

# General purpose transistor (isolated transistor and diode)

## FML10

2SD2652 and a RB461F are housed independently in a UMT package.

### ●Applications

DC / DC converter  
Motor driver

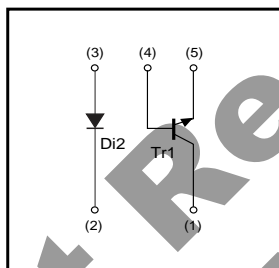
### ●Features

- 1) Tr1: Low  $V_{CE(sat)}$   
Di: Low  $V_F$
- 2) Small package

### ●Structure

Silicon epitaxial planar transistor  
Schottky barrier diode

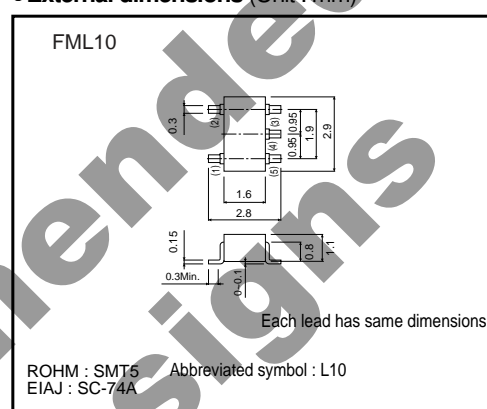
### ●Equivalent circuit



### ●Packaging specifications

| Type                        | FML10 |
|-----------------------------|-------|
| Package                     | SMT5  |
| Marking                     | L10   |
| Code                        | TR    |
| Basic ordering unit(pieces) | 3000  |

### ●External dimensions (Unit : mm)



## Transistors

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

Tr1

| Parameter                    | Symbol           | Limits      | Unit |
|------------------------------|------------------|-------------|------|
| Collector-base voltage       | V <sub>CB0</sub> | 15          | V    |
| Collector-emitter voltage    | V <sub>CE0</sub> | 12          | V    |
| Emitter-base voltage         | V <sub>EB0</sub> | 6           | V    |
| Collector current            | I <sub>C</sub>   | 1.5         | A    |
|                              | I <sub>CP</sub>  | 3           | A *  |
| Power dissipation            | P <sub>C</sub>   | 200         | mW   |
| Junction temperature         | T <sub>J</sub>   | 150         | °C   |
| Range of storage temperature | T <sub>stg</sub> | -40 to +125 | °C   |

\*Single pulse, P<sub>w</sub>=1ms

Di2

| Parameter                             | Symbol           | Limits      | Unit |
|---------------------------------------|------------------|-------------|------|
| Peak reverse voltage                  | V <sub>RM</sub>  | 25          | V    |
| Average rectified forward current     | I <sub>F</sub>   | 700         | mA   |
| Forward current surge peak (60Hz, 1∞) | I <sub>FSM</sub> | 3           | A    |
| Reverse voltage (DC)                  | V <sub>R</sub>   | 20          | V    |
| Junction temperature                  | T <sub>J</sub>   | 125         | °C   |
| Range of storage temperature          | T <sub>stg</sub> | -40 to +125 | °C   |

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

Tr1

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions  |
|--------------------------------------|----------------------|------|------|------|------|---|
| Collector-base breakdown voltage     | BV <sub>CB0</sub>    | 15   | -    | -    | V    | I <sub>C</sub> =10μA                                    |
| Collector-emitter breakdown voltage  | BV <sub>CE0</sub>    | 12   | -    | -    | V    | I <sub>C</sub> =1mA                                     |
| Emitter-base breakdown voltage       | BV <sub>EB0</sub>    | 6    | -    | -    | V    | I <sub>E</sub> =10μA                                    |
| Collector cutoff current             | I <sub>CBO</sub>     | -    | -    | 100  | nA   | V <sub>CB</sub> =15V                                    |
| Emitter cutoff current               | I <sub>EBO</sub>     | -    | -    | 100  | nA   | V <sub>EB</sub> =6V                                     |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | -    | 85   | 200  | mV   | I <sub>C</sub> /I <sub>B</sub> =500mA/25mA              |
| DC current gain                      | h <sub>FE</sub>      | 270  | -    | 680  | -    | V <sub>CE</sub> /I <sub>C</sub> =2V/200mA *             |
| Transition frequency                 | f <sub>r</sub>       | -    | 400  | -    | MHz  | V <sub>CE</sub> =2V, I <sub>E</sub> =-200mA, f=100MHz * |
| Collector output capacitance         | C <sub>ob</sub>      | -    | 12   | -    | pF   | V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz        |

\*Pulsed

Di2

| Parameter       | Symbol         | Min. | Typ. | Max. | Unit | Conditions            |
|-----------------|----------------|------|------|------|------|-----------------------|
| Forward voltage | V <sub>F</sub> | -    | -    | 490  | mV   | I <sub>F</sub> =700mA |
| Reverse current | I <sub>R</sub> | -    | -    | 200  | μA   | V <sub>R</sub> =20V   |

