

TOSHIBA MULTI CHIP DISCRETE DEVICE

HN2E01F

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

Q1

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

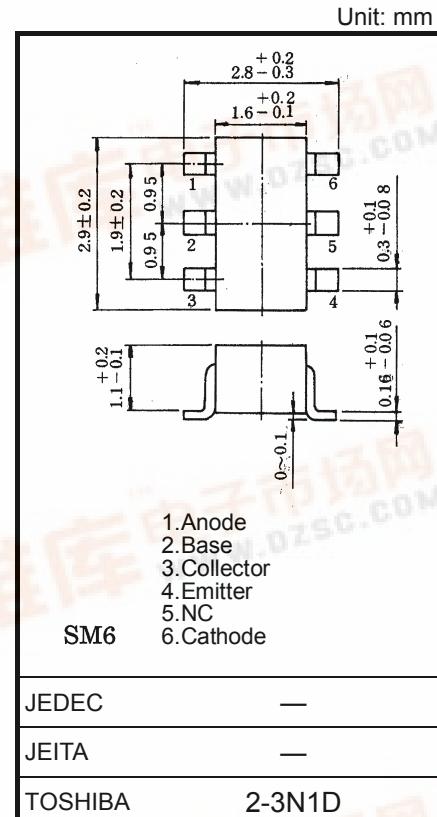
Q2

High DC Current Gain : $h_{FE}=600\sim3600$
 High Voltage : $V_{CEO}=50V$
 High Collector Current : $I_C=150mA$ (max.)

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

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

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



Weight: 0.015g (typ.)

Q2 (Transistor) Absolute Maximum Ratings ($T_a = 25^\circ C$)

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 ($T_a = 25^\circ C$) (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.

Q1 (Diode) Electrical Characteristics ($T_a = 25^\circ C$)

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

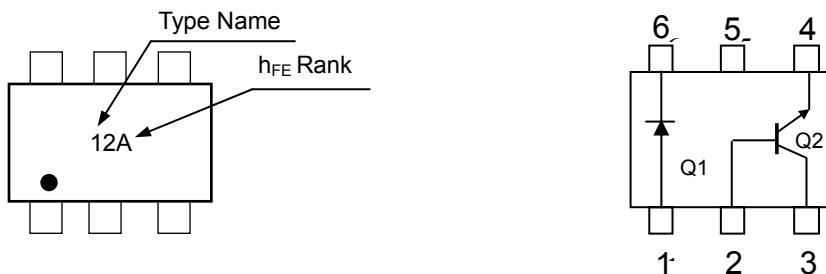
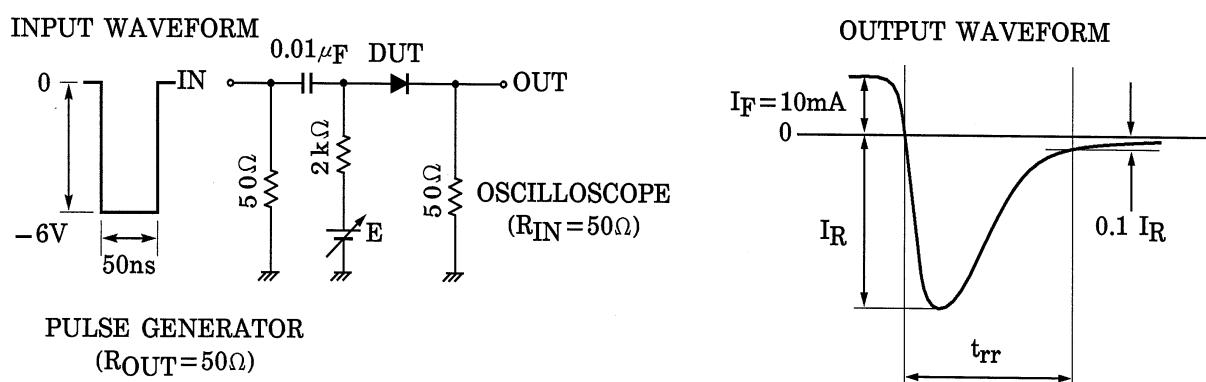
Q2 (Transistor) Electrical Characteristics ($T_a = 25^\circ C$)

