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 Technology Corp.
Customer Support Dept.
April 1, 2003

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2SD1606

Silicon NPN Triple Diffused

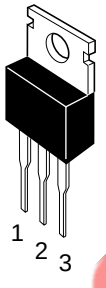
ADE-208-915 (Z)
1st. Edition
September 2000

Application

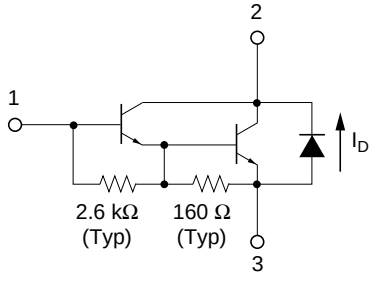
Low frequency power amplifier

Outline

TO-220AB



1. Base
2. Collector (Flange)
3. Emitter



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	120	V
Collector to emitter voltage	V_{CEO}	120	V
Emitter to base voltage	V_{EBO}	7	V
Collector current	I_C	6	A
Collector peak current	$I_{C(peak)}$	12	A
Collector power dissipation	P_C*[1]	40	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C
C to E diode forward current	I_D*[1]	6	A

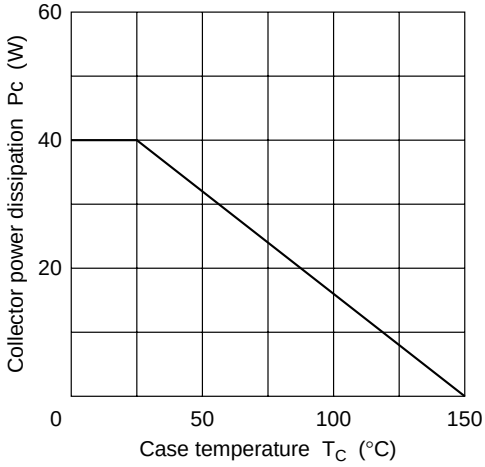
Note: 1. Value at T_C = 25°C.

Electrical Characteristics (Ta = 25°C)

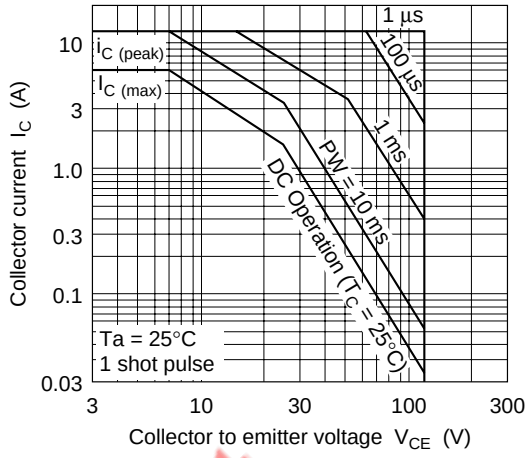
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	120	—	—	V	I_C = 25 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	7	—	—	V	I_E = 50 mA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	100	µA	V_{CB} = 120 V, I_E = 0
	I_{CEO}	—	—	10	µA	V_{CE} = 100 V, R_{BE} = ∞
DC current transfer ratio	h_{FE}	1000	—	20000		V_{CE} = 3 V, I_C = 3 A*[1]
Collector to emitter saturation voltage	$V_{CE(sat)1}$	—	—	1.5	V	I_C = 3 A, I_B = 6 mA*[1]
	$V_{CE(sat)2}$	—	—	3.0	V	I_C = 6 A, I_B = 60 mA*[1]
Base to emitter saturation voltage	$V_{BE(sat)1}$	—	—	2.0	V	I_C = 3 A, I_B = 6 mA*[1]
	$V_{BE(sat)2}$	—	—	3.5	V	I_C = 6 A, I_B = 60 mA*[1]
C to E diode forward voltage	V_D	—	—	3.0	V	I_D = 6 A*[1]
Turn on time	t_{on}	—	0.6	—	µs	I_C = 3 A, I_{B1} = $-I_{B2}$ = 6 mA
Storage time	t_{stg}	—	7.0	—	µs	
Fall time	t_f	—	2.0	—	µs	

Note: 1. Pulse test.

