

Preliminary

TOSHIBA Multi Chip Discrete Device

HN7G01FU

Power Management Switch Application

Driver Circuit Application

Interface Circuit Application

- Q1 (transistor): 2SA1955 equivalent
- Q2 (MOS-FET): 2SK1830 equivalent

Q1 (transistor) Absolute Maximum Ratings (Ta = 25°C)

| Characteristics | 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 (MOS-FET) Absolute Maximum Ratings (Ta = 25°C)

| Characteristics | Symbol | Rating | Unit |
|----------------------|------------------|--------|------|
| Drain-source voltage | V _{DS} | 20 | V |
| Gate-source voltage | V _{GSS} | 10 | V |
| Drain current | I _D | 50 | mA |

Q1, Q2 Common Ratings (Ta = 25°C)

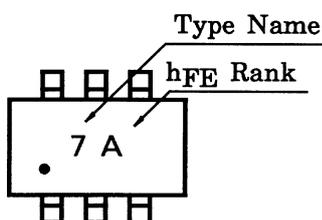
| Characteristics | Symbol | Rating | Unit |
|---------------------------|----------------------------|---------|------|
| Power dissipation | P _C (Note 1) | 200 | mW |
| Junction temperature | T _j | 125 | °C |
| Storage temperature range | T _{stg} | -55~150 | °C |

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.

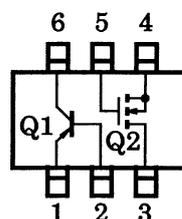
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total rating

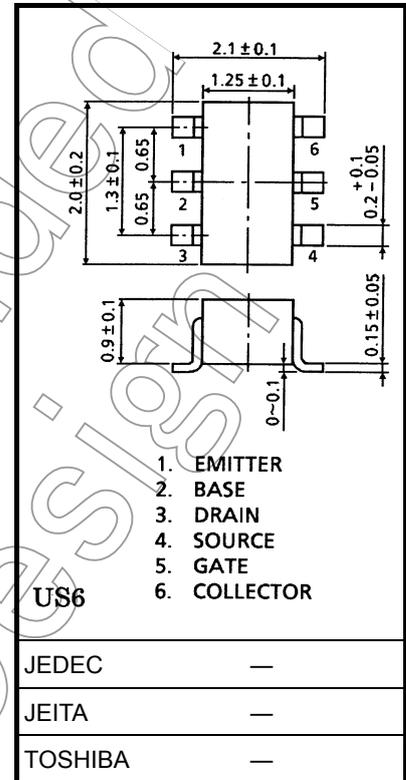
Marking



Pin Assignment (top view)



Unit: mm



Weight: 6.8 mg (typ.)

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

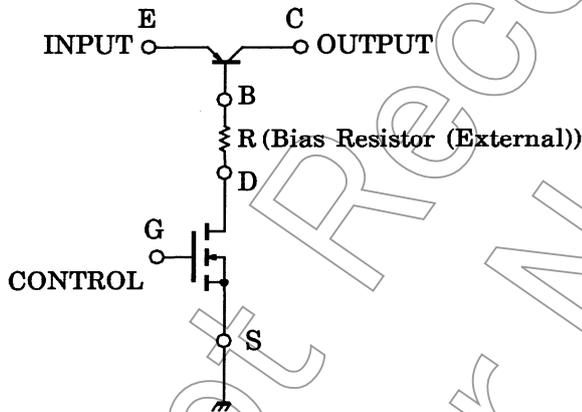
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|----------------------|---|-----|-------|------|---------------|
| Collector cut-off current | I_{CBO} | $V_{CB} = -15\text{ V}, I_E = 0$ | — | — | -0.1 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = -5\text{ V}, I_C = 0$ | — | — | -0.1 | mA |
| DC current gain | h_{FE} (Note 2) | $V_{CE} = -2\text{ V}, I_C = -10\text{ mA}$ | 300 | — | 1000 | |
| Collector-emitter saturation voltage | $V_{CE(sat)}(1)$ | $I_C = -10\text{ mA}, I_B = -0.5\text{ mA}$ | — | -15 | -30 | mV |
| | $V_{CE(sat)}(2)$ | $I_C = -200\text{ mA}, I_B = -10\text{ mA}$ | — | -110 | -250 | |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C = -200\text{ mA}, I_B = -10\text{ mA}$ | — | -0.87 | -1.2 | V |

