

# HN2E01F

Super High Speed Switching Application  
 Audio Frequency Amplifier Application  
 General Switching Application

**Q1**

- Low Forward Voltage Drop :  $V_{F(3)}=0.98V(\text{typ.})$
- Fast Reverse Recovery Time :  $t_{rr}=1.6ns(\text{typ.})$
- Low Total Capacitance :  $C_T=0.5pF(\text{typ.})$

**Q2**

- High DC Current Gain :  $h_{FE}=600\sim 3600$
- High Voltage :  $V_{CEO}=50V$
- High Collector Current :  $I_C=150mA(\text{max.})$

- Q1 (Diode) : 1SS352 Equivalent
- Q2 (Transistor) : 2SC4666 Equivalent

**Q1 (Diode) Absolute Maximum Ratings (Ta = 25°C)**

Characteristic	Symbol	Rating	Unit
Maximum (peak) reverse voltage	$V_{RM}$	85	V
Reverse voltage	$V_R$	80	V
Maximum (peak) forward current	$I_{FM}$	300	mA
Average forward current	$I_O$	100	mA
Surge current (10ms)	$I_{FSM}$	1	A

**Q2 (Transistor) Absolute Maximum Ratings (Ta = 25°C)**

Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	50	V
Collector-emitter voltage	$V_{CEO}$	50	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	150	mA
Base current	$I_B$	30	mA

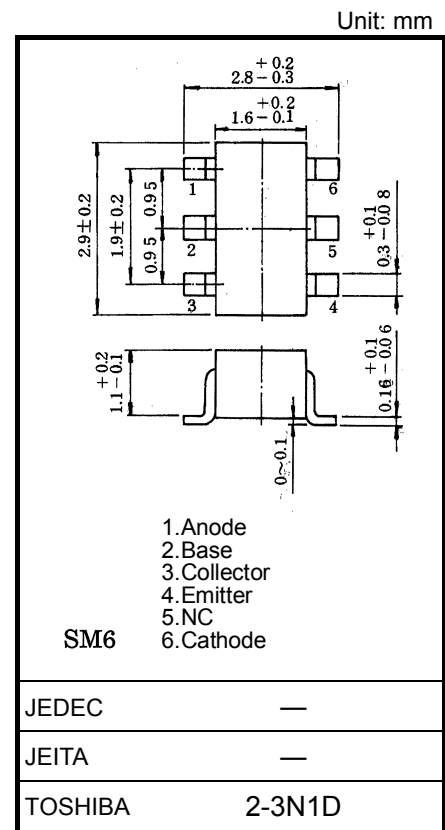
**Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)**

Characteristic	Symbol	Rating	Unit
Collector power dissipation	$P_C^*$	300	mW
Junction temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55~125	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\* Total rating: 200mW per element should not be exceeded.



Weight: 0.015g (typ.)

## Q1 (Diode) Electrical Characteristics (Ta = 25°C)

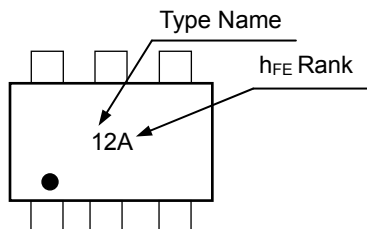
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V <sub>F</sub> (1)	—	I <sub>F</sub> = 1mA	—	0.62	—	V
	V <sub>F</sub> (2)	—	I <sub>F</sub> = 10mA	—	0.75	—	
	V <sub>F</sub> (3)	—	I <sub>F</sub> = 100mA	—	0.98	1.2	
Reverse current	I <sub>R</sub> (1)	—	V <sub>R</sub> = 30V	—	—	0.1	μA
	I <sub>R</sub> (2)	—	V <sub>R</sub> = 80V	—	—	0.5	
Total capacitance	C <sub>T</sub>	—	V <sub>R</sub> = 0, f = 1MHz	—	0.5	—	pF
Reverse recovery time	t <sub>rr</sub>	—	I <sub>F</sub> = 10mA (fig.1)	—	1.6	—	ns

