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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RENESAS

SILICON POWER TRANSISTOR

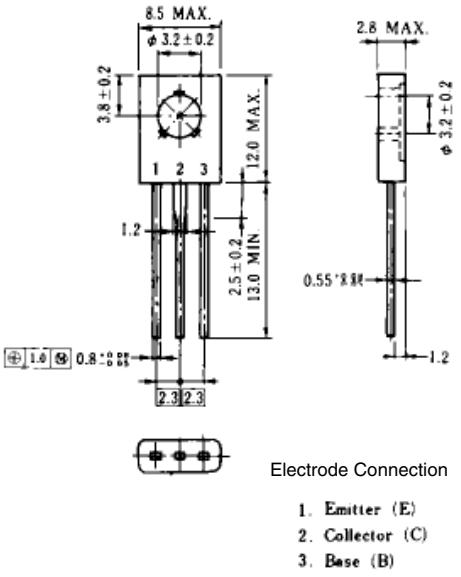
2SD1691

NPN SILICON EPITAXIAL TRANSISTOR
FOR LOW-FREQUENCEY POWER AMPLIFIERS AND MID-SPEED SWITCHING

FEATURES

- Large current capacity and low $V_{CE(sat)}$:
  $I_{C(DC)}$ = 5.0 A, $I_{C(pulse)}$ = 8.0 A
  $V_{CE(sat)}$ = 0.1 V TYP. (@I_C = 2.0 A, I_B = 0.2 A)
- Large power dissipation TO-126 type power transistor
  P_T = 1.3 W (@Ta = 25°C), 20 W (@Tc = 25°C)
- Complementary transistor: 2SB1151

PACKAGE DRAWING (UNIT: mm)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	60	V
Collector to emitter voltage	V_{CEO}	60	V
Emitter to base voltage	V_{EBO}	7.0	V
Collector current (DC)	$I_{C(DC)}$	5.0	A
Collector current (pulse)	$I_{C(pulse)}$*	8.0	A
Base current (DC)	$I_{B(DC)}$	1.0	A
Total power dissipation	P_T (Ta = 25°C)	1.3	W
Total power dissipation	P_T (Tc = 25°C)	20	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 10 ms, duty cycle ≤ 50%

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 50 V, I_E = 0			10	μA
Emitter cutoff current	I_{EBO}	V_{EB} = 7.0 V, I_C = 0			10	μA
DC current gain	h_{FE1}**	V_{CE} = 1.0 V, I_C = 0.1 A	60			
DC current gain	h_{FE2}**	V_{CE} = 1.0 V, I_C = 2.0 A	100		400	
DC current gain	h_{FE3}**	V_{CE} = 1.0 V, I_C = 5.0 A	50			
Collector saturation voltage	$V_{CE(sat)}$**	I_C = 2.0 A, I_B = 0.2 A		0.1	0.3	V
Base saturation voltage	$V_{BE(sat)}$**	I_C = 2.0 A, I_B = 0.2 A		0.9	1.2	V
Turn-on time	t_{on}	I_C = 2.0 A, I_{B1} = –I_{B2} = 0.2 A		0.2	1.0	μs
Storage time	t_{stg}	R_L = 5.0 Ω, V_{CC} ≅ 10 V		1.1	2.5	μs
Fall time	t_f			0.2	1.0	μs

