

TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington)

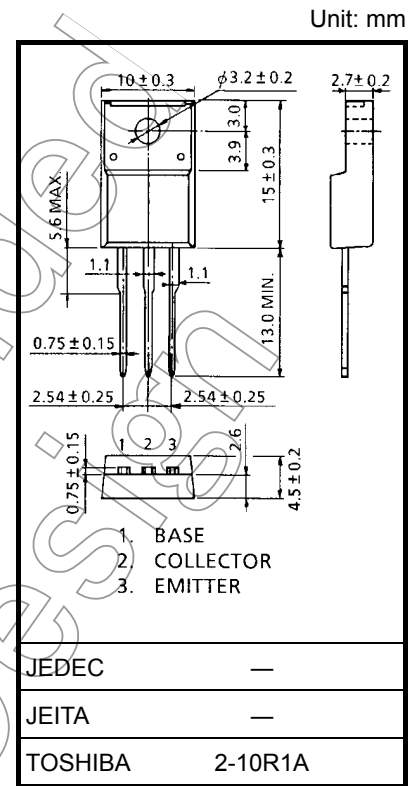
# 2SD1415A

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

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

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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	$T_a = 25^\circ\text{C}$	$P_C$	2.0	W
	$T_c = 25^\circ\text{C}$		25	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

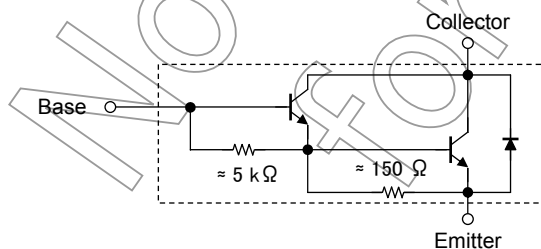


JEDEC	—
JEITA	—
TOSHIBA	2-10R1A

Weight: 1.7 g (typ.)

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).

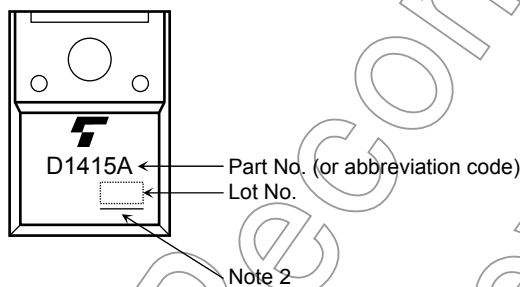
### Equivalent Circuit



## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	100	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.75	—	3.0	$\text{mA}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 50\text{ mA}, I_B = 0$	100	—	—	$\text{V}$
DC current gain		$h_{FE(1)}$	$V_{CE} = 3\text{ V}, I_C = 3\text{ A}$	2000	—	15000	
		$h_{FE(2)}$	$V_{CE} = 3\text{ V}, I_C = 6\text{ A}$	1000	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 3\text{ A}, I_B = 6\text{ mA}$	—	0.9	1.5	$\text{V}$
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 3\text{ A}, I_B = 6\text{ mA}$	—	1.5	2.0	$\text{V}$
Switching time	Turn-on time	$t_{on}$	<p> <math>I_{B1} = 6\text{ mA}, I_{B2} = 6\text{ mA}</math>                      duty cycle <math>\leq 1\%</math> </p>	—	0.3	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	5.1	—	
	Fall time	$t_f$		—	—	0.6	

