

To all our customers

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

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# 2SA778(K), 2SA778A(K)

Silicon PNP Epitaxial

**RENESAS**

ADE-208-314 (Z)

1st. Edition

Mar. 2001

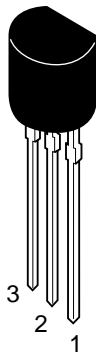
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## Application

High voltage medium speed switching

## Outline

TO-92 (1)



- 1. Emitter
- 2. Collector
- 3. Base

# 2SA778(K), 2SA778A(K)

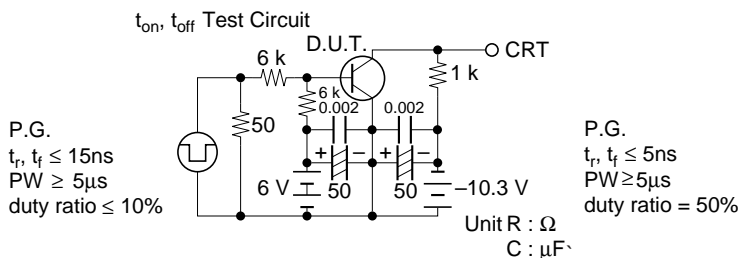
## Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	2SA778(K)	2SA778A(K)	Unit
Collector to base voltage	$V_{CBO}$	-150	-180	V
Collector to emitter voltage	$V_{CEO}$	-150	-180	V
Emitter to base voltage	$V_{EBO}$	-5	-5	V
Collector current	$I_C$	-50	-50	mA
Collector power dissipation	$P_C$	200	200	mW
Junction temperature	$T_j$	150	150	°C
Storage temperature	$T_{stg}$	-55 to +150	-55 to +150	°C

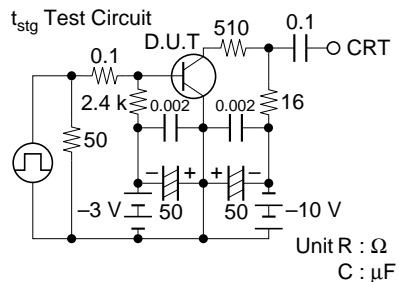
## Electrical Characteristics (Ta = 25°C)

Item	Symbol	2SA778(K)			2SA778A(K)			Unit	Test conditions
		Min	Typ	Max	Min	Typ	Max		
Collector to base breakdown voltage	$V_{(BR)CBO}$	-150	—	—	-180	—	—	V	$I_C = -50 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CER}$	-150	—	—	-180	—	—	V	$I_C = -50 \mu A, R_{BE} = 30 k\Omega$
Collector cutoff current	$I_{CBO}$	—	—	-1.0	—	—	—	$\mu A$	$V_{CB} = -100 V, I_E = 0$
		—	—	—	—	—	-1.0	$\mu A$	$V_{CB} = -150 V, I_E = 0$
Emitter cutoff current	$I_{EBO}$	—	—	-1.0	—	—	-1.0	$\mu A$	$V_{EB} = -5 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	30	100	—	40	100	200		$V_{CE} = -3 V, I_E = -15 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	-0.3	-1.0	—	-0.3	-1.0	V	$I_C = -15 mA, I_B = -1 mA$
Base to emitter saturation voltage	$V_{BE(sat)}$	—	-0.77	-1.0	—	-0.77	-1.0	V	$I_C = -15 mA, I_B = -1 mA$
Collector output capacitance	$C_{ob}$	—	—	10	—	—	10	pF	$V_{CB} = -10 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	$f_T$	—	50	—	—	50	—	MHz	$V_{CE} = -3 V, I_C = -15 mA$
Turn on time	$t_{on}$	—	135	—	—	135	—	ns	$V_{CC} = -10.3 V$
Turn off time	$t_{off}$	—	1.7	—	—	1.7	—	$\mu s$	$I_C = 10 I_{B1} = -10 I_{B2} = -10 mA$
Storage time	$t_{stg}$	—	—	1.0	—	—	1.0	$\mu s$	$V_{CC} = -10 V, I_C = -17 mA, I_{B1} = -1 mA, I_{B2} = -12 mA$

