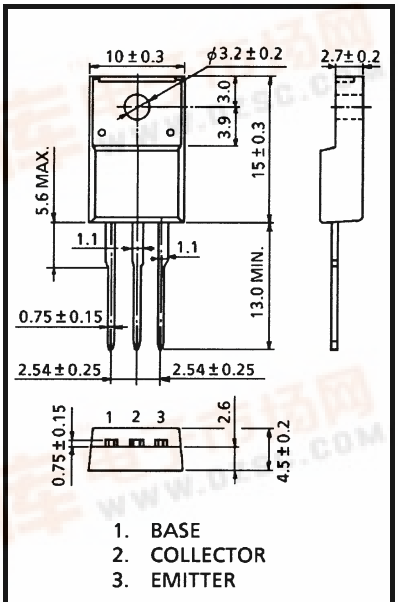
TOSHIBA Transistor Silicon PNP Triple Diffused Type (Darlington Power)

2SB1020A

High-Power Switching Applications
Hammer Drive, Pulse Motor Drive Applications

- High DC current gain: h_{FE} = 2000 (min) (V_{CE} = −3 V, I_C = −3 A)
- Low saturation voltage: $V_{CE\ (sat)}$ = −1.5 V (max) (I_C = −3 A)
- Complementary to 2SD1415A

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-10R1A

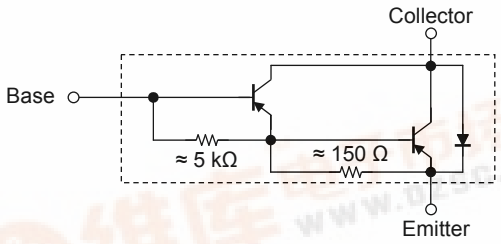
Weight: 1.7 g (typ.)

Absolute Maximum Ratings (Tc = 25°C)

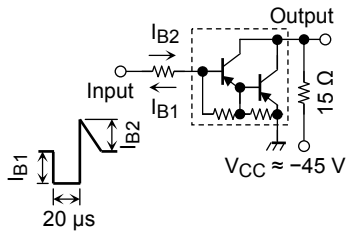
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	−100	V
Collector-emitter voltage		V_{CEO}	−100	V
Emitter-base voltage		V_{EBO}	−5	V
Collector current	DC	I_C	−7	A
	Pulse	I_{CP}	−10	
Base current		I_B	−0.7	A
Collector power dissipation	Ta = 25°C	P_C	2.0	W
	Tc = 25°C		30	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 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).

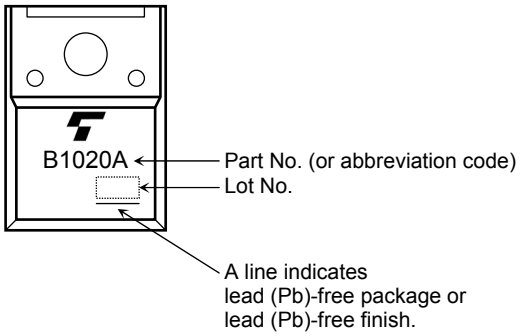
Equivalent Circuit



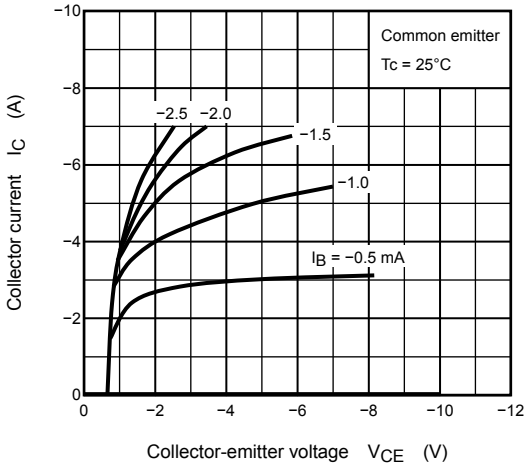
Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −100 V, I_E = 0	—	—	−100	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −5 V, I_C = 0	—	—	−4.0	mA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = −50 mA, I_B = 0	−100	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = −3 V, I_C = −3 A	2000	—	15000	
		$h_{FE\ (2)}$	V_{CE} = −3 V, I_C = −7 A	1000	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)\ (1)}$	I_C = −3 A, I_B = −6 mA	—	−0.95	−1.5	V
		$V_{CE\ (sat)\ (2)}$	I_C = −7 A, I_B = −14 mA	—	−1.3	−2.0	
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = −3 A, I_B = −6 mA	—	−1.55	−2.5	V
Switching time	Turn-on time	t_{on}		—	0.8	—	μs
	Storage time	t_{stg}		—	2.0	—	
	Fall time	t_f		—	2.5	—	
			$-I_{B1} = I_{B2}$ = 6 mA, duty cycle ≤ 1%				

