

TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington)

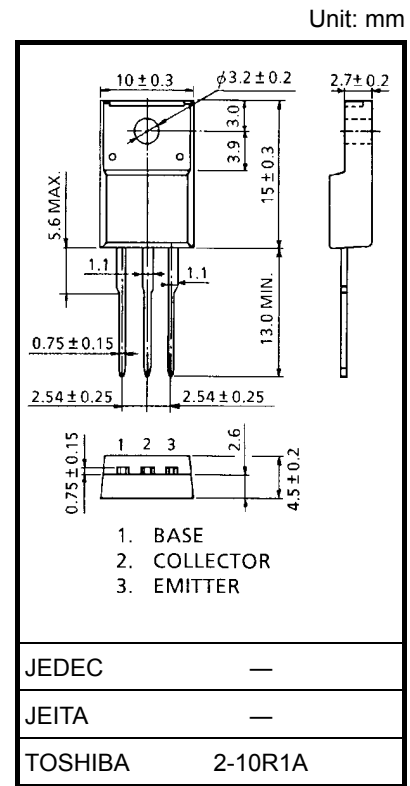
# 2SD1415A

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 ( $T_a = 25^\circ\text{C}$ )

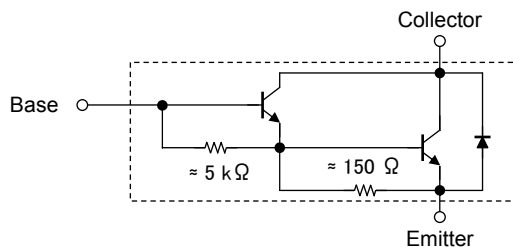
Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	120	V
Collector-emitter voltage	$V_{CEO}$	100	V
Emitter-base voltage	$V_{EBO}$	6	V
Collector current	DC	$I_C$	7
	Pulse	$I_{CP}$	10
Base current	$I_B$	0.7	A
Collector power dissipation	$T_a = 25^\circ\text{C}$	$P_C$	2.0
	$T_c = 25^\circ\text{C}$		25
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$



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).

