Bipolar Transistors Silicon PNP Epitaxial Type

TPCP8605

1. Applications

- High-Speed Switching
- DC-DC Converters

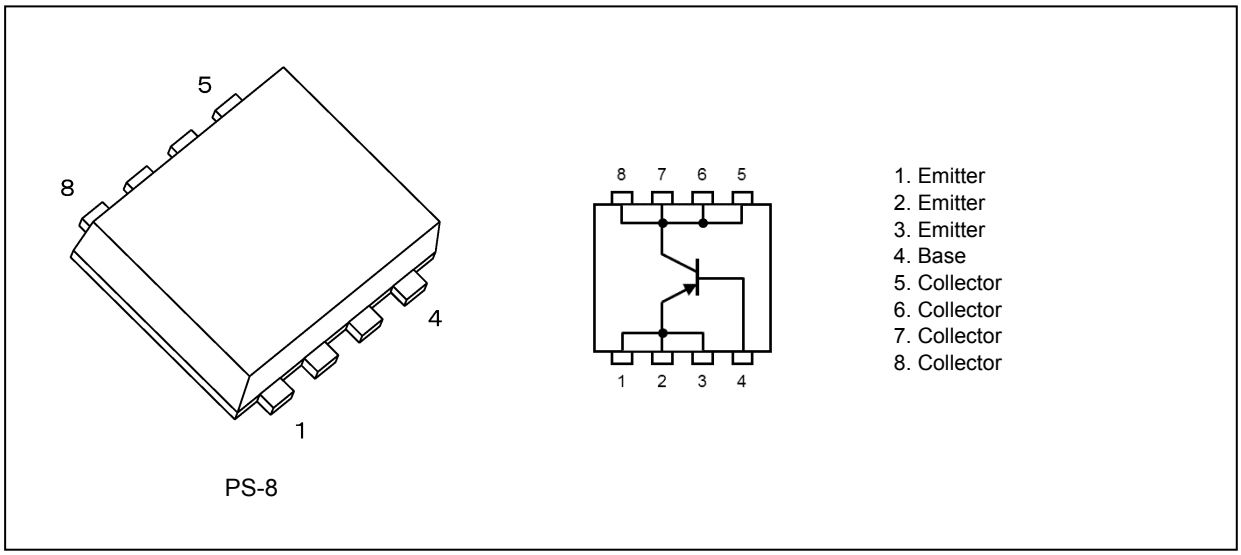
2. Features

(1) High DC current gain: h_{FE} = 200 to 500 (V_{CE} = -2 V, I_C = -0.5 A)

(2) Low collector-emitter saturation voltage: $V_{CE(sat)}$ = -0.27 V (max) (I_C = -1.6 A, I_B = -53 mA)

(3) High-speed switching: t_f = 60 ns (typ.) (I_C = -1.6 A)

3. Packaging and Internal Circuit



PS-8

Start of commercial production
2023-01

4. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	V
Emitter-base voltage		V_{EBO}	-7	V
Collector current (DC)	(Note 1)	I_C	-5	A
Collector current (pulsed)	(Note 1)	I_{CP}	-10	A
Base current		I_B	-0.5	A
Collector power dissipation	(Note 2)	P_C	1.0	W
Collector power dissipation	(Note 3)	P_C	2.0	W
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	-55 to 150	°C

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).

Note 1: Ensure that the junction temperature does not exceed 150 °C.

Note 2: Device mounted on a 25.4 mm × 25.4 mm × 1.6 mm FR-4 glass epoxy board (with a dissipating copper surface of 645 mm^2)

Note 3: Device mounted on a 40.0 mm × 40.0 mm × 0.8 mm ceramic board (with a dissipating copper surface of 1600 mm^2)

5. Electrical Characteristics

5.1. Static Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = -50 V, I_E = 0 A	—	—	-100	nA
Emitter cut-off current	I_{EBO}	V_{EB} = -7 V, I_C = 0 A	—	—	-100	nA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C = -10 mA, I_B = 0 A	-50	—	—	V
DC current gain	$h_{FE(1)}$	V_{CE} = -2 V, I_C = -0.5 A	200	—	500	—
	$h_{FE(2)}$	V_{CE} = -2 V, I_C = -1.6 A	120	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$	I_C = -0.5 A, I_B = -17 mA	—	-0.06	-0.12	V
	$V_{CE(sat)(2)}$	I_C = -1.6 A, I_B = -0.16 A	—	-0.12	-0.21	
	$V_{CE(sat)(3)}$	I_C = -1.6 A, I_B = -53 mA	—	-0.16	-0.27	
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C = -1.6 A, I_B = -53 mA	—	-0.89	-1.10	V

