TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington)

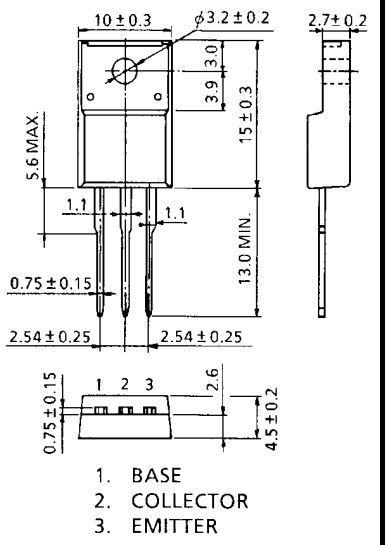
2SD1415A

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)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-10R1A

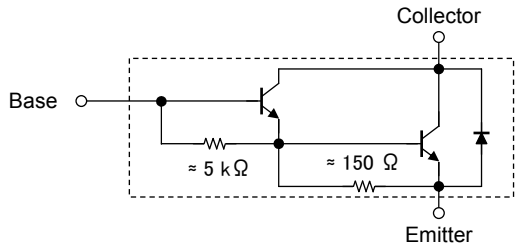
Weight: 1.7 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

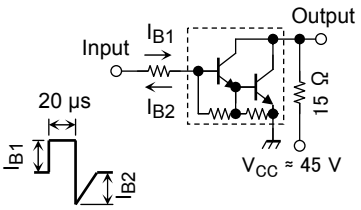
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	120	V
Collector-emitter voltage		V_{CEO}	100	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	DC	I_C	7	A
	Pulse	I_{CP}	10	
Base current		I_B	0.7	A
Collector power dissipation	Ta = 25°C	P_C	2.0	W
	Tc = 25°C		25	
Junction temperature		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).

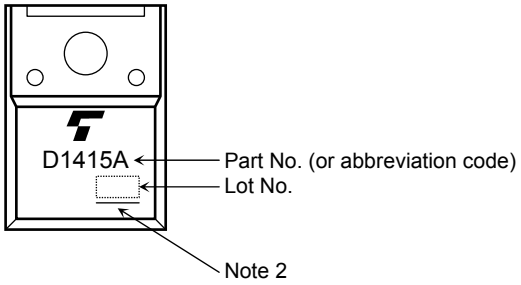
Equivalent Circuit



Electrical Characteristics (Ta = 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} = 6 V, I_C = 0	0.75	—	3.0	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 = 6 A	1000	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 3 A, I_B = 6 mA	—	0.9	1.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 3 A, I_B = 6 mA	—	1.5	2.0	V
Switching time	Turn-on time	t_{on}		—	0.3	—	μs
	Storage time	t_{stg}		—	5.1	—	
	Fall time	t_f	I_{B1} = 6 mA, I_{B2} = 6 mA duty cycle ≤ 1%	—	0.6	—	

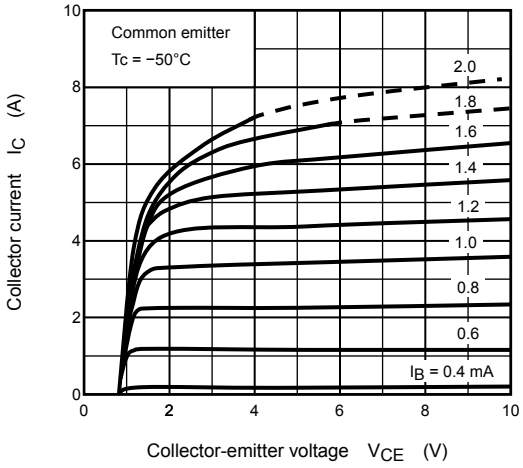
Marking



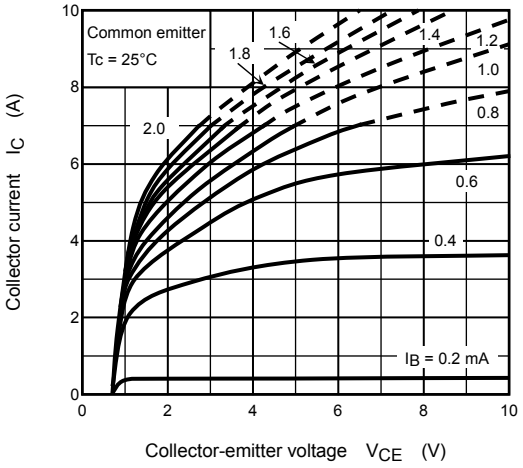
Note2: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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.

