# General purpose transistor (isolated transistor and diode)

## US5L11

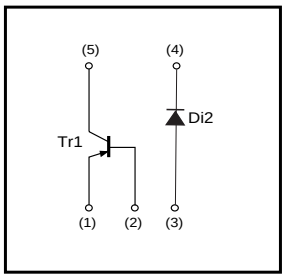
A 2SB1710 and a RB461F are housed independently in a TUMT5 package.

### ●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

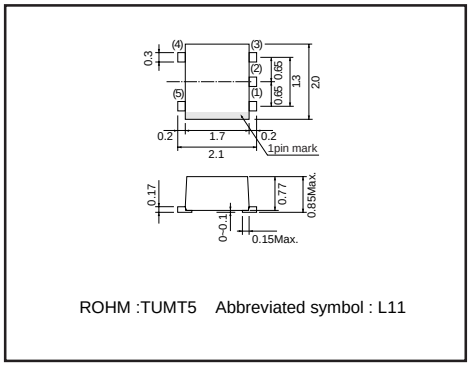
### ●Equivalent circuit




### ●Packaging specifications

| Type | US5L11 |
|---|---|
| Package | TUMT5 |
| Marking | L11 |
| Code | TR |
| Basic ordering unit(pieces) | 3000 |

### ●External dimensions (Unit : mm)




ROHM :TUMT5 Abbreviated symbol : L11

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

Tr1

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Collector-base voltage | $V_{CBO}$ | –30 | V |
| Collector-emitter voltage | $V_{CEO}$ | –30 | V |
| Emitter-base voltage | $V_{EBO}$ | –6 | V |
| Collector current | $I_C$ | –1 | A |
| | $I_{CP}$ | –2 | A ∗1 |
| Power dissipation | Pc | 0.7 | W/ELEMENT ∗2 |
| Junction temperature | Tj | 150 | °C |
| Range of storage temperature | Tstg | –40 to +125 | °C |

∗1 Single pulse, Pw=1ms.
∗2 Mounted on a 25mm×25mm×t0.8mm ceramic substrate

Di2

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Peak reverse voltage | $V_{RM}$ | 25 | V |
| Reverse voltage (DC) | $V_R$ | 20 | V |
| Average rectified forward current | $I_F$ | 700 | mA |
| Forward current surge peak (60Hz, 1∞) | $I_{FSM}$ | 3 | A |
| Power dissipation | $P_D$ | 0.5 | W/ELEMENT ∗ |
| Junction temperature | Tj | 125 | °C |
| Range of storage temperature | Tstg | –40 to +125 | °C |

∗ Mounted on a 25mm×25mm×t0.8mm ceramic substrate

Tr1& Di2

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Total power dissipation | $P_D$ | 0.4 | W/TOTAL ∗1 |
| | | 1.0 | W/TOTAL ∗2 |

∗1 Each terminal mounted on a recommended land
∗2 Mounted on a 25mm×25mm×t0.8mm ceramic substrate

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

Tr1

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | $BV_{CBO}$ | –30 | – | – | V | $I_C$=–10μA |
| Collector-emitter breakdown voltage | $BV_{CEO}$ | –30 | – | – | V | $I_C$=–1mA |
| Emitter-base breakdown voltage | $BV_{EBO}$ | –6 | – | – | V | $I_E$=–10μA |
| Collector cutoff current | $I_{CBO}$ | – | – | –100 | nA | $V_{CB}$=–30V |
| Emitter cutoff current | $I_{EBO}$ | – | – | –100 | nA | $V_{EB}$=–6V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | – | –150 | –350 | mV | $I_C$=–500mA, $I_B$=–25mA |
| DC current gain | $h_{FE}$ | 270 | – | 680 | – | $V_{CE}$=–2V, $I_C$=–100mA ∗ |
| Transition frequency | $f_T$ | – | 320 | – | MHz | $V_{CE}$=–2V, $I_E$=100mA, f=100MHz ∗ |
| Collector output capacitance | Cob | – | 7 | – | pF | $V_{CB}$=–10V, $I_E$=0A, f=1MHz |

∗ Pulsed

Di2

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Forward voltage | $V_F$ | – | 450 | 490 | mV | $I_F$=700mA |
| Reverse current | $I_R$ | – | – | 200 | μA | $V_R$=20V |
| Reverse recovery time | trr | – | 9 | – | ns | $I_F$=$I_R$=100mA, Irr=0.1$I_R$ |

