# General purpose transistor (isolated transistor and diode)

## UML6N

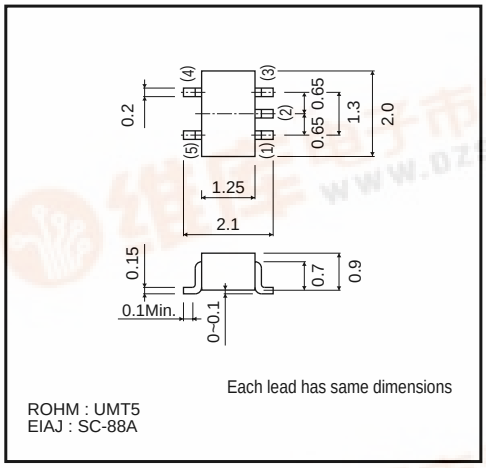
2SA2018 and RB521S-30 are housed independently in a UMT package.

**●Applications**
DC / DC converter
Motor driver

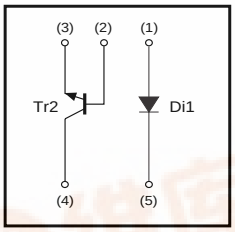
**●Features**
1) Tr : Low $V_{CE(sat)}$
Di : Low $V_F$
2) Small package

**●Structure**
Silicon epitaxial planar transistor
Schottky barrier diode

**●External dimensions** (Unit : mm)




**●Equivalent circuit**




**●Packaging specifications**

| Type | UML6N |
|---|---|
| Package | UMT5 |
| Marking | L6 |
| Code | TR |
| Basic ordering unit (pieces) | 3000 |

●**Absolute maximum ratings** (Ta=25°C)

Di1

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Average revtified forward current | $I_O$ | 200 | mA |
| Forward current surge peak (60Hz, 1∞) | $I_{FSM}$ | 1 | A |
| Reverse voltage (DC) | $V_R$ | 30 | V |
| Junction temperature | Tj | 125 | °C |
| Range of storage temperature | Tstg | –55~+125 | °C |

Tr2

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Collector-base voltage | $V_{CBO}$ | 15 | V |
| Collector-emitter voltage | $V_{CEO}$ | 12 | V |
| Emitter-base voltage | $V_{EBO}$ | 6 | V |
| Collector current | $I_C$ | 500 | mA |
| | $I_{CP}$ | 1 | A |
| Power dissipation | $P_d$ | 120 | mW *1 |
| Junction temperature | Tj | 150 | °C |
| Range of storage temperature | Tstg | –55~+125 | °C |

*1 Each terminal mounted on a recommended land.

●**Electrical characteristics** (Ta=25°C)

Di1

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Forward voltage | $V_R$ | – | 0.40 | 0.50 | V | $I_F$=200mA |
| Reverse current | $I_R$ | – | 4.0 | 30 | µA | $V_R$=10V |

Tr2

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Collector-emitter breakdown voltage | $BV_{CEO}$ | 12 | – | – | V | $I_C$=1mA |
| Collector-base breakdown voltage | $BV_{CBO}$ | 15 | – | – | V | $I_C$=10µA |
| Emitter-base breakdown voltage | $BV_{EBO}$ | 6 | – | – | V | $I_E$=10µA |
| Collector cut-off current | $I_{CBO}$ | – | – | 100 | nA | $V_{CB}$=15V |
| Emitter cut-off current | $I_{EBO}$ | – | – | 100 | nA | $V_{EB}$=6V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | – | 90 | 250 | mV | $I_C$=200mA, $I_B$=10mA |
| DC current gain | $h_{FE}$ | 270 | – | 680 | – | $V_{CE}$=2V, $I_C$=10mA |
| Transition frequency | $f_T$ | – | 320 | – | MHz | $V_{CE}$=2V, $I_E$=–10mA, f=100MHz |
| Collector output capacitance | Cob | – | 7.5 | – | pF | $V_{CB}$=10V, $I_E$=0mA, f=1MHz |

