

UML4N

Transistors

# General purpose transistor (isolated transistor and diode)

## UML4N

A 2SA2018 and a RB521S-30 are housed independently in a UMT package.

●Applications

DC / DC converter  
Motor driver

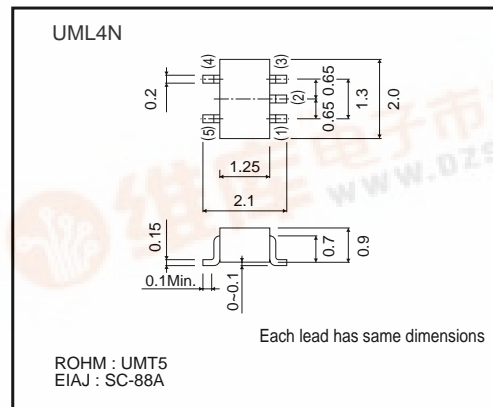
●Features

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

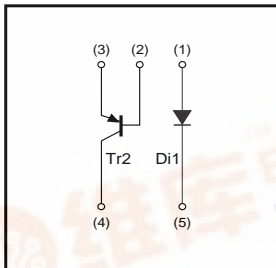
●Structure

Silicon epitaxial planar transistor  
Schottky barrier diode

●External dimensions (Unit : mm)



●Equivalent circuit



●Packaging specifications

Type	UML4N
Package	UMT5
Marking	L4
Code	TR
Basic ordering unit(pieces)	3000

Transistors

●Absolute maximum ratings (Ta=25°C)

Di1

Parameter	Symbol	Limits	Unit
Average rectified forward current	I <sub>o</sub>	200	mA
Forward current surge peak (60Hz, 1∞)	I <sub>FSM</sub>	1	A
Reverse voltage (DC)	V <sub>R</sub>	30	V
Junction temperature	T <sub>j</sub>	125	°C
Range of storage temperature	T <sub>stg</sub>	-55 to +125	°C

Tr2

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>EBO</sub>	-6	V
Collector current	I <sub>c</sub>	-500	mA
	I <sub>CP</sub>	-1	A
Power dissipation	P <sub>d</sub>	120	mW *
Junction temperature	T <sub>j</sub>	150	°C
Range of storage temperature	T <sub>stg</sub>	-55 to +125	°C

\* Each terminal mounted on a recommended land.

●Electrical characteristics (Ta=25°C)

Di1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>R</sub>	-	0.40	0.50	V	I <sub>F</sub> =200mA
Reverse current	I <sub>R</sub>	-	4.0	30	μA	V <sub>R</sub> =10V

Tr2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BV <sub>CE0</sub>	-12	-	-	V	I <sub>C</sub> =-1mA
Collector-base breakdown voltage	BV <sub>CB0</sub>	-15	-	-	V	I <sub>C</sub> =-10μA
Emitter-base breakdown voltage	BV <sub>EBO</sub>	-6	-	-	V	I <sub>E</sub> =-10μA
Collector cut-off current	I <sub>CB0</sub>	-	-	-100	nA	V <sub>CB</sub> =-15V
Emitter cut-off current	I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> =-6V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	-	-100	-250	mV	I <sub>C</sub> =-200mA, I <sub>B</sub> =-10mA
DC current gain	h <sub>FE</sub>	270	-	680	-	V <sub>CE</sub> =-2V, I <sub>C</sub> =-10mA
Transition frequency	f <sub>T</sub>	-	260	-	MHz	V <sub>CE</sub> =-2V, I <sub>E</sub> =10mA, f=100MHz
Collector output capacitance	C <sub>ob</sub>	-	6.5	-	pF	V <sub>CB</sub> =-10V, I <sub>E</sub> =0mA, f=1MHz

