

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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# 2SD1976

Silicon NPN Triple Diffused

RENESAS

ADE-208-918 (Z)  
1st. Edition  
September 2000

## Application

High voltage switching, igniter

## Feature

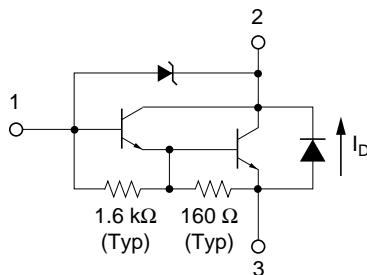
- Built-in High voltage zener diode (300 V)
- High Speed switching

## Outline

TO-220AB



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



## Absolute Maximum Ratings (Ta = 25°C)

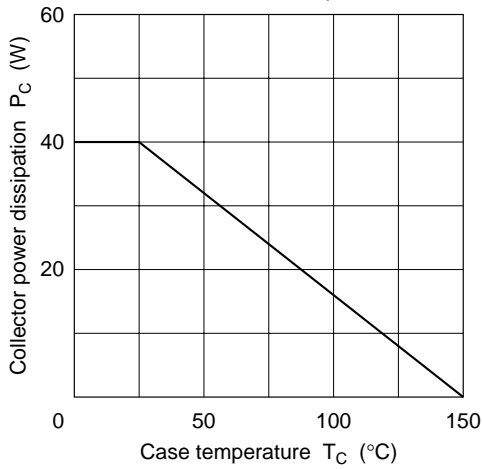
Item	Symbol	Rating	Unit
Collector to base voltage	$V_{CBO}$	300	V
Collector to emitter voltage	$V_{CEO}$	300	V
Emitter to base voltage	$V_{EBO}$	7	V
Collector current	$I_C$	6	A
Diode current	$I_D^{*1}$	6	A
Collector peak current	$I_{C(peak)}$	10	A
Collector power dissipation	$P_C^{*1}$	40	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

Note: 1. Value at T<sub>C</sub> = 25°C.

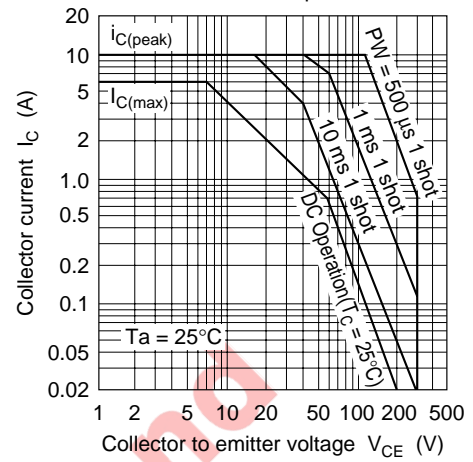
## Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	300	—	420	V	$I_C = 0.1 \text{ mA}$ , $I_E = 0$
Collector to emitter sustain voltage	$V_{CEO(SUS)}$	300	—	—	V	$I_C = 3 \text{ A}$ , $R_{BE} = \infty$ , $L = 10 \text{ mH}$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	7	—	—	V	$I_E = 50 \text{ mA}$ , $I_C = 0$
Collector cutoff current	$I_{CEO}$	—	—	100	μA	$V_{CE} = 300 \text{ V}$ , $R_{BE} = \infty$
DC current transfer ratio	$h_{FE}$	500	—	—		$V_{CE} = 2 \text{ V}$ , $I_C = 4 \text{ A}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	$I_C = 4 \text{ A}$ , $I_B = 40 \text{ mA}$
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	2.0	V	$I_C = 4 \text{ A}$ , $I_B = 40 \text{ mA}$
Emitter to collector diode forward voltage	$V_{ECF}$	—	—	3.5	V	$I_F = 6 \text{ A}$
Turn on time	$t_{on}$	—	1.2	—	μs	$I_C = 4 \text{ A}$ , $V_{CC} = 20 \text{ V}$
Storage time	$t_{stg}$	—	8.0	—		$I_{B1} = -I_{B2} = 40 \text{ mA}$
Fall time	$t_f$	—	8.0	—		