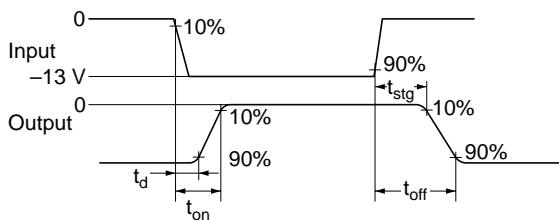
Switching Time Test Circuit



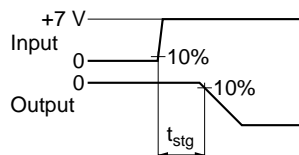
Switching Time Test Circuit

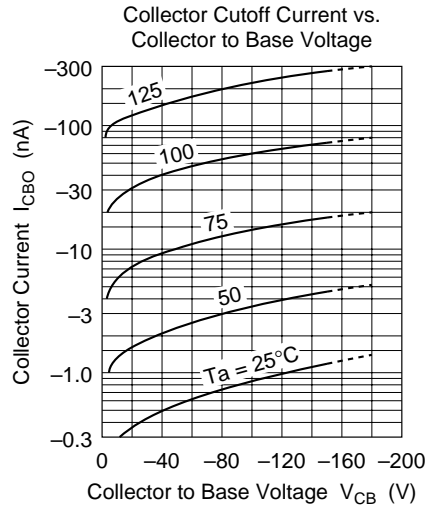
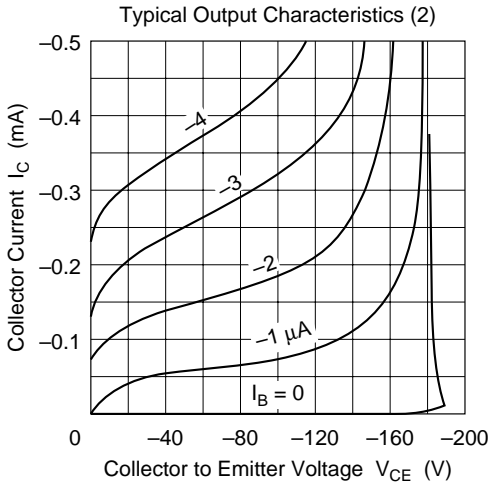
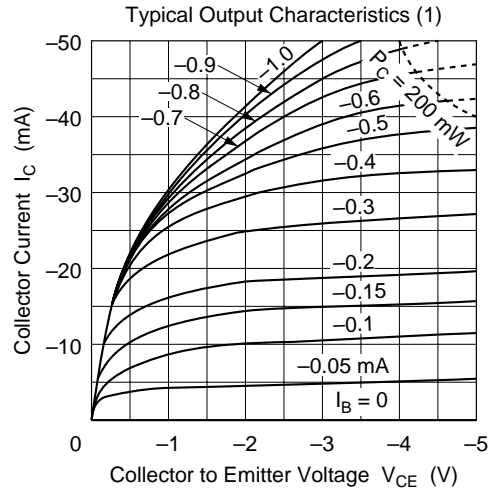
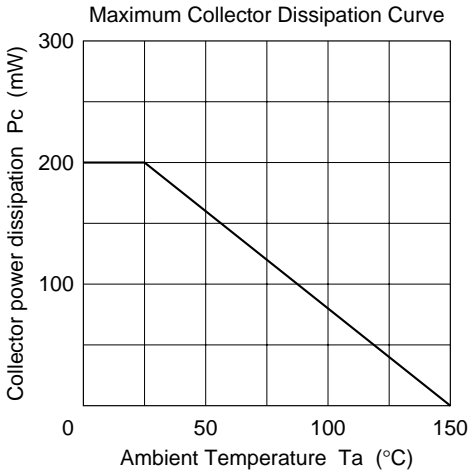


Response Waveform

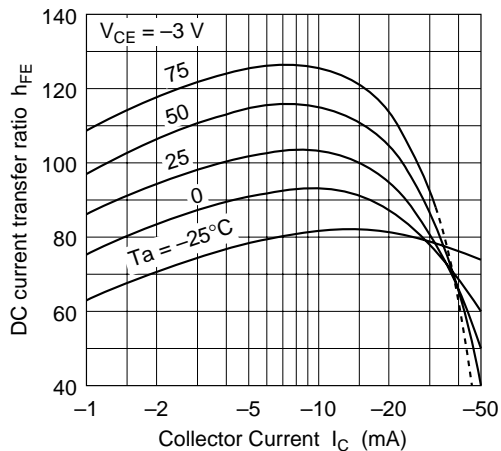


Response Waveform

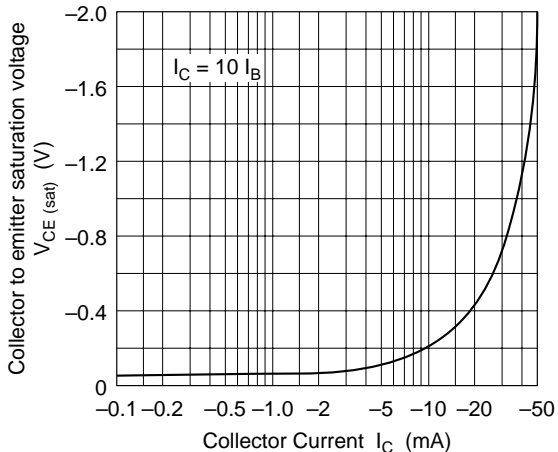




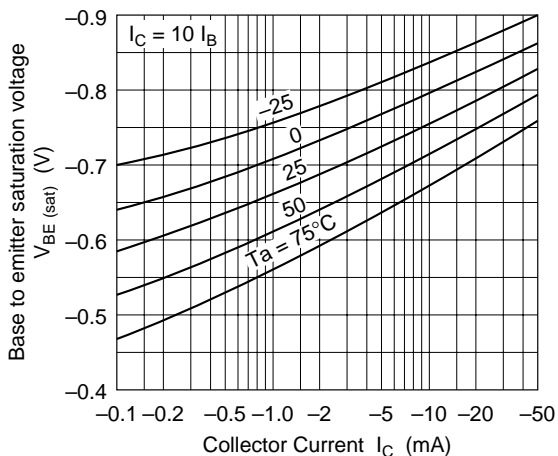
DC Current Transfer Ratio vs. Collector Current