## Q2 (Transistor) Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	—	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0	—	—	100	nA
Emitter cut-off current	I <sub>EBO</sub>	—	V <sub>EB</sub> = 5V, I <sub>C</sub> = 0	—	—	100	nA
DC current gain	h <sub>FE</sub> *	—	V <sub>CE</sub> = 6V, I <sub>C</sub> = 2mA	600	—	3600	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	—	I <sub>C</sub> = 100mA, I <sub>B</sub> = 10mA	—	0.12	0.25	V
Transition frequency	f <sub>T</sub>	—	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA	—	250	—	MHz
Collector output capacitance	C <sub>ob</sub>	—	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	—	3.5	—	pF

\* h<sub>FE</sub> Rank A : 600~1800, B : 1200~3600

### Marking



### Equivalent Circuit (Top View)

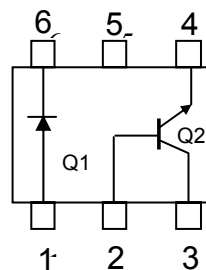
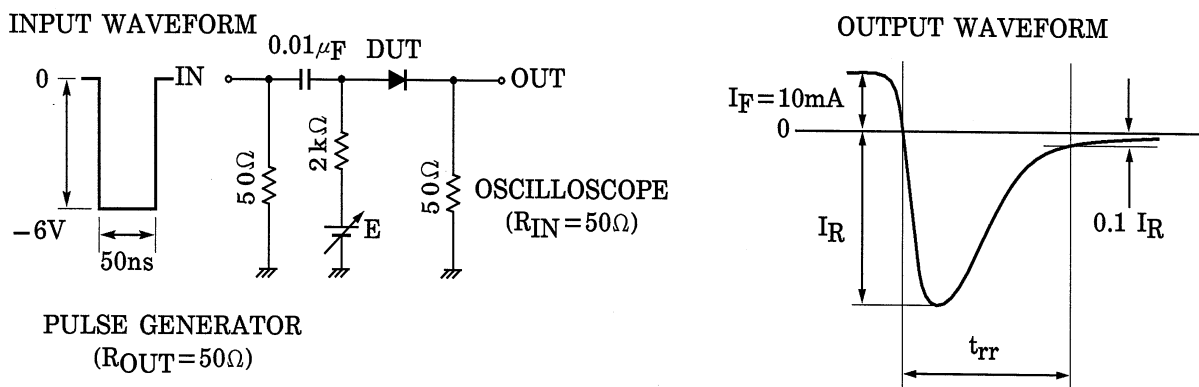
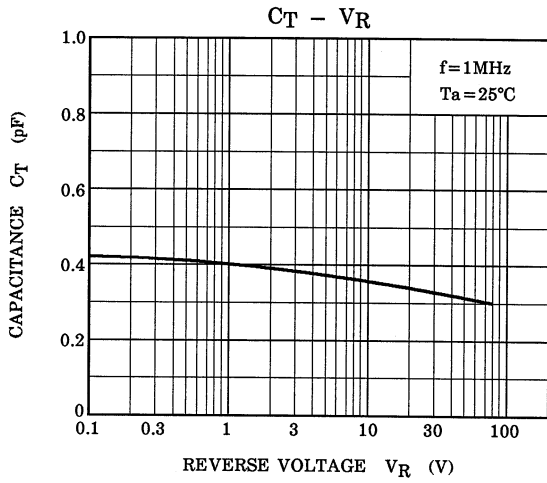
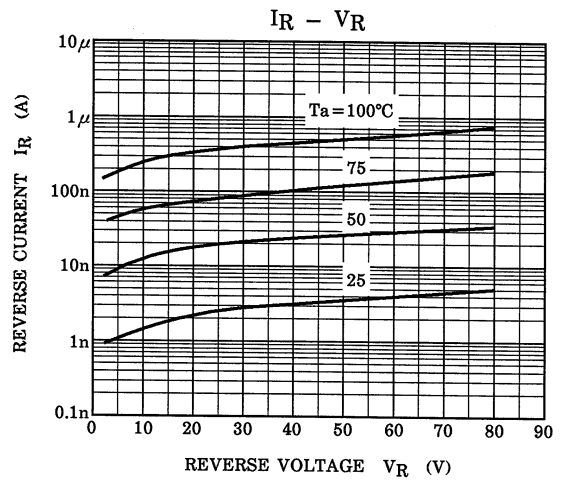
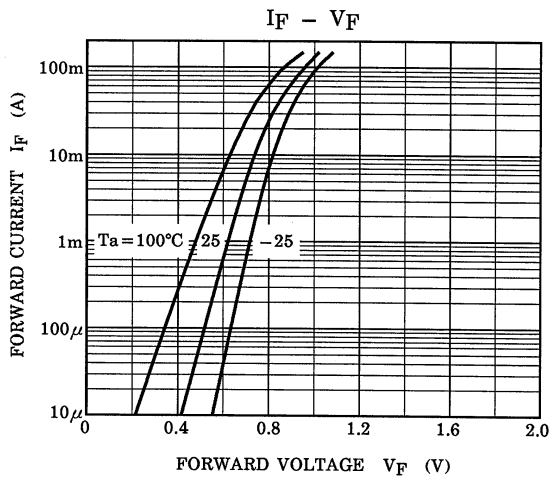


