

General purpose transistor (isolated transistor and diode)

US5L9

A 2SB1709 and a RB461F are housed independently in a TUMT5 package.

●Applications

DC / DC converter
Motor driver

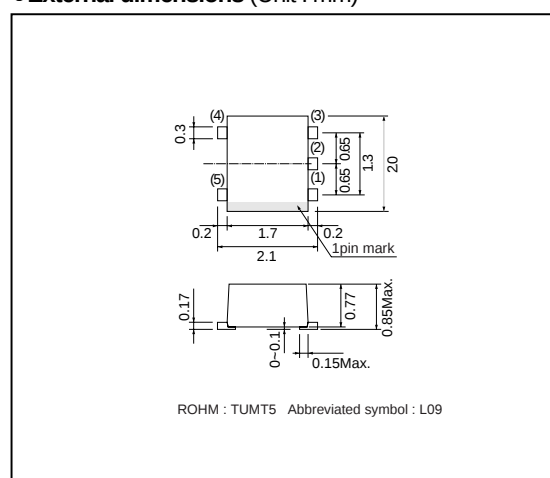
●Features

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

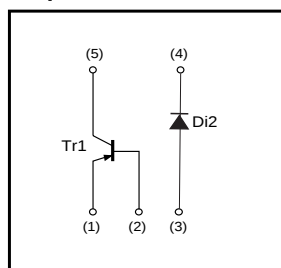
●Structure

Silicon epitaxial planar transistor
Schottky barrier diode

●External dimensions (Unit : mm)



●Equivalent circuit



●Packaging specifications

Type	US5L9
Package	TUMT5
Marking	L09
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 _{CEO}	−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	0.7	W/ELEMENT *2
Junction temperature	T _j	150	°C
Range of storage temperature	T _{stg}	−40 to +125	°C

*1 Single pulse, P_w=1ms.

*2 Mounted on a 25mm × 25mm × 0.8mm 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	T _j	125	°C
Range of storage temperature	T _{stg}	−40 to +125	°C

* Mounted on a 25mm × 25mm × 0.8mm CERAMIC SUBSTRATE.

Tr1&Di2

Parameter	Symbol	Limits	Unit
Total power dissipation	P _D	0.4	W/TOTAL *2
		1.0	W/TOTAL *1

*1 Mounted on a 25mm × 25mm × 0.8mm CERAMIC SUBSTRATE.

*2 Each terminal mounted on a recommended label.

●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 _{CB0}	−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
Reverse recovery time	t _{rr}	−	9	−	nS	I _F =I _R =100mA, I _{rr} =0.1I _R

Transistors

●Electrical characteristic curves

Tr1

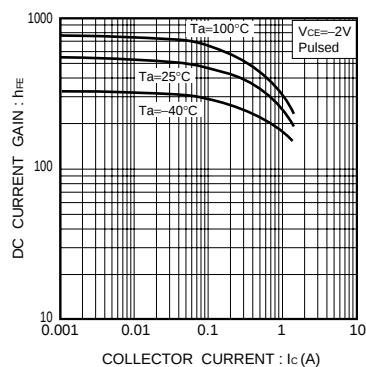


Fig.1 DC current gain vs. collector current

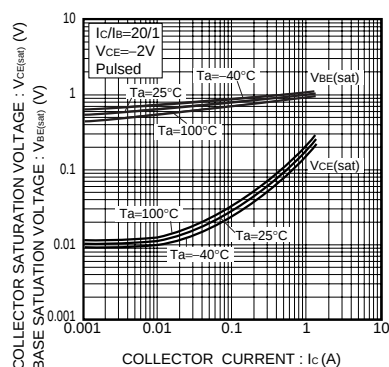


Fig.2 Base-emitter saturation voltage vs. collector current

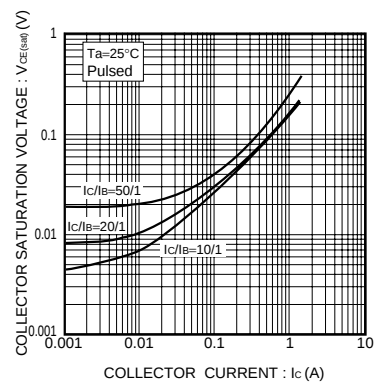


Fig.3 Collector-emitter saturation voltage vs. collector current

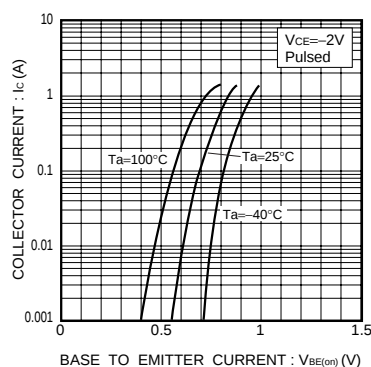


Fig.4 Grounded emitter propagation characteristics

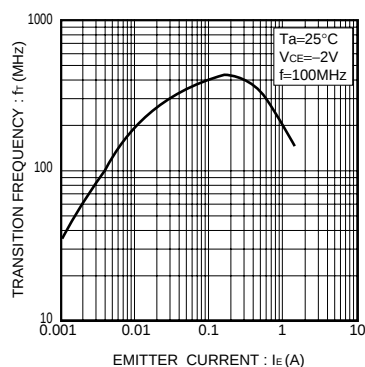


Fig.5 Gain bandwidth product vs. emitter current

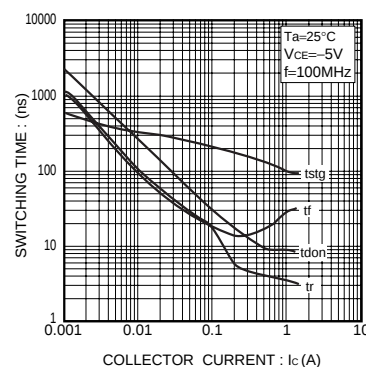
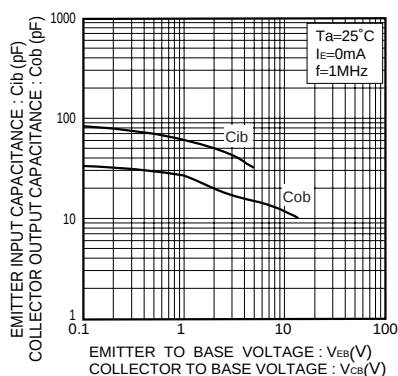


Fig.6 Switching time

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

Transistors

Di2

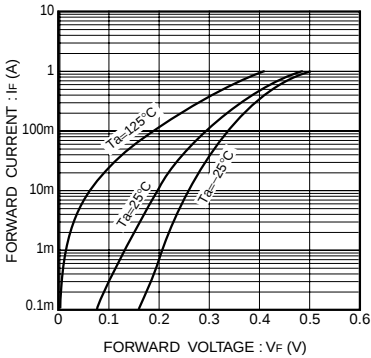


Fig.8 Forward characteristics

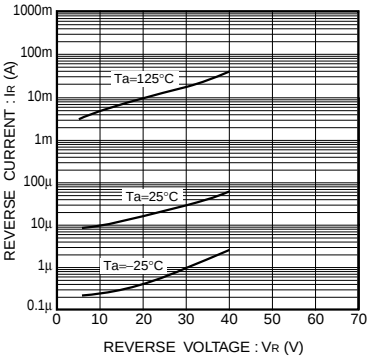


Fig.09 Reverse characteristics

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