General purpose transistor (isolated transistor and diode)

FML9

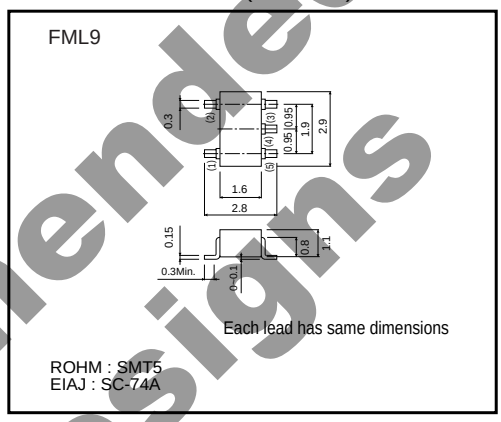
A 2SB1689 and a RB461F are housed independently in a UMT package.

●Applications
DC / DC converter
Motor driver

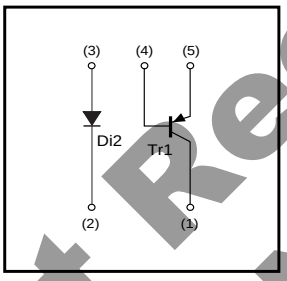
●Features
1) Tr : Low V_{CE}(sat)
Di : Low V_F
2) Small package

●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

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

Tr1

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	–1.5	A
	I_{CP}	–3	A *1
Power dissipation	Pc	200	mW *2
Junction temperature	Tj	150	°C
Range of storage temperature	Tstg	–40 to +125	°C

*1 Single pulse, Pw=1ms.
*2 Each terminal mounted on a recommended land.

Di2

Parameter	Symbol	Limits	Unit
Reak 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	Tj	125	°C
Range of storage temperature	Tstg	–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_{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	$V_{CE(sat)}$	–	–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	Cob	–	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

●**Electrical characteristic curves**

Tr1

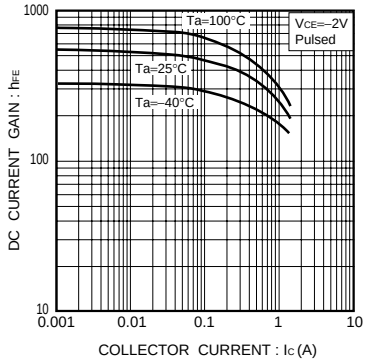


Fig.1 DC current gain vs. collector current

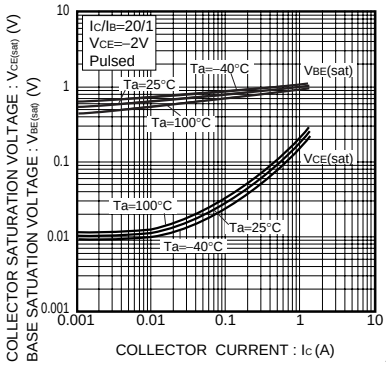


Fig.2 Base-emitter saturation voltage vs. collector current

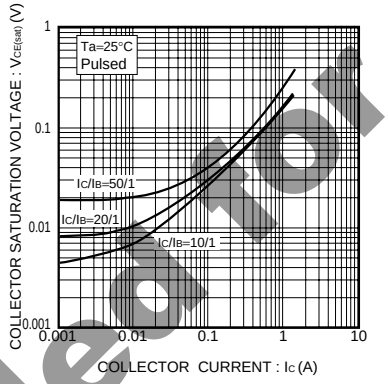


Fig.3 Collector-emitter saturation voltage vs. collector current

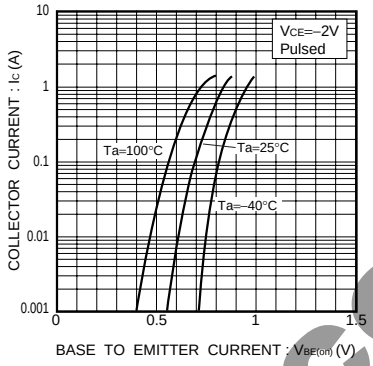


Fig.4 Grounded emitter propagation characteristics

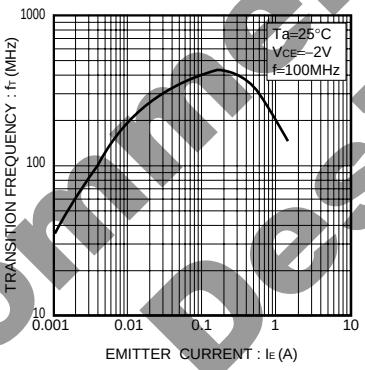


Fig.5 Gain bandwidth product vs. emitter current

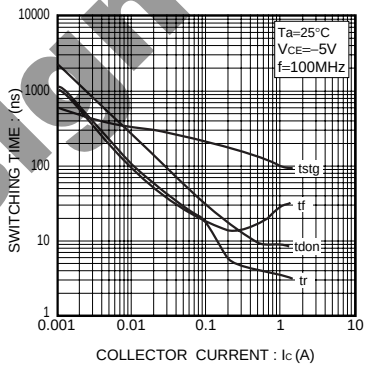


Fig.6 Switching time

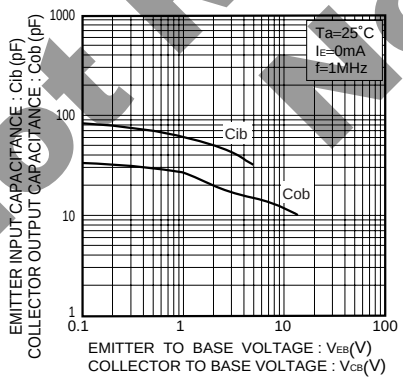


Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

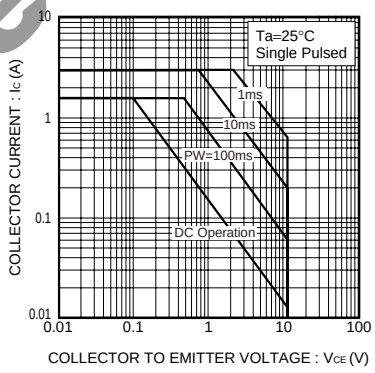


Fig.8 Safe operation area

Di2

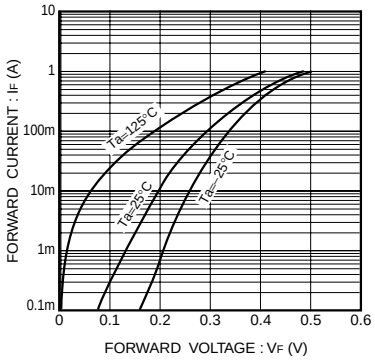


Fig.9 Forward characteristics

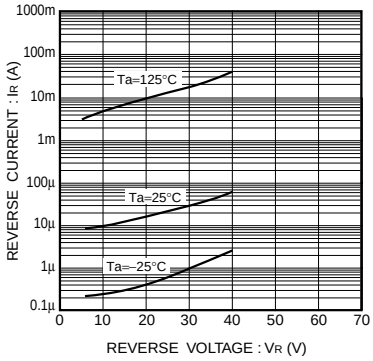


Fig.10 Reverse characteristics

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