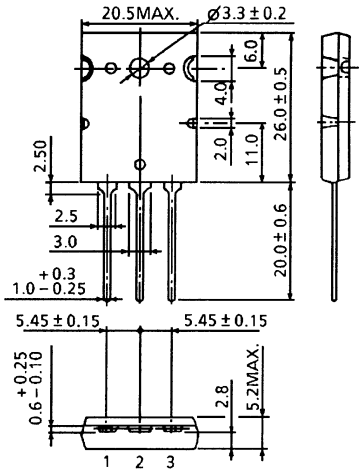
TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington Power Transistor)

2SD1314

High Power Switching Applications
Motor Control Applications

- High DC current gain: h_{FE} = 100 (min) (V_{CE} = 5 V, I_C = 15 A)
- Low saturation voltage: $V_{CE\ (sat)}$ = 2 V (max) (I_C = 15 A, I_B = 0.4 A)
- High speed: t_f = 3 μs (max) (I_C = 15 A)

Unit: mm



1. BASE
2. COLLECTOR (HEAT SINK)
3. EMITTER

JEDEC	—
JEITA	—
TOSHIBA	2-21F1A

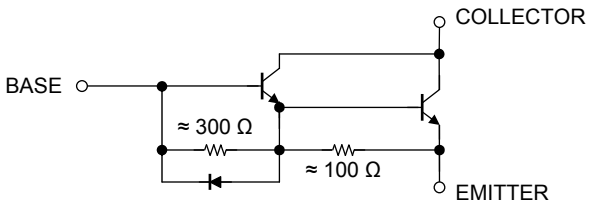
Weight: 9.75 g (typ.)

Absolute Maximum Ratings (Tc = 25°C)

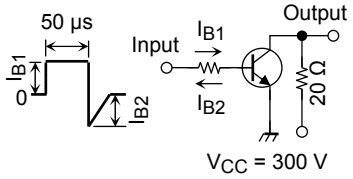
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	600	V
Collector-emitter voltage		V_{CEO}	450	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	DC	I_C	15	A
	Pulse	I_{CP}	30	
Base current		I_B	1.0	A
Collector power dissipation		P_C	150	W
Junction temperature		T_j	150	°C
Storage 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).

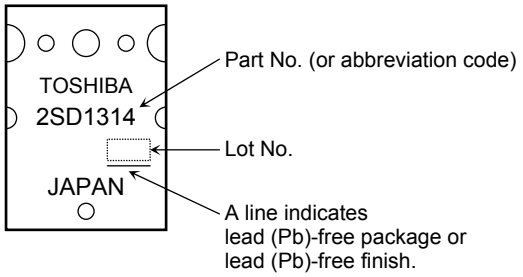
Equivalent Circuit



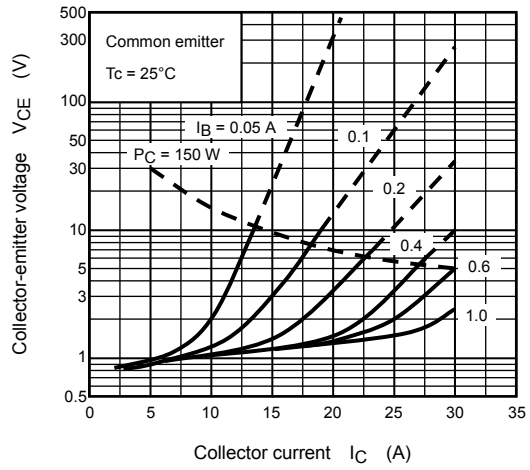
Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 600 V, I_E = 0	—	—	1.0	mA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 V, I_C = 0	—	—	200	mA
Collector-emitter sustaining voltage		$V_{CEO\ (SUS)}$	I_C = 0.5 A, L = 40 mH	450	—	—	V
DC current gain		h_{FE}	V_{CE} = 5 V, I_C = 15 A	100	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 15 A, I_B = 0.4 A	—	—	2.0	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$		—	—	2.5	V
Collector output capacitance		C_{ob}	V_{CB} = 50 V, I_E = 0, f = 1 MHz	—	150	—	pF
Switching time	Turn-on time	t_{on}		—	—	1.0	µs
	Storage time	t_{stg}		—	—	12	
	Fall time	t_f		—	—	3.0	
			I_{B1} = −I_{B2} = 0.4 A, duty cycle = 0.5%				

