

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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SILICON POWER TRANSISTOR 2SC4332, 4332-Z

NPN SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SC4332 and 2SC4332-Z are mold power transistors developed for high-speed switching and feature a very low collector-to-emitter saturation voltage.

This transistor is ideal for use in switching regulators, DC/DC converters, motor drivers, solenoid drivers, and other low-voltage power supply devices, as well as for high-current switching.

FEATURES

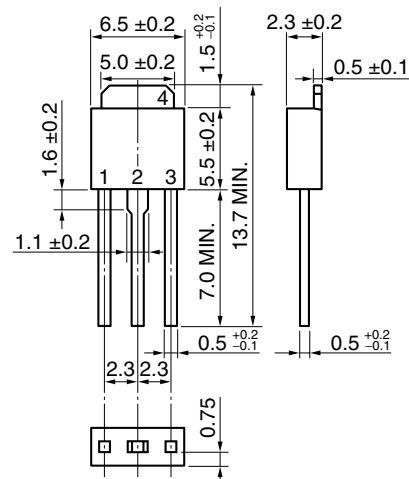
- Low collector saturation voltage
 $V_{CE(sat)} = 0.3 \text{ V MAX. (} I_C = 3.0 \text{ A / } I_B = 0.15 \text{ A)}$
- Fast switching speed:
 $t_f \leq 0.3 \mu\text{s MAX. (} I_C = 3.0 \text{ A)}$
- High DC current gain

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

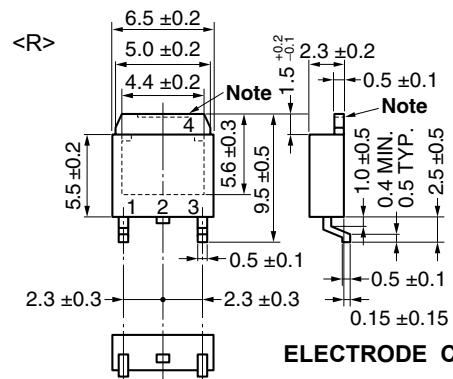
Collector to Base Voltage	V_{CBO}	100	V
Collector to Emitter Voltage	V_{CEO}	60	V
Base to Emitter Voltage	V_{EBO}	7.0	V
Collector Current (DC)	$I_{C(DC)}$	5.0	A
Collector Current (pulse)	$I_{C(pulse)}$ ^{Note1}	10	A
Base Current (DC)	$I_{B(DC)}$	2.5	A
Total Power Dissipation	$P_T (T_C = 25^\circ\text{C})$	15	W
Total Power Dissipation	$P_T (T_A = 25^\circ\text{C})$	1.0 ^{Note2} , 2.0 ^{Note3}	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes**
1. $PW \leq 10 \text{ ms}$, duty cycle $\leq 50\%$
 2. Printing board mounted
 3. $7.5 \text{ cm}^2 \times 0.7 \text{ mm}$, ceramic board mounted

PACKAGE DRAWINGS (Unit: mm)



TO-251 (MP-3)



ELECTRODE CONNECTION

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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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

