

2SA1646, 2SA1646-Z

Silicon Power Transistor

R07DS0048EJ0200

Rev.2.00

Jul 01, 2010

Description

The 2SA1646 is a mold power transistor developed for high-speed 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 high-current switching.

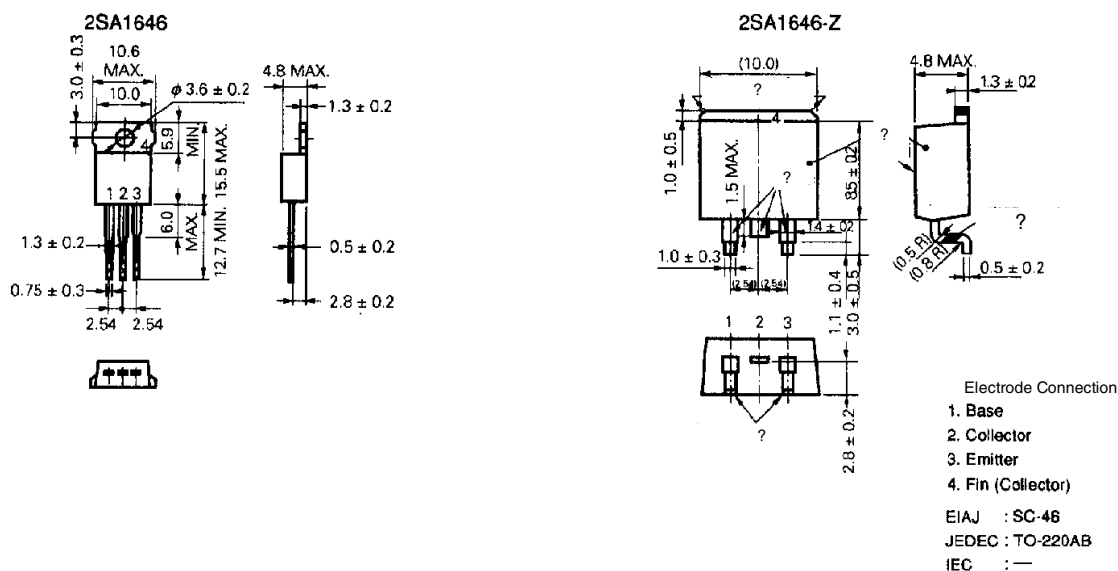
Features

- Fast switching speed
- Low collector-to-emitter saturation voltage:
— $V_{CE(sat)} = -0.3 \text{ V MAX. @ } I_C = -6 \text{ A}$

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	V_{CBO}		-150	V
Collector to emitter voltage	V_{CEO}		-100	V
Emitter to base voltage	V_{EBO}		-7.0	V
Collector current	$I_{D(DC)}$		-10	A
Collector current	$I_{C(pulse)}$	$PW \leq 300 \mu s$, duty cycle $\leq 10\%$	-20	A
Base current	$I_{B(DC)}$		-6.0	A
Total power dissipation	P_T	$T_c = 25^\circ C$	40	W
Total power dissipation	P_T	$T_a = 25^\circ C$	1.5	W
Junction temperature	T_j		150	$^\circ C$
Storage temperature	T_{stg}		-55 to +150	$^\circ C$

Package Drawing (Unit: mm)



Electrical Characteristics (Ta = 25°C)

