

TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC6133

High-Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 400$ to 1000 ($I_C = 0.15A$)
- Low collector-emitter saturation voltage: $V_{CE(sat)} = 0.12$ V (max)
- High-speed switching: $t_f = 45$ ns (typ.)

Absolute Maximum Ratings (Ta = 25°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	1.5
	Pulse	I_{CP}	2.5
Base current	I_B	150	mA
Collector power dissipation	P_C (Note1)	800	mW
	P_C (Note2)	500	
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

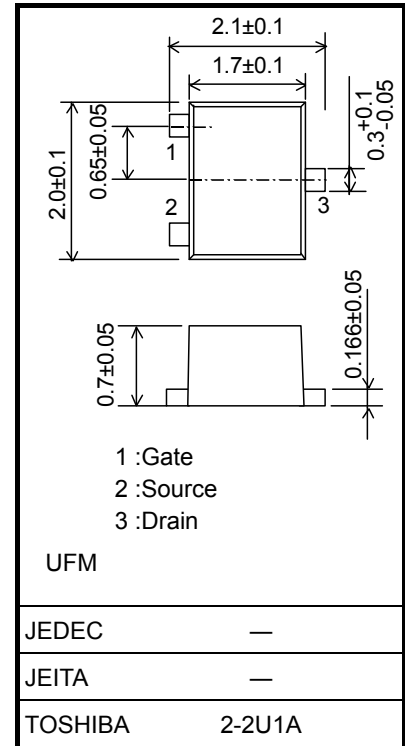
Note1: Mounted on ceramic board.
(25.4 mm × 25.4 mm × 0.8 mm, Cu Pad: 645 mm²)

Note2: Mounted on FR4 board.
(25.4 mm × 25.4 mm × 1.6 mm, Cu Pad: 645 mm²)

Note3: 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).

Unit: mm



Weight: 6.6 mg (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 40\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	20	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = 2\text{ V}, I_C = 0.15\text{ A}$	400	—	1000	
	$h_{FE(2)}$	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$	200	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.5\text{ A}, I_B = 10\text{ mA}$	—	—	0.12	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.5\text{ A}, I_B = 10\text{ mA}$	—	—	1.10	V
Collector output capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	18	—	pF
Switching time	Rise time	t_r	See Figure 1.		—	ns
	Storage time	t_{stg}	$V_{CC} \approx 12\text{ V}, R_L = 24\ \Omega$		—	
	Fall time	t_f	$I_{B1} = -I_{B2} = 17\text{ mA}$		—	

