

HN2E02F

Super High Speed Switching Application

Audio Frequency Amplifier Application

AM Amplifier 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 Voltage : $V_{CEO}=50V$

High Collector Current : $I_C=150mA(\text{max.})$

Good h_{FE} Linearity
: $h_{FE}(I_C=0.1mA)/h_{FE}(I_C=2mA)=0.95$

Q1 (Diode) : 1SS352 Equivalent

Q2 (Transistor) : 2SC4738 Equivalent

Q1 (Diode) Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

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 ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	60	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 ($T_a = 25^\circ\text{C}$) (Q1, Q2 Common)

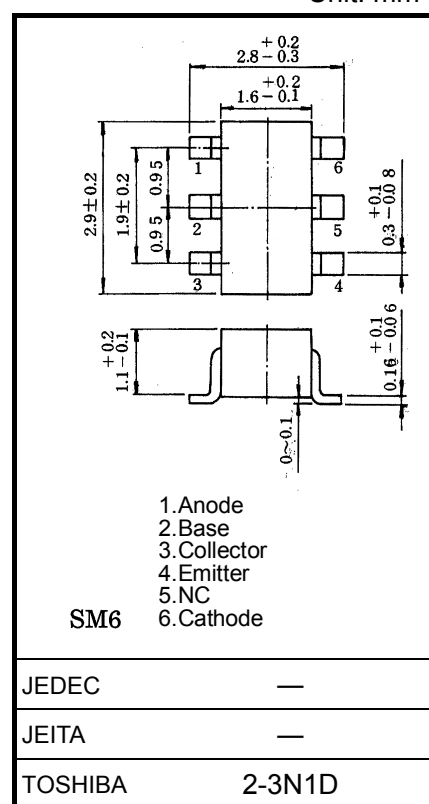
Characteristic	Symbol	Rating	Unit
Collector power dissipation	P_C^*	300	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$

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: Power dissipation per element should not exceed 200mW per element.

Unit: mm



Weight: 0.015g (typ.)

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

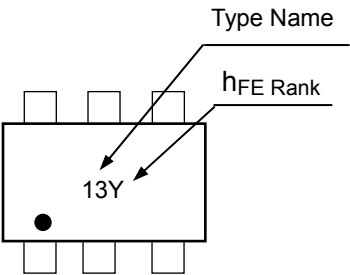
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V_F (1)	—	$I_F = 1\text{mA}$	—	0.62	—	V
	V_F (2)	—	$I_F = 10\text{mA}$	—	0.75	—	
	V_F (3)	—	$I_F = 100\text{mA}$	—	0.98	1.2	
Reverse current	I_R (1)	—	$V_R = 30\text{V}$	—	—	0.1	μA
	I_R (2)	—	$V_R = 80\text{V}$	—	—	0.5	
Total capacitance	C_T	—	$V_R = 0, f = 1\text{MHz}$	—	0.5	—	pF
Reverse recovery time	t_{rr}	—	$I_F = 10\text{mA}$ (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_{CBO}	—	$V_{CB} = 60\text{V}, I_E = 0$	—	—	100	nA
Emitter cut-off current	I_{EBO}	—	$V_{EB} = 5\text{V}, I_C = 0$	—	—	100	nA
DC current gain	h_{FE}^*	—	$V_{CE} = 6\text{V}, I_C = 2\text{mA}$	120	—	700	
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	$I_C = 100\text{mA}, I_B = 10\text{mA}$	—	0.1	0.25	V
Transition Frequency	f_T	—	$V_{CE} = 10\text{V}, I_C = 10\text{mA}$	60	—	—	MHz
Collector Output Capacitance	C_{ob}	—	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	—	2.0	—	pF

* h_{FE} Rank Y(Y) : 120~240, GR(G) : 200~400,BL(L) : 350~700 () Marking Symbol

Marking



Equivalent Circuit (Top View)

