TOSHIBA Multichip Discrete Device

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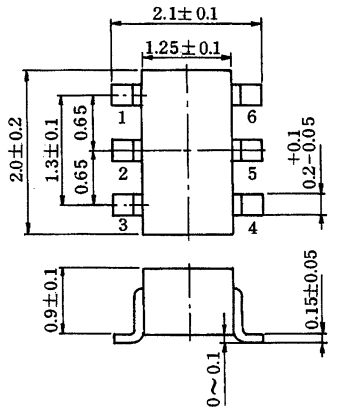
HN7G03FU

Power Management Switch Applications
Driver Circuit Applications
Interface Circuit Applications

Q1 (transistor) : 2SA1955 equivalent

Q2 (S-MOS) : SSM3K04FU equivalent

Unit: mm



1.EMITTER
2.BASE
3.DRAIN
4.SOURCE
5.GATE
6.COLLECTOR

US6	
JEDEC	—
JEITA	—
TOSHIBA	2-2J1E

Weight: 6.8 mg (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	−400	mA
Base current	I_B	−50	mA

Q2 Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GSS}	10	V
Drain current	I_D	100	mA

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

Characteristic	Symbol	Rating	Unit
Power dissipation	P*	200	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.

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Q1 Electrical Characteristics (Ta = 25°C)

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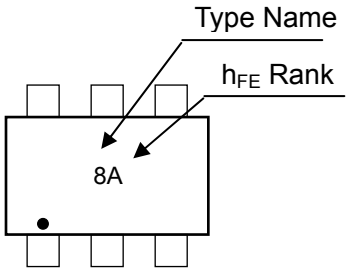
Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	I_{CBO}	—	V_{CB} = −15 V, I_E = 0	—	—	−0.1	μA
Emitter cutoff current	I_{EBO}	—	V_{EB} = −5 V, I_C = 0	—	—	−0.1	μA
DC current gain	h_{FE} (Note 1)	—	V_{CE} = −2 V, I_C = −10 mA	300	—	1000	
Collector-emitter saturation 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

Note 1: h_{FE} classification A: 300~600, B: 500~1000

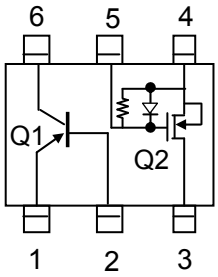
Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	—	V_{GS} = 10 V, V_{DS} = 0	—	—	15	μA
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	—	I_D = 100 μA, V_{GS} = 0	20	—	—	V
Drain current	I_{DSS}	—	V_{DS} = 20 V, V_{GS} = 0	—	—	1	μA
Gate threshold voltage	V_{th}	—	V_{DS} = 3 V, I_D = 0.1 mA	0.7	—	1.3	V
Forward transfer admittance	$\lvert Y_{fs} \rvert$	—	V_{DS} = 3 V, I_D = 10 mA	25	50	—	mS
Drain-source ON-resistance	$R_{DS(ON)}$	—	I_D = 10 mA, V_{GS} = 2.5 V	—	4	12	Ω
Gate-source ON-resistance	R_{GS}	—	V_{GS} = 0 ~ 10 V	0.7	1.0	1.3	MΩ

Marking



Equivalent Circuit (Top View)