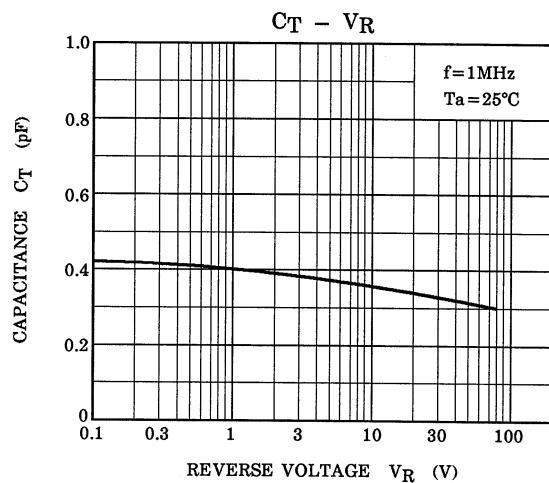
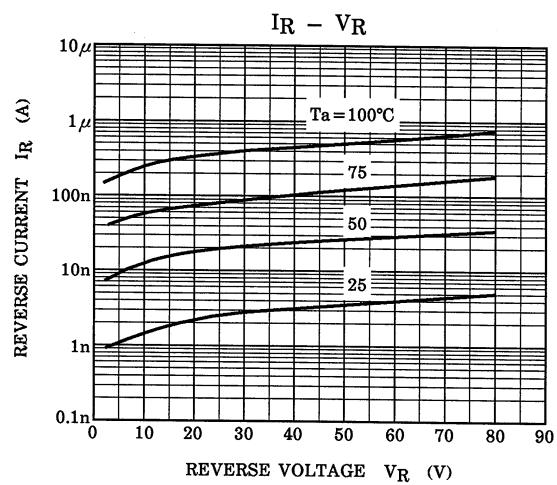
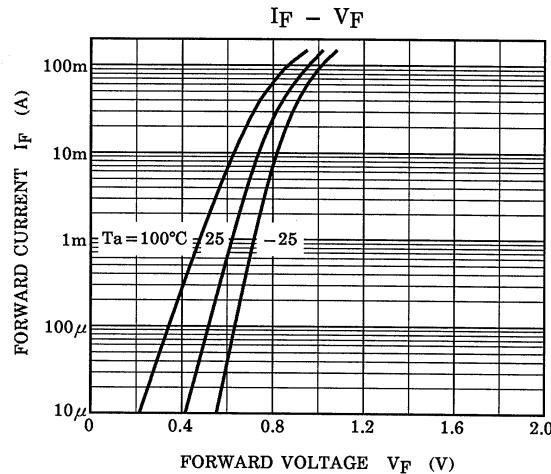
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	—	$V_{CB} = 50\text{V}, I_E = 0$	—	—	100	nA
Emitter cut-off current	I_{EBO}	—	$V_{EB} = 5\text{V}, I_C = 0$	—	—	100	nA
DC current gain	h_{FE}^*	—	$V_{CE} = 6\text{V}, I_C = 2\text{mA}$	600	—	3600	
Collector-emitter saturation voltage	$V_{CE(\text{sat})}$	—	$I_C = 100\text{mA}, I_B = 10\text{mA}$	—	0.12	0.25	V
Transition frequency	f_T	—	$V_{CE} = 10\text{V}, I_C = 10\text{mA}$	—	250	—	MHz
Collector output capacitance	C_{ob}	—	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	—	3.5	—	pF

* h_{FE} Rank A : 600~1800, B : 1200~3600

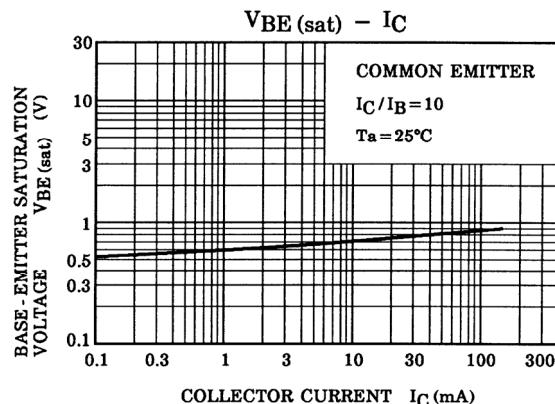
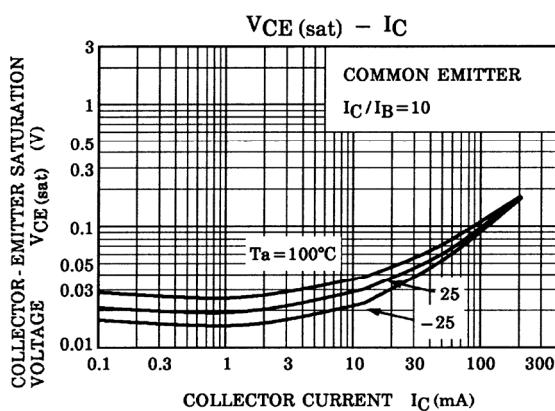
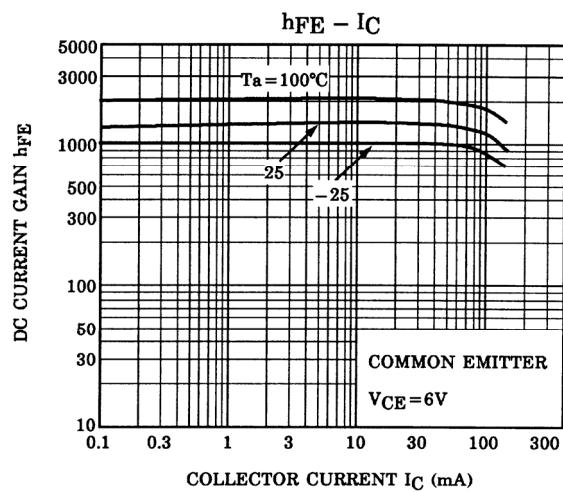
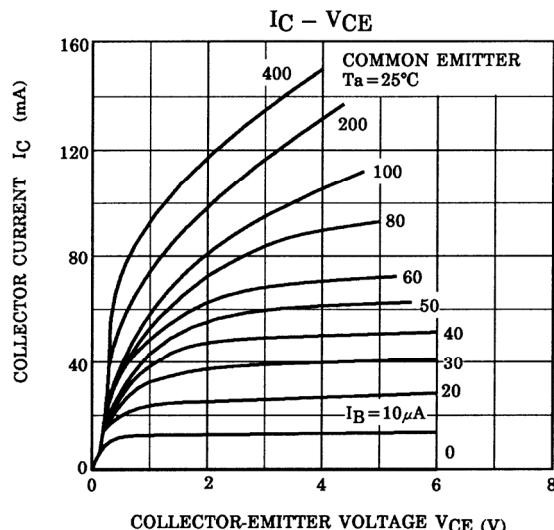
Marking