## ●Electrical characteristic curves

Tr1

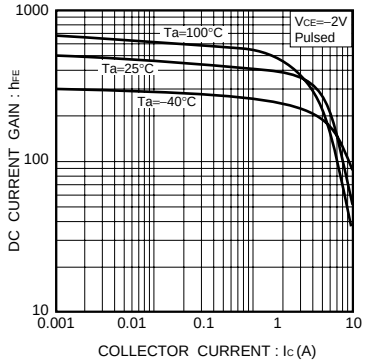



Fig.1 DC current gain vs. collector current

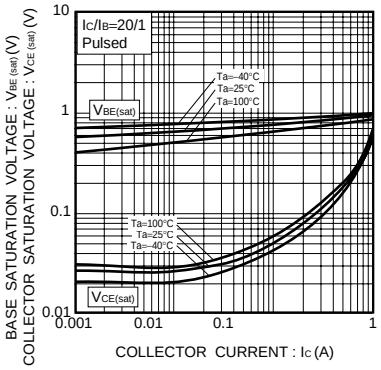



Fig.2 Collector-emitter saturation voltage base-emitter saturation voltage vs. collector current

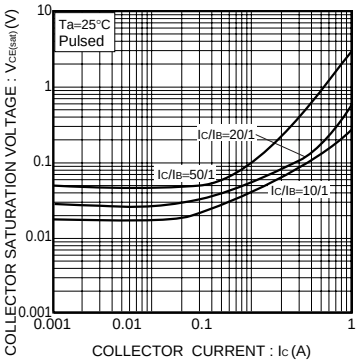



Fig.3 Collector-emitter saturation voltage vs. collector current

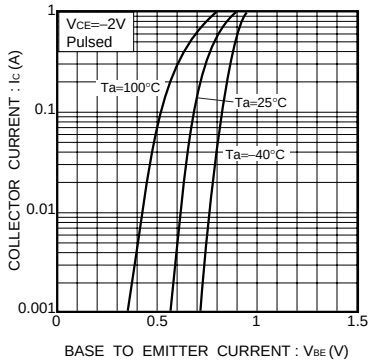



Fig.4 Grounded emitter propagation characteristics

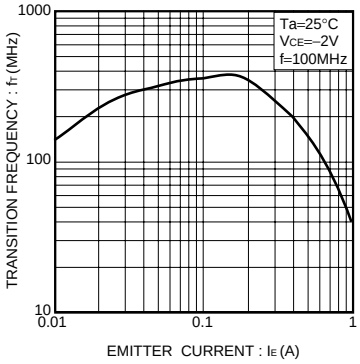



Fig.5 Gain bandwidth product vs. emitter current

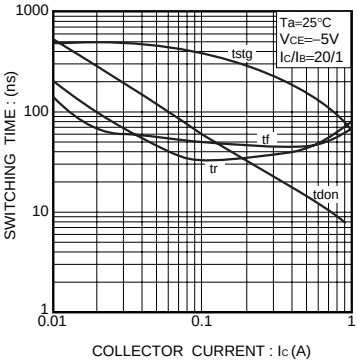



Fig.6 Switching time

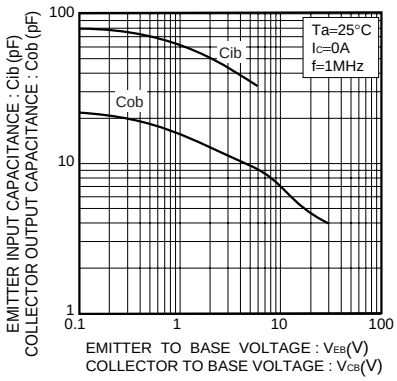



Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

Di2

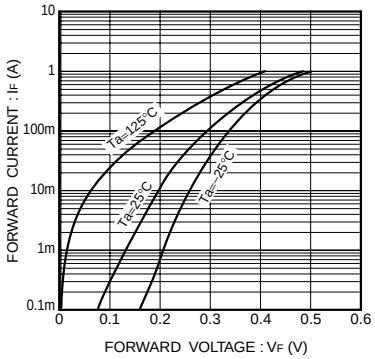



Fig.9 Forward characteristics

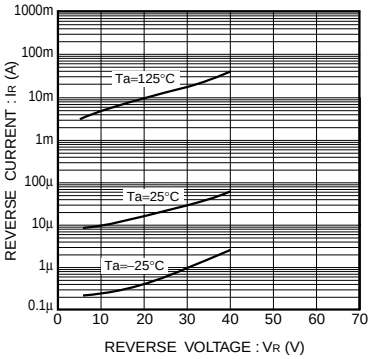



Fig.10 Reverse characteristics

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