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Q1

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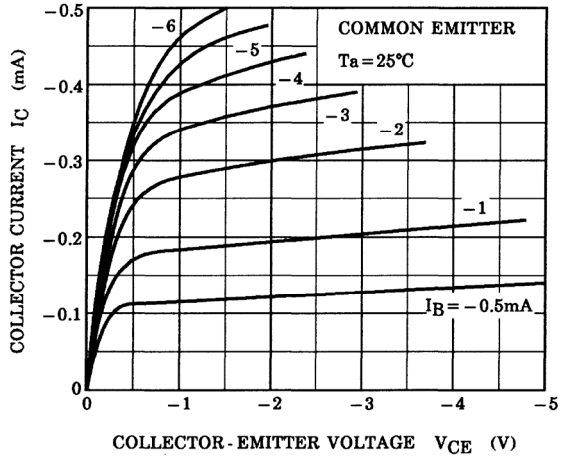
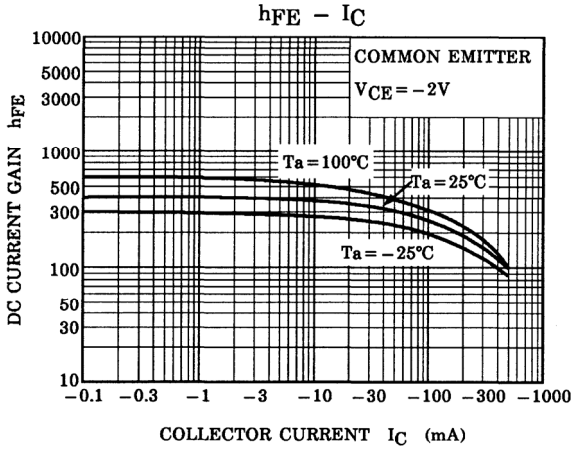
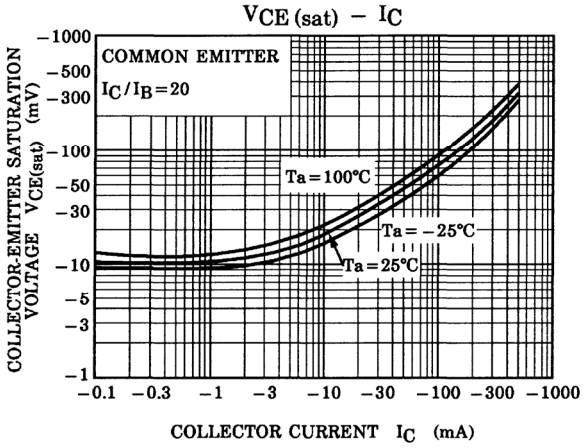
$I_C - V_{CE}$