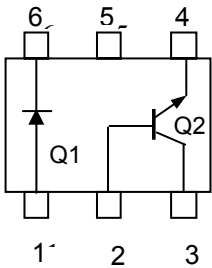
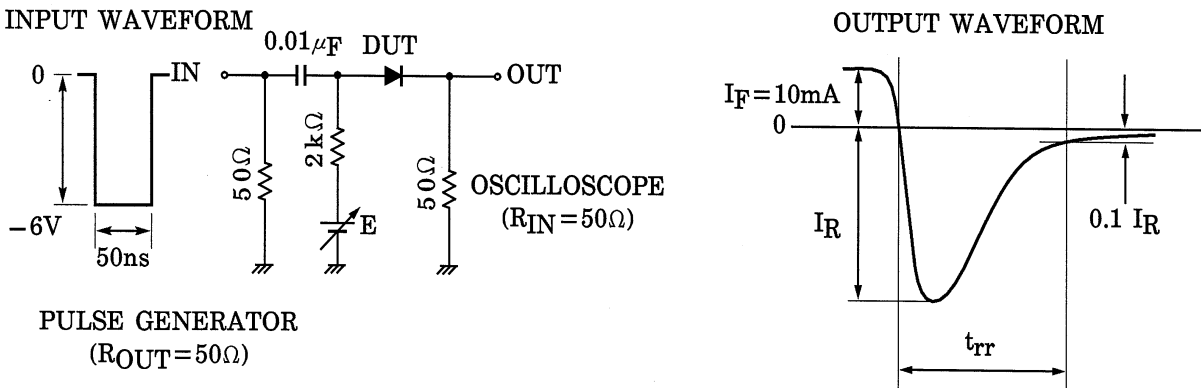
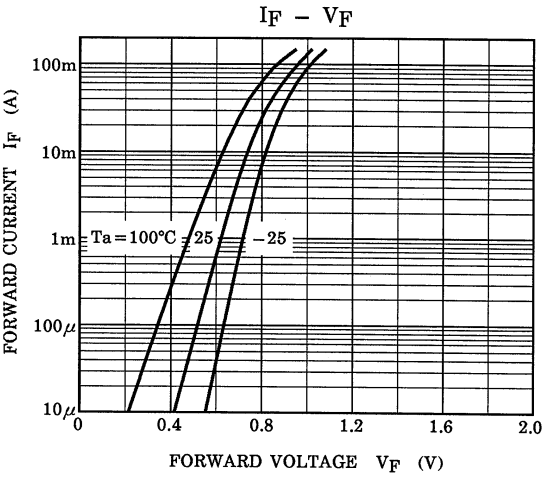
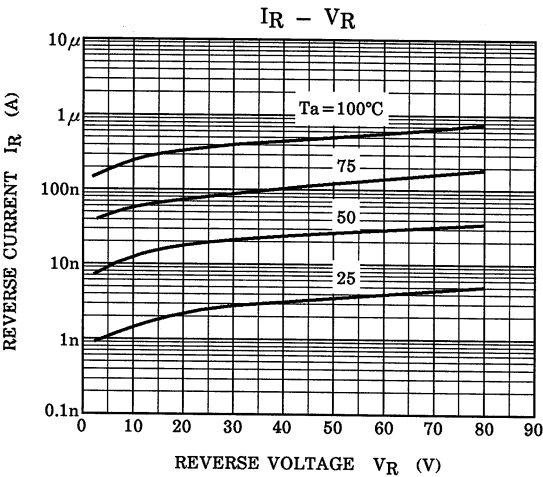
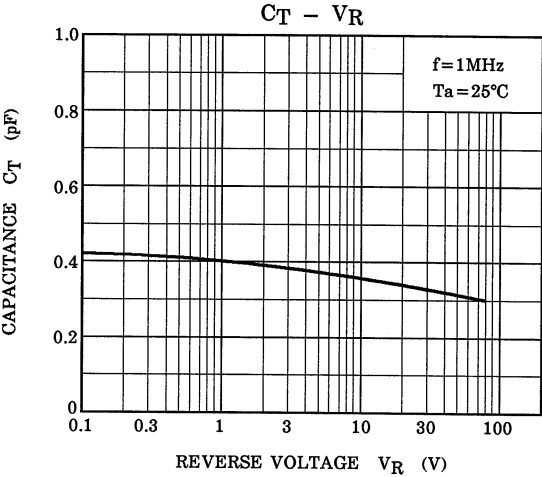


