TOSHIBA Multichip Discrete Device

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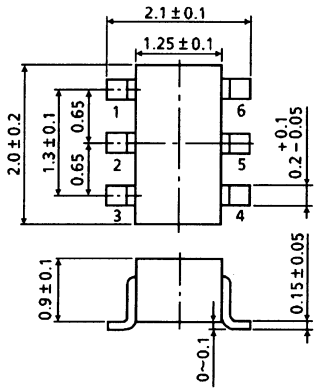
HN7G07FU

Power Management Switch Applications, Inverter Circuit Applications, Driver Circuit Applications and Interface Circuit Applications

- Combining transistor and BRT reduces the parts count, enabling the design of more compact equipment with a simpler system configuration.

  Q1: 2SC5376F equivalent
  Q2: RN1115F equivalent

Unit: mm



1.EMITTER1 (E1)
2.BASE1 (B1)
3.COLLECTOR2 (C2)
4.EMITTER2 (E2)
5.BASE2 (B2)
6.COLLECTOR1 (C1)

US6

JEDEC	—
JEITA	—
TOSHIBA	2-2J1A

Weight: 0.0068 g (typ.)

Q1 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	15	V
Collector-emitter voltage	V_{CEO}	12	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	500	mA
Base current	I_B	50	mA

Q2 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}	10	V
Collector current	I_C	100	mA

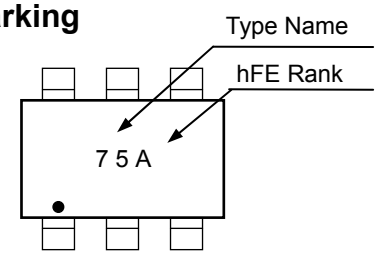
Q1, Q2 Common Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P_C*	200	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

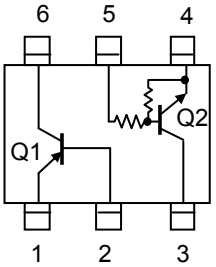
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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. 130 mW per element should not be exceeded.

Marking



Equivalent Circuit (top view)



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Q1 Electrical Characteristics (Ta = 25°C)

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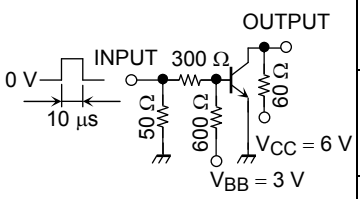
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		I_{CBO}	V_{CB} = 15 V, I_E = 0	—	—	100	nA
Emitter cutoff current		I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	100	nA
DC current gain		h_{FE} **	V_{CE} = 2 V, I_C = 10 mA	300	—	1000	
Collector-emitter saturation voltage		$V_{CE\ (sat)\ (1)}$	I_C = 10 mA, I_B = 0.5 mA	—	15	30	mV
		$V_{CE\ (sat)\ (2)}$	I_C = 200 mA, I_B = 10 mA	—	110	250	
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 200 mA, I_B = 10 mA	—	0.87	1.2	V
Transition frequency		f_T	V_{CE} = 2 V, I_C = 10 mA	—	130	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	4.2	—	pF
Switching time	Turn-on time	t_{on}		—	85	—	ns
	Storage time	t_{stg}		—	170	—	ns
	Fall time	t_f	Duty cycle ≦ 2% IB1 = IB2 = 5 mA	—	40	—	ns

**: h_{FE} Classification A:300~600, B:500~1000

Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
	I_{CEO}	V_{CE} = 50 V, I_E = 0	—	—	500	nA
Emitter cutoff current	I_{EBO}	V_{EB} = 6 V, I_C = 0	0.37	—	0.71	mA
DC current gain	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	50	—	—	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	$V_{I(ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	2.5	V
Input voltage (OFF)	$V_{I(OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.3	—	1.0	V
Transition frequency	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	—	pF
Input resistor	R1	—	1.54	2.2	2.86	kΩ
Resistor ratio	R1/R2	—	—	0.22	—	