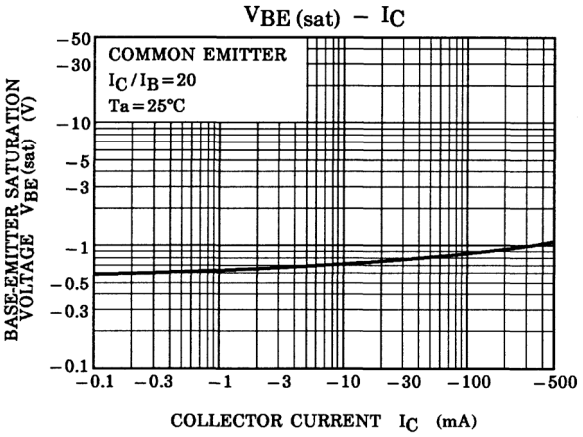
$h_{FE} - I_C$



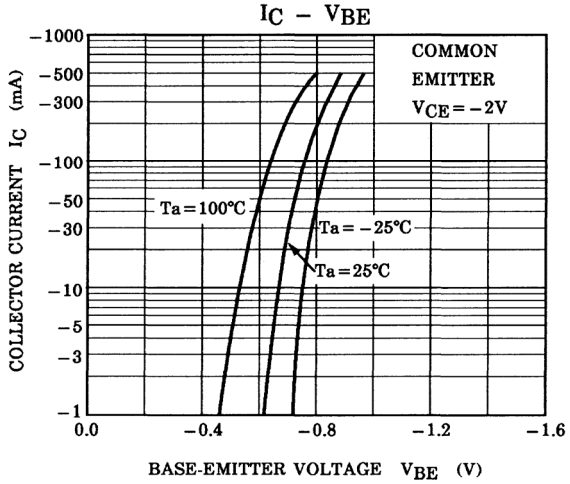
$V_{CE\,(sat)} - I_C$



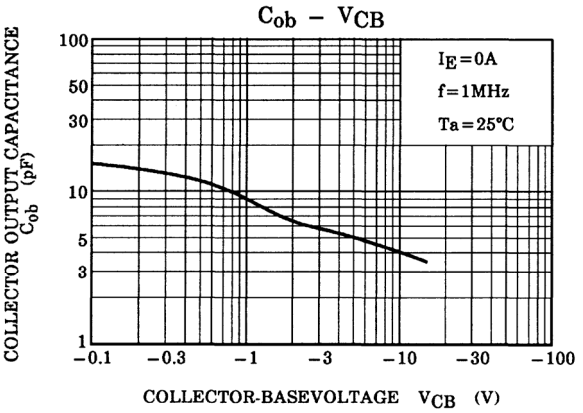
$V_{BE\,(sat)} - I_C$



$I_C - V_{BE}$



$C_{ob} - V_{CB}$



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Q2

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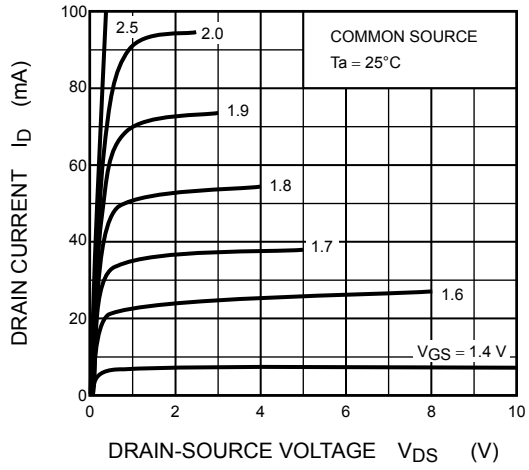
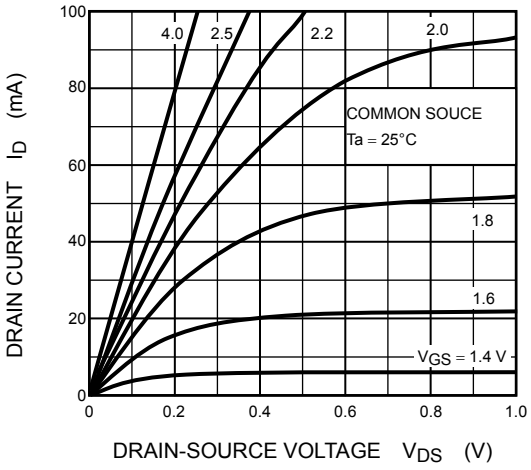
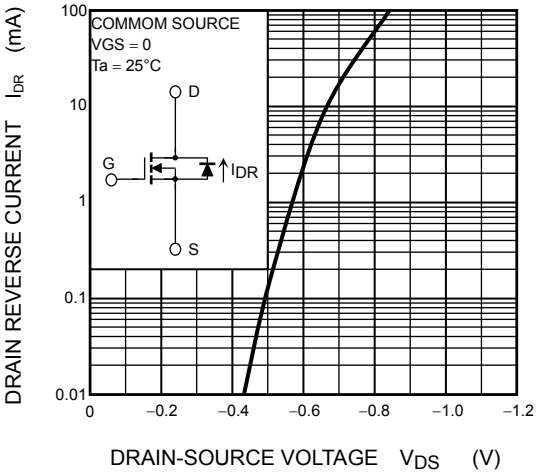
$I_D - V_{DS}$



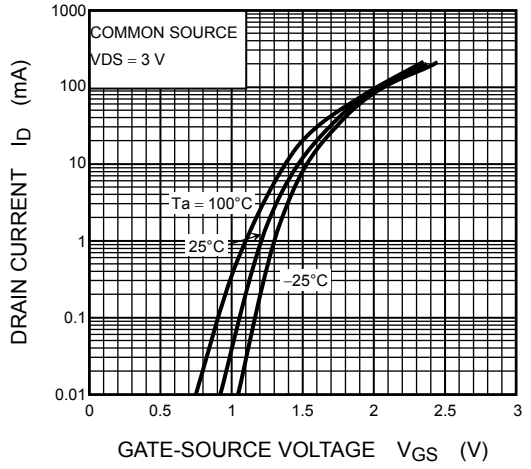
$I_D - V_{DS}$ (LOW-VOLTAGE REGION)