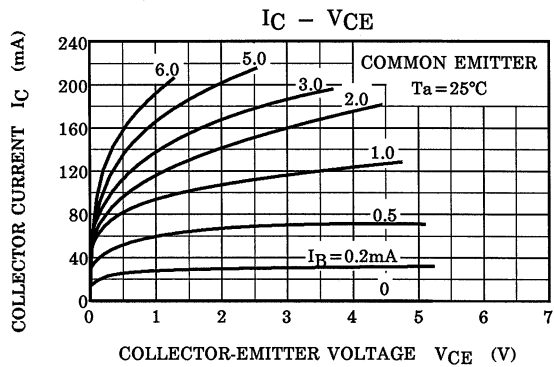
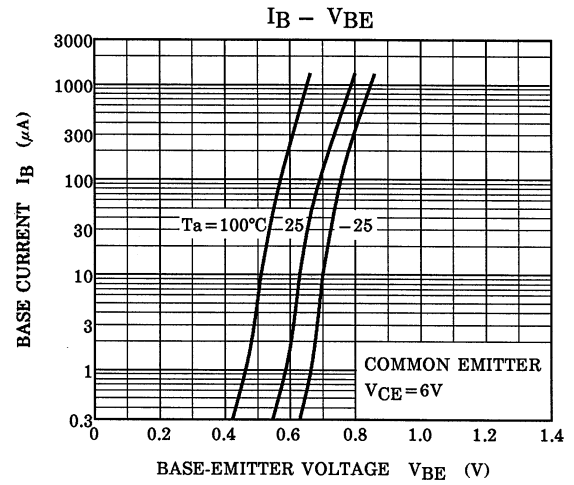
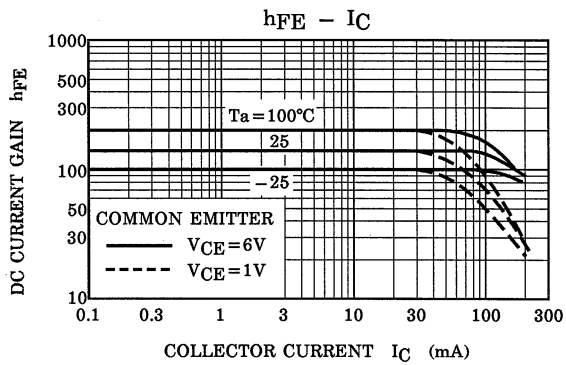
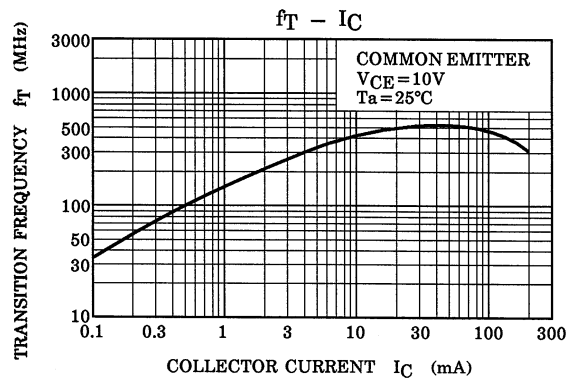
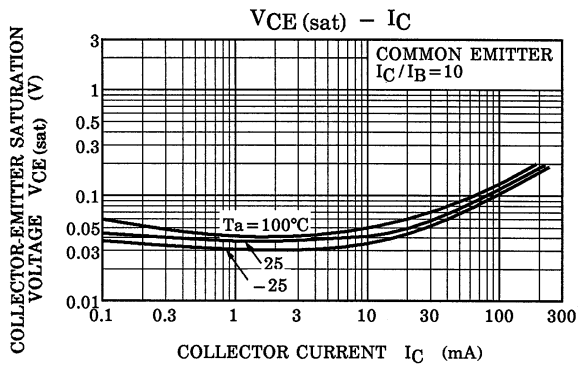
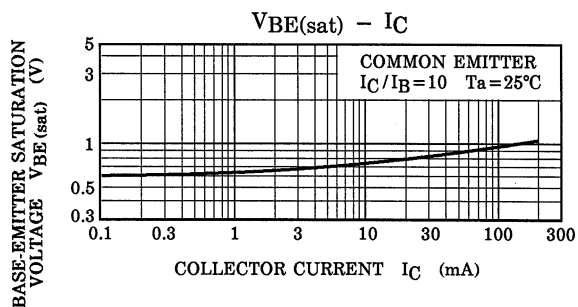
Fig. 1 : Reverse Recovery Time (t_{rr}) Test Circuit



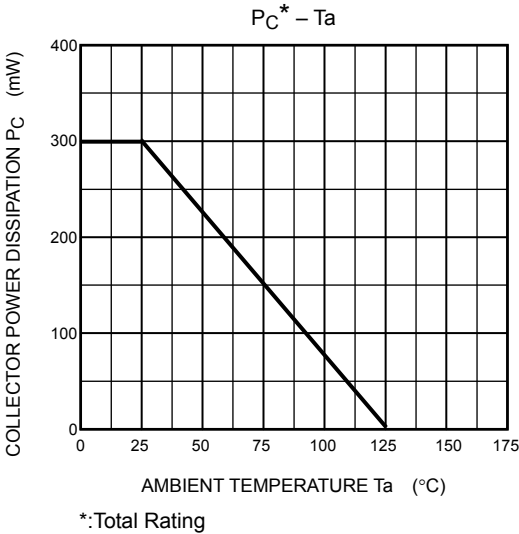
Q1



Q2



Q1, Q2 Common



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20070701-EN GENERAL

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