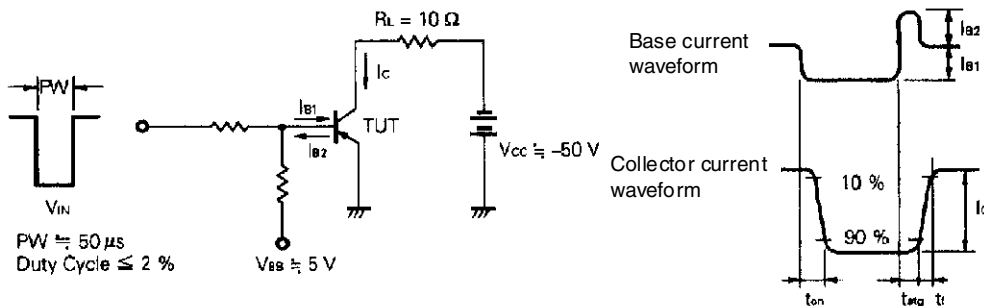
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = -100\text{ V}$, $I_E = 0\text{ A}$			-10	μA
Emitter cutoff current	I_{EBO}	$V_{EB} = -5\text{ V}$, $I_C = 0\text{ A}$			-10	μA
DC current gain	h_{FE1}^{*1}	$V_{CE} = -2\text{ V}$, $I_C = -0.5\text{ A}$	100			—
DC current gain	h_{FE2}^{*1}	$V_{CE} = -2\text{ V}$, $I_C = -2\text{ A}$	100		400	—
DC current gain	h_{FE3}^{*1}	$V_{CE} = -2\text{ V}$, $I_C = -6\text{ A}$	60			—
Collector saturation voltage	$V_{CE(sat)1}^{*1}$	$I_C = -6\text{ A}$, $I_B = -0.3\text{ A}$			-0.3	V
Collector saturation voltage	$V_{CE(sat)2}^{*1}$	$I_C = -8\text{ A}$, $I_B = -0.4\text{ A}$			-0.5	V
Base saturation voltage	$V_{BE(sat)1}^{*1}$	$I_C = -6\text{ A}$, $I_B = -0.3\text{ A}$			-1.2	V
Base saturation voltage	$V_{BE(sat)2}^{*1}$	$I_C = -8\text{ A}$, $I_B = -0.4\text{ A}$			-1.5	V
Gain bandwidth product	f_T	$V_{CE} = -10\text{ V}$, $I_C = -0.5\text{ A}$		150		MHz
Collector capacitance	C_{ob}	$V_{CB} = -10\text{ V}$, $I_E = 0\text{ A}$, $f = 1\text{ MHz}$		250		pF
Turn-on time	t_{on}	$I_C = -6\text{ A}$, $I_{B1} = -I_{B2} = -0.3\text{ A}$, $R_L = 8.3\ \Omega$, $V_{CC} = -50\text{ V}$ Refer to the test circuit.		0.3		μs
Storage time	t_{stg}			1.5		μs
Fall time	t_f			0.4		μs