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Q1

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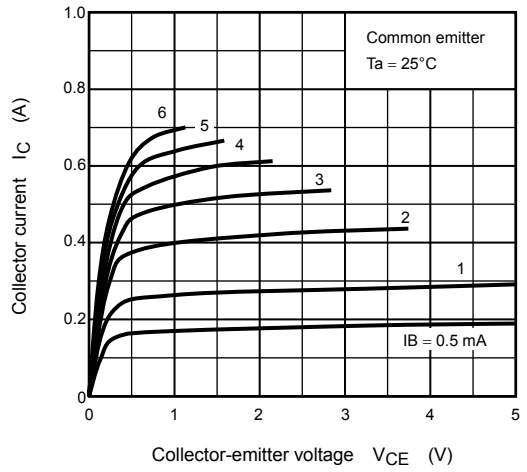
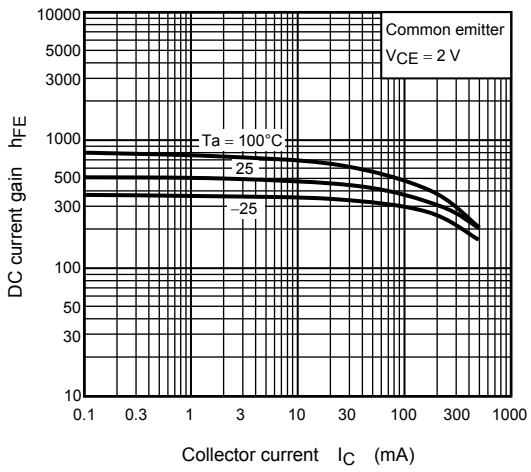
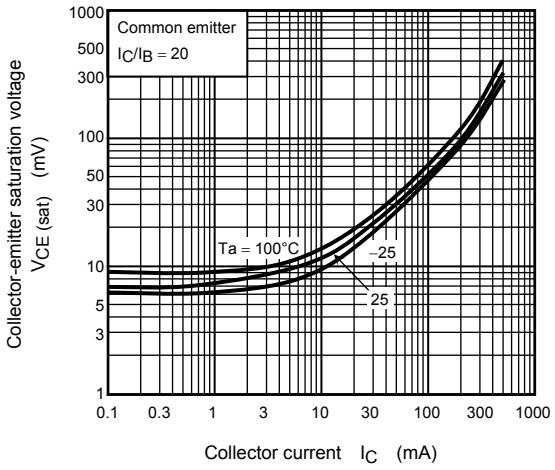
$I_C - V_{CE}$



