

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

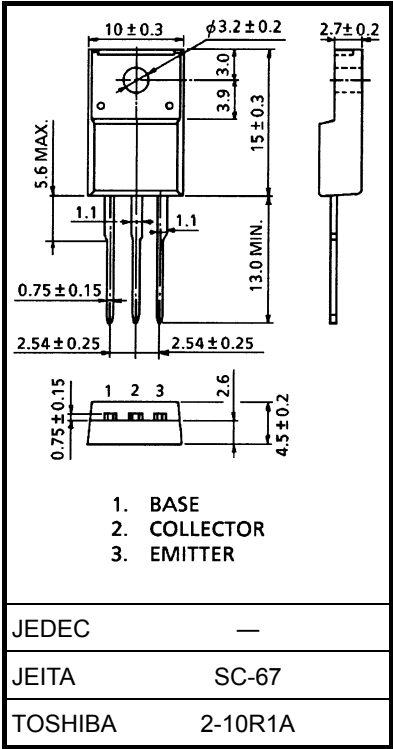
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$

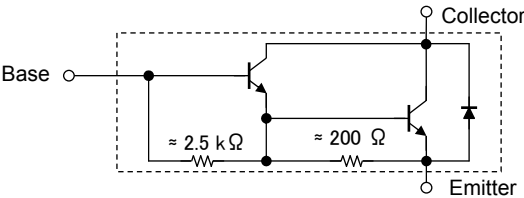
Note1: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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

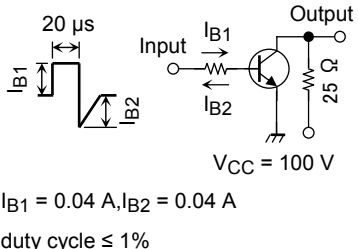
Unit: mm



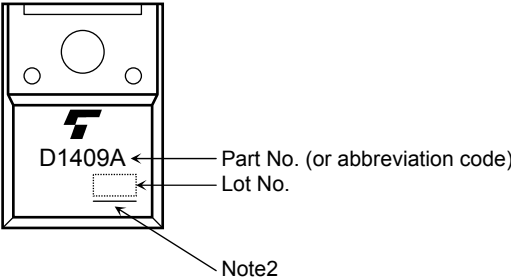
Equivalent Circuit



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		ICBO	V _{CB} = 600 V, I _E = 0	—	—	0.5	mA
Emitter cut-off current		IEBO	V _{EB} = 5 V, I _C = 0	—	—	3	mA
Collector-emitter breakdown voltage		V (BR) CEO	I _C = 10 mA, I _B = 0	400	—	—	V
DC current gain		h _{FE} (1)	V _{CE} = 2 V, I _C = 2 A	600	—	—	
		h _{FE} (2)	V _{CE} = 2 V, I _C = 4 A	100	—	—	
Collector-emitter saturation voltage		V _{CE} (sat)	I _C = 4 A, I _B = 0.04 A	—	—	2.0	V
Base-emitter saturation voltage		V _{BE} (sat)	I _C = 4 A, I _B = 0.04 A	—	—	2.5	V
Emitter-collector forward voltage		V _{ECF}	I _E = 4 A, I _B = 0	—	—	3.0	V
Collector output capacitance		C _{ob}	V _{CB} = 50 V, I _E = 0, f = 1 MHz	—	35	—	pF
Switching time	Turn-on time	t _{on}	 I _{B1} = 0.04 A, I _{B2} = 0.04 A duty cycle ≤ 1%	—	1	—	μs
	Storage time	t _{stg}		—	8	—	
	Fall time	t _f		—	5	—	

