

General purpose transistor (isolated transistor and diode)

FML9

A 2SB1689 and a RB461F are housed independently in a UMT package.

●Applications

DC / DC converter
Motor driver

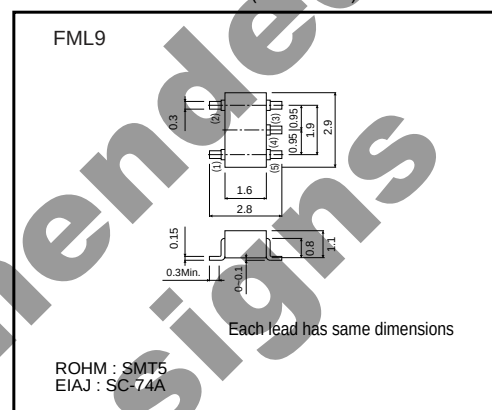
●Features

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

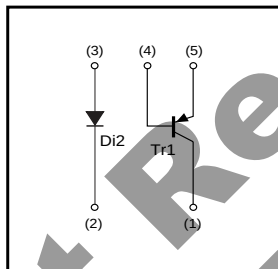
●Structure

Silicon epitaxial planar transistor
Schottky barrier diode

●External dimensions (Unit : mm)



●Equivalent circuit



●Packaging specifications

Type	FML9
Package	SMT5
Marking	L9
Code	TR
Basic ordering unit(pieces)	3000

Transistors

●Absolute maximum ratings (Ta=25°C)

Tr1

Parameter	Symbol	Limits	Unit
Collector-base voltage	V _{CB0}	–15	V
Collector-emitter voltage	V _{CE0}	–12	V
Emitter-base voltage	V _{EB0}	–6	V
Collector current	I _C	–1.5	A
	I _{CP}	–3	A *1
Power dissipation	P _C	200	mW *2
Junction temperature	T _j	150	°C
Range of storage temperature	T _{stg}	–40 to +125	°C

*1 Single pulse, Pw=1ms.

*2 Each terminal mounted on a recommended land.

Di2

Parameter	Symbol	Limits	Unit
Peak reverse voltage	V _{RM}	25	V
Average rectified forward current	I _F	700	mA
Forward current surge peak (60Hz, 1∞)	I _{FSM}	3	A
Reverse voltage (DC)	V _R	20	V
Junction temperature	T _j	125	°C
Range of storage temperature	T _{stg}	–40 to +125	°C

●Electrical characteristics (Ta=25°C)

Tr1

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 _{EB0}	–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)}	–	–110	–200	mV	I _C =–500mA, I _B =–25mA
DC current gain	h _{FE}	270	–	680	–	V _{CE} =–2V, I _C =–200mA
Transition frequency	f _T	–	400	–	MHz	V _{CE} =–2V, I _E =200mA, f=100MHz
Collector output capacitance	C _{ob}	–	12	–	pF	V _{CB} =–10V, I _E =0mA, f=1MHz

Di2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V _F	–	–	490	mV	I _F =700mA
Reverse current	I _R	–	–	200	μA	V _R =20V

