

TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington)

2SD1409A

High Voltage Switching Applications

- High DC current gain: $h_{FE} = 600$ (min.) ($V_{CE} = 2\text{ V}$, $I_C = 2\text{ A}$)
- Monolithic construction with built-in base-emitter shunt resistor

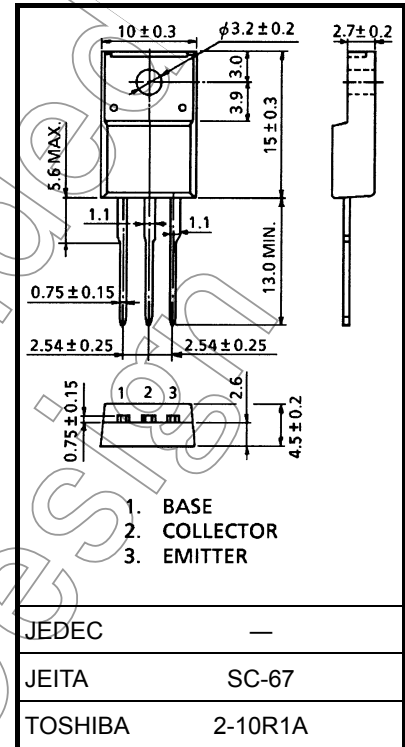
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	600	V
Collector-emitter voltage		V_{CEO}	400	V
Emitter-base voltage		V_{EBO}	5	V
Collector current		I_C	6	A
Base current		I_B	1	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	$^\circ\text{C}$

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).

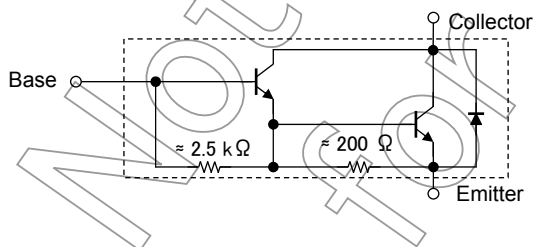
Industrial Applications

Unit: mm



Weight: 1.7 g (typ.)

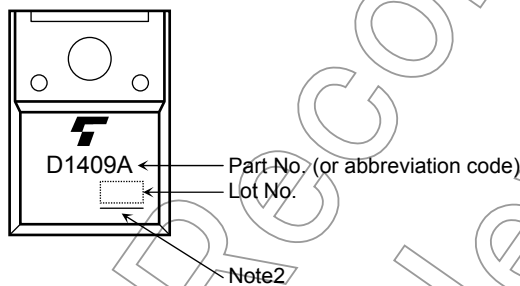
Equivalent Circuit



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 600\text{ V}, I_E = 0$	—	—	0.5	mA
Emitter cut-off current		I_{EBO}	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	3	mA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	400	—	—	V
DC current gain		$h_{FE(1)}$	$V_{CE} = 2\text{ V}, I_C = 2\text{ A}$	600	—	—	
		$h_{FE(2)}$	$V_{CE} = 2\text{ V}, I_C = 4\text{ A}$	100	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 4\text{ A}, I_B = 0.04\text{ A}$	—	—	2.0	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 4\text{ A}, I_B = 0.04\text{ A}$	—	—	2.5	V
Emitter-collector forward voltage		V_{ECF}	$I_E = 4\text{ A}, I_B = 0$	—	—	3.0	V
Collector output capacitance		C_{ob}	$V_{CB} = 50\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	35	—	pF
Switching time	Turn-on time	t_{on}	<p>$I_{B1} = 0.04\text{ A}, I_{B2} = 0.04\text{ A}$ duty cycle $\leq 1\%$</p>	—	1	—	μs
	Storage time	t_{stg}		—	8	—	
	Fall time	t_f		—	5	—	