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

h_{FE} CLASSIFICATION

Marking	M	L	K
h_{FE2}	100 to 200	160 to 320	200 to 400

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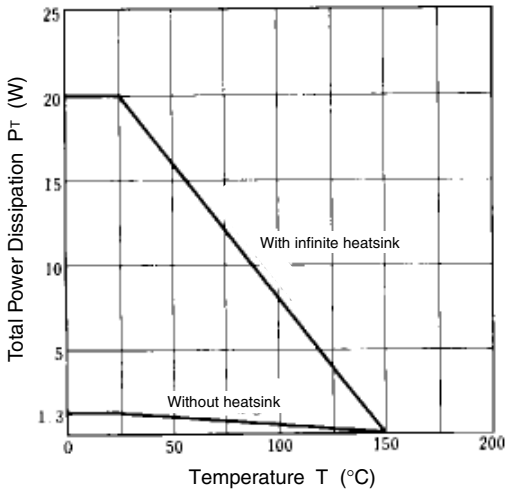
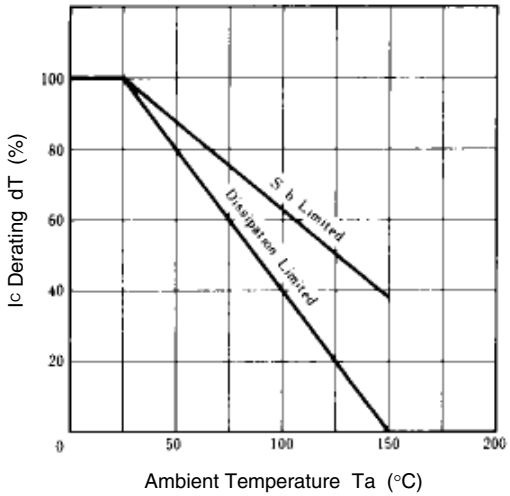
TYPICAL CHARACTERISTICS (Ta = 25°C)