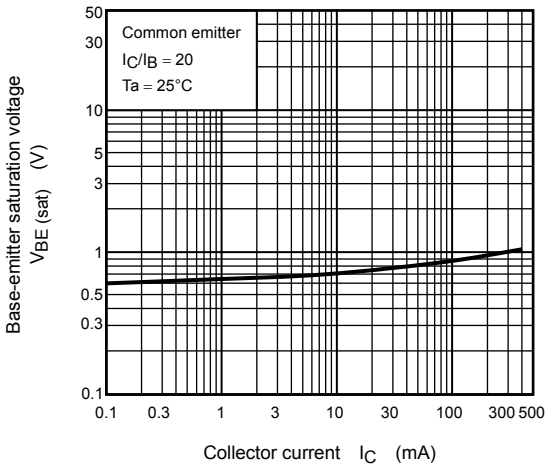
$h_{FE} - I_C$



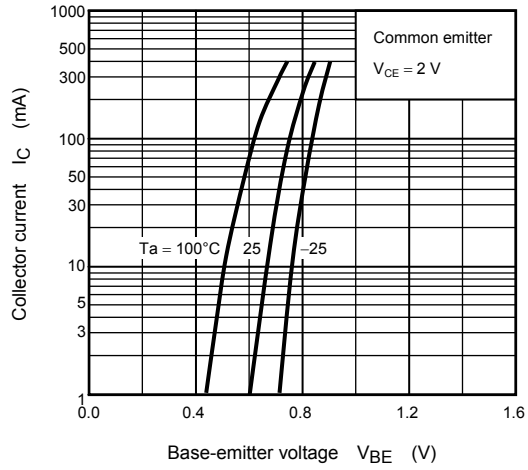
$V_{CE\ (sat)} - I_C$



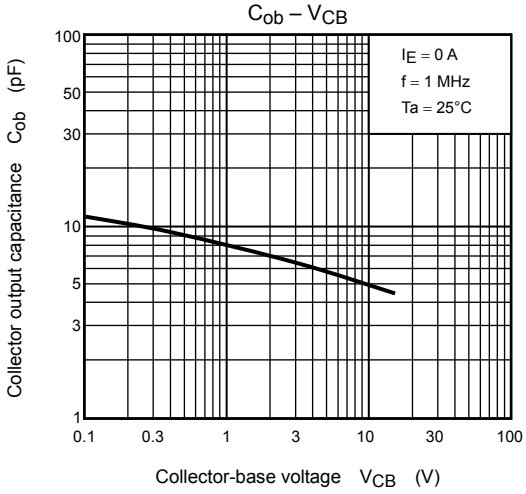
$V_{BE\ (sat)} - I_C$



$I_C - V_{BE}$



$C_{ob} - V_{CB}$



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Q2

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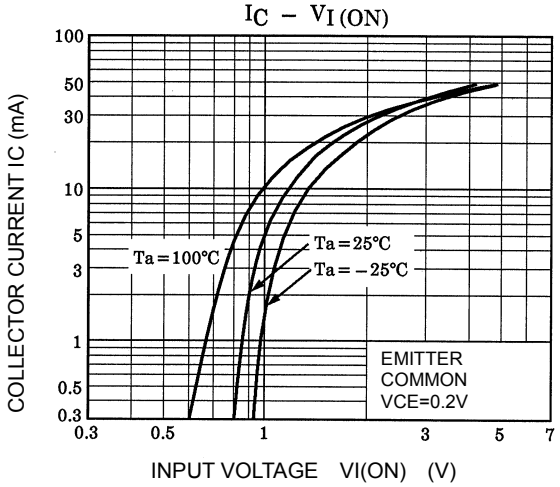
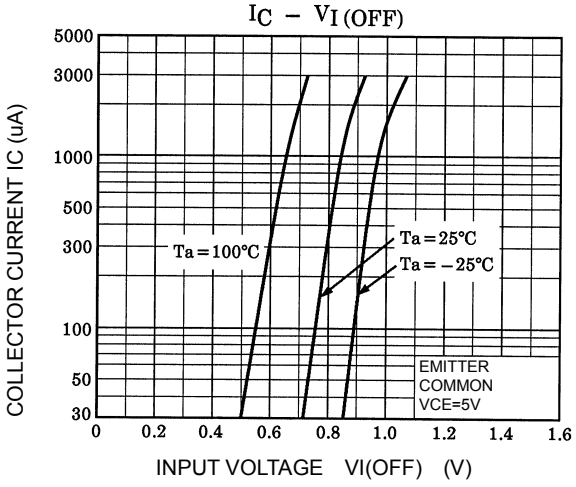
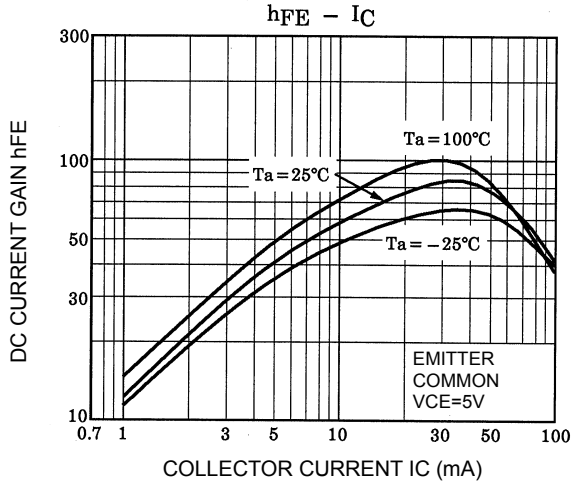
$I_C - V_{I\,(ON)}$



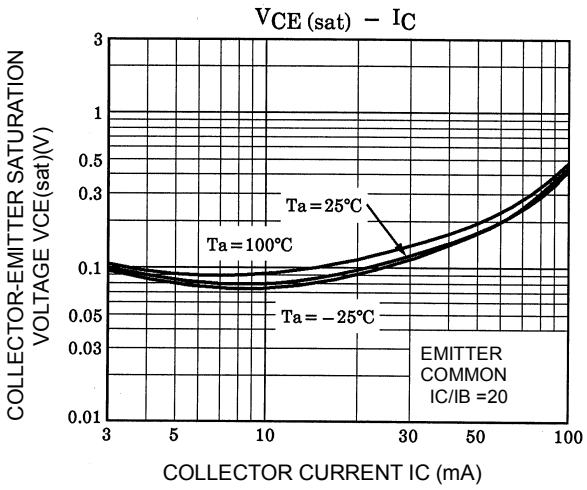
$I_C - V_{I\,(OFF)}$



$h_{FE} - I_C$



$V_{CE\,(sat)} - I_C$



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Q1, Q2 common

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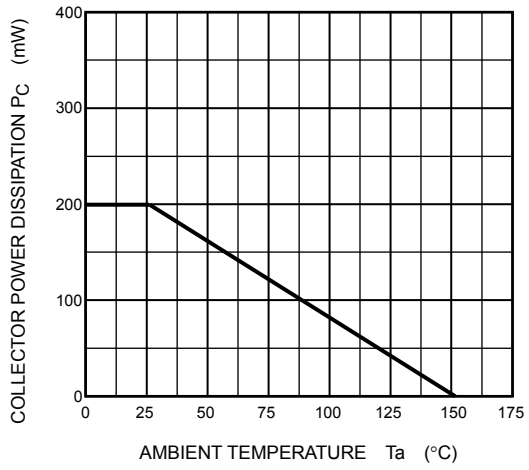
P_C* – Ta



*:Total rating

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