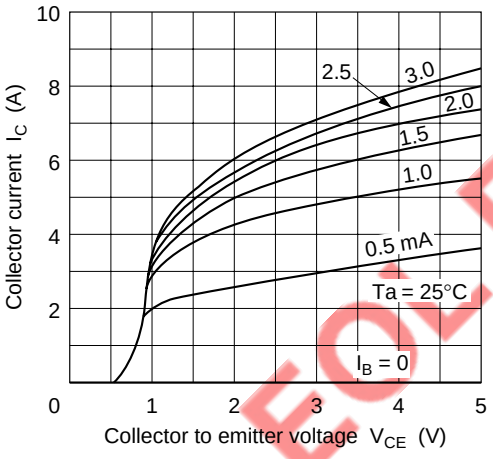
Maximum Collector Dissipation Curve



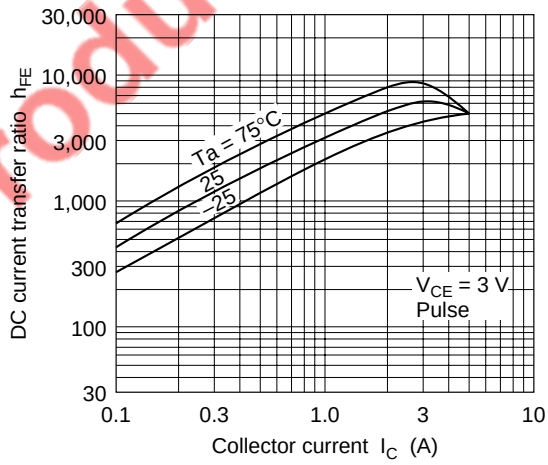
Area of Safe Operation

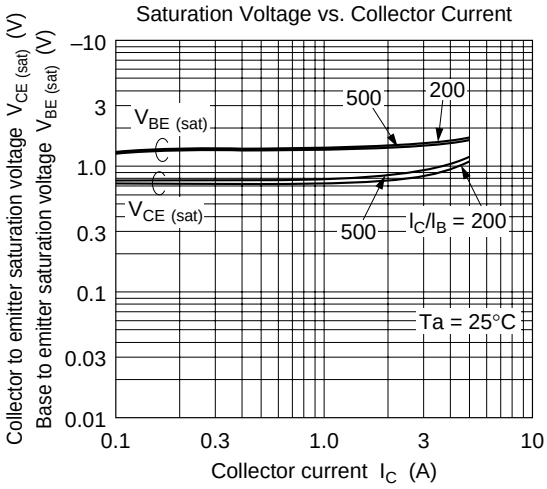


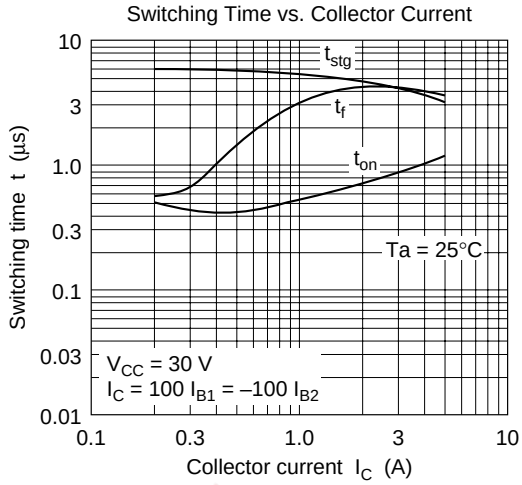
Typical Output Characteristics

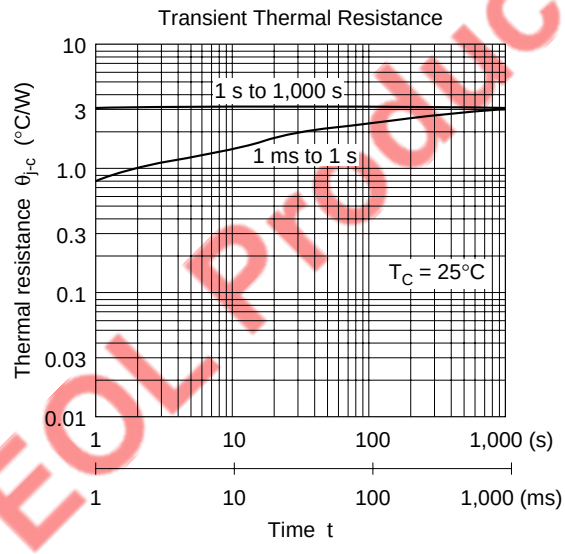


DC Current Transfer Ratio vs. Collector Current




Saturation Voltage vs. Collector Current
Collector to emitter saturation voltage $V_{CE (sat)}$ (V)
Base to emitter saturation voltage $V_{BE (sat)}$ (V)
–10
3
1.0
0.3
0.1
0.03
0.01
$V_{BE (sat)}$
$V_{CE (sat)}$
500
200
500
I_C/I_B = 200
Ta = 25°C
0.1
0.3
1.0
3
10
Collector current I_C (A)


Switching Time vs. Collector Current
Switching time t (µs)
10
3
1.0
0.3
0.1
0.03
0.01
t_{stg}
t_f
t_{on}
Ta = 25°C
V_{CC} = 30 V
I_C = 100 I_{B1} = –100 I_{B2}
0.1
0.3
1.0
3
10
Collector current I_C (A)


Transient Thermal Resistance
Thermal resistance θ_{j-c} (°C/W)
10
3
1.0
0.3
0.1
0.03
0.01
1 s to 1,000 s
1 ms to 1 s
T_C = 25°C
1
10
100
1,000 (s)
1
10
100
1,000 (ms)
Time t

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