Transistors

●Electrical characteristic curves

Tr1

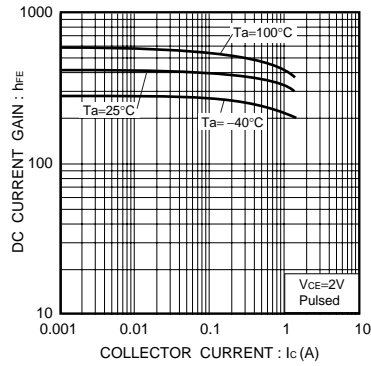


Fig.1 DC current gain vs. collector current

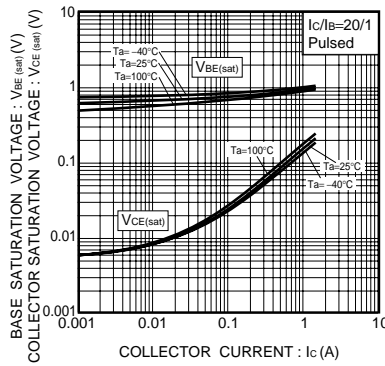


Fig.2 Collector-emitter saturation voltage base-emitter saturation voltage vs. collector current

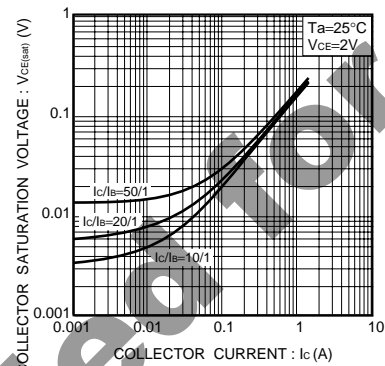


Fig.3 Collector-emitter saturation voltage vs. collector current

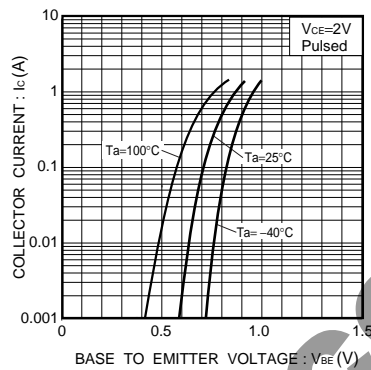


Fig.4 Grounded emitter propagation characteristics

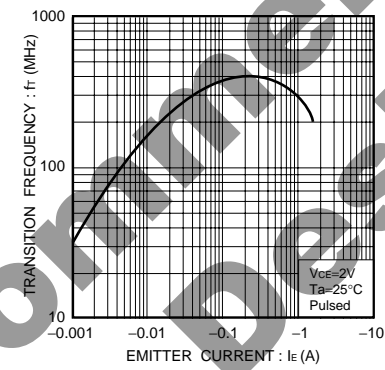


Fig.5 Gain bandwidth product vs. emitter current

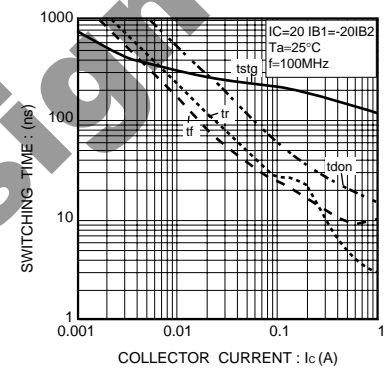


Fig.6 Switching time

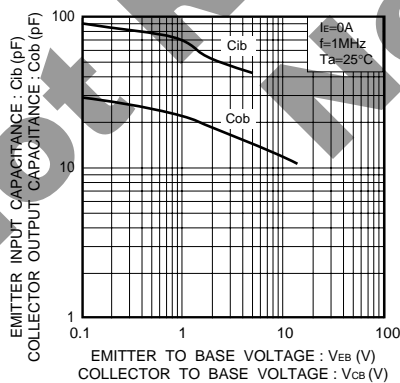


Fig.7 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

Transistors

Di2

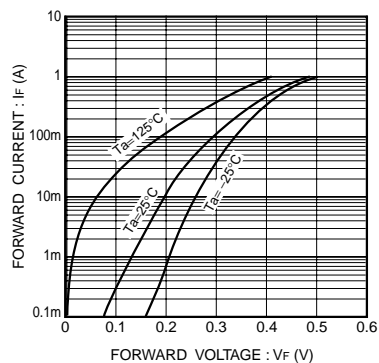


Fig.9 Forward characteristics

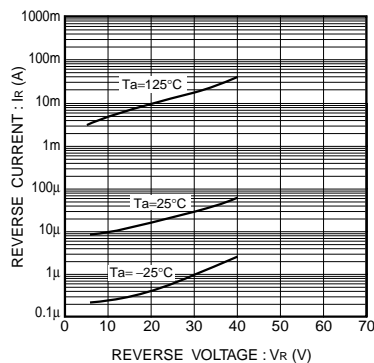


Fig.10 Reverse characteristics

Not Recommended for New Designs

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