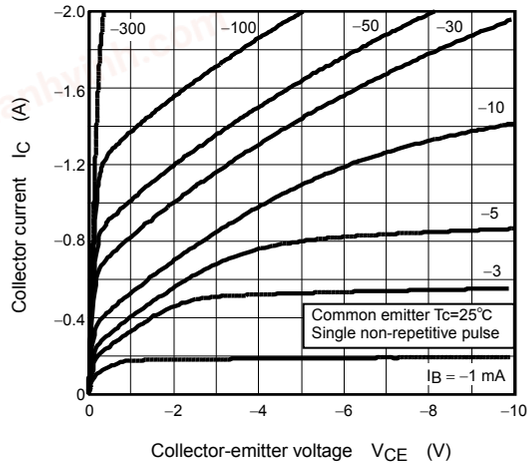
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Marking

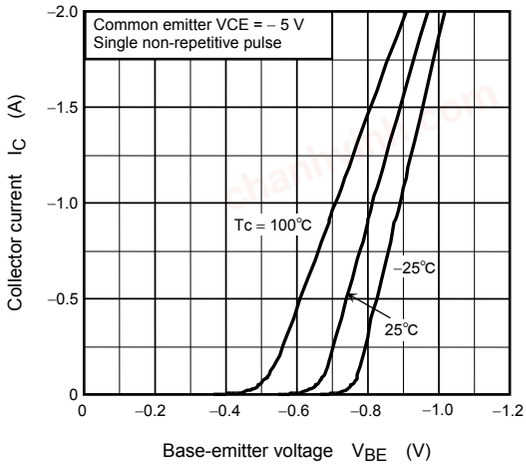


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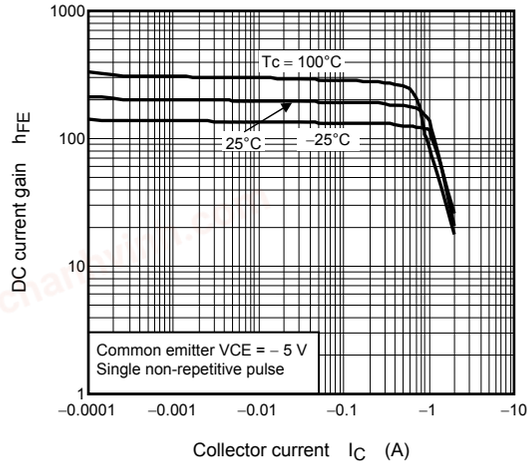
$I_C - V_{CE}$