●**Electrical characteristic curves**

Di1

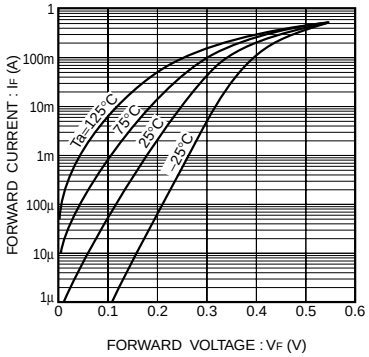



Fig.1 Forward characteristics

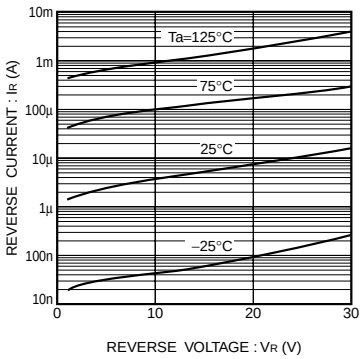



Fig.2 Reverse characteristics

Tr2

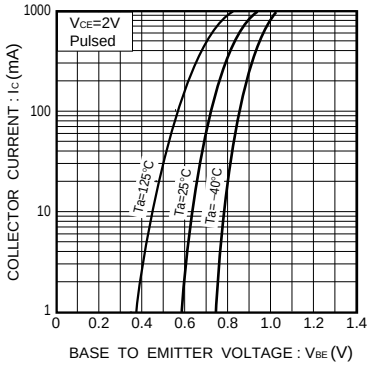



Fig.3 Grounded emitter propagation characteristics

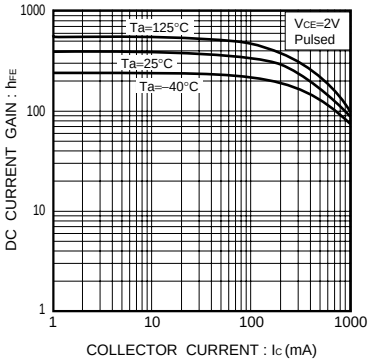



Fig.4 DC current gain vs. collector current

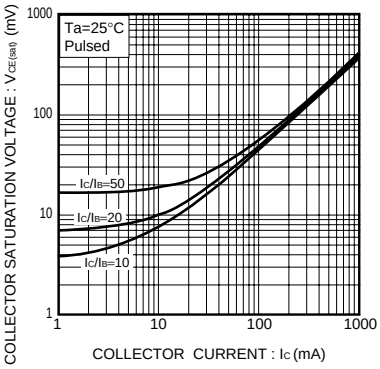



Fig.5 Collector-emitter saturation voltage vs. collector current ( I )

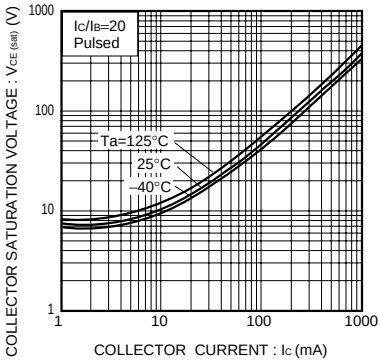



Fig.6 Collector-emitter saturation voltage vs. collector current ( II )

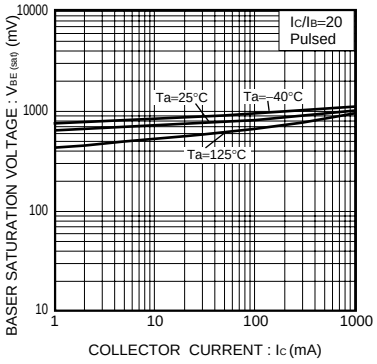



Fig.7 Base-emitter saturation voltage vs. collector current

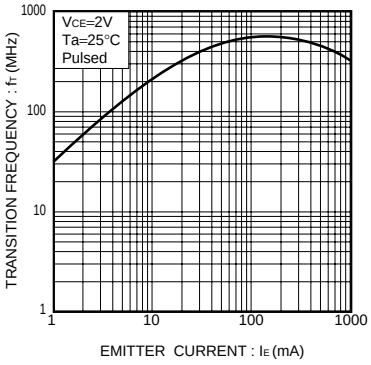



Fig.8 Gain bandwidth product vs. emitter current

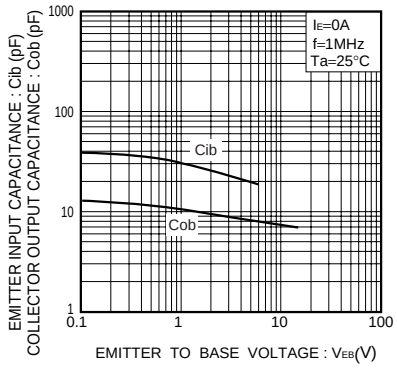



Fig.9 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

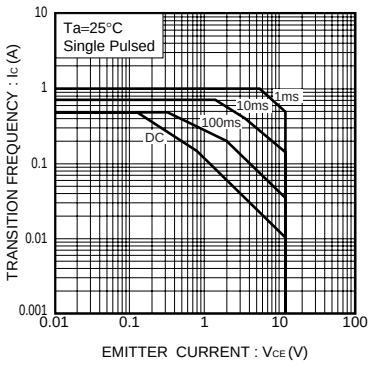



Fig.10 Safe operation area

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