

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>)

Send any inquiries to <http://www.renesas.com/inquiry>.

The logo for Renesas, featuring the word "RENESAS" in a bold, sans-serif font. The letter "R" is stylized with a square cutout at its top-left corner.

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PNP SILICON TRIPLE DIFFUSED TRANSISTOR

DESCRIPTION

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

FEATURES

- High Voltage: $V_{CE0} = -600$ V
- High Speed: $t_r \leq 1.0$ μ s
- Complement to 2SC3632-Z

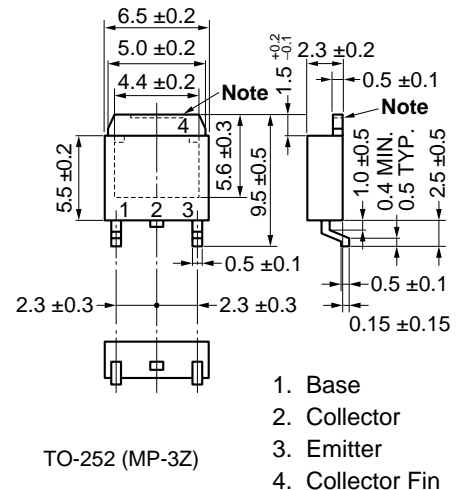
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Collector to base voltage	V_{CBO}	-600	V
Collector to emitter voltage	V_{CE0}	-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 ($T_A = 25^\circ\text{C}$) ^{Note 2}	P_T	2.0	W
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes 1. $PW \leq 10$ ms, Duty Cycle $\leq 50\%$

2. When mounted on ceramic substrate of $7.5\text{ cm}^2 \times 0.7$ mm

<R> PACKAGE DRAWING (Unit: mm)



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

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ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

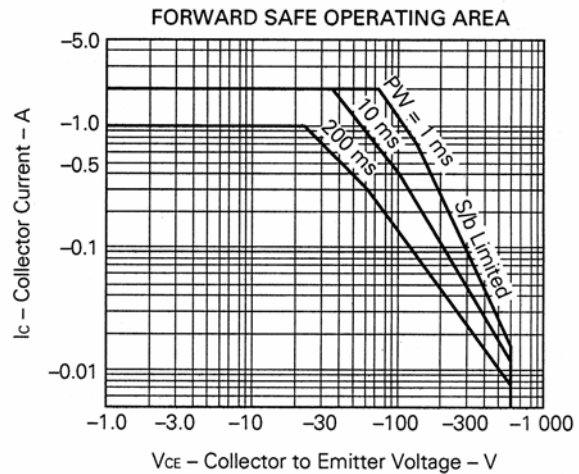
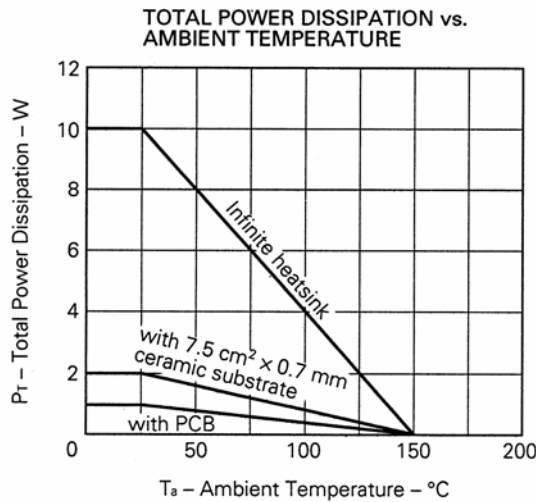
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I _{cBO}			-10	μA	V _{CB} = -600 V, I _E = 0
Emitter Cutoff Current	I _{EBO}			-10	μA	V _{EB} = -7.0 V, I _C = 0
DC Current Gain	h _{FE1} ***	30	58	120		V _{CE} = -5.0 V, I _C = -0.1 A
DC Current Gain	h _{FE2} ***	5	19			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 %