5.2. Dynamic Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector output capacitance	C_{ob}	V_{CB} = -10 V, I_E = 0 A, f = 1 MHz	—	40	—	pF
Switching time (rise time)	t_r	See Figure 5.2.1 V_{CC} ≈ -24 V, R_L = 15 Ω, I_{B1} = -53 mA, I_{B2} = 53 mA	—	55	—	ns
Switching time (storage time)	t_{stg}		—	300	—	
Switching time (fall time)	t_f		—	60	—	

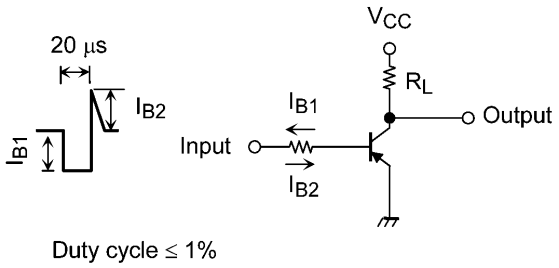


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

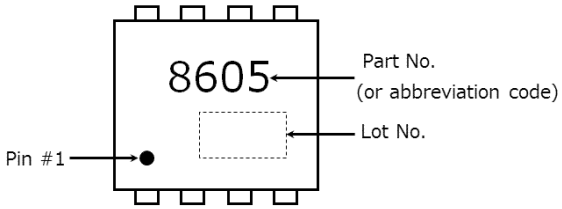


Fig. 6.1 Marking

Note: A line beside a Lot No. identifies the indication of product Labels.
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