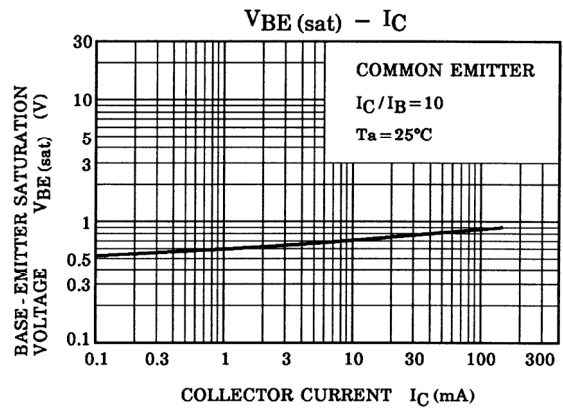
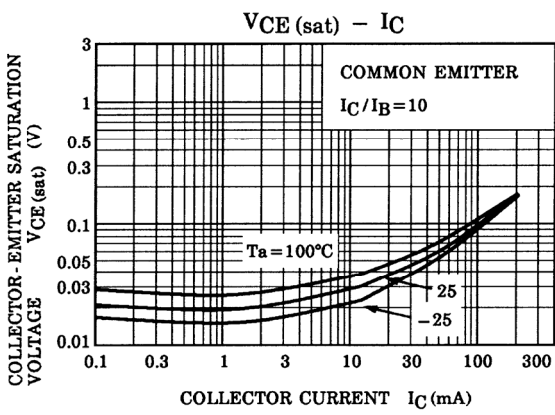
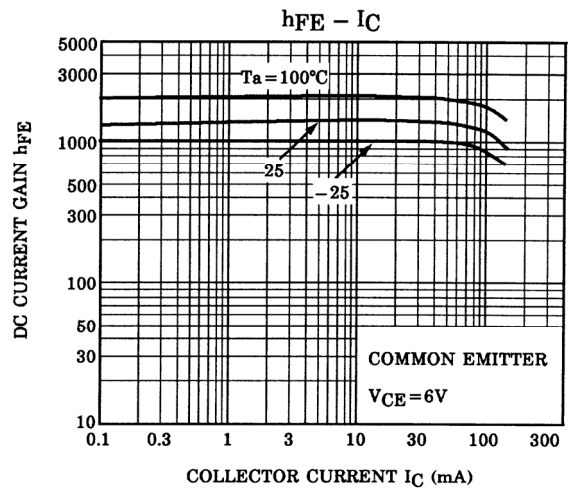
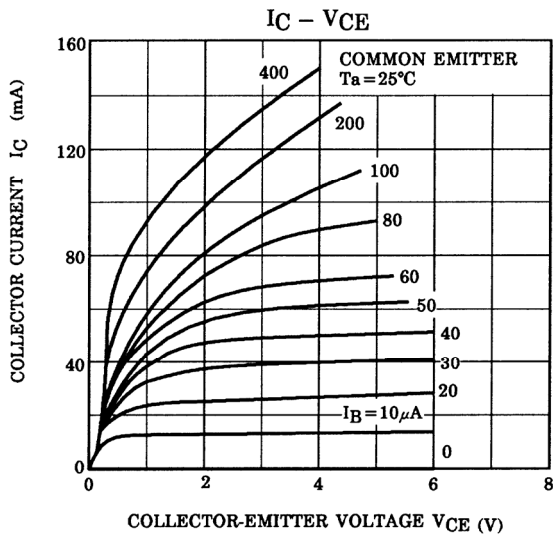
Fig. 1 : Reverse Recovery Time (t<sub>rr</sub>) Test Circuit