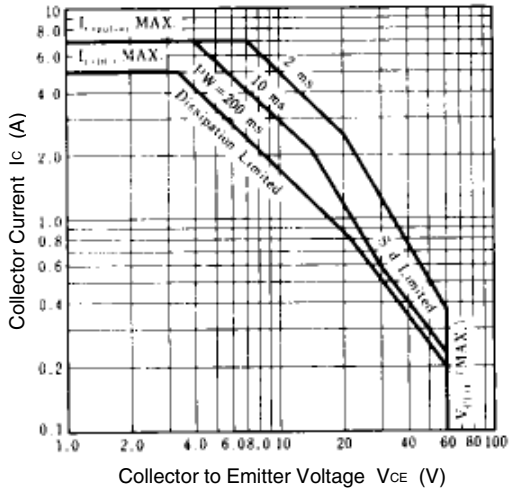
TOTAL POWER DISSIPATION vs. TEMPERATURE



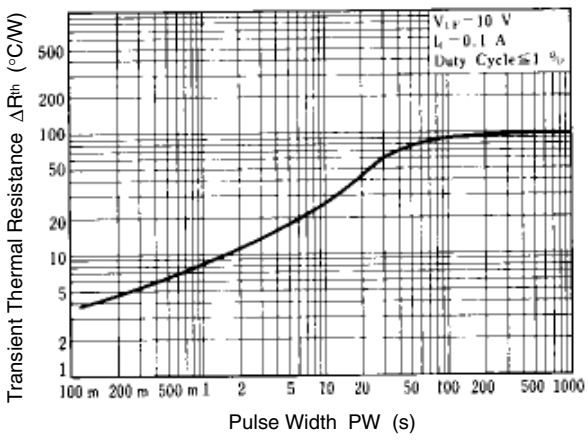
DERATING CURVE OF SAFE OPERATING AREA



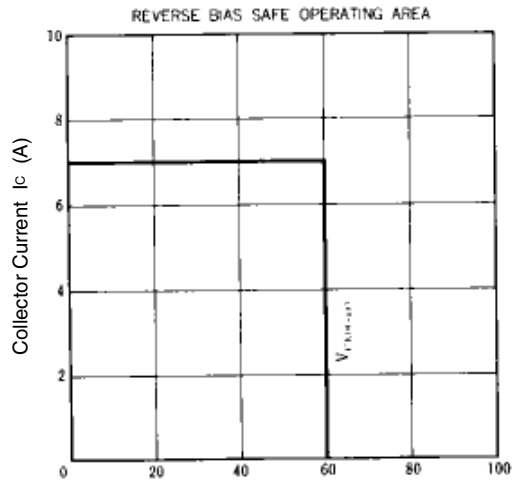
SAFE OPERATING AREA



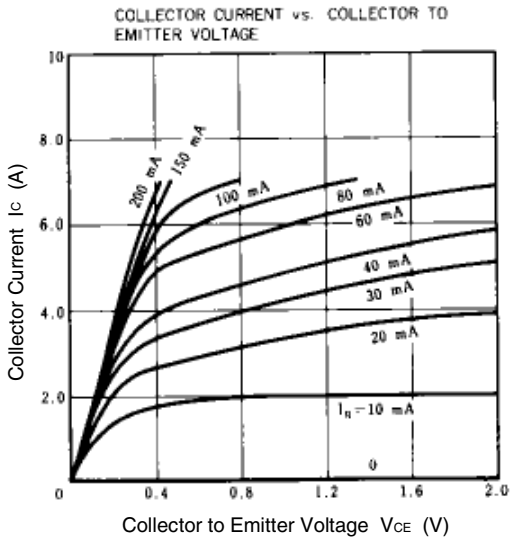
TRANSIENT THERMAL RESISTANCE



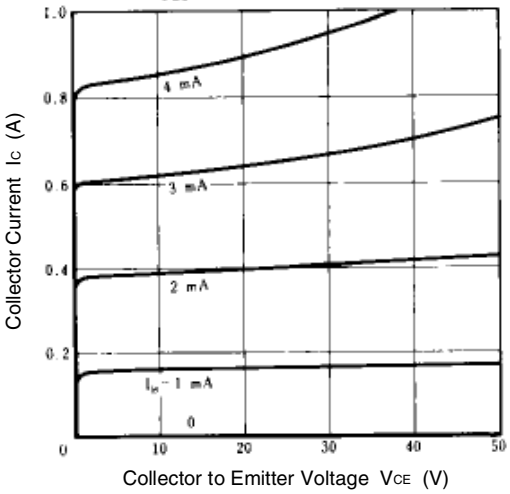
REVERSE BIAS SAFE OPERATING AREA



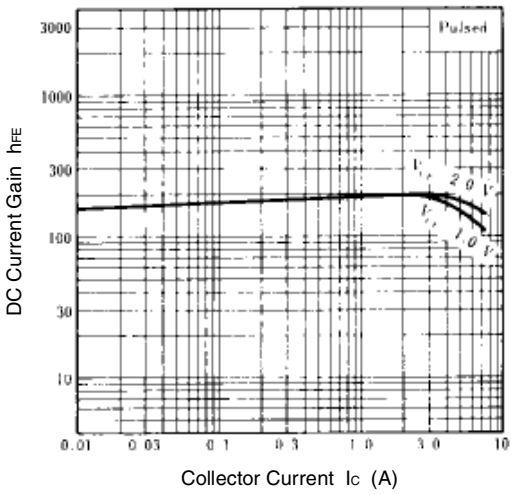
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



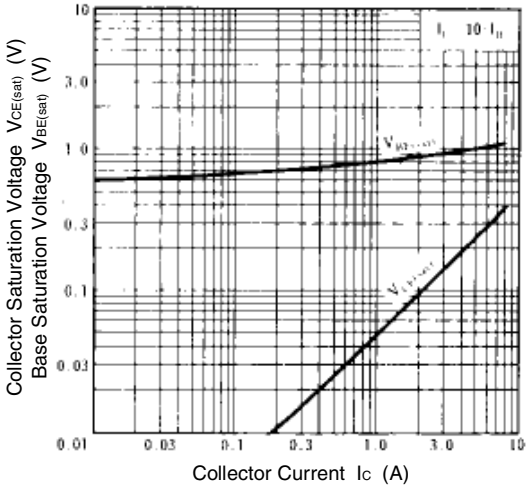
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs
COLLECTOR CURRENT



COLLECTOR AND BASE SATURATION
VOLTAGE vs COLLECTOR CURRENT



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