TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington Power Transistor)

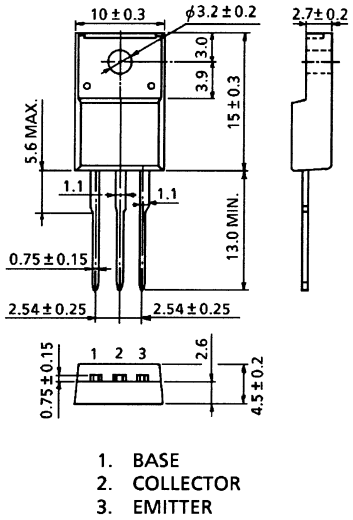
2SD2271

Motor Drive Applications

High-Current Switching Applications

- High DC current gain: h_{FE} = 500 (min) (V_{CE} = 2 V, I_C = 5 A)
- High breakdown voltage: $V_{CEO\ (SUS)}$ = 200 V (min)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-10R1A

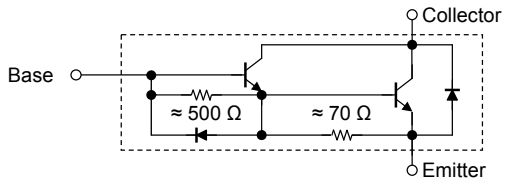
Weight: 1.7 g (typ.)

Absolute Maximum Ratings (Tc = 25°C)

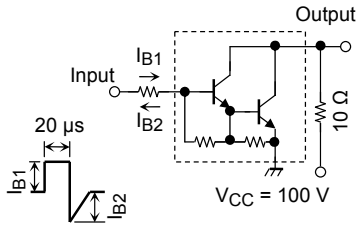
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	300	V
Collector-emitter voltage		V_{CEO}	200	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	DC	I_C	±12	A
	Pulse	I_{CP}	±18	
Base current		I_B	1	A
Collector power dissipation	Ta = 25°C	P_C	2.0	W
	Tc = 25°C		30	
Junction temperature		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).

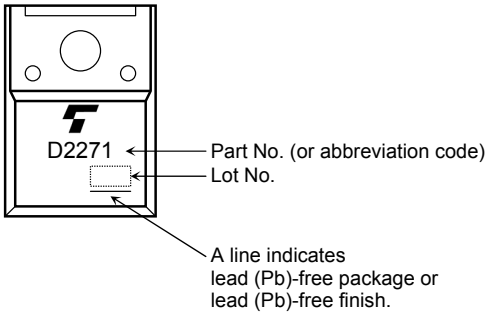
Equivalent Circuit



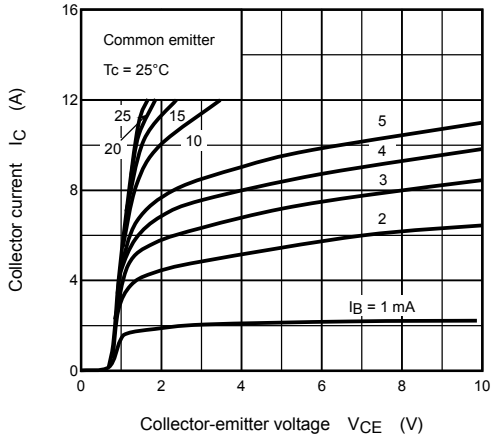
Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 300 V, I_E = 0	—	—	100	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 V, I_C = 0	50	—	150	mA
Collector-base breakdown voltage		$V_{(BR)\ CBO}$	I_C = 1 mA, I_E = 0	300	—	—	V
Collector-emitter sustaining voltage		$V_{CEO\ (SUS)}$	I_C = 0.25 A, L = 40 mH	200	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = 2 V, I_C = 5 A	500	—	5000	
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 10 A	100	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 10 A, I_B = 0.1 A	—	—	2.0	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 10 A, I_B = 0.1 A	—	—	2.3	V
Emitter-collector forward voltage		V_{ECF}	I_E = 10 A, I_B = 0	—	1.5	2.0	V
Transition frequency		f_T	V_{CE} = 2 V, I_C = 1 A	—	40	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	200	—	pF
Switching time	Turn-on time	t_{on}	 $I_{B1} = -I_{B2}$ = 0.1 A, duty cycle ≤ 1%	—	—	1.0	μs
	Storage time	t_{stg}		—	—	12	
	Fall time	t_f		—	—	2.0	