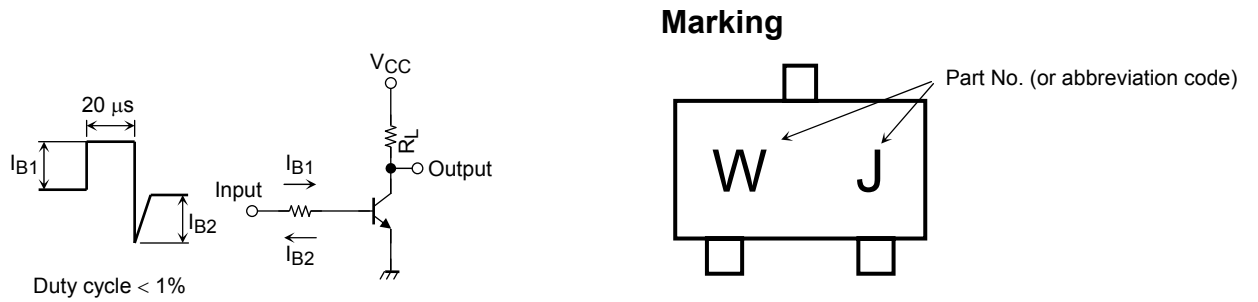
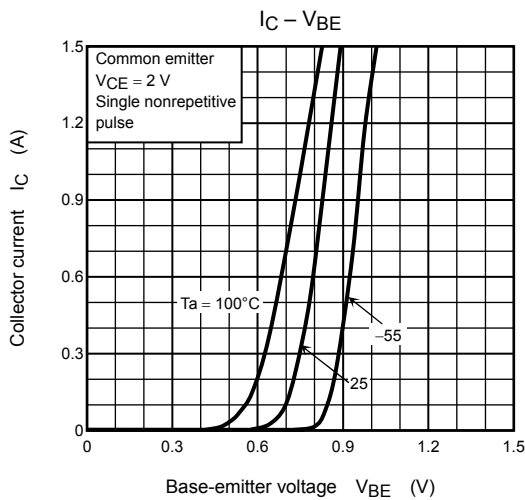
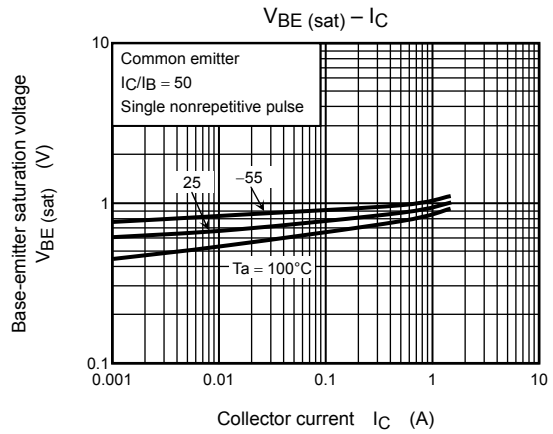
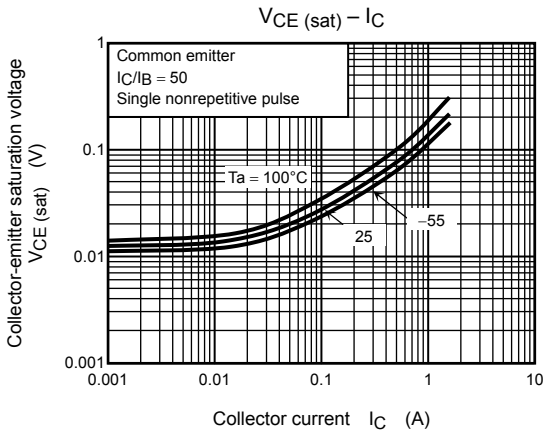
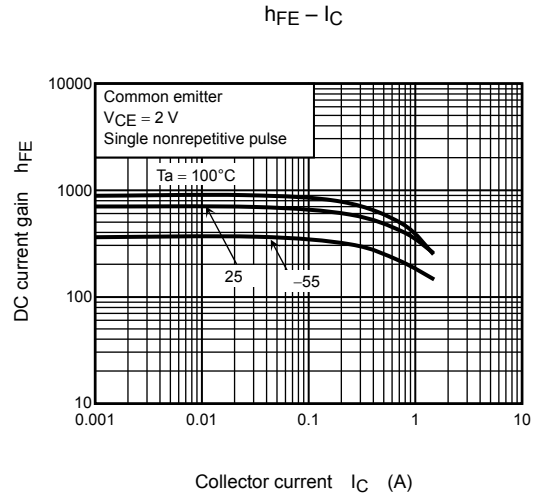
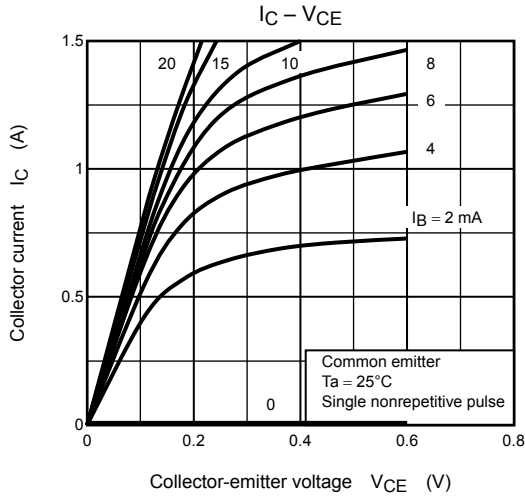


Figure 1 Switching Time Test Circuit & Timing Chart



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