

# 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

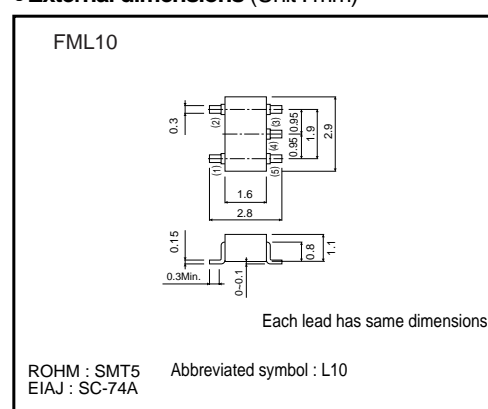
### ●Features

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

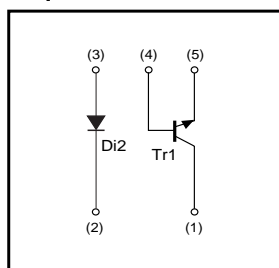
### ●Structure

Silicon epitaxial planar transistor  
Schottky barrier diode

### ●External dimensions (Unit : mm)



### ●Equivalent circuit



### ●Packaging specifications

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

## Transistors

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

Tr1

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CBO</sub>	15	V
Collector-emitter voltage	V <sub>CEO</sub>	12	V
Emitter-base voltage	V <sub>EBO</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>CBO</sub>	15	–	–	V	I <sub>C</sub> =10μA
Collector-emitter breakdown voltage	BV <sub>CEO</sub>	12	–	–	V	I <sub>C</sub> =1mA
Emitter-base breakdown voltage	BV <sub>EBO</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>T</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

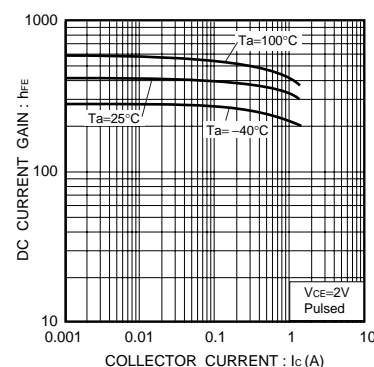


Fig.1 DC current gain vs. collector current

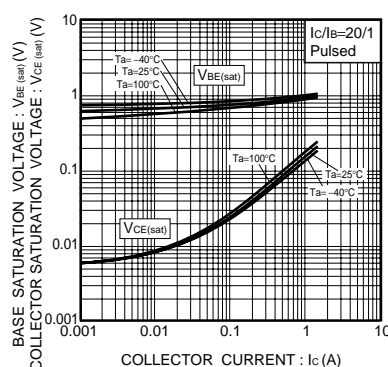


Fig.2 Collector-emitter saturation voltage base-emitter saturation voltage vs. collector current

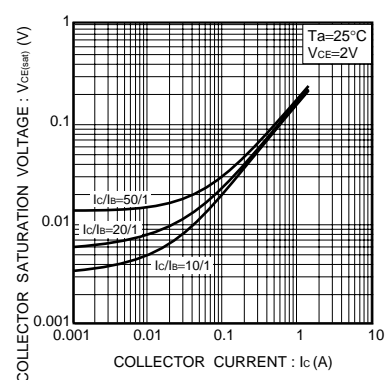


Fig.3 Collector-emitter saturation voltage vs. collector current

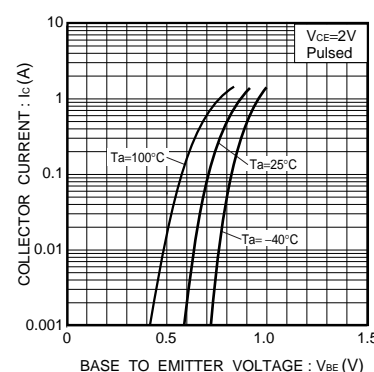


Fig.4 Grounded emitter propagation characteristics

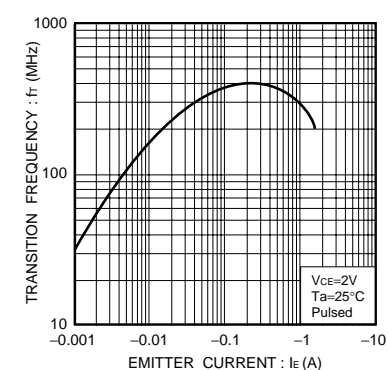


Fig.5 Gain bandwidth product vs. emitter current

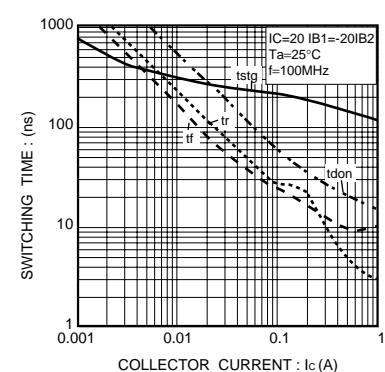
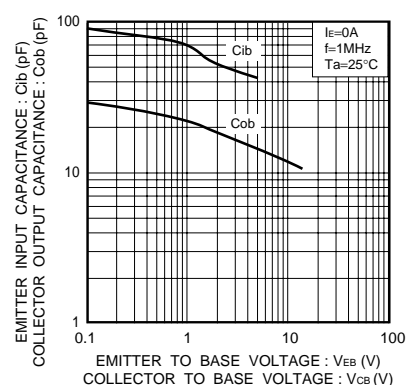


Fig.6 Switching time

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

Transistors

Di2

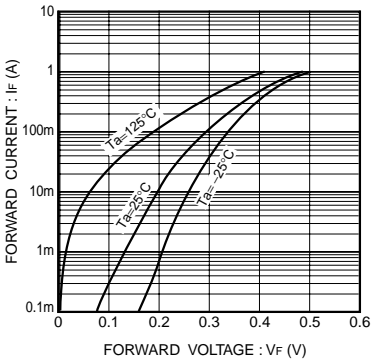


Fig.9 Forward characteristics

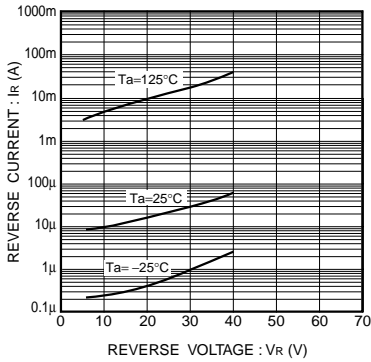


Fig.10 Reverse characteristics

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