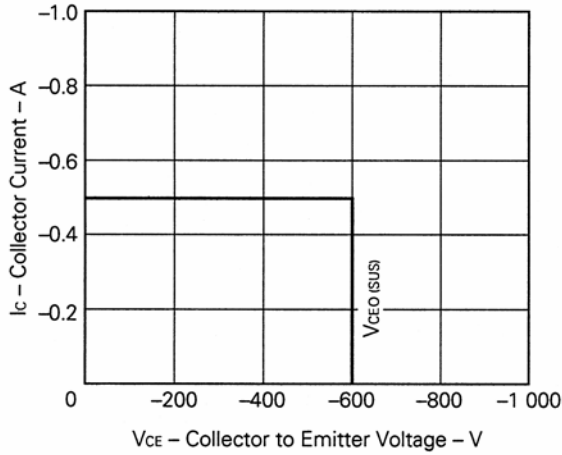
h_{FE} Classification

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

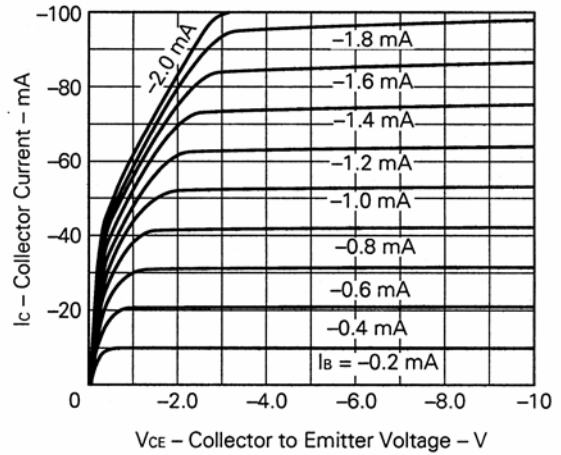
TYPICAL CHARACTERISTICS (T_a = 25 °C)



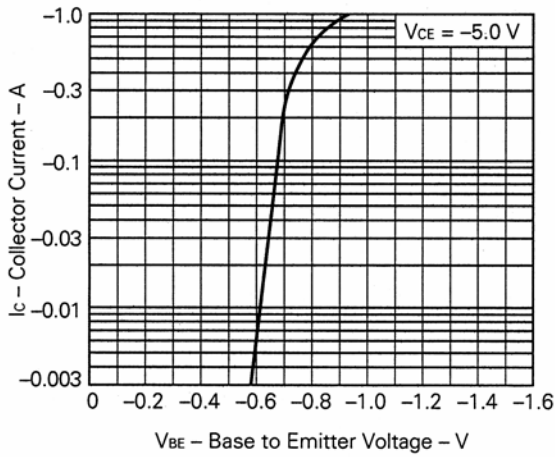
REVERSE BIAS SAFE OPERATING AREA



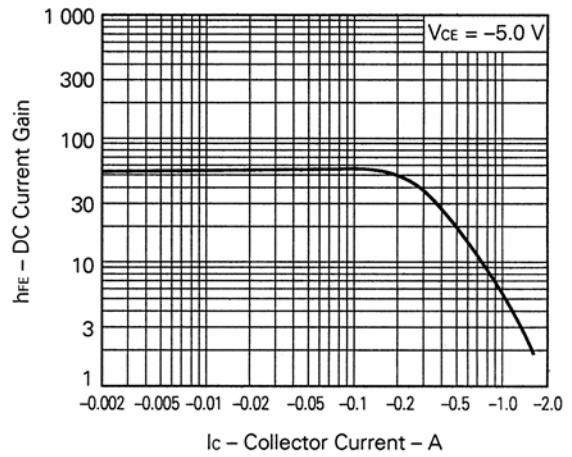
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



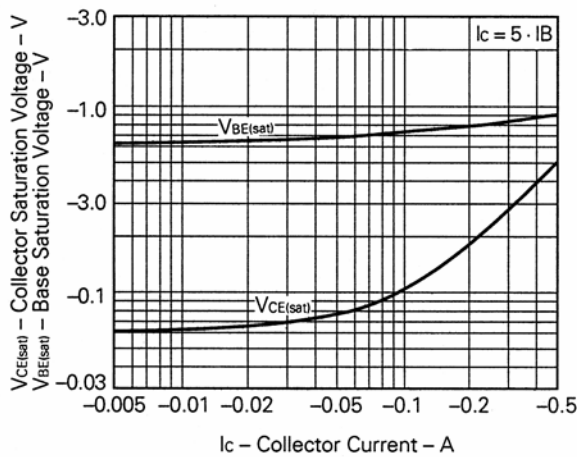
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



