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To our customers,

Old Company Name in Catalogs and Other Documents

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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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DATA SHEET

RENESAS

SILICON POWER TRANSISTOR
2SB963-Z

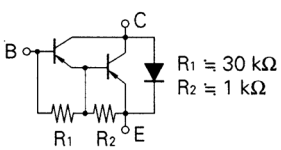
PNP SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION)

DESCRIPTION

The 2SB963-Z is designed for switching, especially in Hybrid Integrated Circuits.

FEATURES

- High Gain h_{FE} = 2000 to 3000
- Complement to 2SD1286-Z



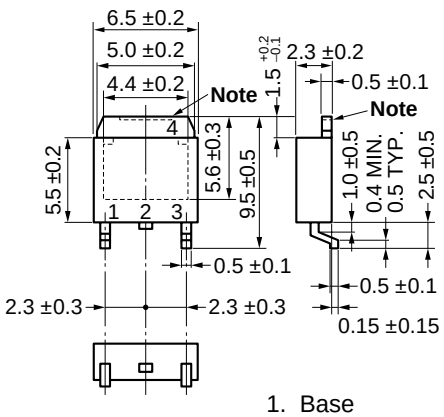
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Collector to Base voltage	V_{CBO}	–60	V
Collector to Emitter voltage	V_{CEO}	–60	V
Emitter to Base voltage	V_{EBO}	–8	V
Collector Current (DC)	$I_{C(DC)}$	∓1.0	A
Collector Current (pulse) Note 1	$I_{C(pulse)}$	∓2.0	A
Total Power Dissipation Note 2	P_T (T_A = 25°C)	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.

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

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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} = −60 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			−1.0	μA	V_{EB} = −5.0 V, I_C = 0
DC Current Gain	h_{FE1}***	1 000				V_{CE} = −2.0 V, I_C = −0.2 A
DC Current Gain	h_{FE2}***	2 000		30 000		V_{CE} = −2.0 V, I_C = −0.5 A
Collector Saturation Voltage	$V_{CE(sat)}$***			−1.5	V	I_C = −0.5 A, I_B = −50 mA
Base Saturation Voltage	$V_{BE(sat)}$***			−2.0	V	I_C = −0.5 A, I_B = −50 mA
Turn On Time	t_{on}		0.5		μs	I_C = −0.5 A, R_L = 100 Ω
Storage Time	t_{stg}		1.0		μs	I_{B1} = −I_{B2} = −0.1 mA
Fall Time	t_f		1.0		μs	V_{CC} = −50 V

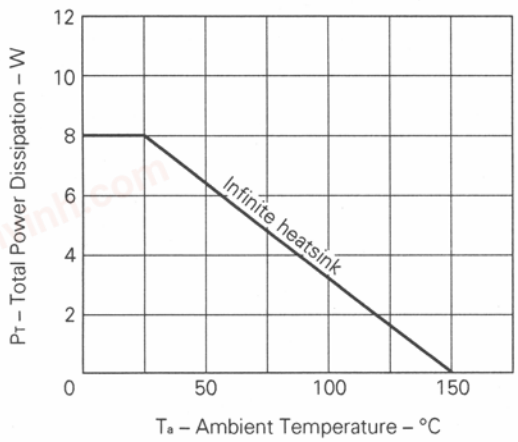
*** Pulsed: PW ≦ 350 μs, Duty Cycle ≦ 2 %

h_{FE} Classification

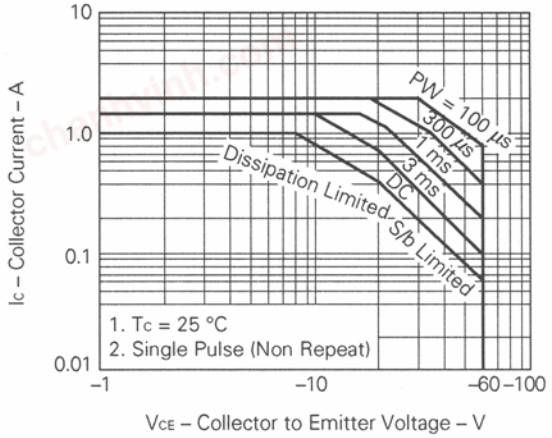
MARKING	M	L	K
h_{FE2}	2 000 to 5 000	4 000 to 10 000	8 000 to 30 000

TYPICAL CHARACTERISTICS (T_a = 25 °C)

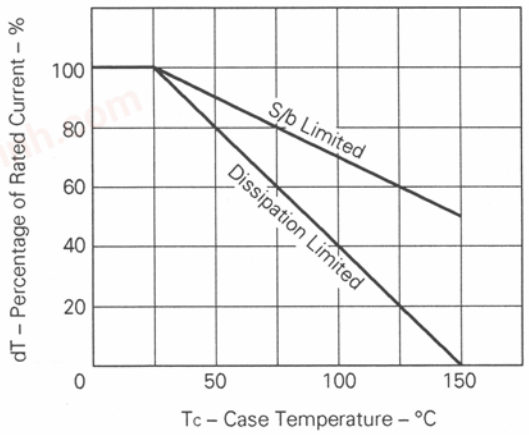
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