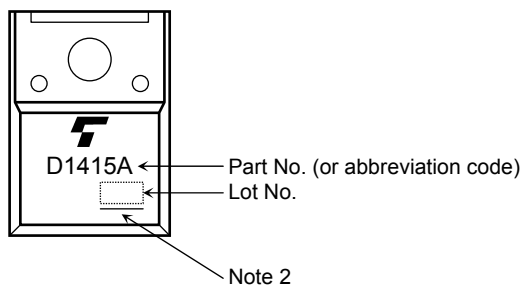
### Equivalent Circuit



## 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

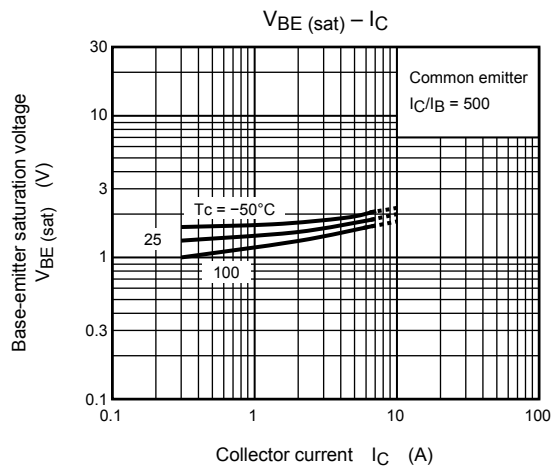
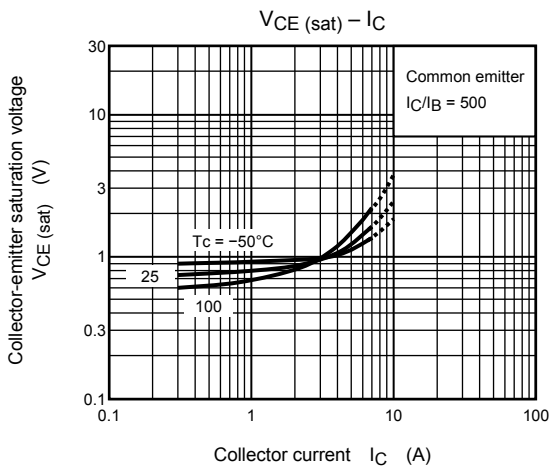
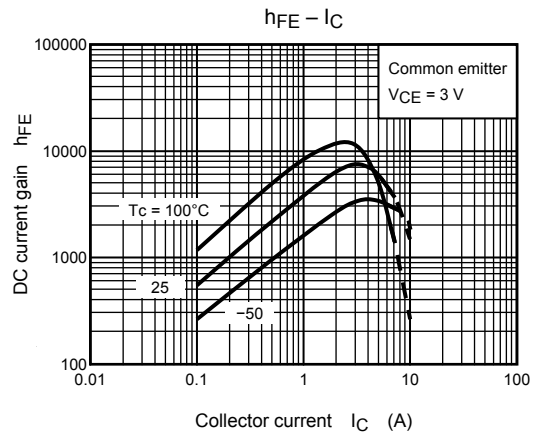
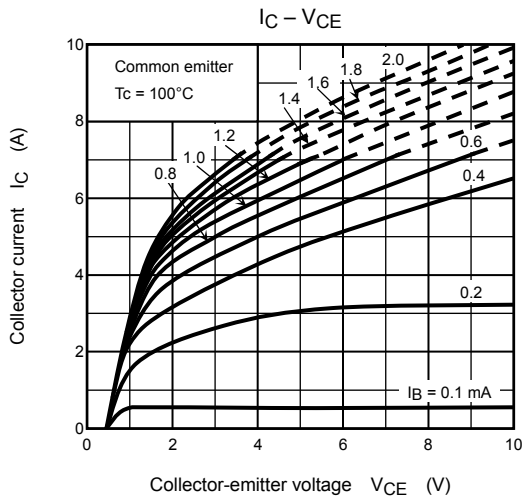
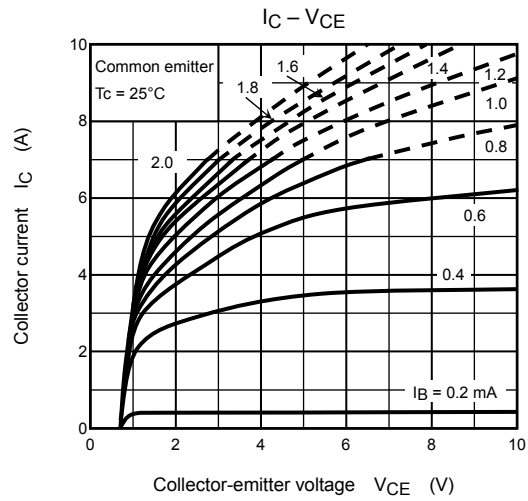
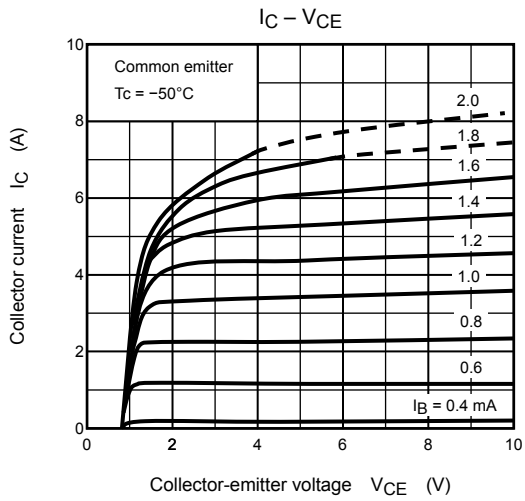


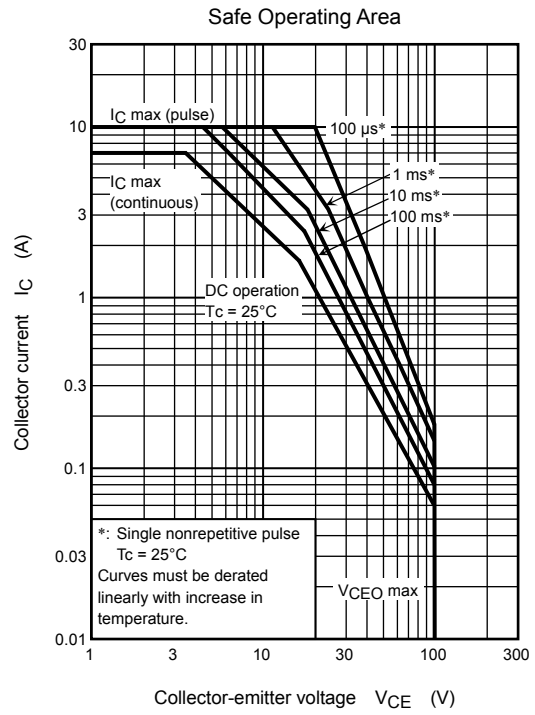
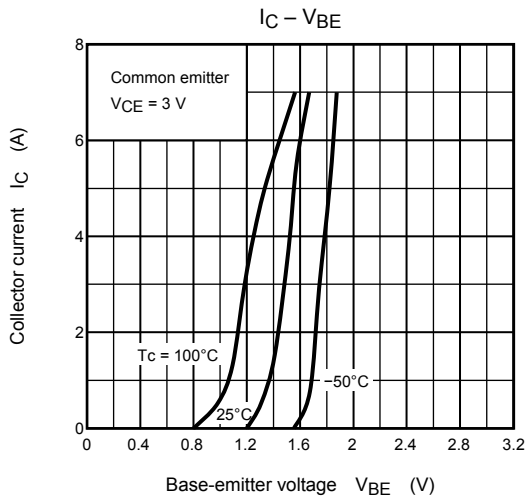
Note2: A line under a Lot No. identifies the indication of product Labels.

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.





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