

TOSHIBA Transistor Silicon NPN Triple Diffused Type

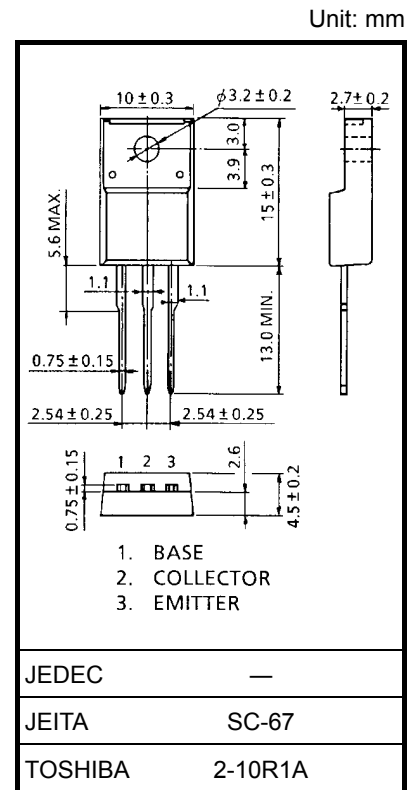
2SD2204

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

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

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

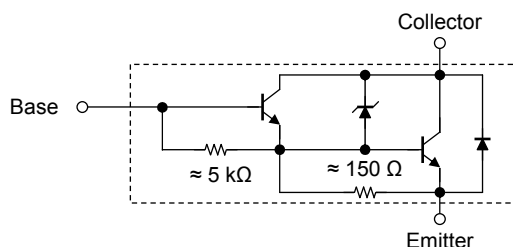
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	65 ± 10	V
Collector-emitter voltage		V_{CEO}	65 ± 10	V
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC	I_C	4	A
	Pulse	I_{CP}	6	
Base current		I_B	0.5	A
Collector power dissipation	$T_a = 25^\circ\text{C}$	P_C	2.0	W
	$T_c = 25^\circ\text{C}$		25	
Junction temperature		T_j	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$



Weight: 1.7 g (typ.)

Note: 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).