## Marking

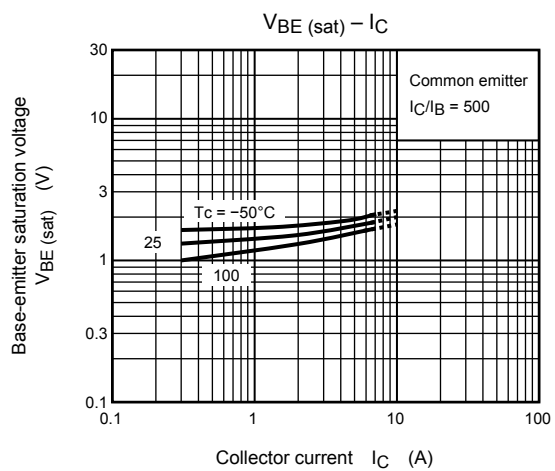
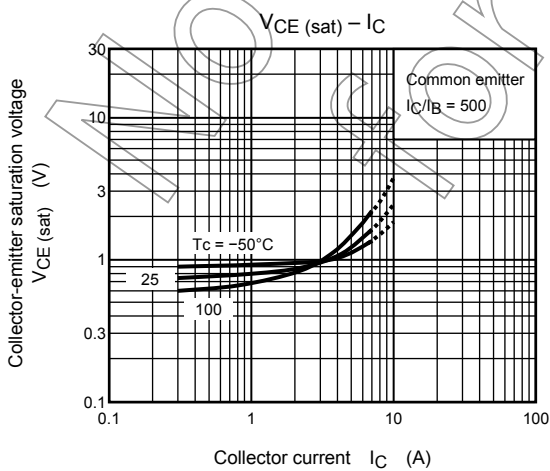
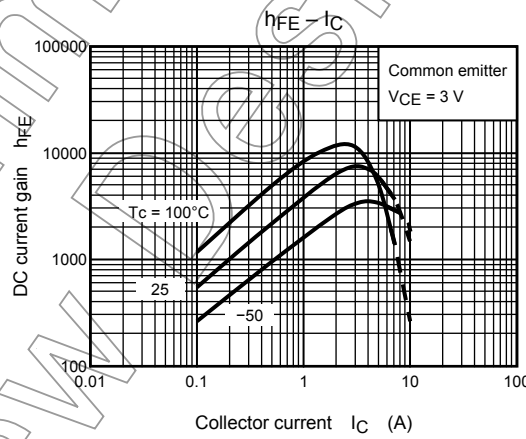
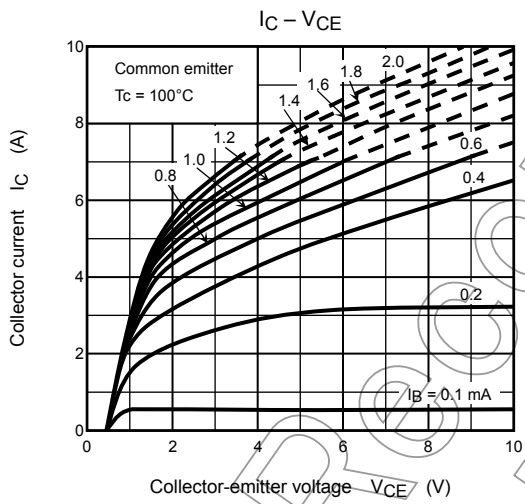
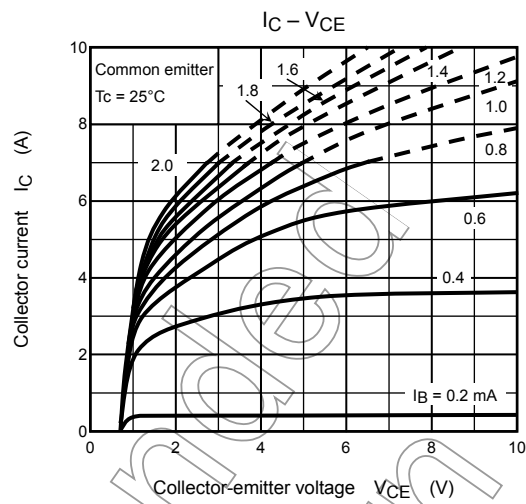
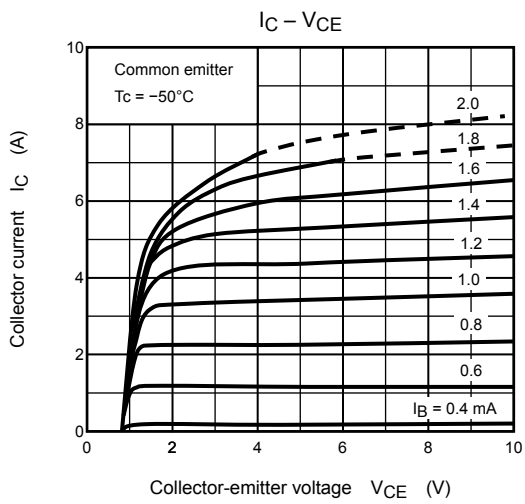


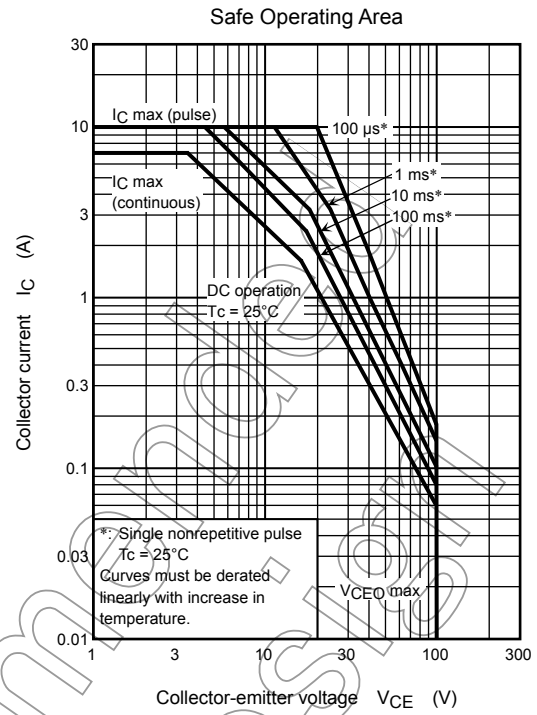
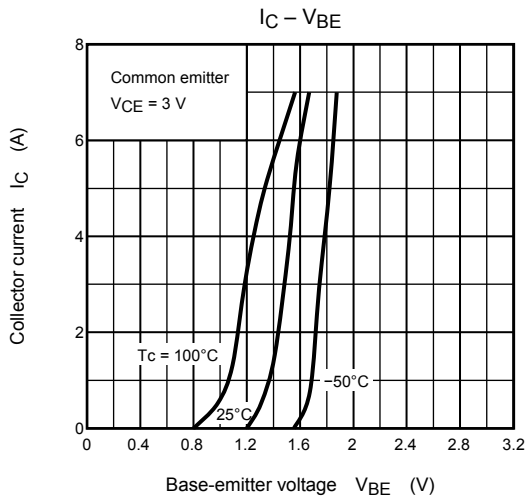
Note2: A line under a Lot No. identifies the indication of product Labels.

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.





Not Recommended for New Design

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