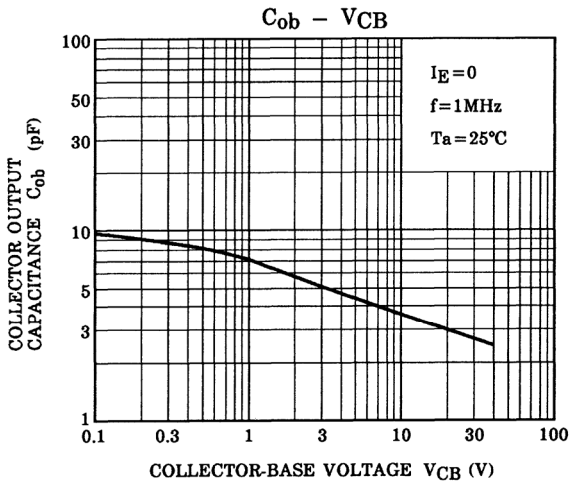
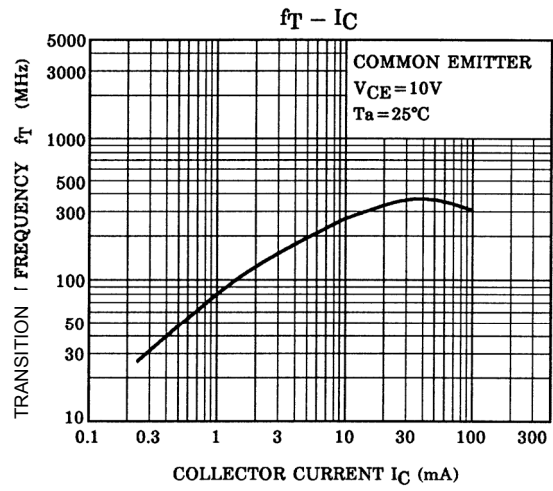
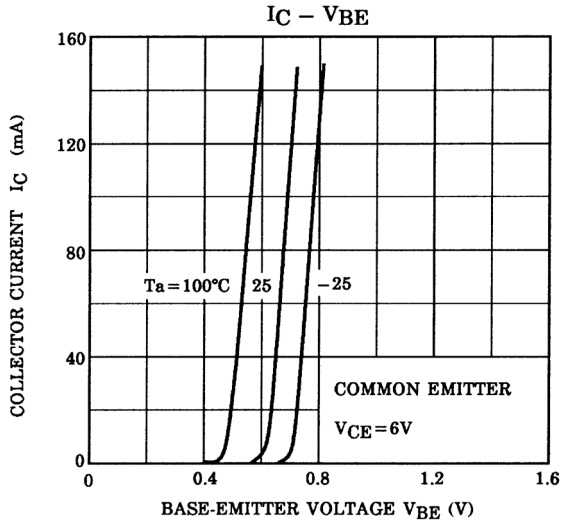
Q1



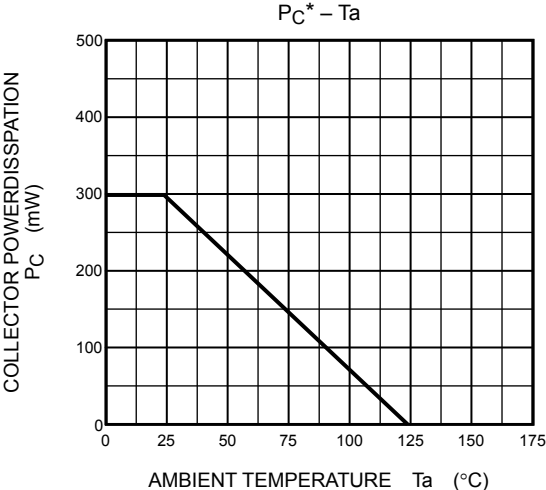
**Q2**



Q2



**Q1, Q2 Common**



\*Total Rating.

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20070701-EN GENERAL

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