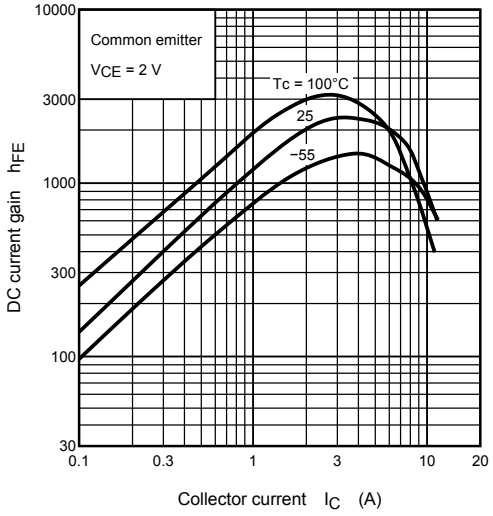
Marking



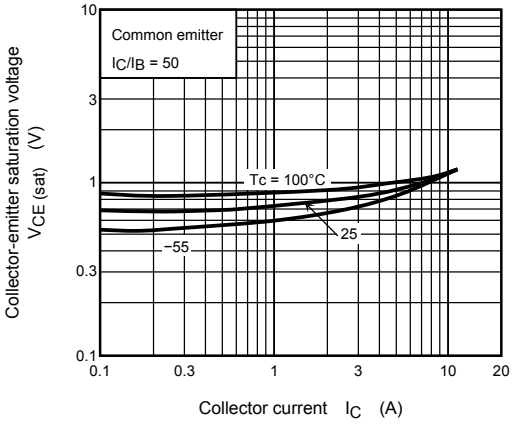
$I_C - V_{CE}$



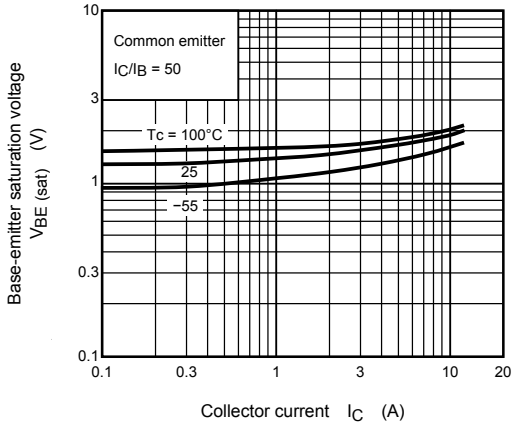
$h_{FE} - I_C$



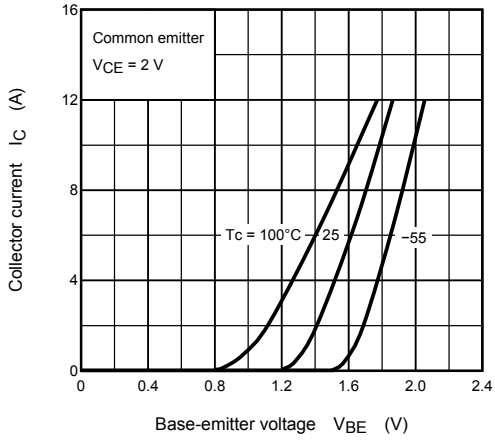
$V_{CE\ (sat)} - I_C$



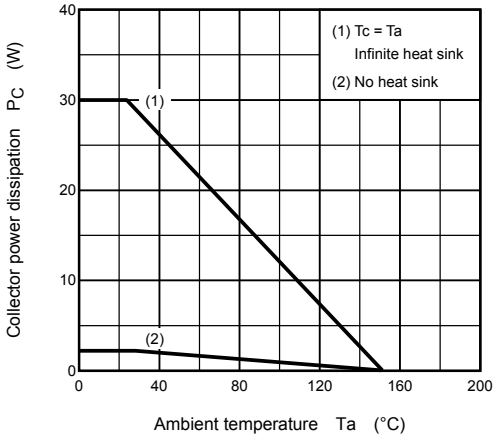
$V_{BE\ (sat)} - I_C$



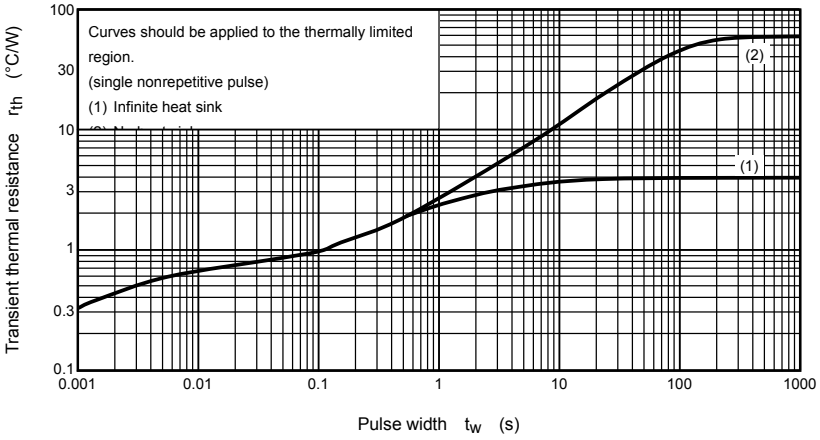
$I_C - V_{BE}$



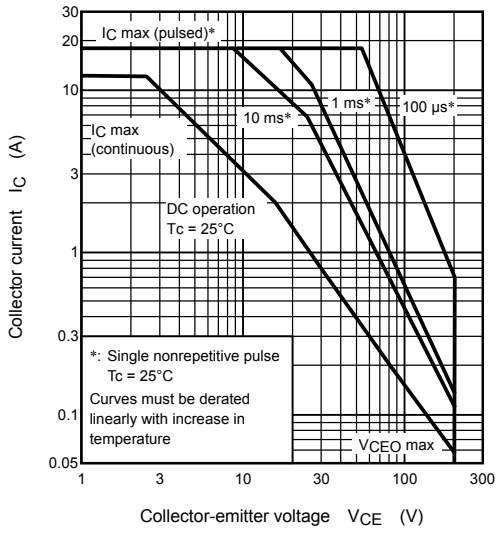
$P_C - Ta$



$r_{th} - t_w$



Safe Operating Area



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