●Electrical characteristic curves

Di1

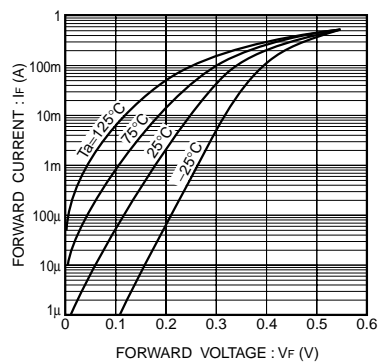


Fig.1 Forward characteristics

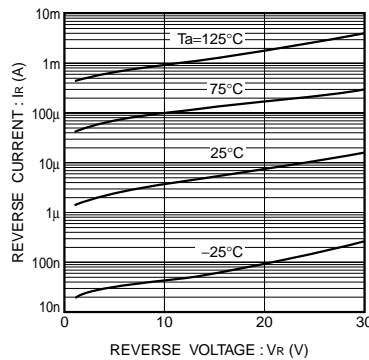


Fig.2 Reverse characteristics

Transistors

Tr2

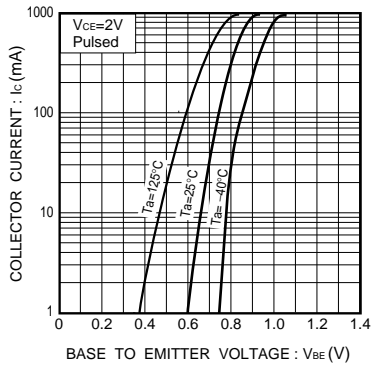


Fig.3 Grounded emitter propagation characteristics

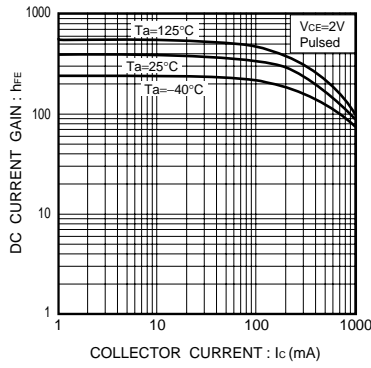


Fig.4 DC current gain vs. collector current

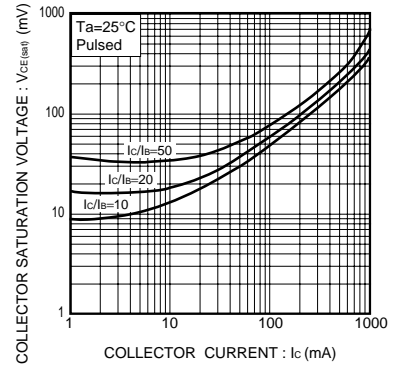


Fig.5 Collector-emitter saturation voltage vs. collector current ( I )

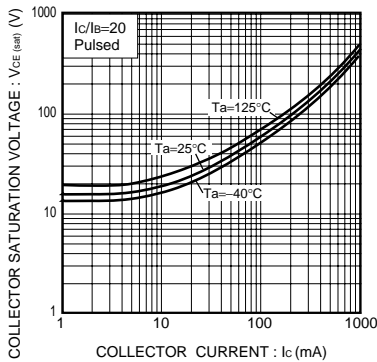


Fig.6 Collector-emitter saturation voltage vs. collector current ( II )

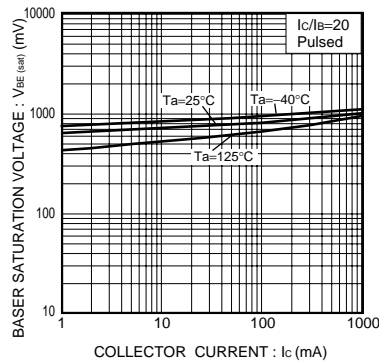


Fig.7 Base-emitter saturation voltage vs. collector current

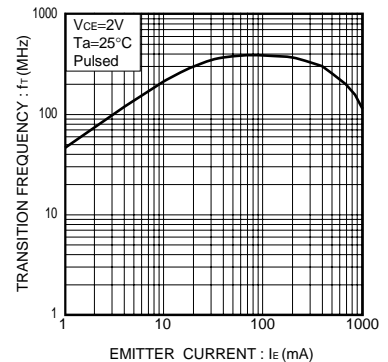


Fig.8 Gain bandwidth product vs. emitter current

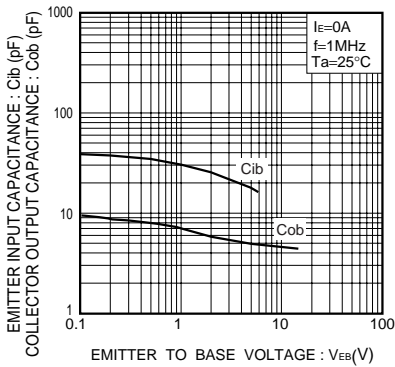


Fig.9 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

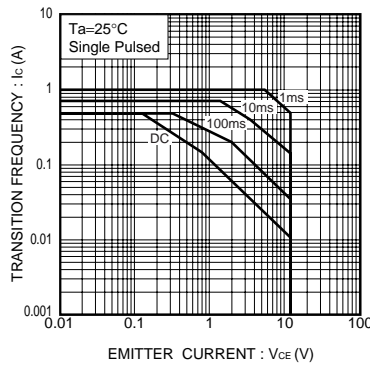


Fig.10 Safe operation area

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