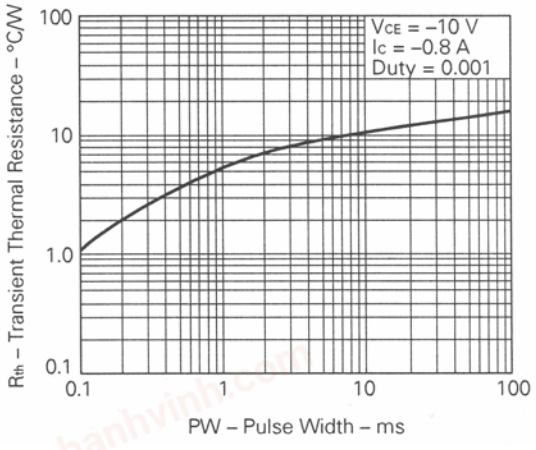
SAFE OPERATING AREA



DERATING CURVE OF SAFE OPERATING AREA

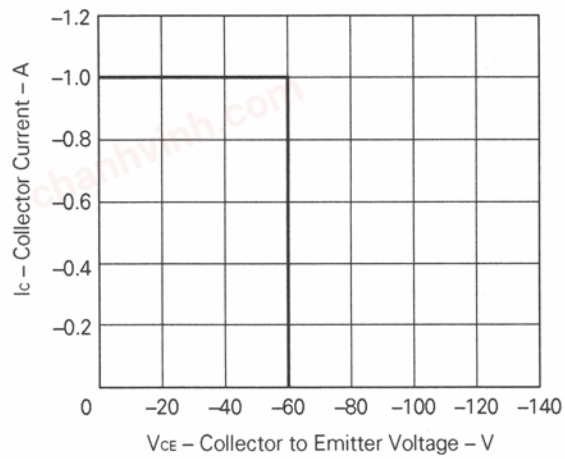


TRANSIENT THERMAL RESISTANCE

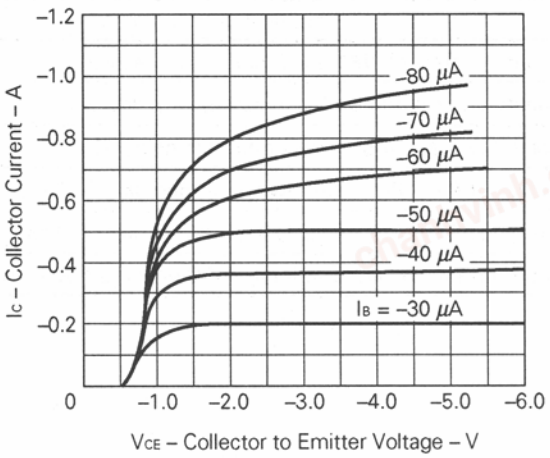


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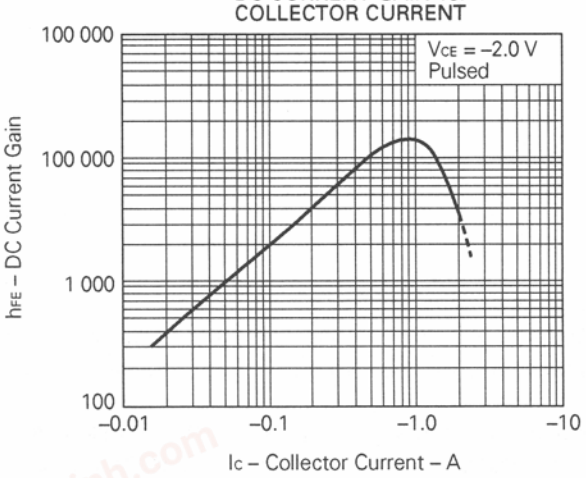
REVERSE BIAS SAFE OPERATING AREA



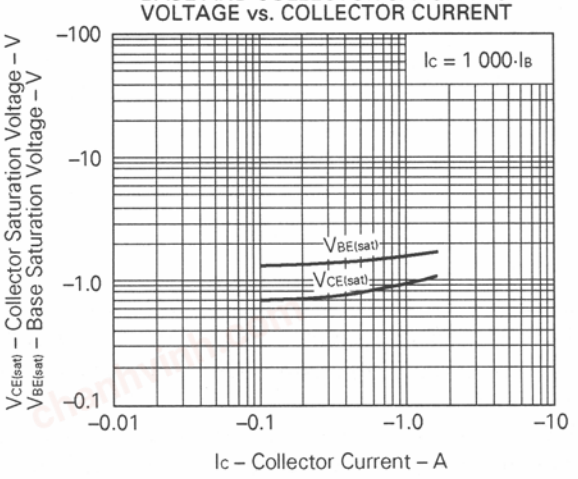
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



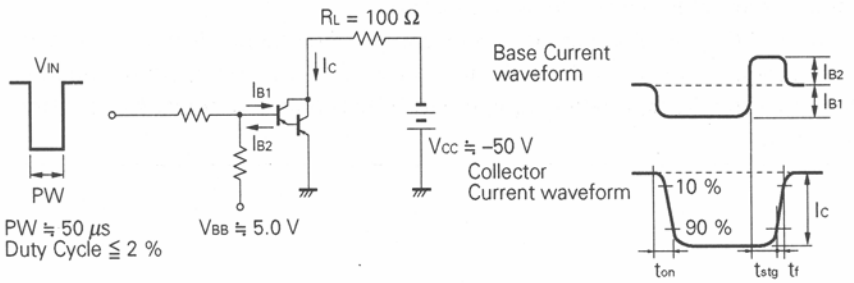
DC CURRENT GAIN vs.
COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION
VOLTAGE vs. COLLECTOR CURRENT



SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



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