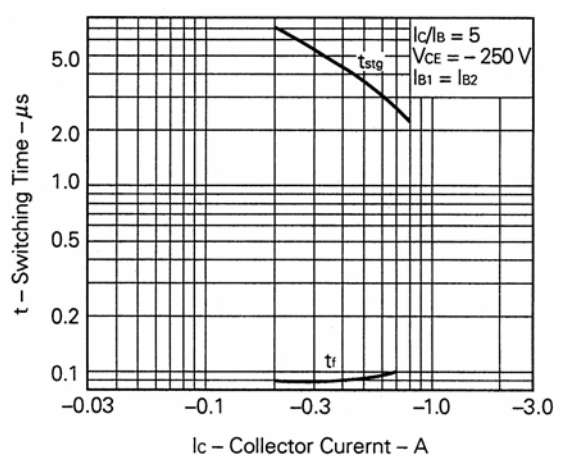
DC CURRENT GAIN vs. COLLECTOR CURRENT



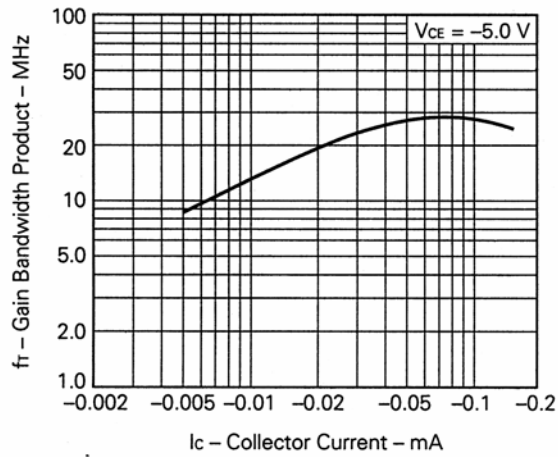
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



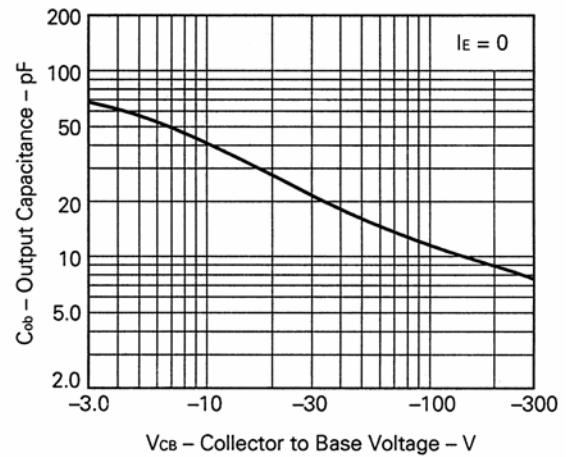
TURN OFF TIME vs. COLLECTOR CURRENT



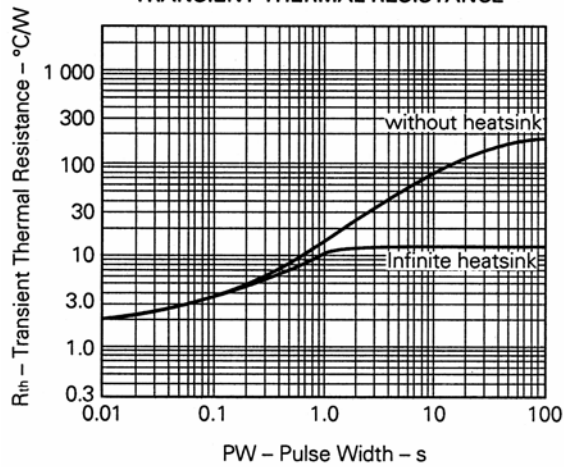
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



TRANSIENT THERMAL RESISTANCE



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