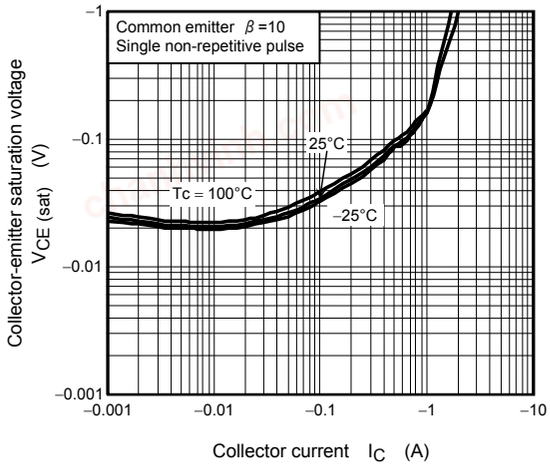
$I_C - V_{BE}$



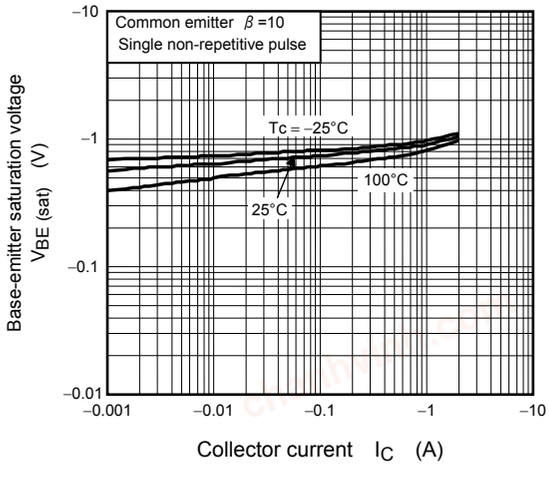
$h_{FE} - I_C$



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

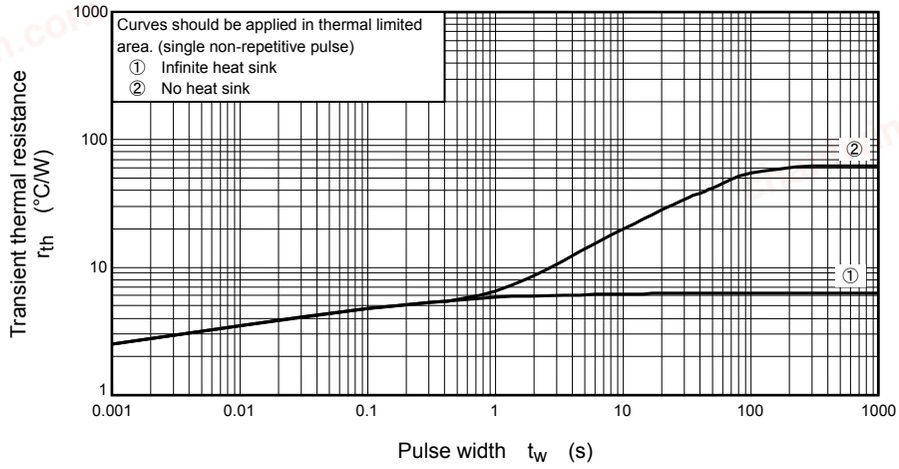


$V_{BE\ (sat)} - I_C$

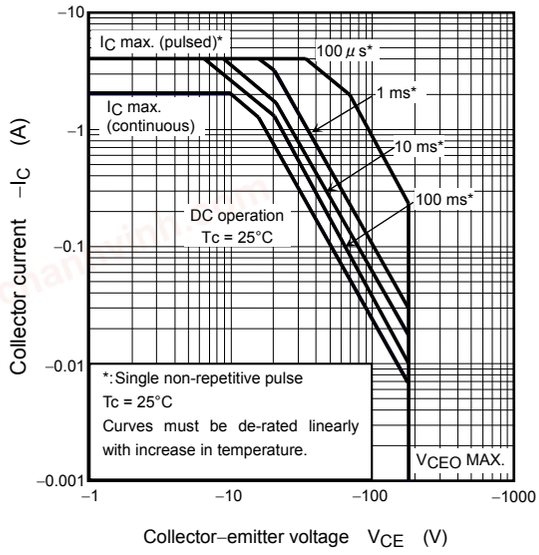


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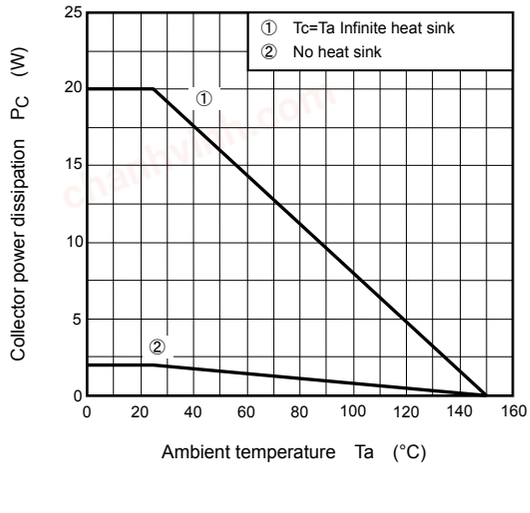
$r_{th} - t_w$



Safe Operating Area



P_C – Ta



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20070701-EN

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