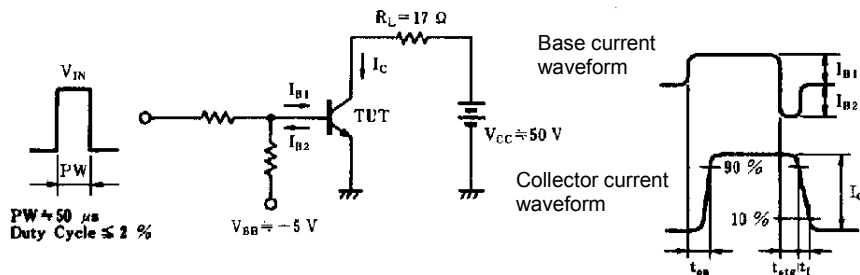
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to Emitter Voltage	V _{CEQ(SUS)}	I _C = 3.0 A, I _B = 0.3 A, L = 1 mH	60			V
Collector to Emitter Voltage	V _{CEx(SUS)}	I _C = 3.0 A, I _{B1} = -I _{B2} = 0.3 A, V _{BE(OFF)} = -1.5 V, L = 180 μH, clamped	60			V
Collector Cut-off Current	I _{CBO}	V _{CE} = 60 V, I _E = 0			10	μA
Collector Cut-off Current	I _{CER}	V _{CE} = 60 V, R _{BE} = 51 Ω, T _A = 125°C			1.0	mA
Collector Cut-off Current	I _{CEx1}	V _{CE} = 60 V, V _{BE(OFF)} = -1.5 V			10	μA
Collector Cut-off Current	I _{CEx2}	V _{CE} = 60 V, V _{BE(OFF)} = -1.5 V, T _A = 125°C			1.0	mA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 5.0 V, I _C = 0			10	μA
DC Current Gain	h _{FE1} ^{Note}	V _{CE} = 2.0 V, I _C = 0.5 A	100			
DC Current Gain	h _{FE2} ^{Note}	V _{CE} = 2.0 V, I _C = 1.0 A	100		400	
DC Current Gain	h _{FE3} ^{Note}	V _{CE} = 2.0 V, I _C = 3.0 A	60			
Collector Saturation Voltage	V _{CE(sat)1} ^{Note}	I _C = 3.0 A, I _B = 0.15 A			0.3	V
Collector Saturation Voltage	V _{CE(sat)2} ^{Note}	I _C = 4.0 A, I _B = 0.2 A			0.5	V
Base Saturation Voltage	V _{BE(sat)1} ^{Note}	I _C = 3.0 A, I _B = 0.15 A			1.2	V
Base Saturation Voltage	V _{BE(sat)2} ^{Note}	I _C = 4.0 A, I _B = 0.2 A			1.5	V
Collector Capacitance	C _{ob}	V _{CB} = 10 V, I _E = 0, f = 1.0 MHz		130		pF
Gain Bandwidth Product	f _T	V _{CE} = 10 V, I _E = -0.5 A		150		MHz
Turn-on Time	t _{on}	I _C = 3.0 A, R _L = 16.7 Ω, I _{B1} = -I _{B2} = 0.15 A, V _{CC} = 50 V Refer to the test circuit.			0.3	μs
Storage Time	t _{stg}				1.5	μs
Fall Time	t _f				0.3	μs