Transistors

●Electrical characteristic curves

Tr1

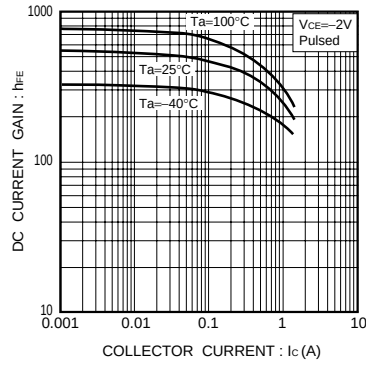


Fig.1 DC current gain vs. collector current

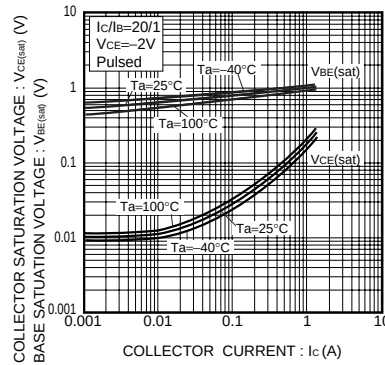


Fig.2 Base-emitter saturation voltage vs. collector current

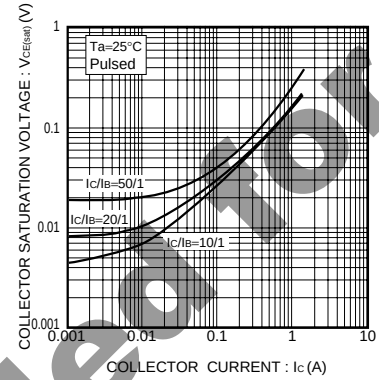


Fig.3 Collector-emitter saturation voltage vs. collector current

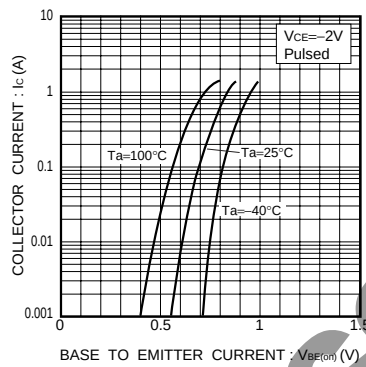


Fig.4 Grounded emitter propagation characteristics

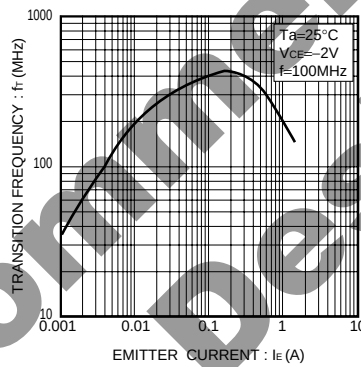


Fig.5 Gain bandwidth product vs. emitter current

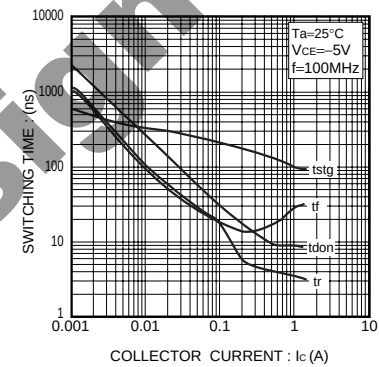


Fig.6 Switching time

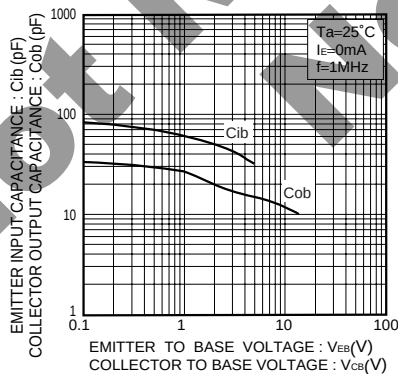
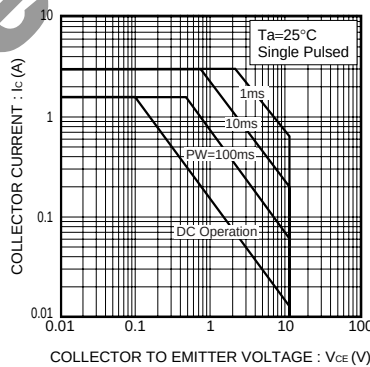
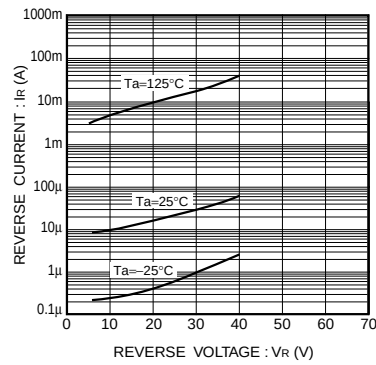
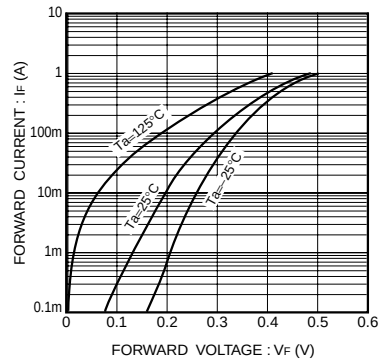
Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

Fig.8 Safe operation area

Transistors

Di2



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