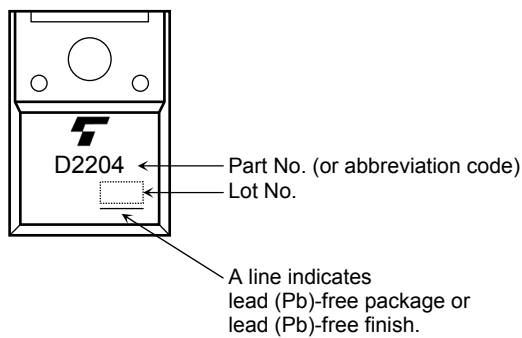
Equivalent Circuit

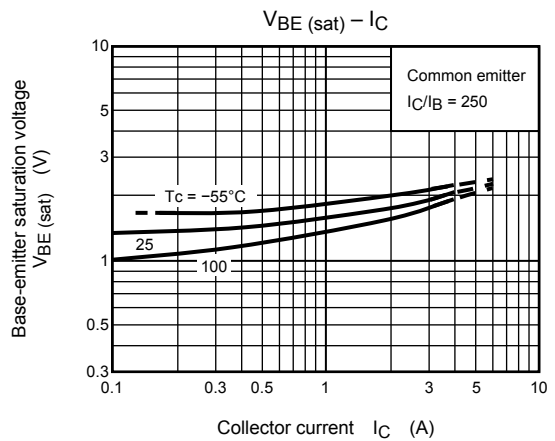
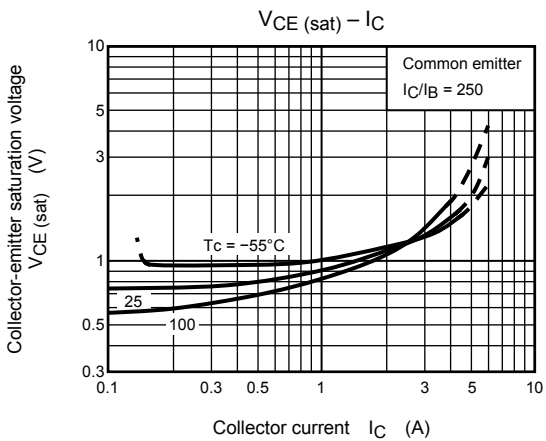
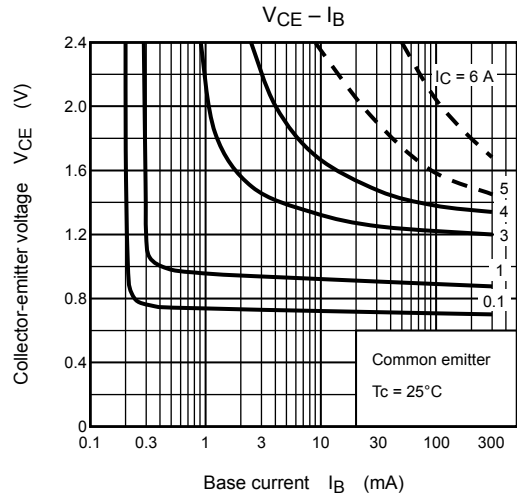
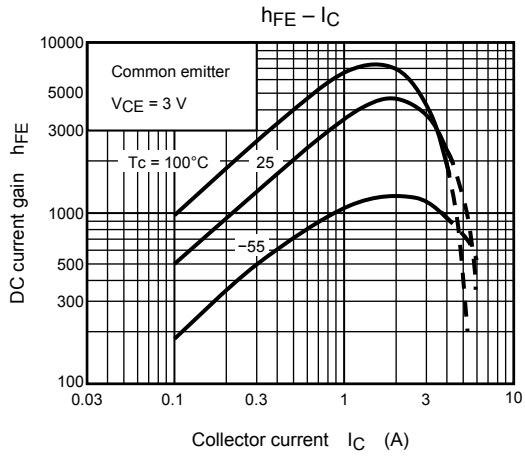
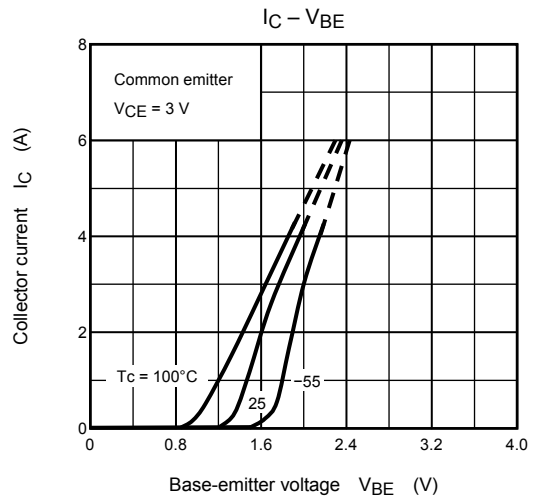
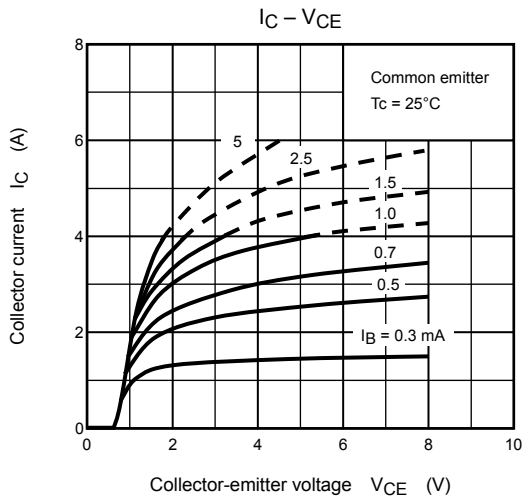


