

TOSHIBA Transistor Silicon NPN Epitaxial Type

# 2SC5738

High-Speed Switching Applications  
DC-DC Converter Applications

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.5$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.15$  V (max)
- High-speed switching:  $t_f = 90$  ns (typ.)

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

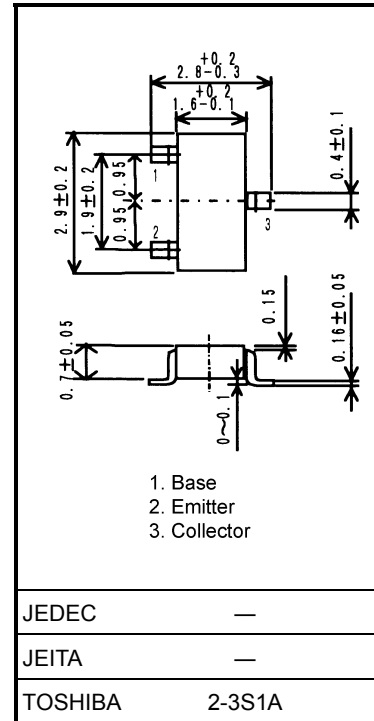
Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	40	V
Collector-emitter voltage		$V_{CEX}$	30	V
Collector-emitter voltage		$V_{CEO}$	20	V
Emitter-base voltage		$V_{EBO}$	7	V
Collector current	DC	$I_C$	3.5	A
	Pulse	$I_{CP}$	6.0	
Base current		$I_B$	350	mA
Collector power dissipation	DC	$P_C$	625	mW
	$t = 10$ s	(Note)	1000	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

Note: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)

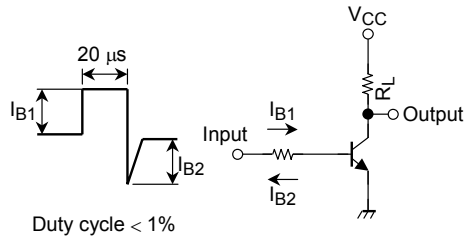
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 40$ V, $I_E = 0$	—	—	100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 7$ V, $I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10$ mA, $I_B = 0$	20	—	—	V
DC current gain		$h_{FE}(1)$	$V_{CE} = 2$ V, $I_C = 0.5$ A	400	—	1000	
		$h_{FE}(2)$	$V_{CE} = 2$ V, $I_C = 1.6$ A	200	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 1.6$ A, $I_B = 32$ mA	—	—	0.15	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 1.6$ A, $I_B = 32$ mA	—	—	1.10	V
Collector output capacitance		$C_{ob}$	$V_{CB} = 10$ V, $I_E = 0$ , $f = 1$ MHz	—	18	—	pF
Switching time	Rise time	$t_r$	See Figure 1.	—	100	—	ns
	Storage time	$t_{stg}$	$V_{CC} \approx 12$ V, $R_L = 7.5 \Omega$	—	350	—	
	Fall time	$t_f$	$I_{B1} = -I_{B2} = 53$ mA	—	90	—	