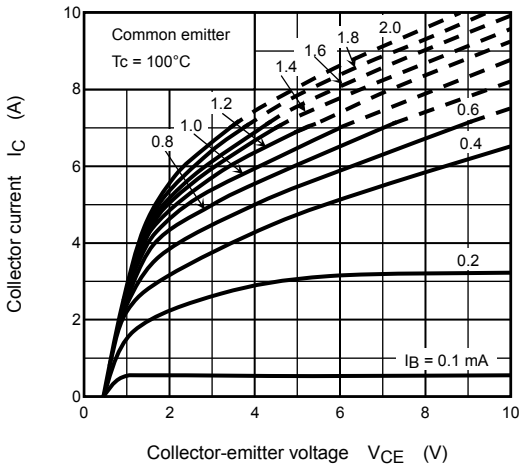
$I_C - V_{CE}$



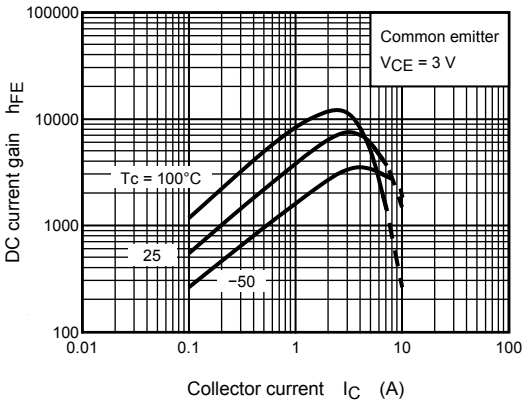
$I_C - V_{CE}$



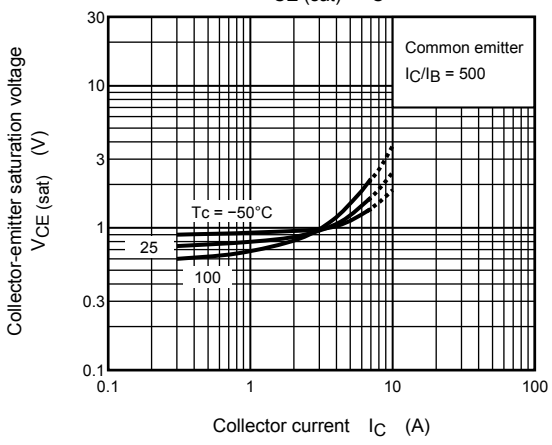
$I_C - V_{CE}$



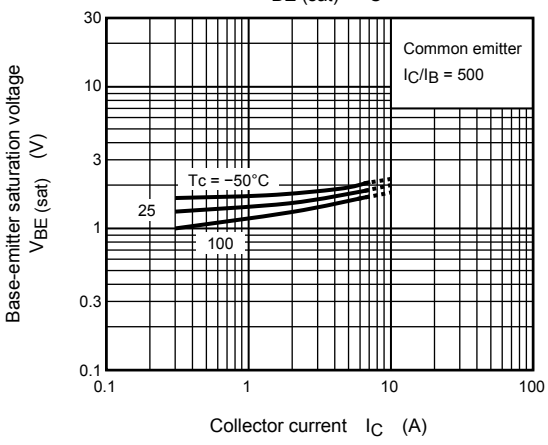
$h_{FE} - I_C$



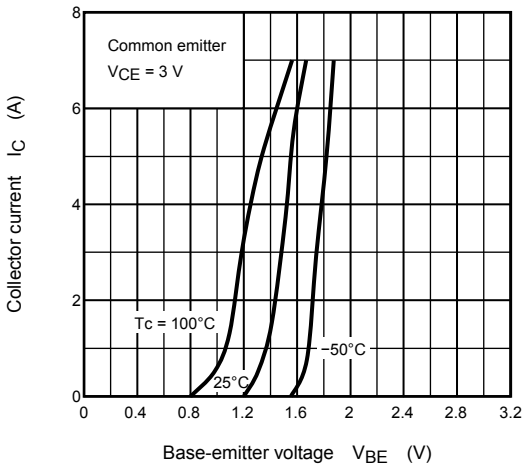
$V_{CE\ (sat)} - I_C$



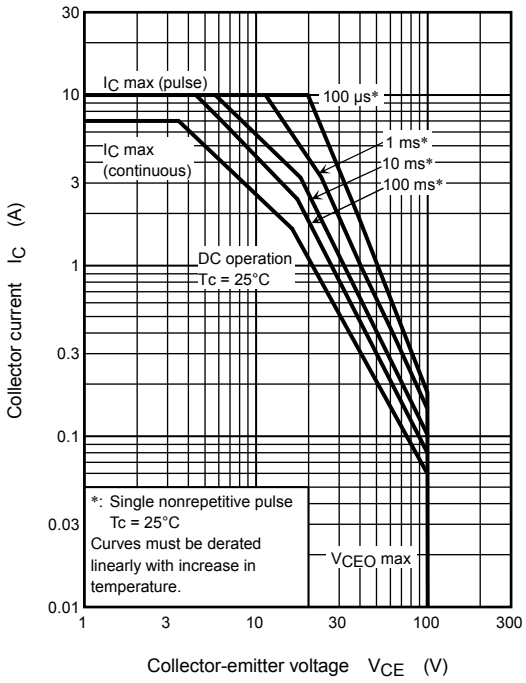
$V_{BE\ (sat)} - I_C$



$I_C - V_{BE}$



Safe Operating Area



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