Note 2: h_{FE} classification A: 300~600, B: 500~1000

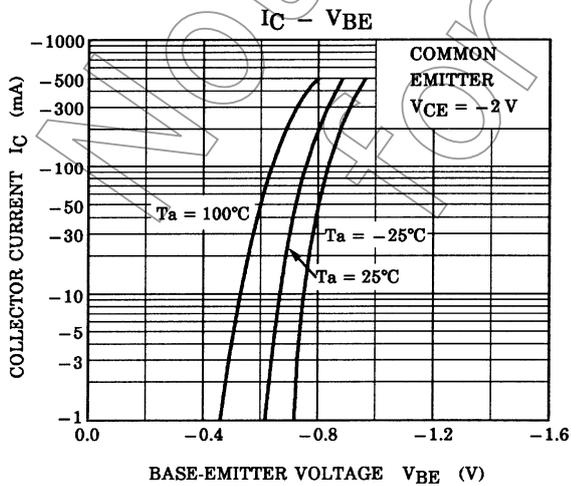
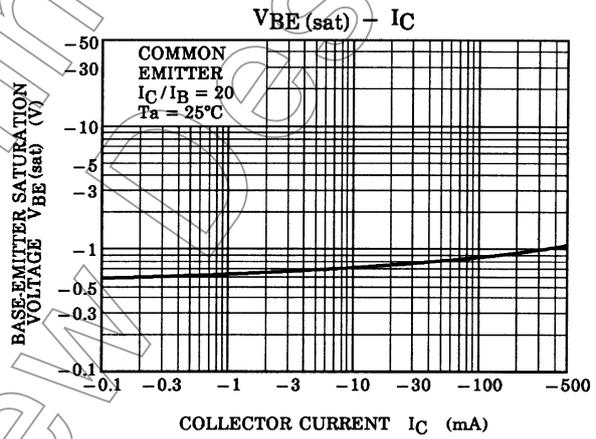
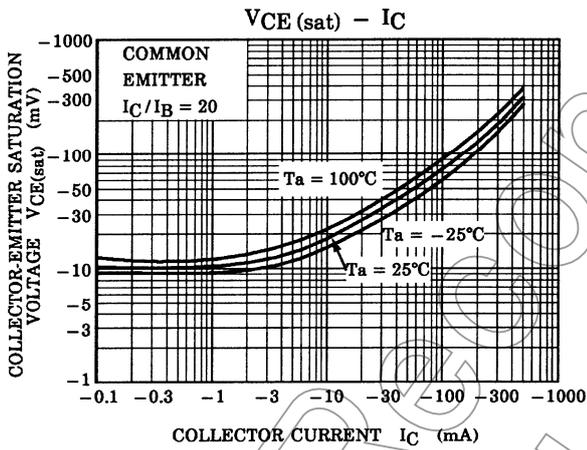
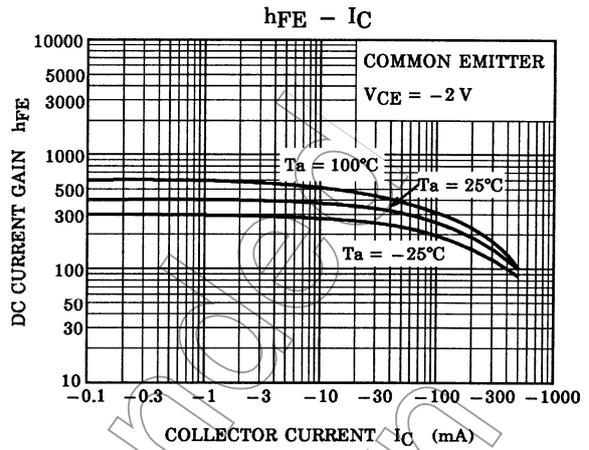
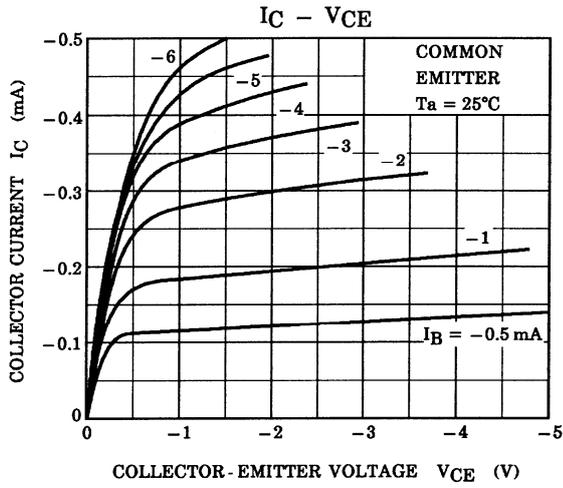
Q2 (MOS-FET) Electrical Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------|---------------|---|-----|------|-----|---------------|
| Gate leakage current | I_{GSS} | $V_{GS} = 10\text{ V}, V_{DS} = 0$ | — | — | 1 | μA |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 100\ \mu\text{A}, V_{GS} = 0$ | 20 | — | — | V |
| Drain current | I_{DSS} | $V_{DS} = 20\text{ V}, V_{GS} = 0$ | — | — | 1 | μA |
| Gate threshold voltage | V_{th} | $V_{DS} = 3\text{ V}, I_D = 0.1\text{ mA}$ | 0.5 | — | 1.5 | V |
| Forward transfer admittance | $ Y_{fs} $ | $V_{DS} = 3\text{ V}, I_D = 10\text{ mA}$ | 20 | — | — | mS |
| Drain-source ON resistance | $R_{DS(ON)}$ | $I_D = 10\text{ mA}, V_{GS} = 2.5\text{ V}$ | — | 20 | 40 | Ω |