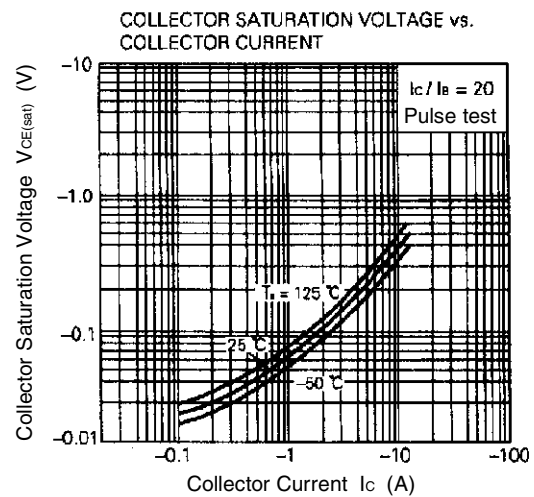
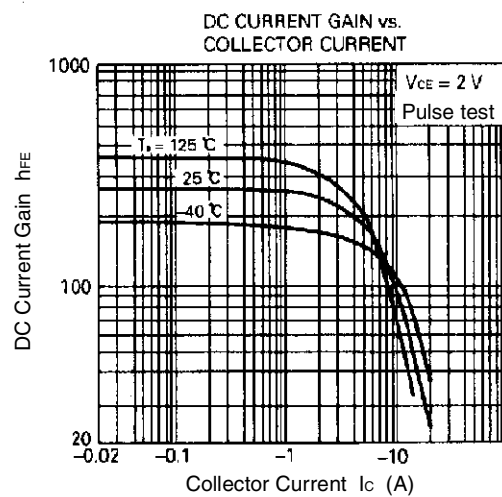
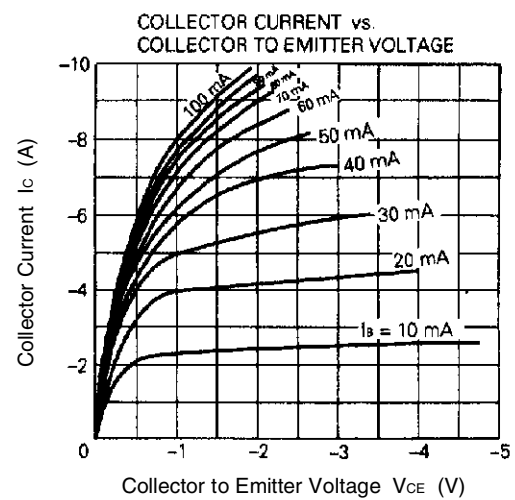
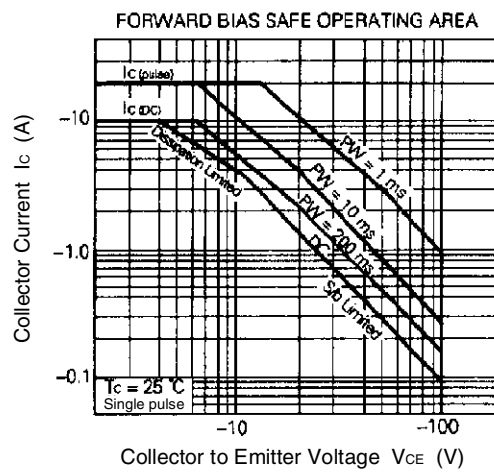
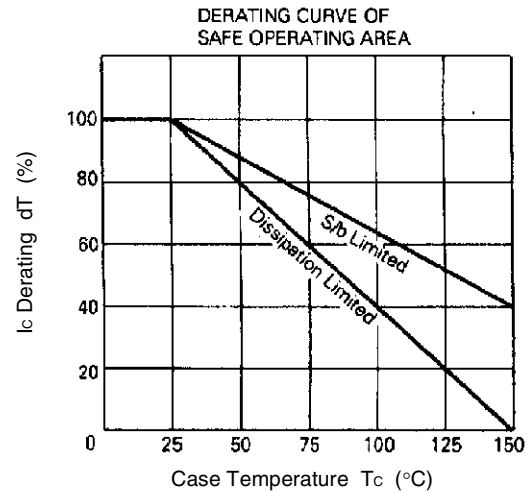
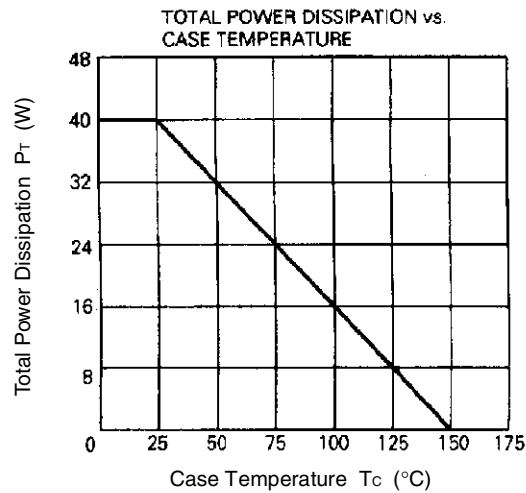
Note: *1. Pulse test $PW \leq 350\ \mu\text{s}$, Duty Cycle $\leq 2\%$