Marking

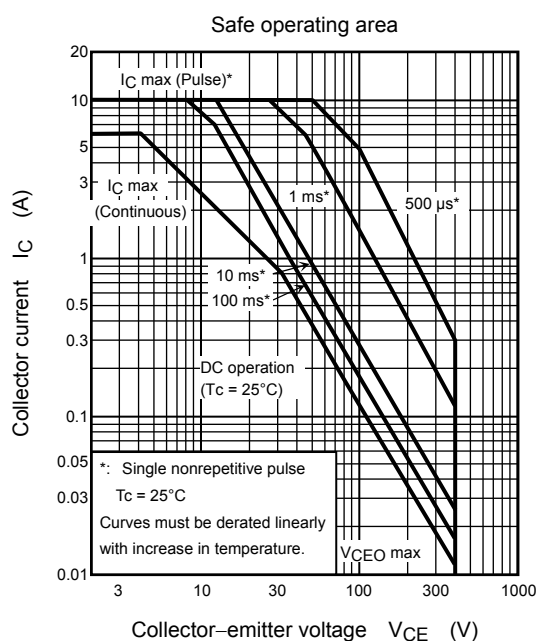
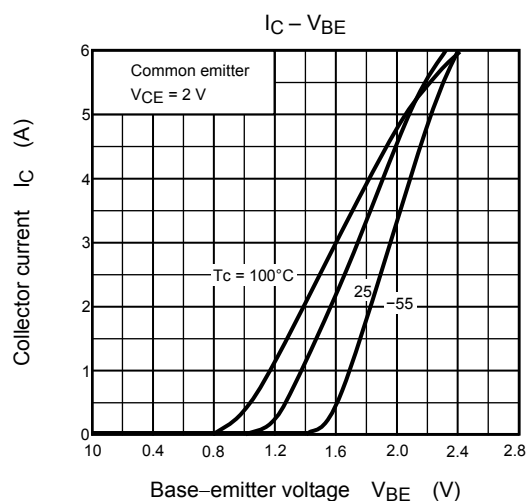
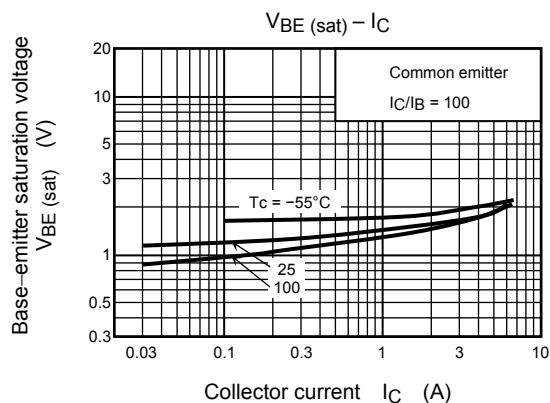
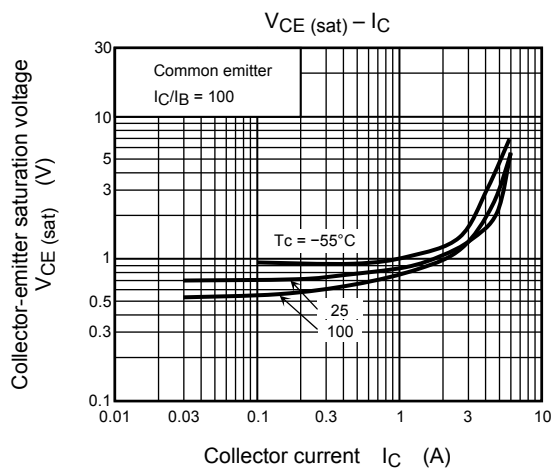
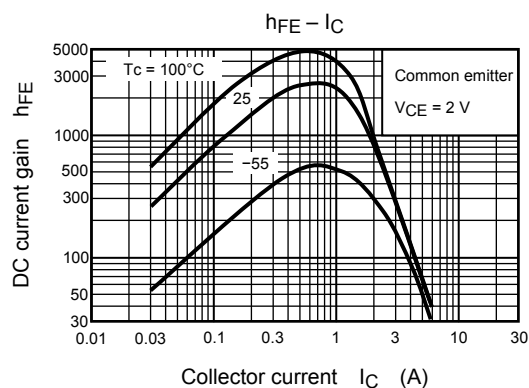
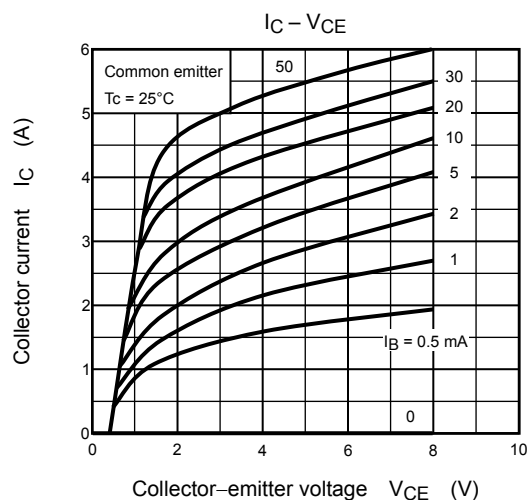


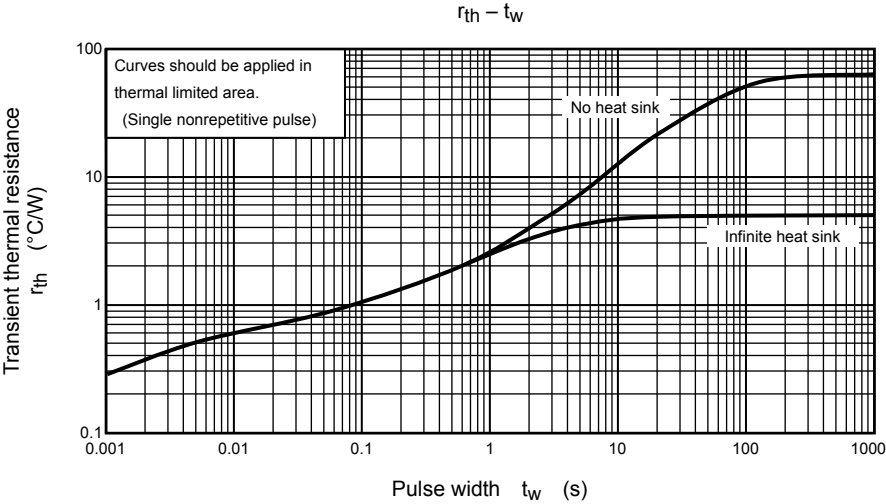
Note2: A line under a Lot No. identifies the indication of product Labels.

Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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