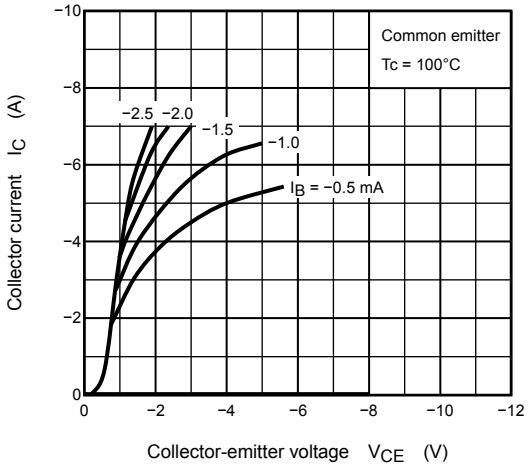
Marking



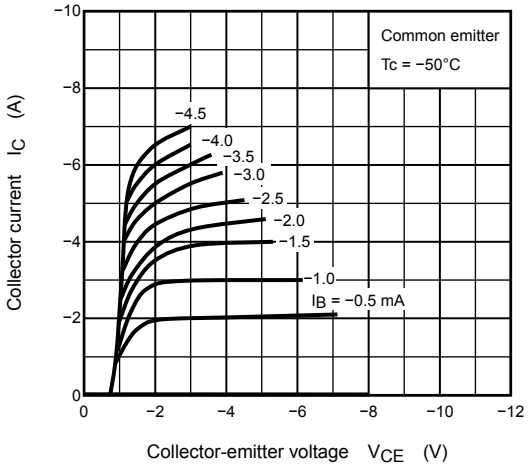
$I_C - V_{CE}$



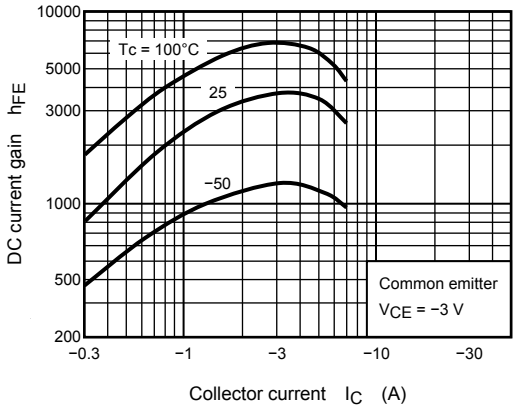
$I_C - V_{CE}$



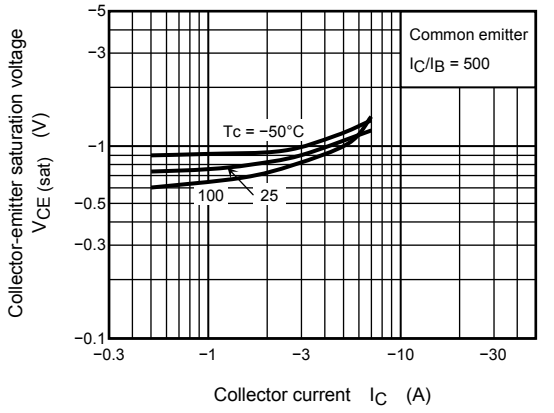
$I_C - V_{CE}$



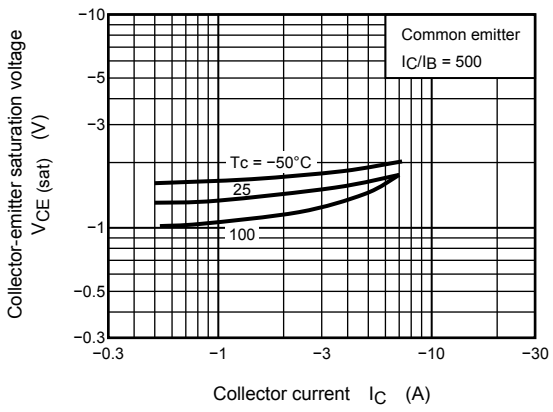
$h_{FE} - I_C$