7. Characteristics Curves (Note)

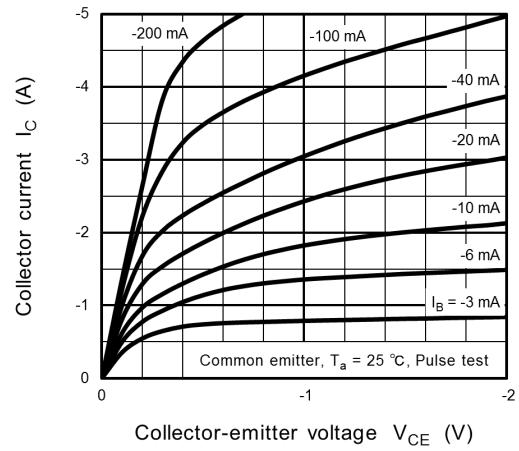


Fig. 7.1 I_C - V_{CE}

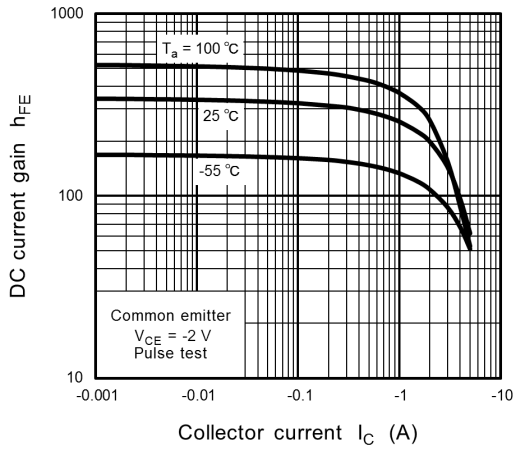


Fig. 7.2 h_{FE} - I_C

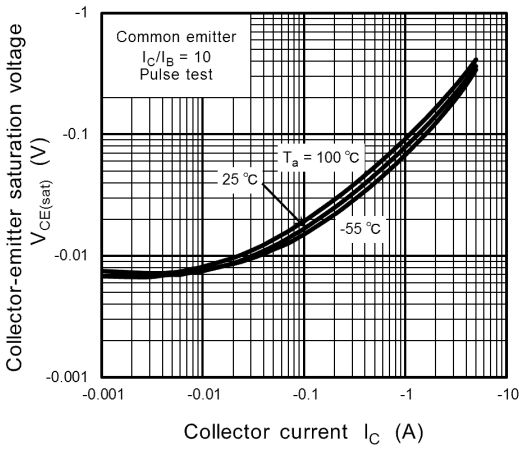


Fig. 7.3 $V_{CE(sat)}$ - I_C

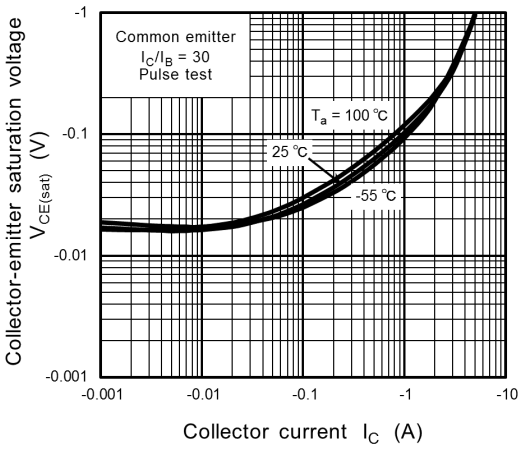


Fig. 7.4 $V_{CE(sat)}$ - I_C

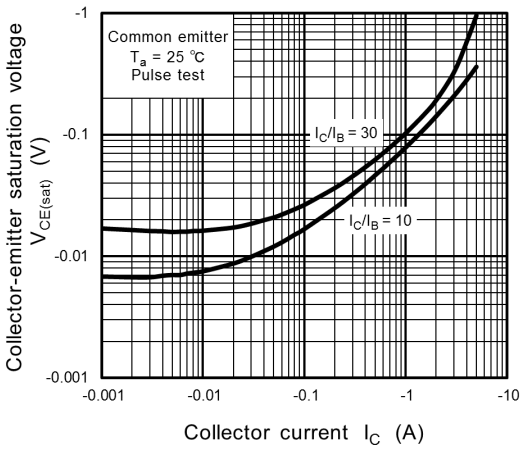


Fig. 7.5 $V_{CE(sat)}$ - I_C

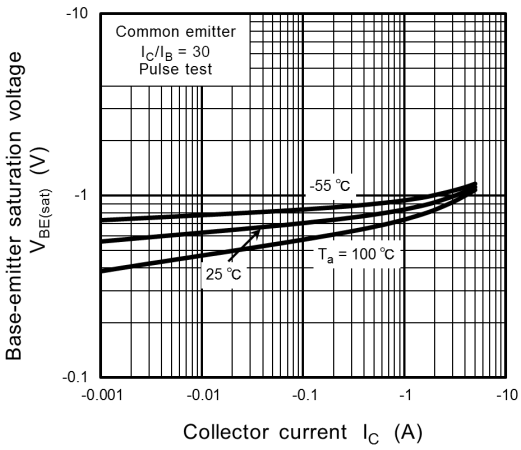


Fig. 7.6 $V_{BE(sat)}$ - I_C

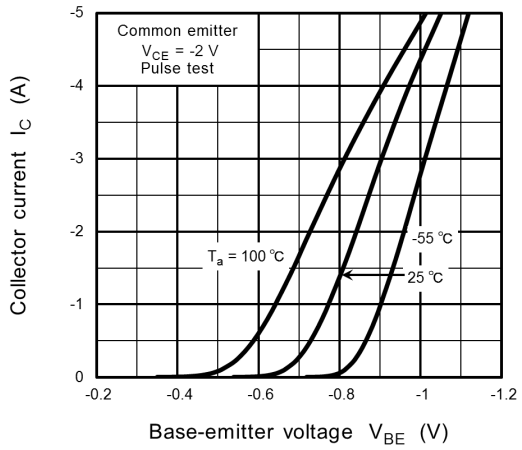


Fig. 7.7 I_C - V_{BE}

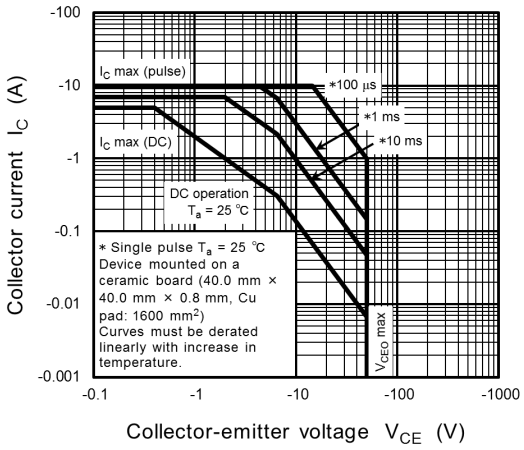


Fig. 7.8 Safe Operating Area (Guaranteed Maximum)