Note Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

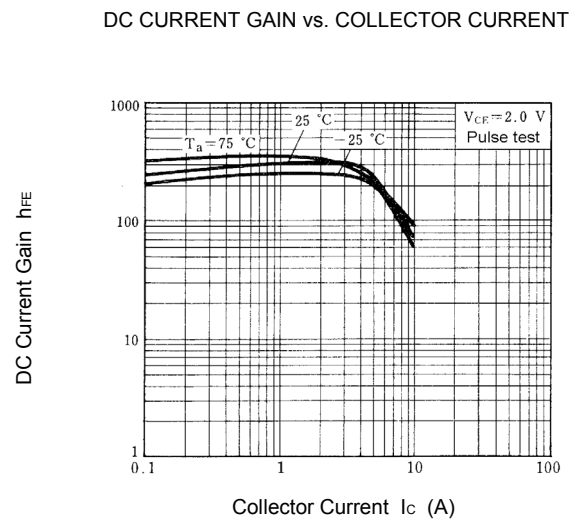
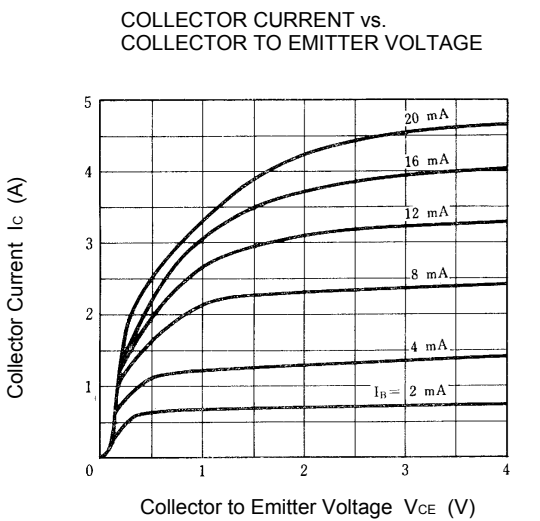
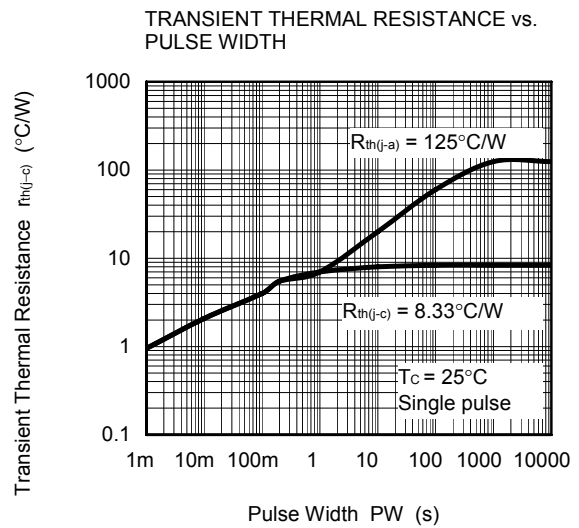
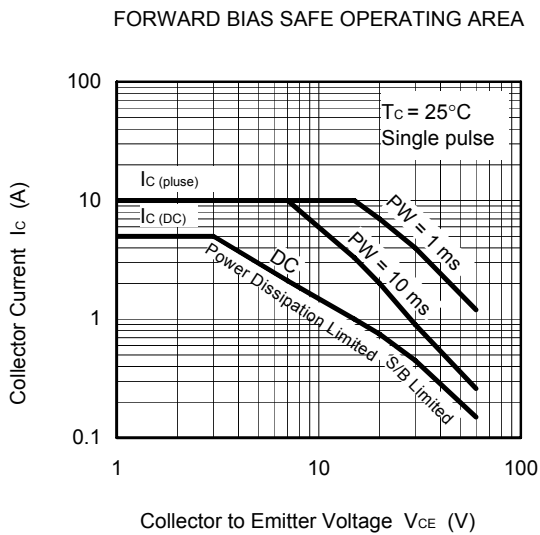
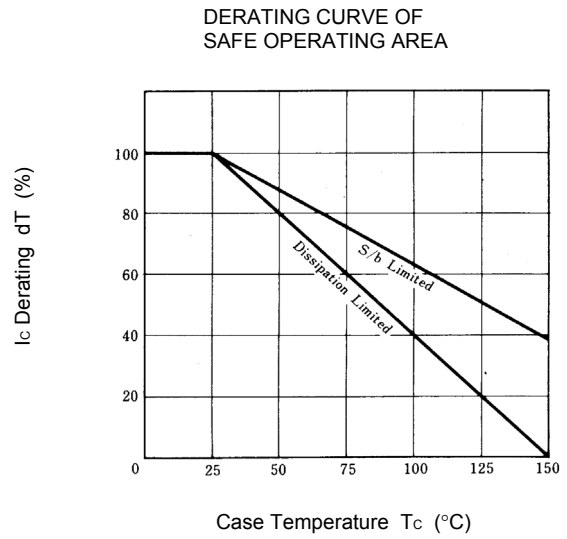
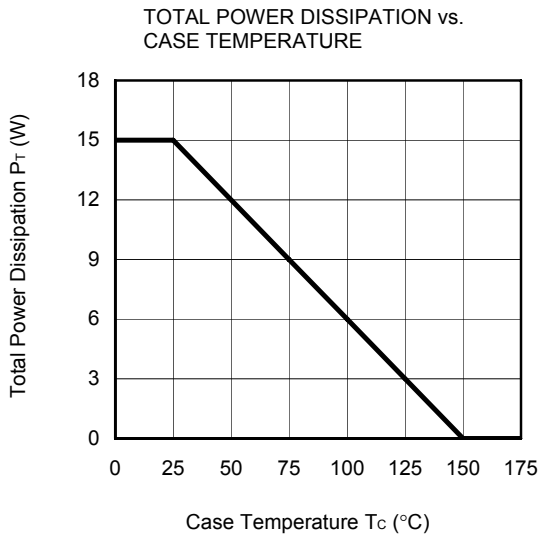
h_{FE} CLASSIFICATION

