To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

SILICON POWER TRANSISTOR
2SA1413-Z

PNP SILICON TRIPLE DIFFUSED TRANSISTOR

DESCRIPTION

The 2SA1413-Z is designed for High Voltage Switching, especially in Hybrid Integrated Circuits.

FEATURES

- High Voltage: V_{CEO} = −600 V
- High Speed: $t_f \leq 1.0\ \mu s$
- Complement to 2SC3632-Z

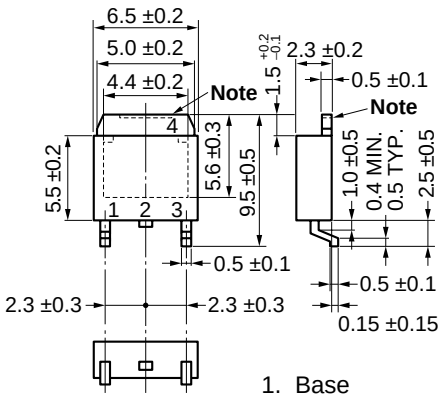
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Collector to base voltage	V_{CBO}	−600	V
Collector to emitter voltage	V_{CEO}	−600	V
Base to emitter voltage	V_{EBO}	−7	V
Collector current (DC)	$I_{C(DC)}$	−1.0	A
Collector current (pulse) **Note 1**	$I_{C(pulse)}$	−2.0	A
Total power dissipation (T_A = 25°C) **Note 2**	P_T	2.0	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Notes 1. PW ≤ 10 ms, Duty Cycle ≤ 50%

2. When mounted on ceramic substrate of 7.5 cm^2 × 0.7 mm

<R> **PACKAGE DRAWING (Unit: mm)**



TO-252 (MP-3Z)

1. Base
2. Collector
3. Emitter
4. Collector Fin

Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

Document No. D18251EJ4V0DS00 (4th edition)
(Previous No. TC-1636A)
Date Published June 2006 NS CP(K)
Printed in Japan

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			−10	μA	V_{CB} = −600 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			−10	μA	V_{EB} = −7.0 V, I_C = 0
DC Current Gain	h_{FE1}***	30	58	120		V_{CE} = −5.0 V, I_C = −0.1 A
DC Current Gain	h_{FE2}***	5	19			V_{CE} = −5.0 V, I_C = −0.5 A
Collector Saturation Voltage	$V_{CE(sat)}$***		−0.28	−1.0	V	I_C = −0.3 A, I_B = −60 mA
Base Saturation Voltage	$V_{BE(sat)}$***		−0.85	−1.2	V	I_C = −0.3 A, I_B = −60 mA
Gain Bandwidth Product	f_T		28		MHz	V_{CE} = −10 V, I_E = 50 mA
Output Capacitance	C_{ob}		42		pF	V_{CB} = −10 V, I_E = 0, f = 1.0 MHz
Turn-on Time	t_{on}		0.1	0.5	μs	I_C = −0.5 A, R_L = 500 Ω I_{B1} = −I_{B2} = −0.1 A V_{CC} = −250 V
Storage Time	t_{stg}		3.5	5.0	μs	
Fall time	t_f		0.08	0.5	μs	

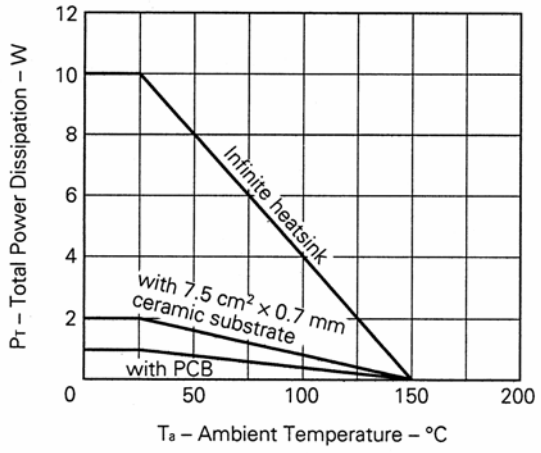
*** Pulsed: PW ≦ 350 μs, Duty Cycle ≦ 2 %