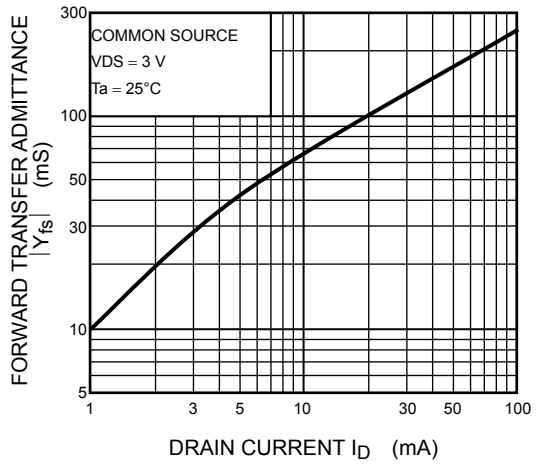
$I_{DR} - V_{DS}$



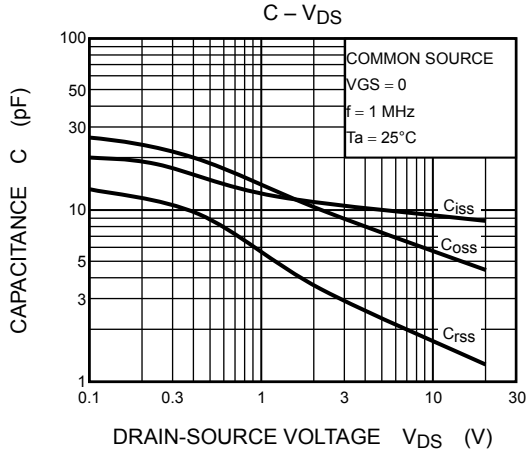
$I_D - V_{GS}$



$|Y_{fs}| - I_D$



$C - V_{DS}$



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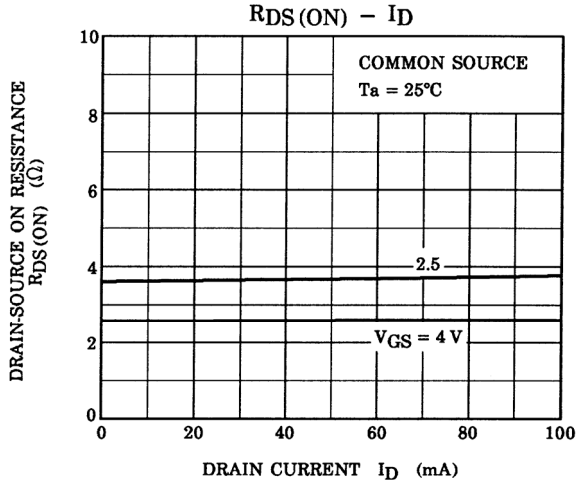
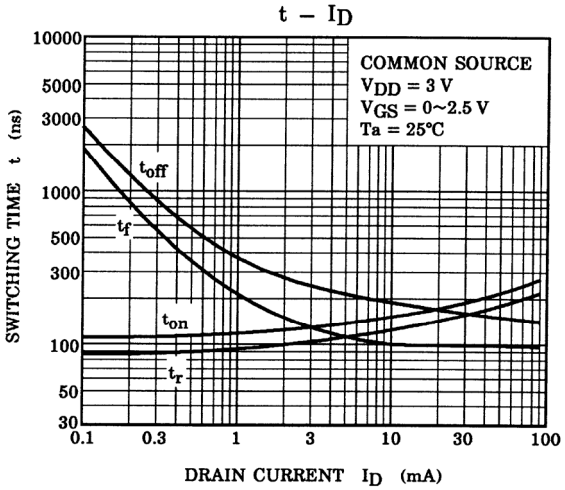
Q2

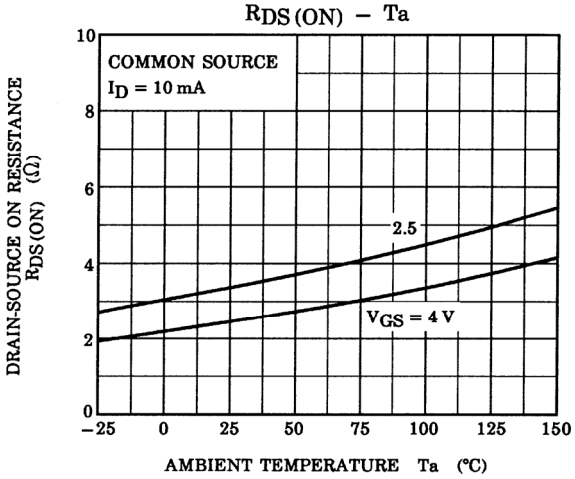
$R_{DS(ON)}$ – I_D



t – I_D



$R_{DS(ON)}$ – Ta



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Q1, Q2 common

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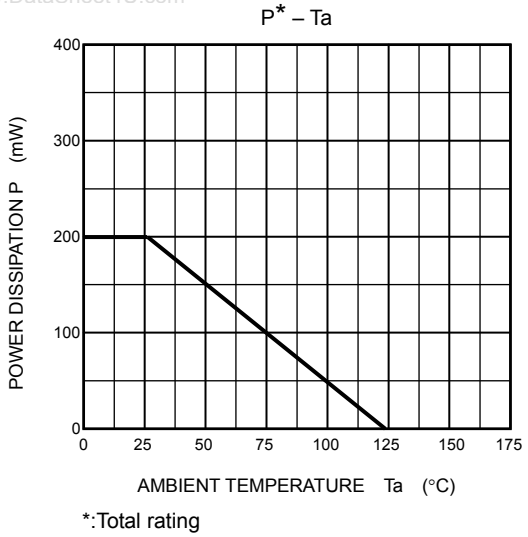

*:Total rating

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