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

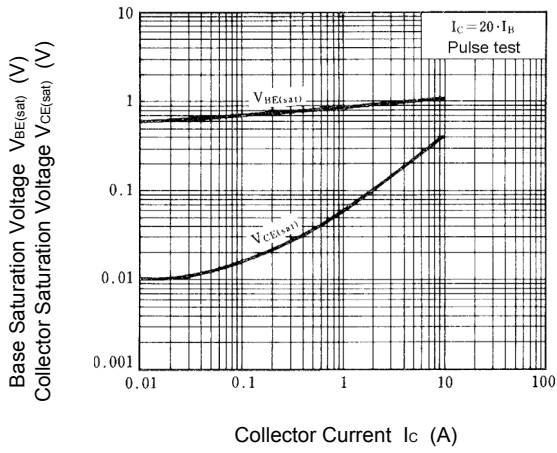
SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



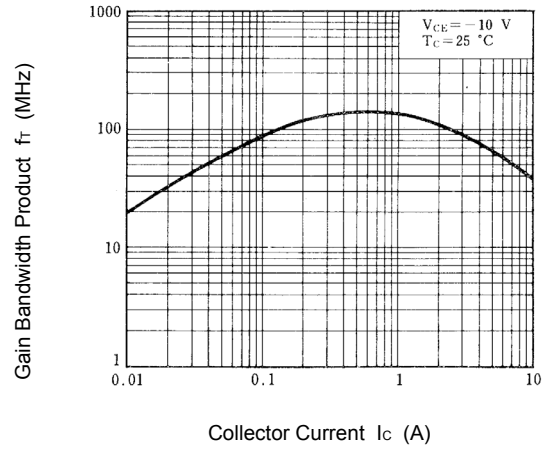
TYPICAL CHARACTERISTICS (T_A = 25°C)



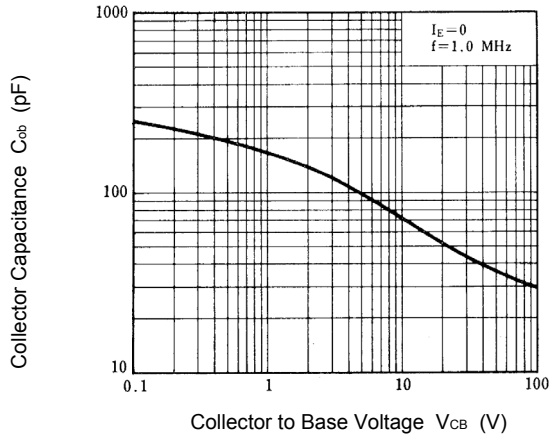
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



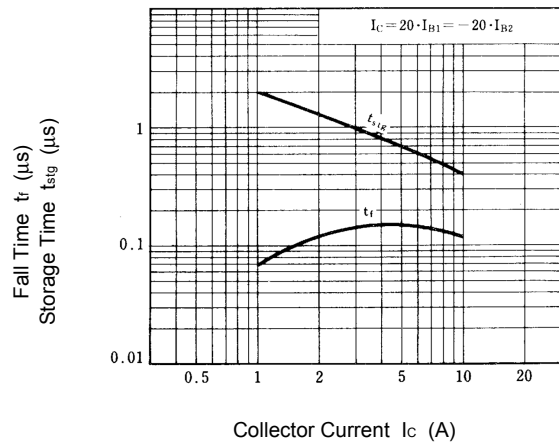
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



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