

TOSHIBA Transistor Silicon NPN Triple Diffused Type (Darlington)

# 2SD2604

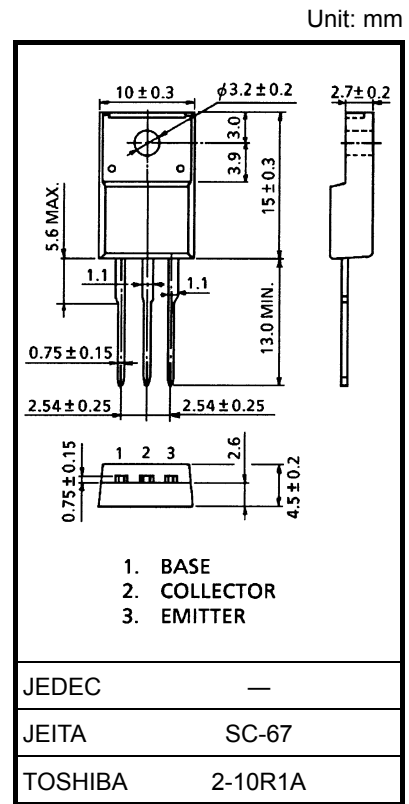
High-Power Switching Applications  
Hammer Drive, Pulse Motor Drive Applications

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

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## Absolute Maximum Ratings (Tc = 25°C)

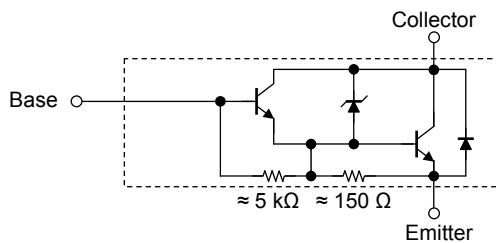
Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	95	V
Collector-emitter voltage		$V_{CEO}$	110 ± 15	V
Emitter-base voltage		$V_{EBO}$	5	V
Collector current	DC	$I_C$	5	A
	Pulse	$I_{CP}$	10	
Base current		$I_B$	0.7	A
Collector power dissipation	Ta = 25°C	$P_C$	2.0	W
	Tc = 25°C		20	
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55 to 150	°C



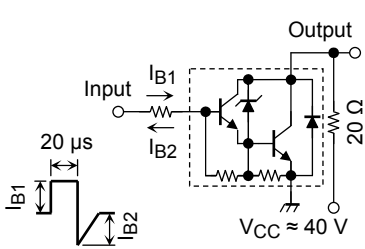
Weight: 1.7 g (typ.)

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).