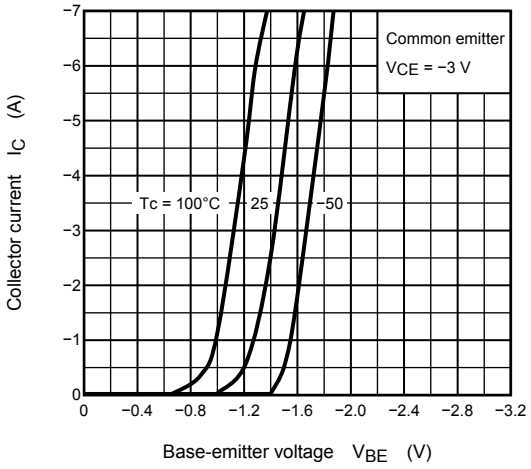
$V_{CE\ (sat)} - I_C$



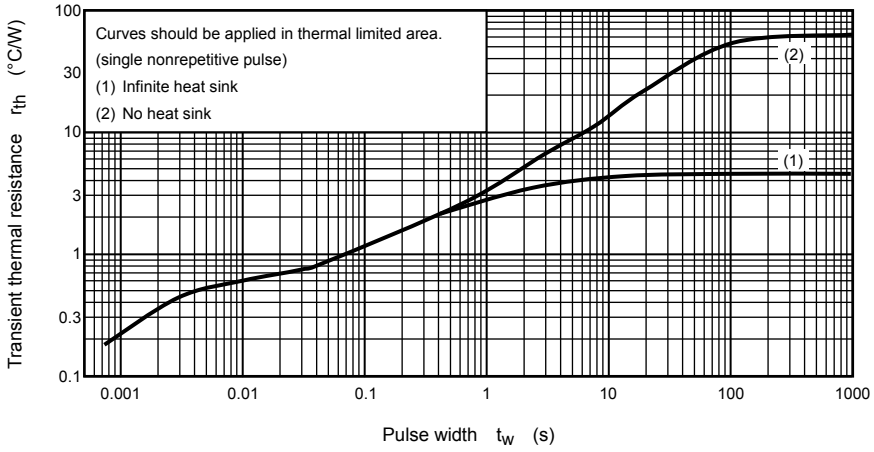
$V_{BE\ (sat)} - I_C$



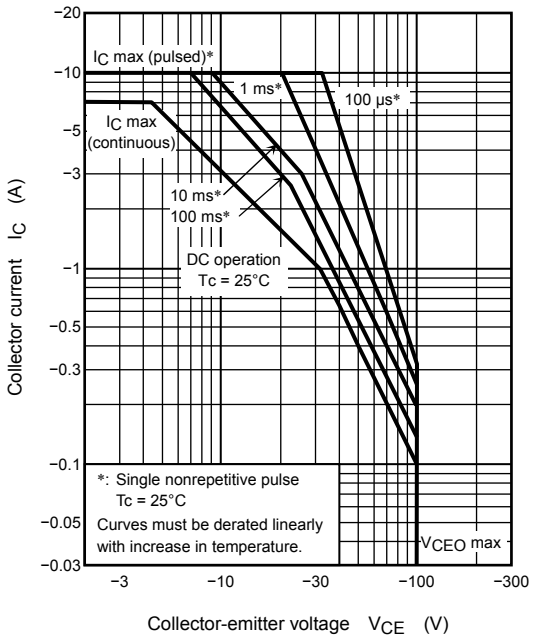
$I_C - V_{BE}$



$r_{th} - t_w$



Safe Operating Area



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