Unit: mm

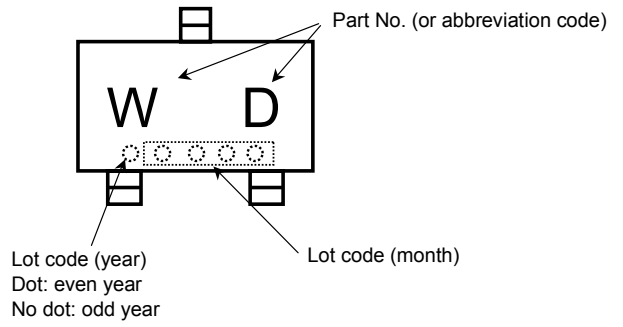


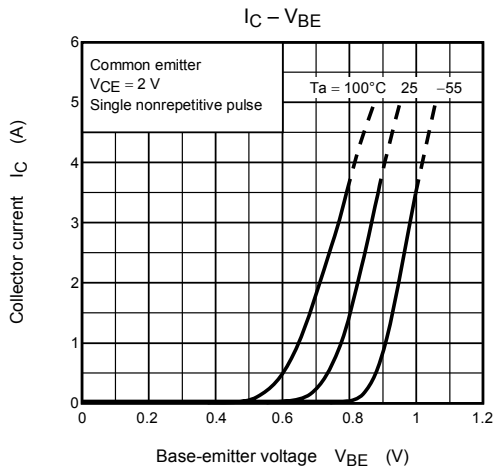
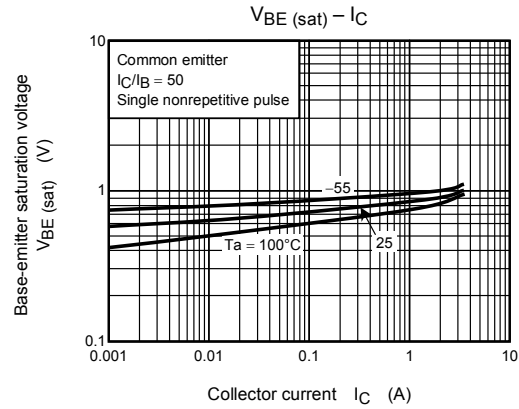
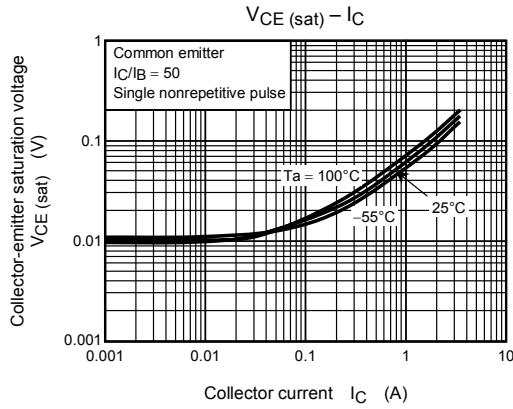
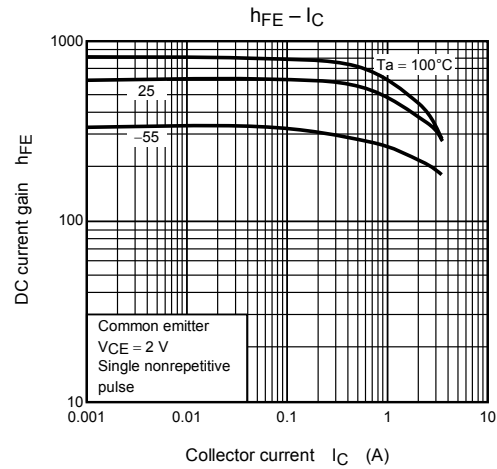
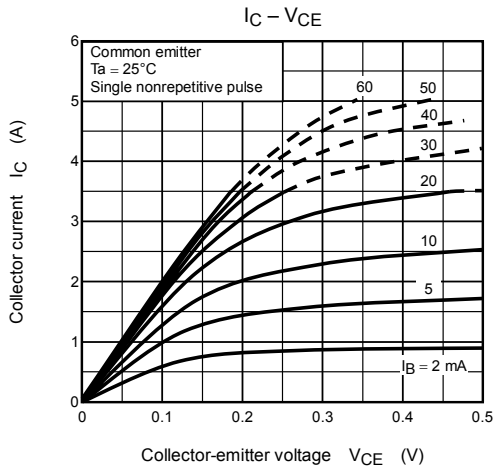
Weight: 0.01 g (typ.)

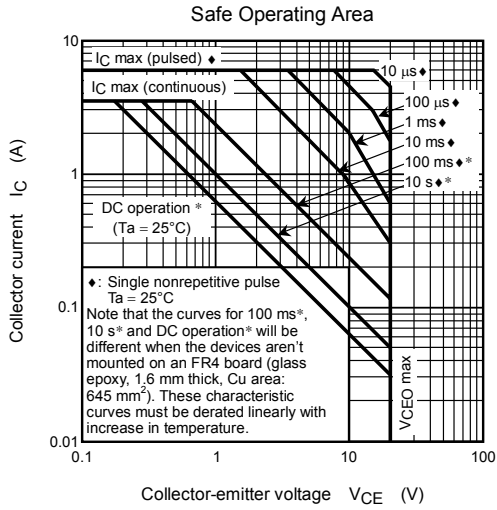
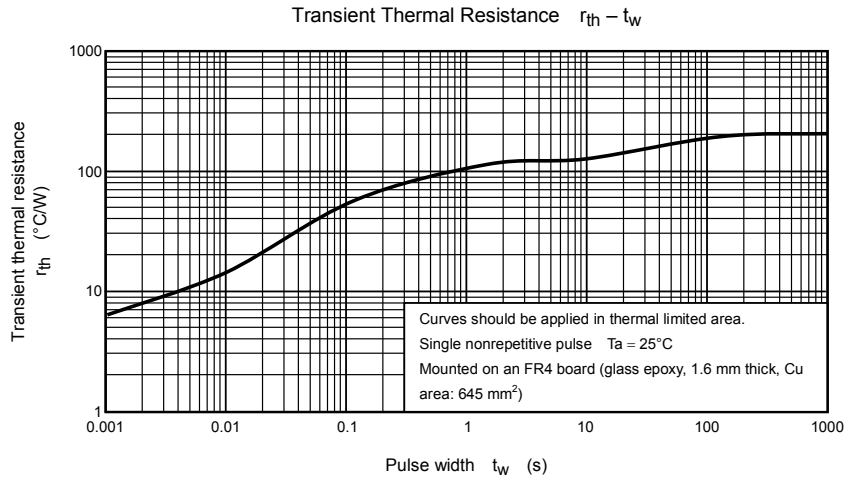


**Figure 1 Switching Time Test Circuit & Timing Chart**

**Marking**







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