h_{FE} Classification

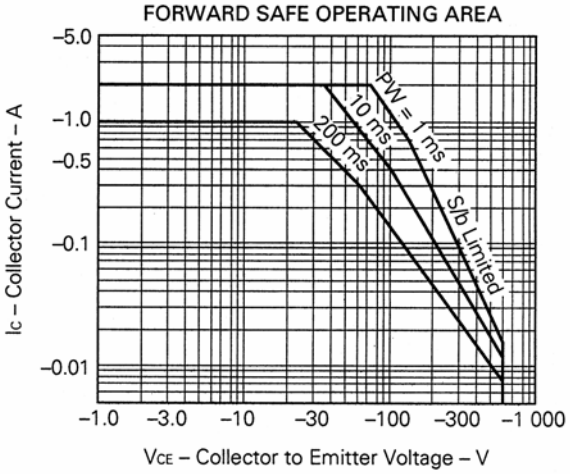
MARKING	M	L	K
h_{FE1}	30 to 60	40 to 80	60 to 120

TYPICAL CHARACTERISTICS (T_a = 25 °C)

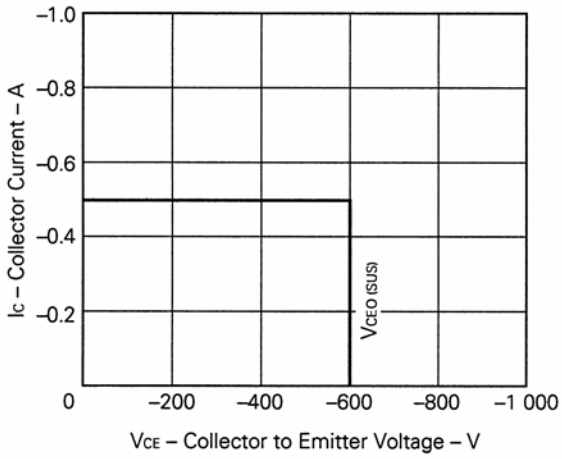
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



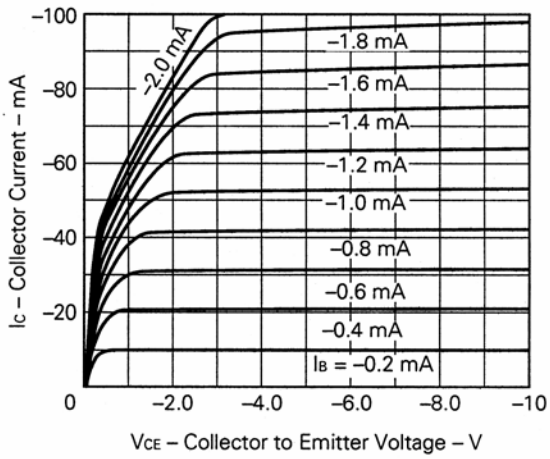
FORWARD SAFE OPERATING AREA



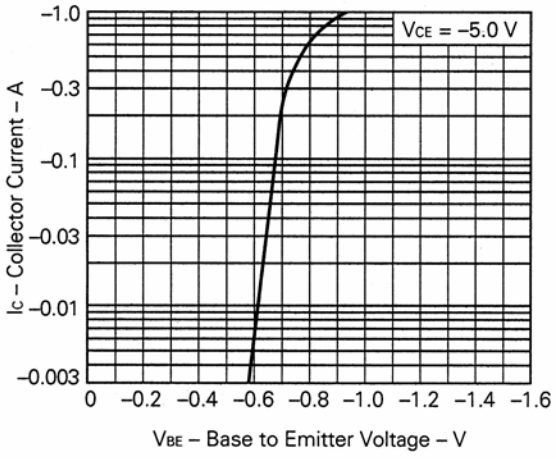
REVERSE BIAS SAFE OPERATING AREA



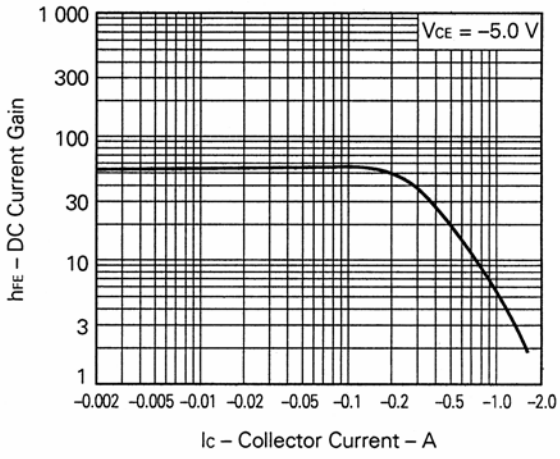
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



