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April 1<sup>st</sup>, 2010 Renesas Electronics Corporation

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## DATA SHEET

# SILICON POWER TRANSISTOR 2SA1645, 2SA1645-Z

### PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1645 is a mold power transistor developed for highspeed switching and features a very low collector-to-emitter saturation voltage. This transistor is ideal for use in switching power supplies, DC/DC converters, motor drivers, solenoid drivers, and other low-voltage power supply devices, as well as for highcurrent switching.

#### **FEATURES**

· Fast switching speed

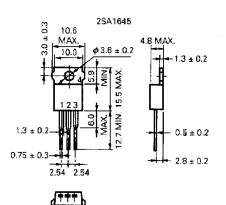
RENESAS

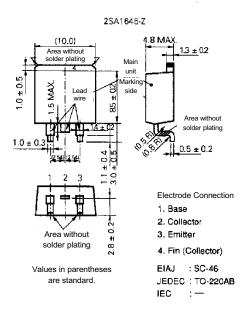
 Low collector-to-emitter saturation voltage: VCE(sat) = -0.3 V MAX. @Ic = -4 A

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	Vсво		-150	V
Collector to emitter voltage	Vceo		-100	V
Emitter to base voltage	Vebo		-7.0	V
Collector current	ID(DC)		-7.0	А
Collector current	IC(pulse)	PW ≤ 300 <i>µ</i> s, Duty Cycle ≤ 10%	-14	A
Base current	B(DC)		-3.5	А
Total power dissipation	P⊤	Tc = 25 °C	35	W
Total power dissipation	P⊤	Ta = 25 °C	1.5	W
Junction temperature	Tj		150	°C
Storage temperature	Tstg		–55 to +150	°C

#### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

#### PACKAGE DRAWING (UNIT: mm)





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#### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

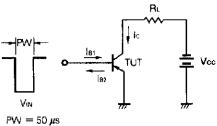
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	Ісво	$V_{CB} = -100 \text{ V}, \text{ Ie} = 0$			-10	μA
Emitter cutoff current	Іево	VEB = -5 V, Ic = 0			-10	μA
DC current gain	hfe1*	$V_{CE} = -2 V$ , $I_{C} = -0.5 A$	100			-
DC current gain	hfe2*	Vce = -2 V, Ic = -1.5 A	100		400	-
DC current gain	hfe3*	$V_{CE} = -2 V$ , $I_{C} = -4 A$	60			-
Collector saturation voltage	V <sub>CE(sat)1</sub> *	Ic = -4 A, I <sub>B</sub> = -0.2 A			-0.3	V
Collector saturation voltage	V <sub>CE(sat)2</sub> *	$I_{C} = -6 A, I_{B} = -0.3 A$			-0.5	V
Base saturation voltage	V <sub>BE(sat)1</sub> *	$I_{C} = -4 A, I_{B} = -0.2 A$			-1.2	V
Base saturation voltage	VBE(sat)2*	$I_{C} = -6 A, I_{B} = -0.3 A$			-1.5	V
Gain bandwidth product	f⊤	$V_{CE} = -10 \text{ V}, \text{ Ic} = -1.5 \text{ A}$		150		MHz
Collector capacitance	Cob	$V_{CB} = -10 \text{ V}, \text{ I}_{E} = 0, \text{ f} = 1 \text{ MHz}$		150		pF
Turn-on time	ton	$I_{C} = -4 A$ , $I_{B1} = -I_{B2} = -0.2 A$ ,		0.3		μs
Storage time	tstg	R <sub>L</sub> = 12.5 Ω, V <sub>CC</sub> = $-50$ V Refer to the test circuit.		1.5		μs
Fall time	tr			0.4		μs

\* Pulse test PW  $\leq$  350  $\mu$ s, duty cycle  $\leq$  2%

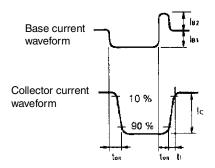
#### **hfe CLASSIFICATION**

Marking	М	L	к	
hfe2	100 to 200	150 to 300	200 to 400	

#### SWITCHING TIME TEST CIRCUIT

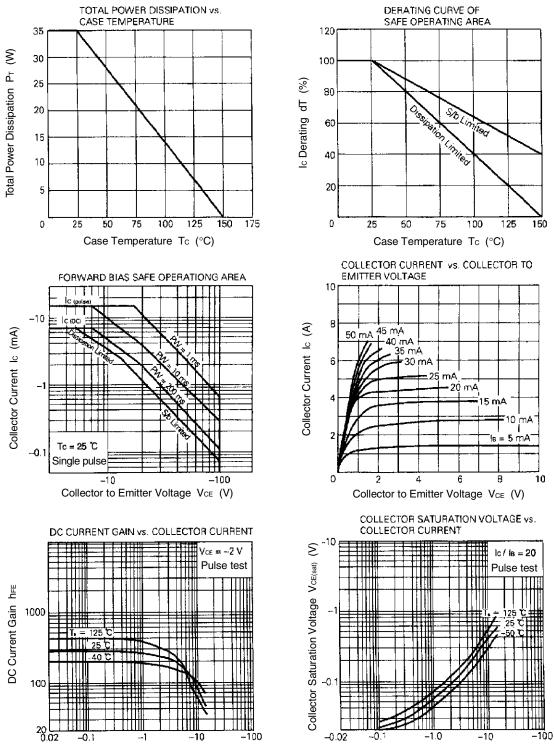


 $PW = 50 \ \mu s$ Duty Cycle  $\leq 2 \ \%$ 

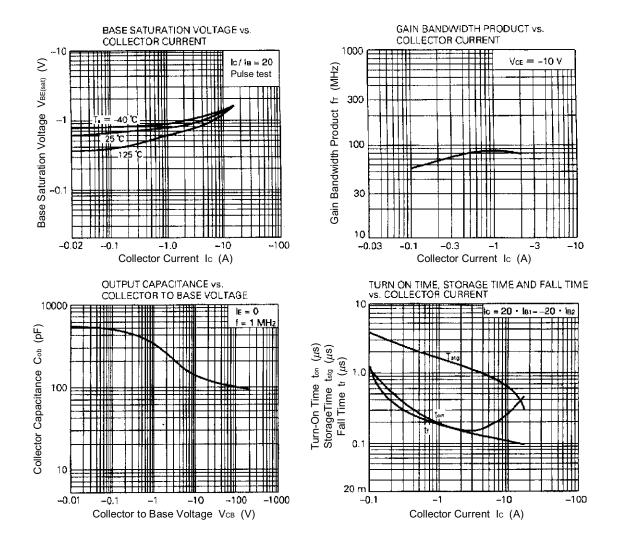


**TYPICAL CHARACTERISTICS (Ta = 25°C)** 

Collector Current Ic (A)



-1.0 -10-0 Collector Current Ic (mA)



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[MEMO]

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