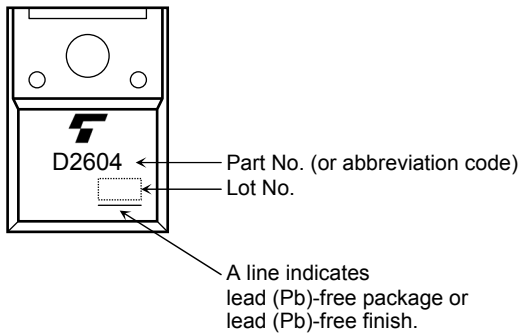
## Equivalent Circuit

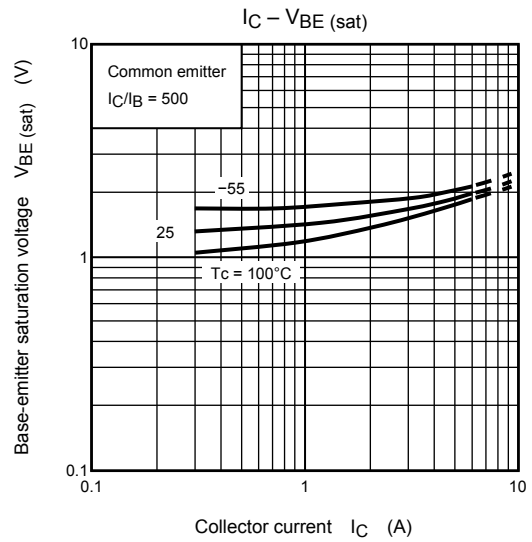
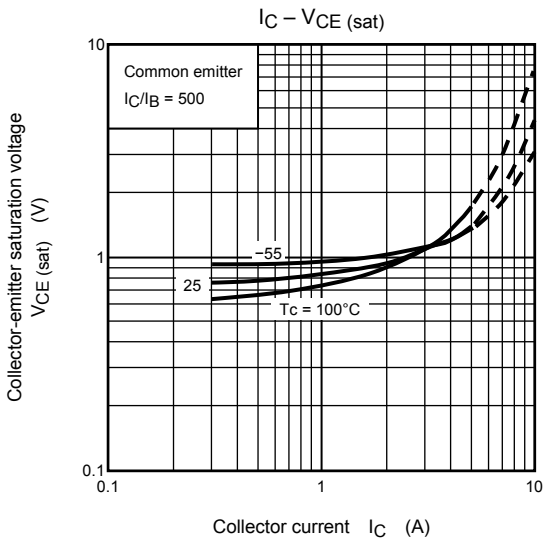
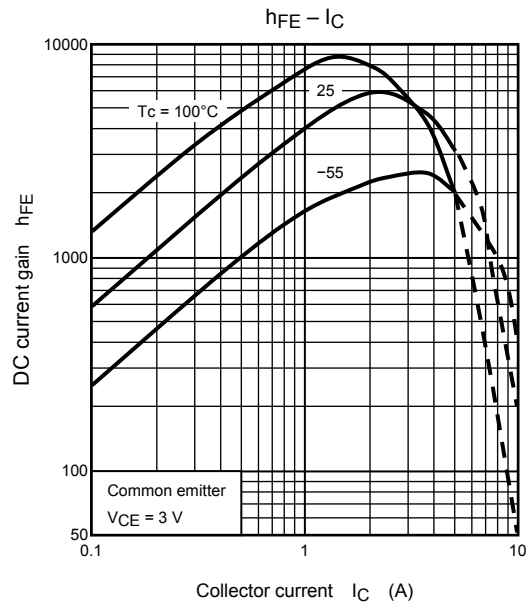
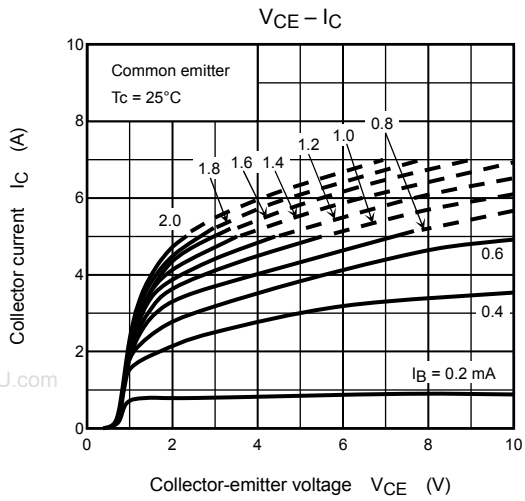


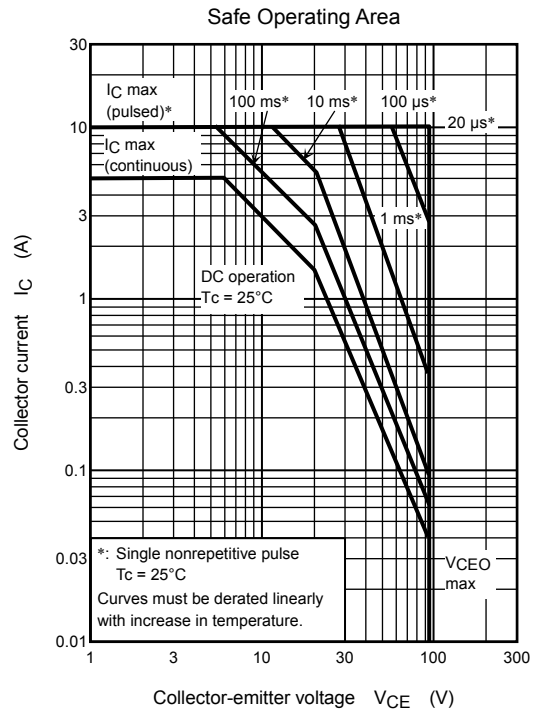
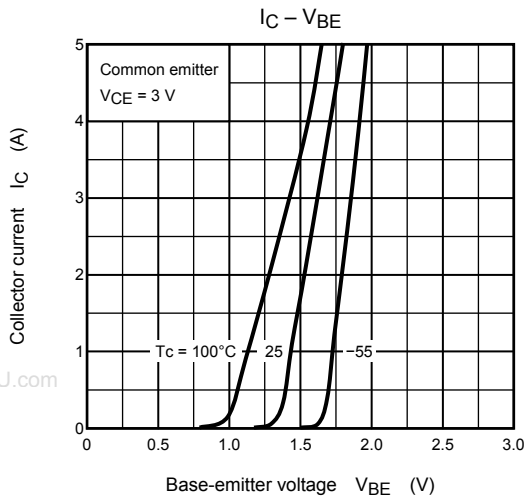
## Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 90\text{ V}, I_E = 0$	—	—	100	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.75	—	3.0	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	95	110	125	V
DC current gain		$h_{FE(1)}$	$V_{CE} = 3\text{ V}, I_C = 2\text{ A}$	2000	—	15000	
		$h_{FE(2)}$	$V_{CE} = 3\text{ V}, I_C = 5\text{ A}$	1000	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 2\text{ A}, I_B = 4\text{ mA}$	—	0.9	1.5	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 2\text{ A}, I_B = 4\text{ mA}$	—	1.5	2.5	V
Switching time	Turn-on time	$t_{on}$	 <p><math>I_{B1} = -I_{B2} = 4\text{ mA}, \text{duty cycle} \leq 1\%</math></p>	—	0.5	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	5.0	—	
	Fall time	$t_f$		—	0.7	—	

## Marking







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