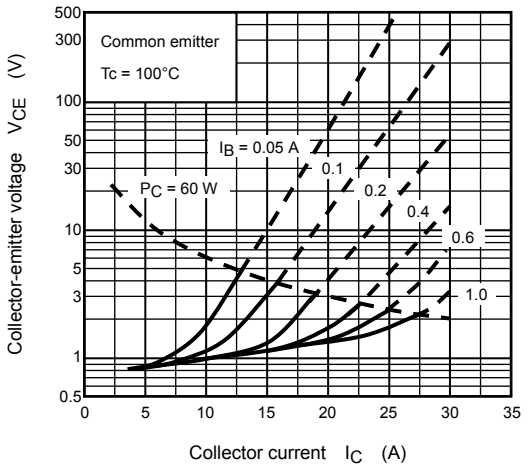
Marking



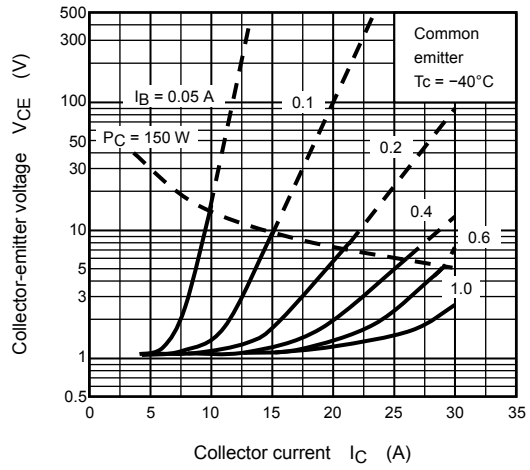
$V_{CE} - I_C$



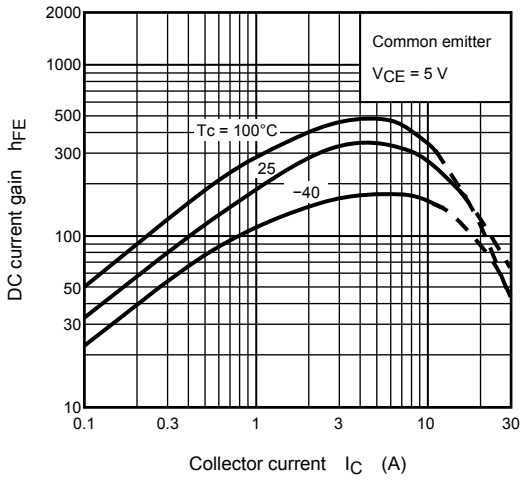
$V_{CE} - I_C$



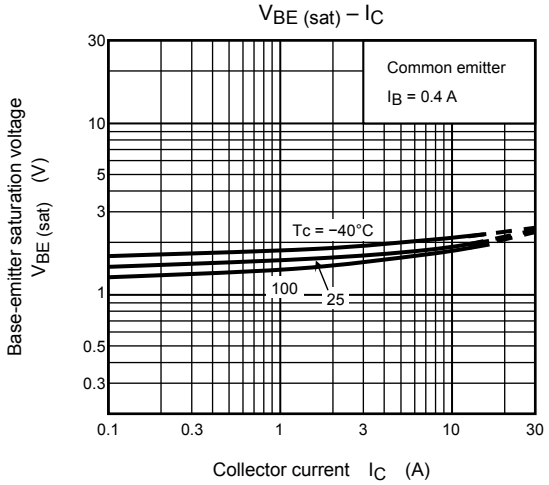
$V_{CE} - I_C$



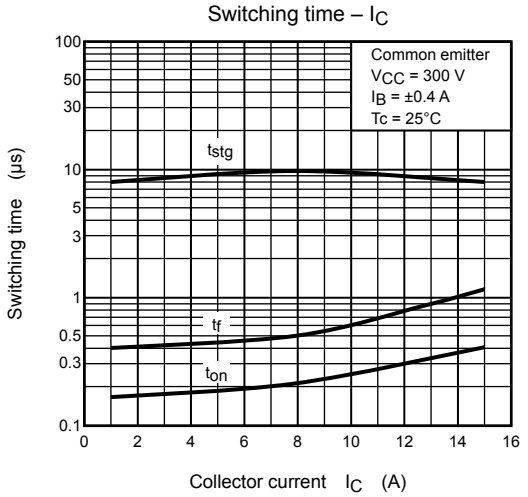
$h_{FE} - I_C$



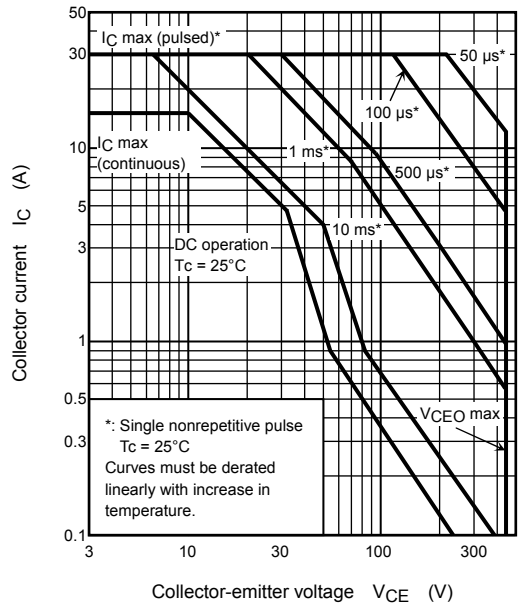
$V_{BE\ (sat)} - I_C$



Switching time – I_C



Safe Operating Area



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