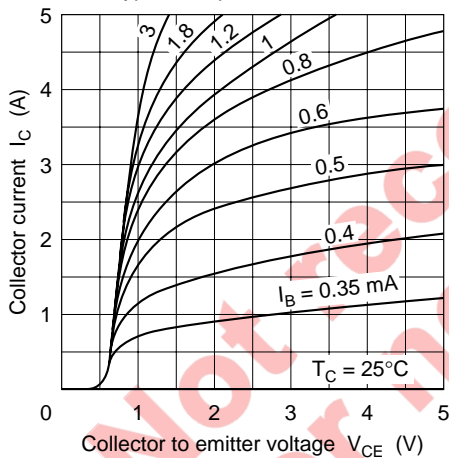
Maximum Collector Dissipation Curve



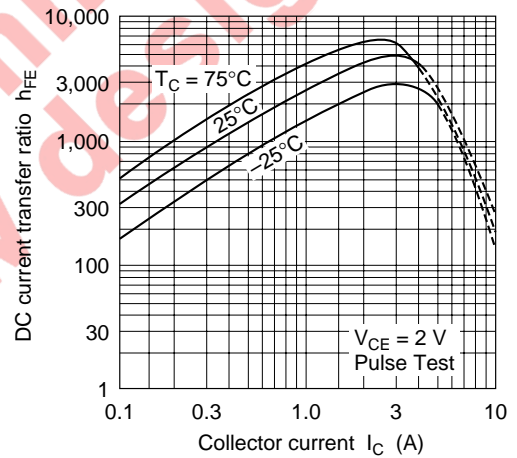
Area of Safe Operation

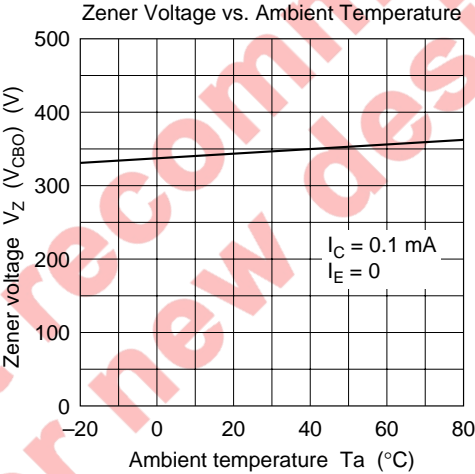
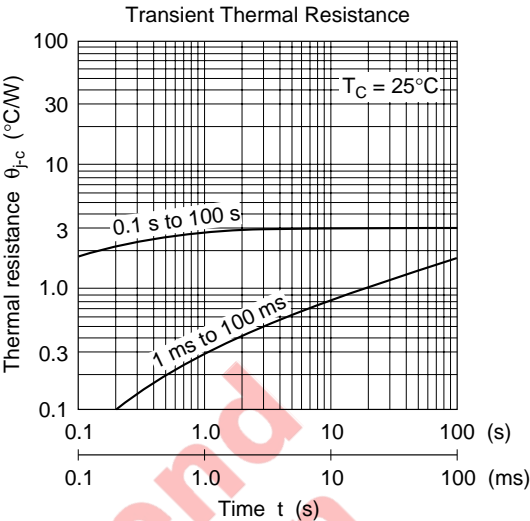
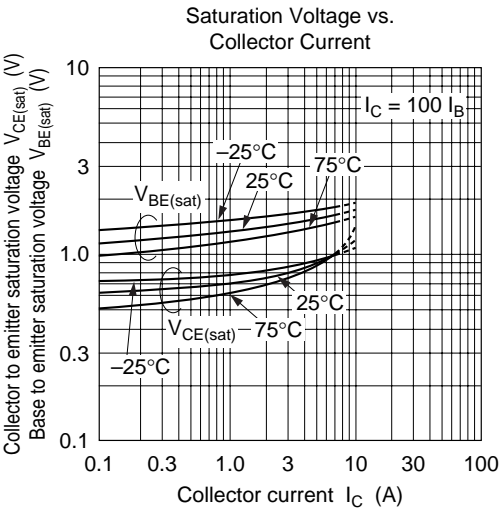


Typical Output Characteristics



DC Current Transfer Ratio vs. Collector Current





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