Equivalent Circuit (Top View)

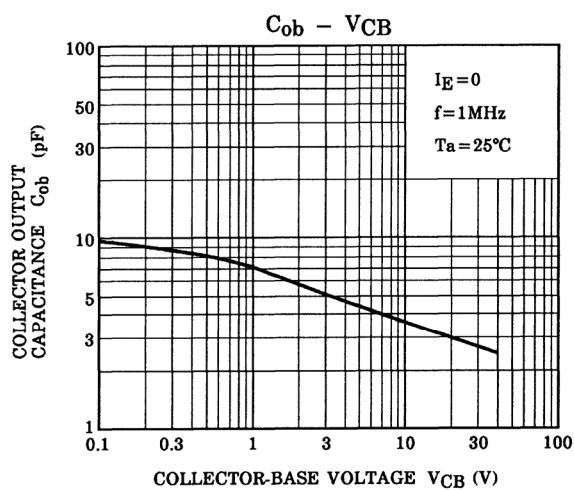
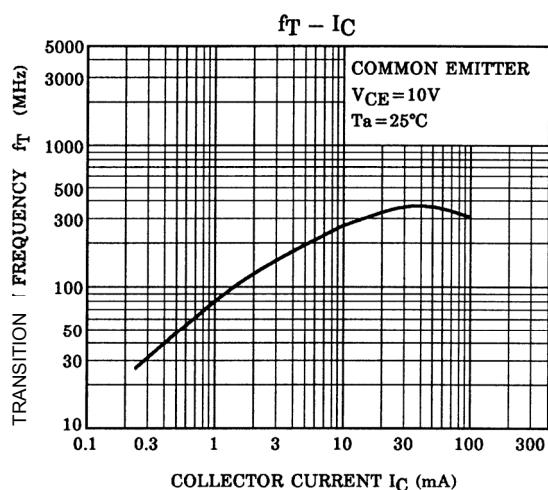
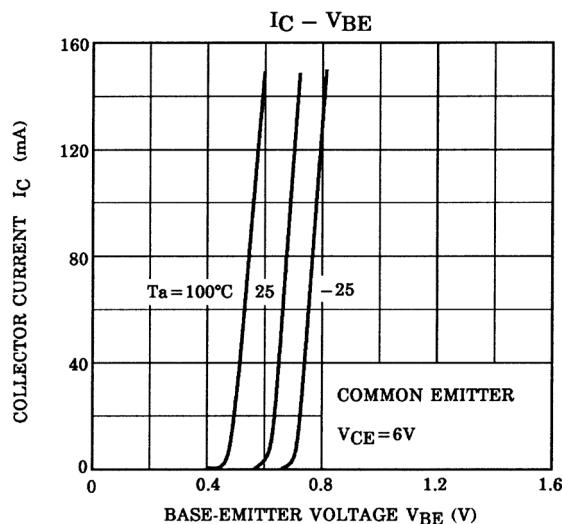
Fig. 1 : Reverse Recovery Time (t_{rr}) Test Circuit

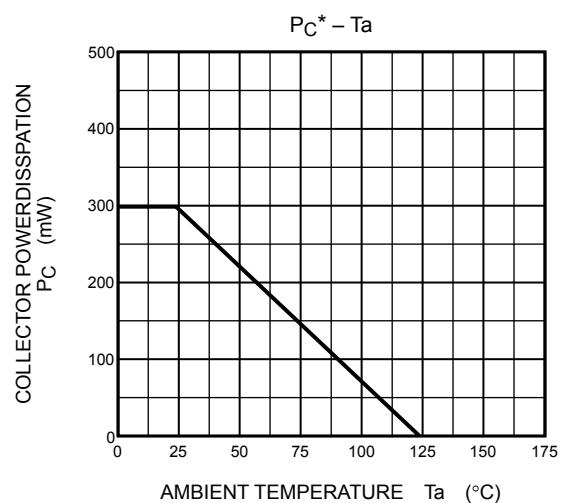
Q1

Q2



Q2



Q1, Q2 Common

*Total Rating.

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20070701-EN GENERAL

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