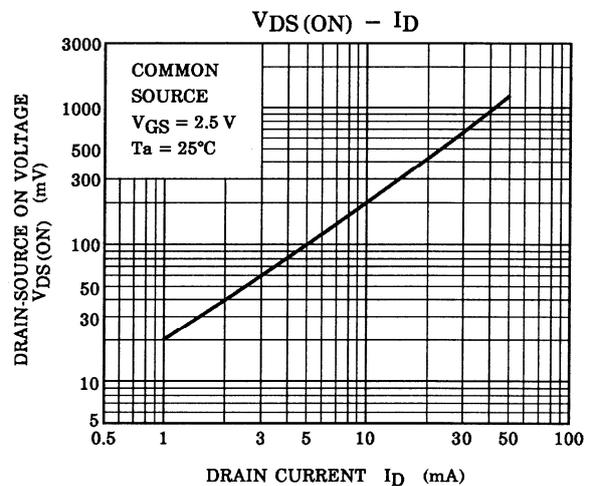
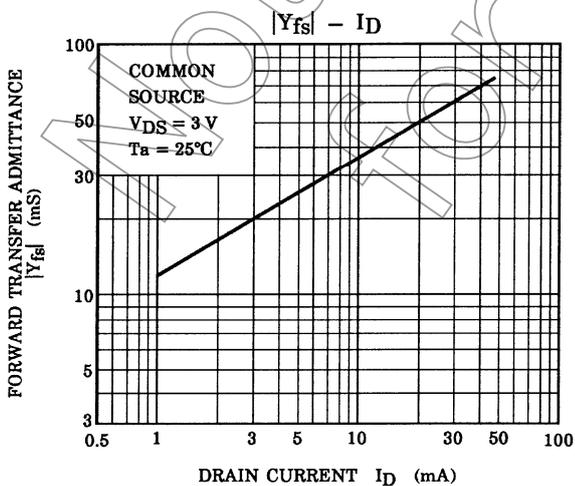
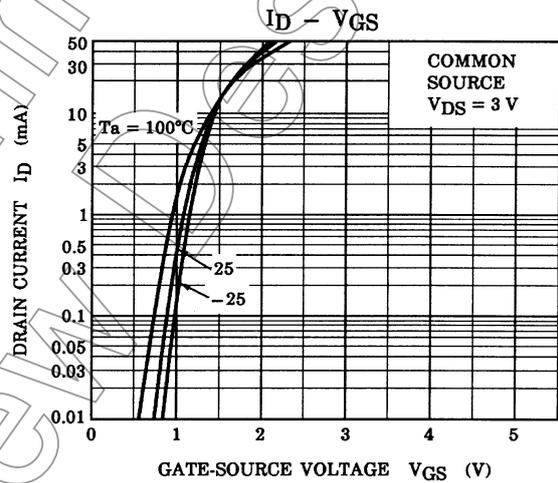
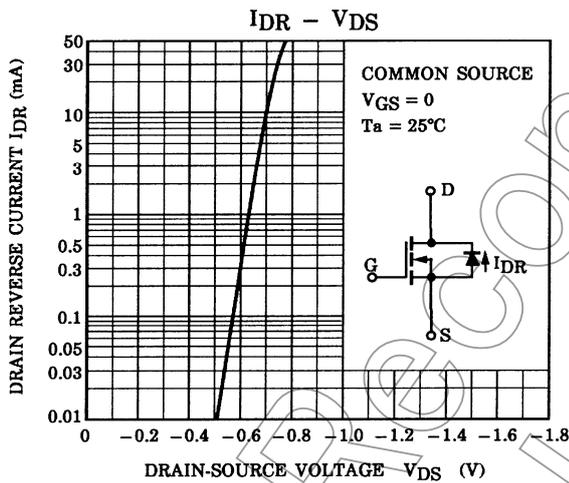
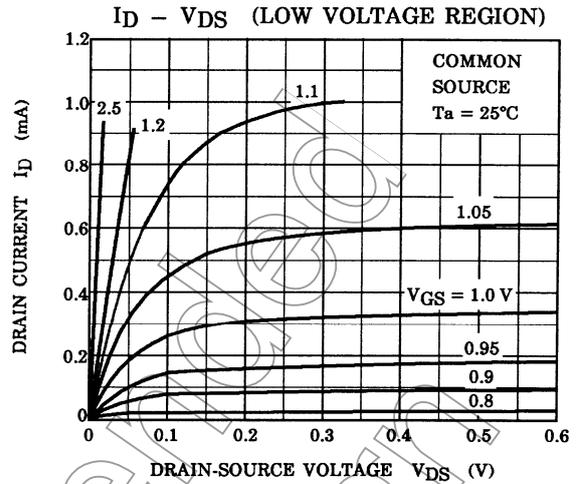
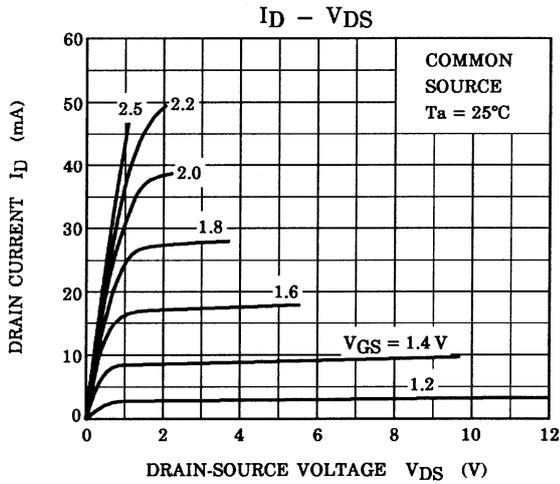
Application Example (power management switch)



Transistor



MOS-FET



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