Marking

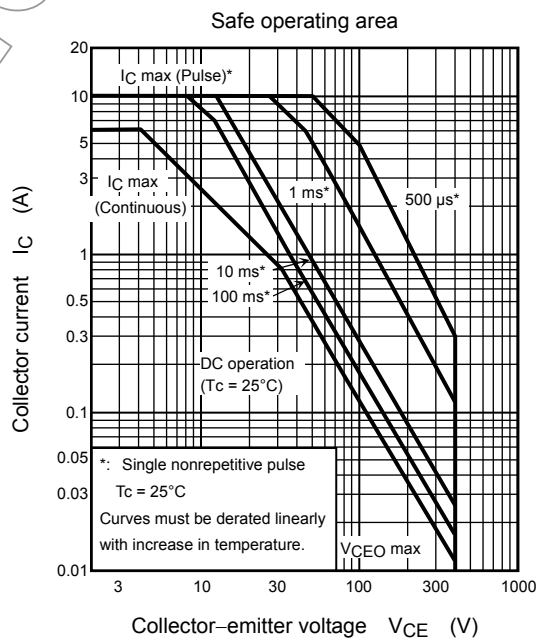
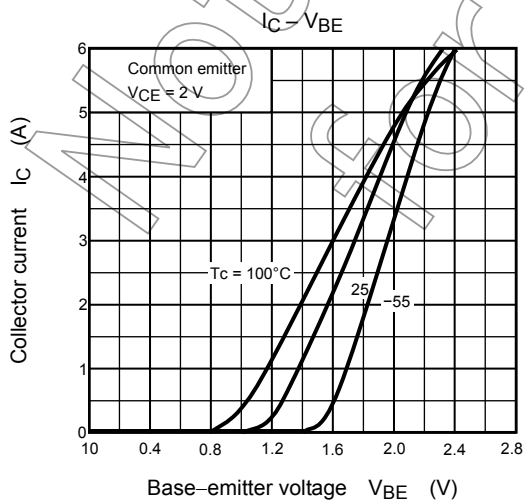
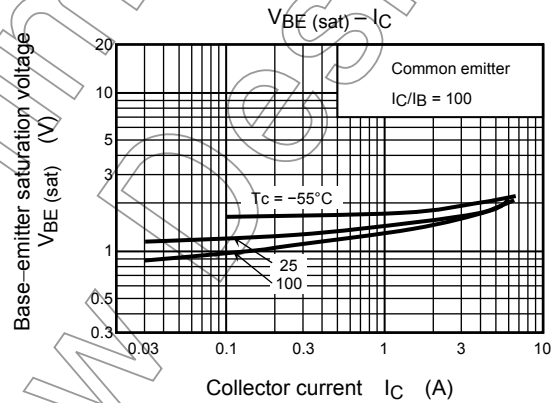
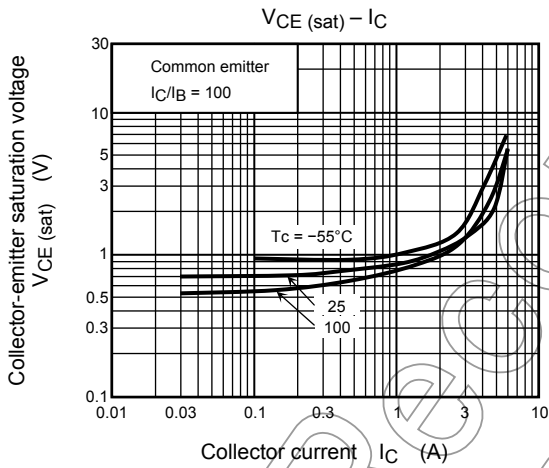
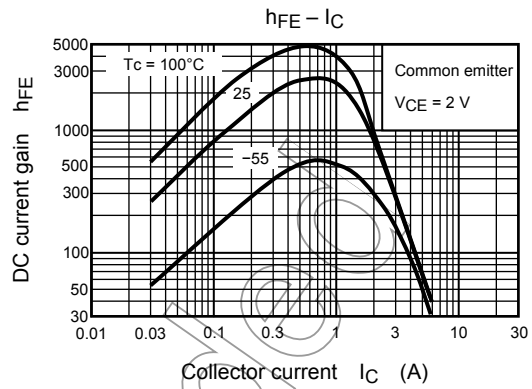
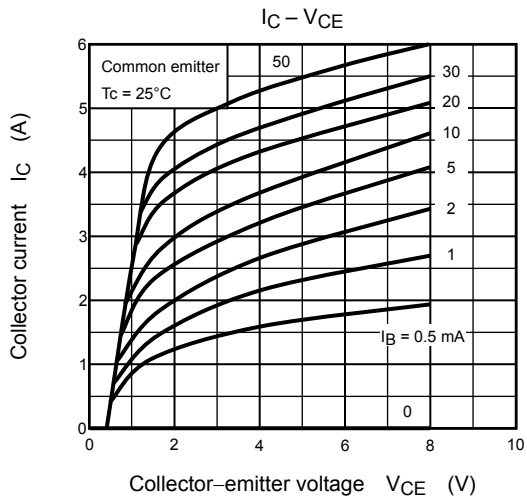


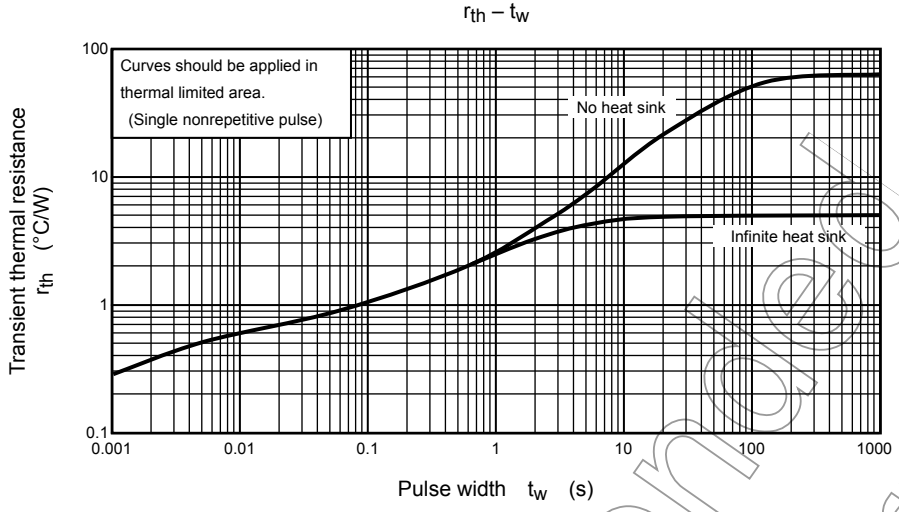
Note2: A line under a Lot No. identifies the indication of product Labels.

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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