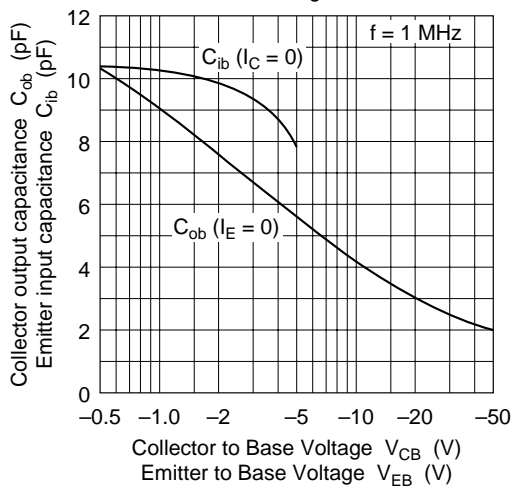
Collector to Emitter Saturation Voltage vs. Collector Current



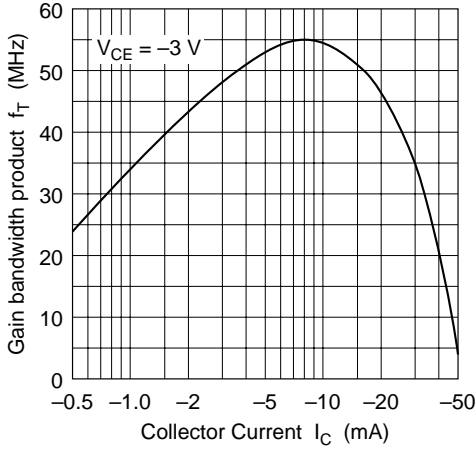
Base to Emitter Saturation Voltage vs. Collector Current



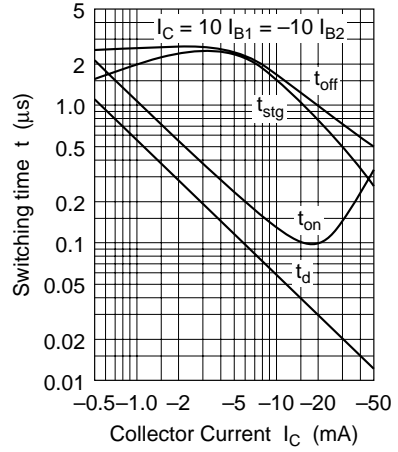
Input and Output Capacitance vs. Voltage



Gain Bandwidth Product vs. Collector Current



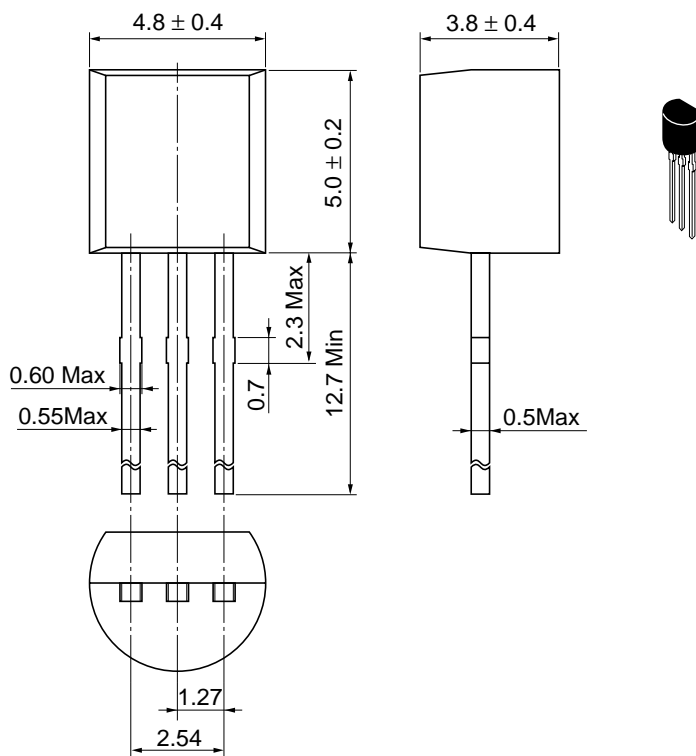
Switching Time vs. Collector Current





Package Dimensions

As of January, 2001  
Unit: mm



Hitachi Code	TO-92 (1)
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.25 g

## Cautions

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