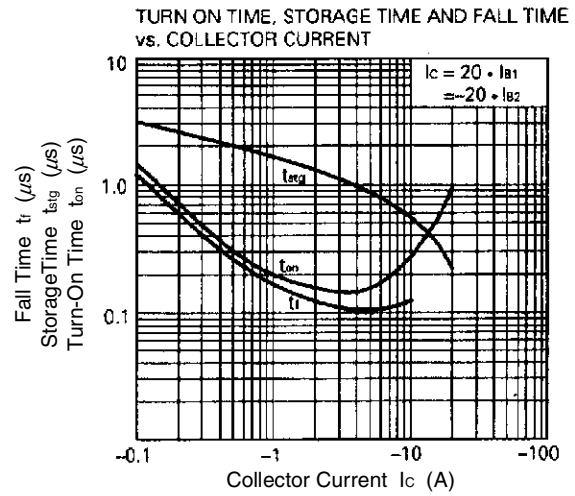
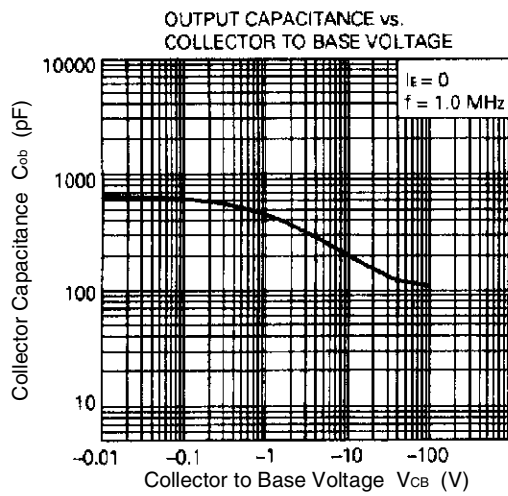
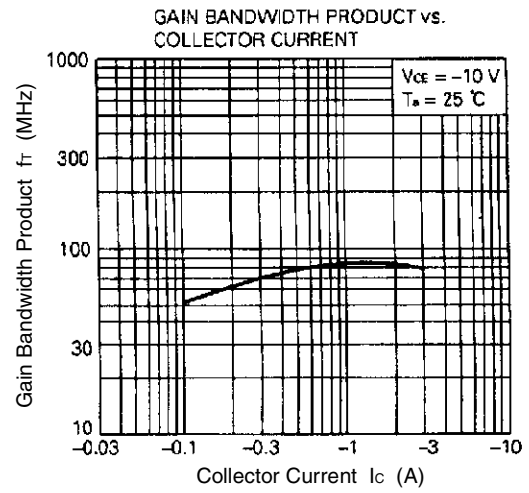
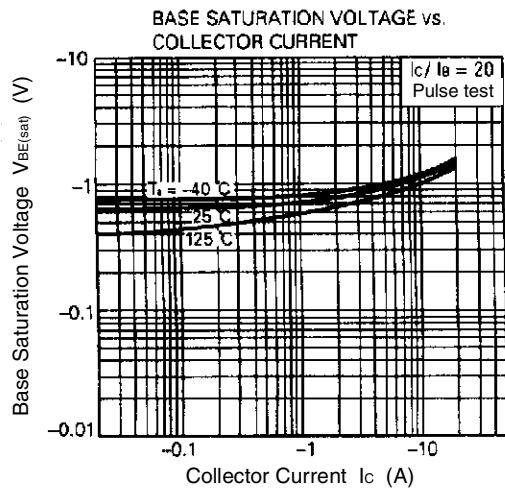
 h_{FE} Classification

Marking	M	L	K
h_{FE2}	100 to 200	150 to 300	200 to 400

Switching Time Test Circuit



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



Revision History	2SA1646,2SA1646-Z Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Apr 12, 2002	-	First Edition issued (D16120EJ1V0DS00)
2.00	Jul 01, 2010	p.1	Deletion of the description "Mold package that does not require an insulating board or insulation bushing" in Features. Deletion of Quality Grades.
		Throughout	Change of the format to Renesas Electronics Corporation's new format.

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhichunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
7F, No. 363 Fu Shing North Road Taipei, Taiwan, R.O.C.
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 HarbourFront Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Laviel' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141