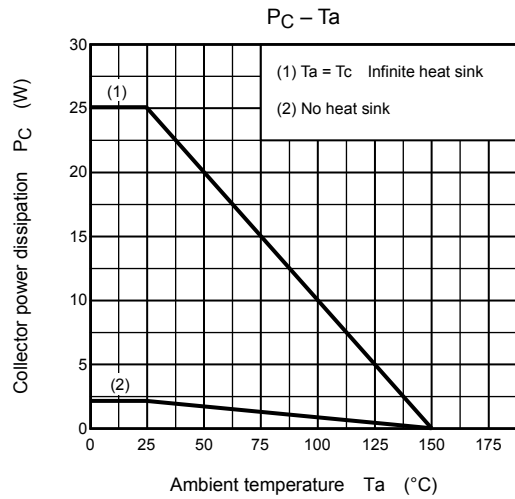
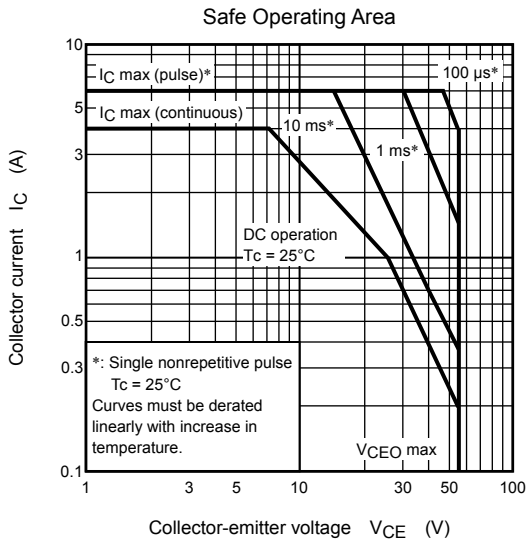
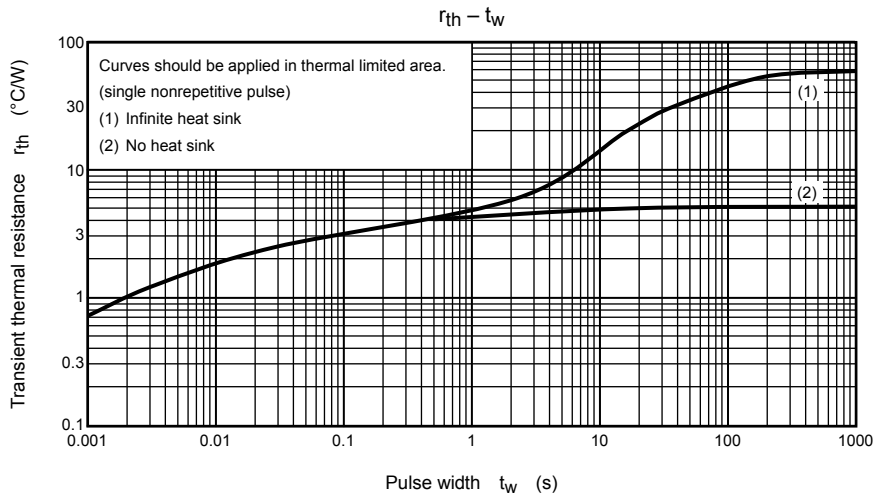
Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 45\text{ V}, I_E = 0$	—	—	100	μA
Emitter cut-off current		I_{EBO}	$V_{EB} = 6\text{ V}, I_C = 0$	—	—	2.5	mA
Collector-emitter breakdown voltage		$V_{(BR) CEO}$	$I_C = 10\text{ mA}, I_B = 0$	55	65	75	V
DC current gain		$h_{FE} (1)$	$V_{CE} = 3\text{ V}, I_C = 1.5\text{ A}$	2000	—	15000	
		$h_{FE} (2)$	$V_{CE} = 3\text{ V}, I_C = 3\text{ A}$	1000	—	—	
Collector-emitter saturation voltage		$V_{CE (sat) (1)}$	$I_C = 1.5\text{ A}, I_B = 3\text{ mA}$	—	—	1.5	V
		$V_{CE (sat) (2)}$	$I_C = 3\text{ A}, I_B = 12\text{ mA}$	—	—	2.0	
Base-emitter saturation voltage		$V_{BE (sat)}$	$I_C = 1.5\text{ A}, I_B = 3\text{ mA}$	—	—	2.0	V
Switching time	Turn-on time	t_{on}	<p>$I_{B1} = -I_{B2} = 3\text{ mA}, \text{duty cycle} \leq 1\%$</p>	—	1.0	—	μs
	Storage time	t_{stg}		—	5.0	—	
	Fall time	t_f		—	2.0	—	

Marking







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20070701-EN

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