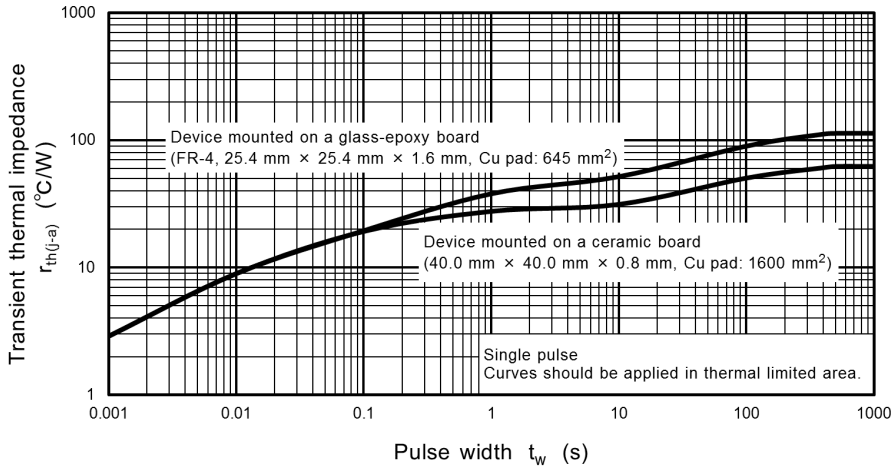
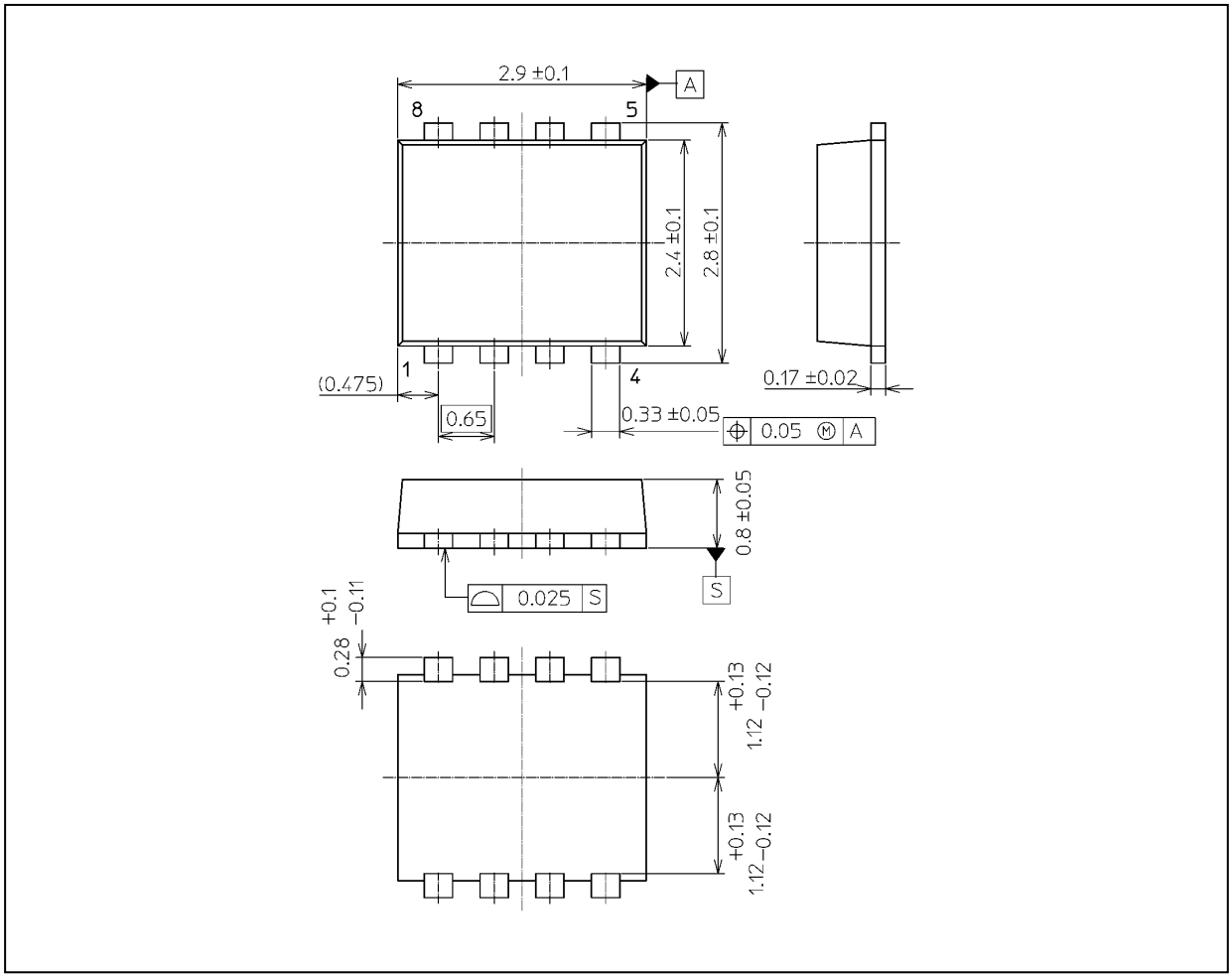


Fig. 7.9 r_{th} - t_w (Guaranteed Maximum)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 0.017 g (typ.)

Package Name(s)
TOSHIBA: 2-3V1S
Nickname: PS-8

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