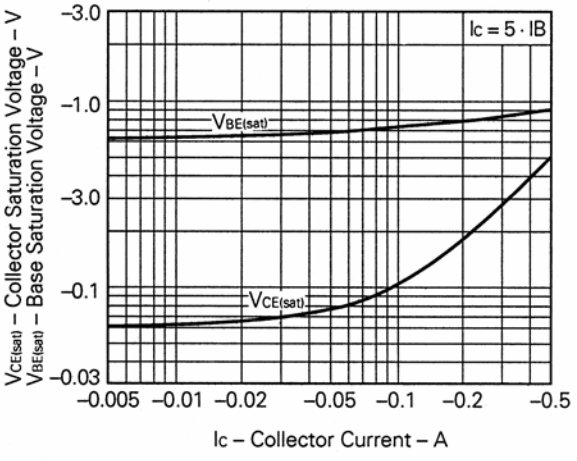
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



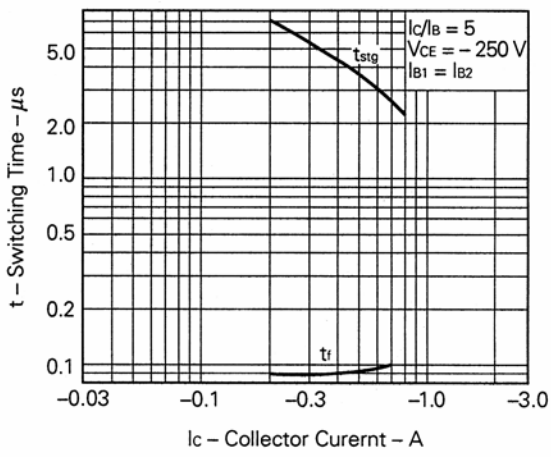
DC CURRENT GAIN vs.
COLLECTOR CURRENT



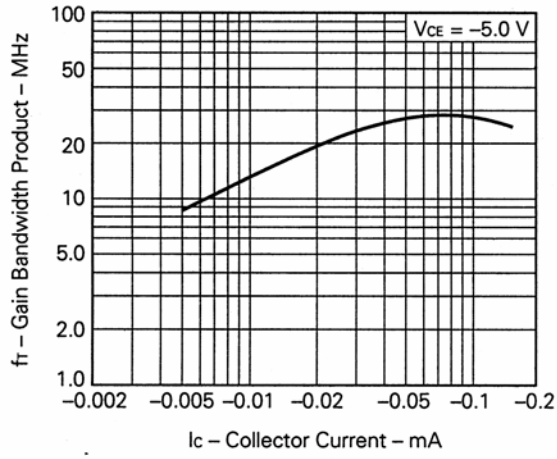
COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



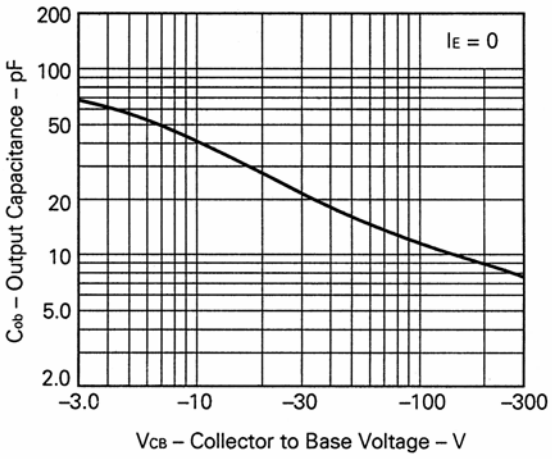
TURN OFF TIME vs.
COLLECTOR CURRENT



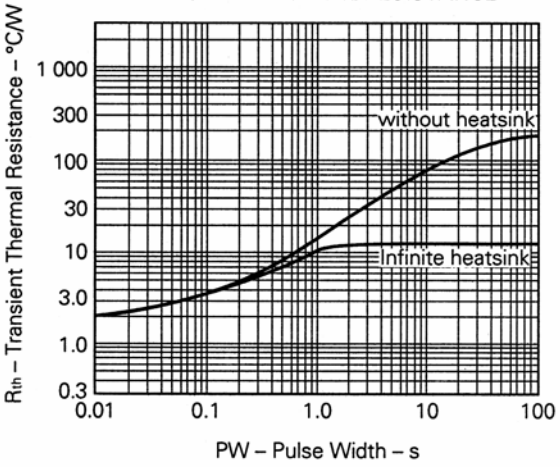
GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT



OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



TRANSIENT THERMAL RESISTANCE



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